Faculty of Health Sciences

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Abstract book
Abstract Detail

MICROBIAL CONTAMINATION OF DENTURE POLISHING EQUIPMENT

Background: In many dental practices and laboratories, the dentists and technicians use the same denture polishing lathes and pumice slurry for polishing both new and old repaired dentures without changing or disinfecting this equipment between usages. Aim: This study was undertaken to investigate whether the pumice and polishing wheels could harbour microorganisms, and if so to identify and quantify these.

Method: The project was conducted in the undergraduate and production laboratories of an academic teaching institution where the polishing machines are in constant daily use. Two machines were identified in each laboratory, one used exclusively for new dentures and the other for dentures which had been exposed to any form of patient oral contact. The equipment was labelled and all staff and students were informed to use them as indicated. Samples from the polishing wheels and the pumice slurry were collected twice daily (morning and afternoon) on alternate days over a period of one week in order to test for the presence and type of microorganisms, and to establish if the levels of contamination increased throughout the week with usage.

Results: revealed that pumice from all machines was contaminated with a variety of bacterial, yeasts and moulds. Of particular concern was the presence of Aspergillus, as this is transferred via aerosol, which is abundant when the lathes are used.

Discussion and Conclusions: Results highlighted the potential dangers of denture polishing equipment to patients in terms of cross-contamination during polishing and finishing procedures, and identified the need for standardised disinfection protocol. A consultative process was conducted by the researchers from the oral and dental hospital and the department of medical microbiology in order to set up a disinfection protocol for the polishing wheels, machinery and pumice slurry. Prevention of cross contamination is crucial to avoid dentists and technicians being responsible for inadvertently infecting their denture wearing patients, which could result in medical malpractice law suits being lodged against them, as well as for personal protection.
Abstract Detail
THE USE OF SPIRITUALITY IN OCCUPATIONAL THERAPY PRACTICE: AN APPRECIATIVE INQUIRY

Introduction: The understanding of spirituality in healthcare has been recognised in occupational therapy since the profession’s founding and contributes to rendering true holistic care. Occupational therapists assert that therapy should treat body, mind and spirit. However, the role and practice of spirituality amongst occupational therapists remains unclear and undefined. Research has indicated that spirituality in educational curricula needs further exploration.

Aim: To explore how spirituality is being addressed in occupational therapy practice by clinicians and educators. Method: An Appreciative Inquiry (AI) workshop was conducted with occupational therapists and occupational therapy educators. In AI the focus is on discovering the best possible outcomes by applying the 4D cycle of discover, dream, design and destiny. The workshop was presented by an independent and experienced facilitator.

Objective: Discover Phase: (appreciating the best of what is) • To explore and describe spirituality in occupational therapy practice through the generation of experienced successes in spirituality. Participants: Twenty-four occupational therapy educators (from three universities) as well as occupational therapy clinicians (from private and public settings) from Gauteng province attended the appreciative inquiry workshop, which was also an ethics continuous professional development (CPD) workshop.

Findings: According to the tradition of AI, themes emerging during the workshop are guided by the facilitator and identified by the participants. Two questions were used to facilitate discussions in the Discovery phase.

• Question 1: Share your ideas about what spirituality in occupational therapy practice is. Understanding of Spirituality: Two core themes emerged namely Meaning to life and connectedness
• Question 2: Describe how you use spirituality in your practice (think about what works well) Client-centred Practice approach was a theme prevalent here.

Conclusion: • The occupational therapists that participated in this study have a clear understanding of spirituality in occupational therapy practice. • By using client-centred practice, occupational therapists are addressing spirituality.
Abstract Detail
CLINICAL PRESENTATION OF HIV-INFECTED PATIENTS IN A PSYCHIATRIC HOSPITAL IN SOUTH AFRICA

Background: Africa is profoundly stricken by the HIV pandemic. People living with HIV/AIDS are more likely to be diagnosed with psychiatric disorders than the general population. Psychiatric disorders are substantially more common in people living with HIV/AIDS compared to the general population. In South Africa, almost half of people who are HIV positive have diagnosable mental disorders. Mental illness increases the likelihood of high risk behaviors which increases the risk of infection with HIV, and, conversely, the presence of HIV/AIDS increases the lifetime prevalence of psychiatric illness. These patients may have considerable deficits in their knowledge of HIV, which may affect whether they have been tested for HIV. Given the high HIV burden in South Africa and the increasing pressure on mental health facilities, this study describes the clinical presentation of mental illness in a group of HIV positive patients admitted to a psychiatric hospital.

Materials and Methods: We retrospectively sourced data from 105 patient files, at Weskoppies Hospital, between January 2012 and December 2016.

Results: 56 patients had a psychotic disorder; 27 patients had a mood disorder and three patients had a cognitive disorder. Multiple diagnoses were observed in seven patients with a mood and psychotic disorder; ten patients with a psychotic and cognitive disorder and one patient with a mood and cognitive disorder. One patient had all three diagnoses. The most common medical co-morbidities were hypertension (15.24%) and tuberculosis (13.33%).

Conclusion: Mentally ill patients who are HIV positive mostly present with mood and psychotic disorders. Patients with severe mental illness who are HIV positive may have more than one psychiatric diagnosis, as well as an elevated prevalence of co-morbid medical disease such as TB and hypertension. This highlights the extreme susceptibility of these patients, and underscores the need for clinicians to be vigilant in detecting various neuropsychiatric manifestations of HIV infection to effectively manage and optimize treatment. This study highlights the need for further intervention in these vulnerable patients. Our findings have re-affirmed the need for mental health services and HIV treatment programs to investigate these dual diagnoses.
SCREENING FOR GESTATIONAL DIABETES MELLITUS IN A SOUTH AFRICAN POPULATION: PREVALENCE AND COMPARISON OF DIAGNOSTIC CRITERIA

Background: The prevalence of gestational diabetes mellitus (GDM) is increasing. Most major world organisations now recommend universal screening for GDM based on the International Association of Diabetes in Pregnancy Study Groups (IADPSG) criteria. Currently there is a lack of consensus on the diagnostic criteria for GDM used in South Africa (SA). The Society for Endocrinology, Metabolism and Diabetes of South Africa’s revised guidelines recommend the use of the IADPSG criteria for the diagnosis of GDM. The objective was to determine the prevalence of GDM in an SA population. We compared the prevalence of GDM using the various diagnostic criteria and evaluated the risk factors associated with GDM.

Methods: This was a prospective cohort observational study carried out at a level 1 clinic in Johannesburg, SA. All pregnant women at <26 weeks’ gestation were recruited. Patients known to have GDM were excluded. At recruitment, a data questionnaire was completed and bloods were drawn for a random glucose test and measurement of the glycated haemoglobin level. A 75 g 2-hour oral glucose tolerance test (OGTT) was scheduled before 28 weeks’ gestation.

Results: Five hundred and fifty-four patients (55.4%) completed the OGTT. The prevalence of GDM was 25.8% if universal screening and the IADPSG criteria were used. If universal screening and the National Institute for Health and Care Excellence (NICE) criteria were used, the prevalence was 17.0%. If selective risk factor-based screening was used, only 254 (45.8%) of the women would have had an OGTT. The prevalence of GDM in this instance would have been 15.2% with the IADPSG criteria and 3.6% with the NICE criteria. Two hundred and fifty-four patients (45.8%) had at least one risk factor for GDM. The presence of one or more risk factors had a poor sensitivity (58.7%) and specificity (58.6%) for the detection of GDM in our study population.

Discussion and conclusions: The prevalence of GDM would be substantially increased if universal screening with the IADPSG criteria were to be employed. Risk factors are a poor screening test for GDM.
Abstract

POSTGRADUATE PAEDIATRIC STUDENT ENGAGEMENT IN A CLINICAL SKILLS PROGRAM.

Background: The purpose of this study was to explore barriers, enablers and engagement of postgraduate paediatric students in a compulsory clinical skills program. Since inception, attendance rates were low. This raised concerns within the paediatric department regarding the potential negative impact on the student’s level of preparedness for the exit exam.

Methods: All participants provided informed consent for this ethics approved study (1302017). Mixed methods of data collection were used. Attendance registers were analysed descriptively. Qualitative triangulation of data was achieved by using focus group discussions, 5 minute observation reports and student self-assessed engagement tools. Focus group discussions were transcribed verbatim with thematic network analysis of the data to explore the student perceptions of the barriers and enablers for attendance of the clinical skills programme.

Results: Average attendance of clinical skills was 31%. The subjective and objective engagement instruments identified students as passive learners. Thematic analysis of the focus group revealed barriers to attendance related to workload; limited supervisory support; lack of prioritisation of academic and logistical issues. Enablers included bedside clinical teaching and optimised division of labour. Recommendations for changes were made.

Discussion: Paediatric registrars at UP are engaged and attentive in clinical skills sessions, despite low attendance rates. Logistic issues related to call registers, consultant willingness to release registrars and transport difficulties were highlighted by the students as reasons for the poor attendance. During the focus group discussions, students expressed their perception of the importance of the programme and provided possible solutions or recommendations to improve attendance. These included incorporation of an e learning platform; initiating a mentorship programme; and review of the current schedules. Further investigation including the lecturers is needed before final recommendations can be made.

Take home message: Creatively balancing learning of clinical skills with patient care an ongoing process.
PROMOTING INTRINSIC MOTIVATION AND ENGAGEMENT USING GAME-BASED LEARNING IN PHARMACOLOGY

**Background:** The purpose of the study was to assess the effect of a supplementary, cooperative, case report-style game using audience-response technology on self-reported intrinsic motivation and engagement of first-year oral hygiene students in undergraduate pharmacology.

**Method:** A mixed method design was used to assess the full 2017 class (N = 8) with validated questionnaires (Instructional Materials Motivation Scale [IMMS] and Flow Experience and Motivation Questionnaire [FEMQ]) and one-minute written feedback after two didactic and gaming sessions, as well as an exit-level focus group interview (N = 6). Quantitative and qualitative analysis was done using a one-tailed Mann-Whitney U-test and inductive thematic analysis through a lens of the self-determination theory, respectively.

**Results:** IMMS (120.3 vs 105.6) and FEMQ (96.63 vs 87) scores were higher (p<0.05) during the game than didactic session, however, did not achieve significant superiority (p>0.05) at the second session. Intrinsic motivation was statistically higher (p<0.05) in both gaming sessions (~13 vs ~11). Themes included autonomy, competence, confidence, environment, extrinsic motivation, intrinsic motivation, relatedness, satisfaction and value. Extrinsic motivation (i.e. competition, prizes, acknowledgement) was mentioned positively. Students noted that the game promoted autonomy, perceived competence and relatedness. The environment was fun, engaging and motivating even when questions were answered incorrectly using the audience-response system. This was paralleled to other modules where failures were demotivating.

**Discussion and conclusion:** Cooperatively discussing case reports as a real-world simulation promoted pharmacology’s relevance and value. Learning became an autonomous action to gain perceived competence, increasing intrinsic motivation. Engagement was promoted inside and outside of the classroom, developing intra- and interpersonal skills. Although extrinsic motivation was evident, given the context, the environment and facilitator actions seemed to transform this into intrinsic motivation. Incorporating cooperative game-based learning using audience-response technology in pharmacology prove to enhance intrinsic motivation and engagement.
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Abstract Detail
MENTAL HEALTH SYMPTOMS EXPERIENCED BY PATIENTS AWAITING A KIDNEY TRANSPLANT AT A PUBLIC HOSPITAL IN SOUTH AFRICA

Background: Chronic kidney disease progresses over a period of time before end-stage renal disease, a life-threatening condition, develops. In the meantime, patients undergo haemodialysis and peritoneal dialysis until they come into consideration for a kidney transplant. Waiting for a suitable donor and undergoing dialysis three to four times a week can have a profound effect on patients’ mental health. Patients experience dietary restrictions as well as lifestyle changes. However, if detected timeously, with mental healthcare and psychoactive medication patients waiting for a kidney transplant may experience better outcomes and an improved quality of life. The aim of the study was to explore and describe the mental health symptoms experienced by patients awaiting a kidney transplant in a selected public hospital in South Africa.

Method: A qualitative approach was applied to answer the research question, ‘What are the mental health symptoms experienced by patients awaiting a kidney transplant in a public hospital in South Africa? A purposive sample of 16 patients with chronic kidney disease undergoing haemodialysis and peritoneal dialysis in an academic hospital was selected. Qualitative, unstructured interviews were conducted by an independent moderator with male and female patients in 2016. The data was analysed using the content analysis steps of Morse and Field. From the data analysis three themes emerged. Trustworthiness and ethical considerations guided the study process.

Results: The symptoms of mental illness as experienced by participants were presented as emotional symptoms, physiological changes, and functional impairment. Emotional symptoms included feelings of anger, depression, and suicidal thoughts. Physiological changes involved the loss of energy, eating and sleeping disorders and the loss of interest in sexual activities. Functional impairment encompassed a decrease in work productivity and social functioning.

Discussion and conclusion: The study confirmed that chronic kidney disease results in patients experiencing symptoms of mental illness. Recommendations were made for nurses to become more skilled and knowledgeable about the emotional plight of the patients they serve. Ideas for how nephrology nurses can holistically care for patients with chronic kidney disease as well as provide support for their families were recommended.
Community nurses’ experiences working in the TB work environment: A phenomenological study

Background: South Africa has one of the world’s worst Tuberculosis (TB) epidemics. Several interventions were instituted by the Department of Health to manage TB and, regrettably, people still die from the disease. The community health nurses provide care to people diagnosed with TB in facilities that have low staffing ratios with increased workload and responsibilities.

Aim: This study aims to explore the experiences of community health nurses in the TB work environment.

Objective: This paper explores and describes the experiences of community health nurses working in TB work environment.

Method: A qualitative descriptive phenomenological design was used to describe the experiences of community health nurses in the TB work environment. A purposive sampling method was used to select twenty nurses. Data was collected through in-depth interviews and the researcher followed steps Colaizzi process of data analysis.

Findings: Four themes were identified and discussed. These themes include fear of being infected with TB, control of infection, defaulting TB treatment and screening services. These themes were further confirmed with literature.

Conclusion: It has been concluded that the participants had fear of contracting TB which was attributed to delayed diagnosis of TB patients, patients’ ignorance regarding TB transmission and community health nurses with chronic diseases and interacting with undiagnosed TB patients. Compromised TB infection control measures such as failure to wear protective masks was revealed by several participants. Recommendations for the Community Nursing management included drawing up a policy relating to provision of care for the nurses that were infected with TB (caring for the carer). Nurses should be encouraged to provide service that shows compassion and empathy to TB patients.
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Abstract Detail
DESIRABLE DIABETES NUTRITION EDUCATION PROGRAMME FOR TYPE 2 DIABETES ADULTS AT A TERTIARY HOSPITAL: INSIGHTS FROM STAKEHOLDERS

Background: Patient education is a core component of diabetes care. The education provided should be relevant to the target group as well as be offered in a structured manner.

Aim: To describe the desirable characteristics of a diabetes nutrition education programme (NEP) as perceived by stakeholders at a tertiary healthcare setting, in order to inform the adaptation of an NEP from a primary healthcare setting.

Method: This qualitative study was implemented at an outpatient diabetes clinic of a teaching tertiary hospital of the University of Pretoria (UP). Convenience samples of 28 type 2 diabetes adults (40-70 years) [mean age 59±9 years; 11 females] and 10 health professionals [3 doctors, 5 dietitians, 2 nurses] serving them participated. Five focus group discussions generated data from the patients. Self-administered open-ended questionnaire obtained data from the health professionals. Thematic framework data analysis was conducted. The study had ethical approval from the Faculty of Health Sciences, Research Ethics Committee, UP (no. 42016).

Results: Six common themes emerged. The themes include preferred programme content, meetings suggestions (monthly preferred to weekly; morning sessions), delivery format, delivery approach to enhance learning (participatory methods e.g. group activities and food tasting sessions), support for behaviour change (e.g. involving family) and educator characteristics (e.g. positive attitudes). Keeping participants’ motivated (e.g. testimonials from those with success stories; good speakers) was an additional theme from patients. Some issues in the common themes differed e.g. only health professionals suggested portion control and meal regularity as topics for the NEP.

Conclusions: Key stakeholders provided comprehensive insight on desirable diabetes NEP. Most of the aspects identified were similar to those in the original NEP; confirming programme relevance and appropriateness. In adapting the NEP, the differing aspects (e.g. monthly instead of weekly meetings) have been incorporated to enhance its fit to the new setting.
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Abstract Detail
DEVELOPMENT OF A WEB-BASED DIETARY SCREENER FOR DAIRY INTAKE OF SOUTH AFRICAN ADULTS

Introduction: Data suggest that many South Africans fail to meet recommended dairy intakes. The Consumer Education Project (CEP) of Milk SA is tasked to address this, yet no dietary assessment tool is available to quickly determine current intakes and changes in intake over time. The aim of this study was to identify develop a dairy intake screener for adults 19-35 years, LSM 8–10.

Methods: A critical analysis of scientific literature and available tools was conducted. Guided by the South African food-based dietary guidelines, industry needs and recommendations from similar studies, the content and interpretation of a South African dairy intake screener was compiled. The draft was reviewed and revised by a working group of dietitians and nutritionists knowledgeable in dietary assessment and dairy nutrition. Software developers translated the content into a web-based application. Ongoing refinement took place.

Results: No relevant web-based dairy intake screener was identified, necessitating the development of a local tool. A food-based approach, focusing on milk, maas, yoghurt and cheese was identified. Similar to other traditional (paper-based) versions of screeners, the quantitative food frequency questionnaire was chosen as the basic format, with a scoring system theoretically calculating dairy intake. Graphic enhancement, interactivity and preliminary guidance (based on participants’ score) and linkage to existing information of the CEP was added. Initial internal testing suggests the dairy screener is functional.

Conclusion: A web-based dairy screener was developed and is available to identify the risk of low dairy intakes. The usefulness and validity of the tool in the intended target group needs to be determined.
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Abstract Detail
EFFECT OF SCHOOL BASED NUTRITION EDUCATION ON NUTRITION SELF-EFFICACY AND KNOWLEDGE OF GRADE 2 AND 3 LEARNERS IN RESOURCE LIMITED SETTINGS OF PRETORIA

Background: Self-efficacy and knowledge as potential dietary behaviour mediators are important targets for change in school based nutrition education programmes (NEPs).

Aim: To determine whether nutrition education (NE) based on South African food based dietary guidelines would improve the nutrition self-efficacy (NSE) and knowledge (NK) of Grade 2 and 3 learners in resource limited settings (Pretoria).

Method: A quasi experimental study was conducted with a convenience sample of learners (n=178) at two primary schools. Participants received nine NEP lessons for six weeks. The NEP had been planned based on a needs assessment and comprised classroom curriculum, education materials and homework activities. A modified Pathways knowledge, attitudes and behaviours questionnaire assessed the NSE and NK at baseline, six weeks (post-test) and 12 months (follow-up). Paired t-tests and independent sample t-tests evaluated the effect of the NEP at six weeks and repeated measures ANOVA at 12 months (p<0.05 significance level).

Results: From baseline to follow-up, mean NSE scores decreased (0.80 vs. 0.74; p=0.00) while those for NK increased (0.52 vs. 0.73, p=0.000). Mean NSE scores for less fatty foods increased (0.766 vs. 0.797; p=0.078), while those for less sugary foods decreased (0.80 vs. 0.797; p=0.43). Girls (n=64) had higher scores for both NSE (p>0.05) and NK (0.59 vs. 0.51; p=0.047 at post-test; 0.74 vs. 0.63, p=0.02 at follow-up) as compared to boys (n=57).

Conclusion: The tailored NE improved nutrition knowledge and not self-efficacy of the participants with more positive effects on girls. NE for young children should probably follow gender specific approaches.
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ABSTRACT DETAIL  
SEVERITY OF PSYCHOSIS AS A PREDICTOR FOR DEPRESSIVE AND ANXIETY FEATURES IN ACUTE PHASE SCHIZOPHRENIA

BACKGROUND: Considering that depressive and anxiety symptoms are common in schizophrenia, this study investigated whether the severity of a psychotic episode in acute phase schizophrenia is predictive of concurrent depressive and anxiety features.

METHOD: Fifty one hospitalised patients between the ages of 18 and 65, with acute phase schizophrenia participated prospectively in a cross-sectional study. The severity of the psychotic episode, the depressive features and the anxiety features were measured by the Structured Clinical Interview for Positive and Negative Syndrome Scale (SCI-PANSS), the Calgary Depression Scale for Schizophrenia (CDSS), the Hamilton Anxiety Rating Scale (HAM-A) and the Staden Schizophrenia Anxiety Rating Scale (S-SARS). The acute phase was verified by a minimum total score of 60 on the SCI-PANSS as well as a score of at least 4 on any 2 of the SCI-PANSS items that constitute a psychotic item subscale (these are, hallucinatory behaviour, delusions, conceptual disorganisation, and suspiciousness). The total SCI-PANSS-scores were adjusted to exclude appropriately the depression or anxiety items contained therein. To examine akathisia as potential confounder, the Barnes Akathisia Scale was applied.

RESULTS: A higher adjusted total SCI-PANSS-score predicted statistically significantly higher scores for depressive features on the CDSS (p<0.0001) and for anxiety features on the HAM-A (p = 0.05) and the S-SARS (p<0.0001). The group that scored more or equal to the median (=99) on the adjusted total SCI-PANSS, scored significantly higher (p<0.0001) on the CDSS, the HAM-A and the S-SARS than the group scoring below it. Akathisia measured distinctly different (p<0.0001) from both anxiety measures.

DISCUSSION AND CONCLUSION: This study suggests that the severity of a psychotic episode in acute phase schizophrenia predicts the severity of both concurrent depressive and anxiety features. A heavy burden owing to a more severe degree of a psychotic episode is made even heavier by more severe depressive and anxiety features at the time. The justified clinical attention to the psychotic symptoms in severe degrees of acute phase schizophrenia and the undoubted clinical challenges that these symptoms pose, may overshadow if not obscure the presence and importance of the depressive and anxiety features. However, vigilance in recognising and treating these symptoms is paramount in reducing the suffering of an already vulnerable population.
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Abstract Detail
ELDER ABUSE - THE SOUTH AFRICAN PERSPECTIVE

Introduction: The concern about elder abuse increases as the global population ages. Elder abuse is a public health, human rights and criminal justice problem that goes beyond socioeconomic classes and regions. It remains understudied, especially in developing countries with limited resources. Research is hindered by the lack of consensus on a single definition of what constitutes elder abuse and neglect.

Methods: A review was done with the assistance of an expert reference librarian. Numerous databases were searched using combinations of the following keywords: abuse, aged, elderly, elder abuse, assault, exploitation, neglect, South Africa.

Results: After an extensive search of the available literature 14 articles were included in the review. South Africa is a multicultural nation, plagued by HIV/AIDS, poverty and the remaining effects of the legacy of apartheid. This background sets the stage for some categories of abuse that are unique to the country that are highlighted in this review. The available research on elder abuse is very limited and no reliable data about the prevalence of elder abuse in South Africa could be found.

Conclusion: There is a clear need for more longitudinal research about risk factors and consequences of elder abuse. Similar to findings from international research, is the lack of consensus on a universal and comprehensive definition of abuse or an elder abuse instrument that clearly defines a cut-off for definite elder abuse. Research collaborations that include developing countries, as well as collaborations between communities, governments and researchers can improve future research efforts. Research results should be used to address gaps in policies, legal processes and service delivery to ensure that all people can age with security and dignity.
Abstract Detail
FAMILY HISTORY AND DIAGNOSTIC SPECIFICITY IDENTIFIES SPORADIC SCHIZOAFFECTIVE DISORDER OF THE BIPOLAR TYPE AS A MORE HOMOGENEOUS SCHIZOPHRENIA SUBTYPE FOR GENETIC STUDIES

Introduction: Schizophrenia is a heterogeneous disorder with strong genetic vulnerability. Family history of schizophrenia has been considered in genetic studies under several models. De novo genetic events seem to play a larger role in sporadic cases, whereas small effect polygenic variation plays a larger role in familial cases.

Aim: This study aimed to identify a more homogeneous phenotype using the familial-sporadic distinction.

Materials and methods: The study included 384 participants with schizoaffective disorder from the Afrikaner founder population in South Africa who are considered comparable to Caucasian patients from the United States. A comprehensive data capturing sheet was completed.

Results: Analysis showed no significant differences between the sporadic and the familial groups for age at disease onset, season of birth, co-morbid diagnoses, clinical symptomatology or suicidality history when schizoaffective disorder diagnoses were considered jointly.

Discussion: When the diagnoses were examined separately, however, the sporadic schizoaffective disorder, bipolar type was found to have a significantly lower age at onset (mean 20.18 versus 25.07 years), 8.8 times more hallucinations, 6.6 times more childhood odd behavior, were 2.8 times more likely to be single and had 2.9 times more suicide attempts as opposed to ideation.

In conclusion, the sporadic schizoaffective disorder bipolar type forms a more homogeneous subgroup for genetic studies.
Abstract Detail
QUALITY OF LIFE OF ADULTS WITH AUTOIMMUNE BULLOUS DISEASES IN PRETORIA

Background: Autoimmune bullous diseases (AIBD) are caused by autoantibodies directed against epidermal antigens or the dermoeipidermal junction, and are clinically characterised by blisters and painful erosions of the skin and mucous membranes. Although rare, AIBD has a significant impact on the quality of life (QOL) of patients. The assessment of health-related QOL has become increasingly recognised as an important parameter in patient care as well as research. Very few studies have been done on the QOL of AIBD patients and thus far there is no published data on QOL in South African patients with AIBD. In this study, we sought to assess the QOL in patients with AIBD in our population.

Methods: This cross-sectional study was conducted on 25 autoimmune bullous dermatoses patients who were seen at the dermatology department of Steve Biko Academic and Kalafong Hospitals in Pretoria, South Africa. QOL was evaluated using the RAND 36-Item Health Survey to evaluate the general health status and the Dermatology Life Quality Index to assess the dermatologic-specific aspects. Demographical data was also collected.

Results and Discussion: The study evaluated 14 patients with bullous pemphigoid, 7 with pemphigus foliaceus, 3 with pemphigus vulgaris and 1 patient with epidermolysis bullosa aquisita. The average age was 56 ± 18 years and 16 (64%) were female. The median score of the DLQI was 12 ± 7.5, which classified as a “very large effect” on quality of life. The most compromised categories of the DLQI were that of “symptoms and feelings” and “daily activities. QOL, as assessed by the Rand SF 36 shows the most affected scales were those of role limitations due to physical health (39), general health (45) and energy/fatigue (48).

Conclusion: Autoimmune bullous dermatoses significantly impair the QOL of patients in public hospitals in Pretoria, South Africa. We described a large impact for both the general health and dermatology-specific QOL aspects. Therefore for effective and individualised patient care, consideration should be given to the patient’s QOL impairment as well as clinical condition.
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Abstract Detail  
SURVEILLANCE OF KLEBSIELLA PNEUMONIAE OVER A 10-YEAR PERIOD IN PRIVATE HOSPITALS IN SOUTH AFRICA

Background: Developing countries have a desperate need for molecular surveillance systems that has the ability to recognize and track the emergence of high-risk antimicrobial resistant (AMR) clones. Whole genomic sequencing (WGS) and rapid PCR assays were used to track the emergence of a novel K. pneumoniae clone ST307 with blaOXA-181 in the private sector across multiple provinces in South Africa.

Methods: A total of 983 clinical Klebsiella pneumoniae were collected from 2007 to 2017 across South Africa. Illumina WGS was performed on a sub-collection (n=118) and this information was used to design PCR primers for the identification of ST307 and its association with blaOXA-181 on IncX3 plasmids.

Results: WGS showed that K. pneumoniae ST307 belonged to two clades. Clade I was associated with blaCTX-M-15 and corresponded to ST307 sequences deposited in Genbank (n=9). A novel ST307 clade II (that differ from clade I in approximately 100 SNPs) contained blaOXA-181 and was associated with IS3000 on IncX3 plasmids. PCR screening showed that ST307 clade I with blaCTX-M-15 was present in 2007 and clade II with blaOXA-181 emerged during 2012. In 2013 and 2014, 30% (1560) of K. pneumoniae with blaOXA-181 tested positive for ST307 clade II and was found in three Gauteng cities. During 2015 to 2016 the numbers of ST307 increased exponentially; 69% (286414) belonged to clade II that had subsequently spread to more than 10 cities across six different provinces (i.e. Eastern Cape, Gauteng, Free State, Limpopo, Mpumalanga, North West).

Discussion and Conclusions: This study described the rapid emergence over a 10-year period of K. pneumoniae ST307 clade II with blaOXA-181 in South Africa. The importance of using WGS to develop molecular surveillance methods for tracking emerging AMR clones in a rapid fashion was also highlighted. Our results suggest that clade I with blaCTX-M-15 established itself first in the healthcare system during the mid-2000s and clade II evolved and rapidly spread after acquiring IncX3 plasmids containing blaOXA-181.
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Abstract Detail
FACTORS ASSOCIATED WITH SUCCESSFUL COMPLETION OF A SUBSTANCE REHABILITATION PROGRAMME AT A PSYCHIATRIC TRAINING HOSPITAL

Background: Comorbid psychiatric and substance use disorders are common globally. Management of either condition is influenced by comprehensive management of the other. The aim of this study was to determine which patient and substance factors are associated with completion of a substance rehabilitation programme in psychiatric inpatients.

Methods: The study was conducted at the Substance Rehabilitation Unit (SRU) of Weskoppies Hospital, a psychiatric training hospital in South Africa. It was a hospital-based two-group cross-sectional study comparing clinical files of completers and non-completers of the SRU programme with respect to patient and substance factors.

Results: Most of the patients referred to the SRU were involuntarily admitted, between the ages of 30-49, male, Black African, South African, single, unemployed, never having received a disability grant, and with a highest level of education between Grades 8 and 11. Substance-induced disorders, psychotic disorders and Cluster B personality traits were common. Cannabis, alcohol and tobacco were the most frequently used substances. Patients with a lower level of education, who receive a disability grant, or who use Nyaope or tobacco, were statistically significantly less likely to complete the SRU programme than those without these factors. Psychiatric diagnosis and general medical comorbidity were not associated with completion.

Discussion and Conclusions: Completion rates were comparable to those in general substance rehabilitation centres. The association of tobacco smoking and non-completion was in keeping with other research. Low educational level may be a predictive factor of non-completion in this population. There is little research on the influence of Nyaope use on substance rehabilitation. Nyaope is a mixture of opiates (heroin) and cannabis, with other substances such as talc, baking powder and/or antiretroviral medications to give it bulk. This study has yielded several recommendations for substance rehabilitation services in this population and filled a number of research gaps. Further research is still needed, especially with regard to substance rehabilitation in Nyaope-users and the role of disability grants. Creative approaches will be necessary in order to support patients at risk of drop-out, in light of resource limitations and the drive towards individualised care.
PROBLEMATIC BORDERLINE TRAITS ARE NOT PREDICTIVE OF A DISSOCIATIVE DISORDER DIAGNOSIS

Background: The relationship between borderline personality disorder (BPD) and dissociative disorders (DDs) has been studied frequently, but not using logit models. Dissociation is one of the brain’s ways of handling traumatic events. When severe, as in DDs, there are significant problems with one’s consciousness and sense of self, e.g., ‘breaks’ in awareness with contradictory behaviour at different times. BPD is characterised by marked instability of mood and relationships. BPD and DDs may occur comorbidly, but they are not the same thing. We investigated whether problematic borderline traits statistically predict the grouping of psychiatric in-patients into those with, and those without a DD.

Method: Psychiatric in-patients (n=116; mean age=35; F:M=1.28:1) completed dissociation and trauma scales. DD diagnoses were confirmed by multidisciplinary team diagnosis or administering SCID-D to high dissociators. Problematic borderline traits (average BPD Index of 17 items in Multidimensional Inventory of Dissociation (MID)) indicate a subset of BPD patients who exaggerate/falsify symptoms or trauma history to get sympathy/attention. Logit models examined whether BPD Index predicts diagnostic grouping of patients under DD (n=16) or not (n=100). The TRAUMA-T factor of the Traumatic Symptom Inventory-2 and the Post-traumatic Checklist score (PCLtot) were included as potential moderators.

Results: 13.8% of participants had a DD. BPD Index was not a significant predictor of a DD (p=0.24), with/without controlling for TRAUMA-T and PCLtot, despite their moderate association with BPD Index (r=0.62; r=0.58). BPD Index does not influence the odds of DD diagnosis (odds=0.974; 95%CI=0.931–1.018).

Discussion and Conclusion: Sparseness of the data constrained statistical analyses. However, similar multivariate analyses for other research questions yielded statistically highly significant results; hence the lack of statistical significance for this research question cannot be ascribed solely to data sparseness. Future research should establish whether BPD patients with DD demonstrate different BPD elements from non-DD BPD patients. Future studies should also examine whether the BPD Index of the MID measures different aspects of BPD from those aspects that may predict DD. This study did not provide statistical evidence of a close relationship between problematic borderline traits and DDs. Clinicians should guard against equating BPD with DDs in psychiatric patients.
Abstract Detail
AIRWAY TRAUMA FOLLOWING LARYNGOSCOPE-ASSISTED AND STANDARD LARYNGEAL MASK AIRWAY INSERTION TECHNIQUES - A RANDOMISED CONTROLLED TRIAL

Background: Although airway morbidity with laryngeal mask airways (LMAs) is less than with endotracheal tubes, the incidence of sore throat and hoarseness remains high. This impacts patient satisfaction. Reduction of complications with various LMA placement techniques have been studied but few studies have primarily assessed laryngoscope-assisted placement to this effect. A single previous study has reported, as secondary outcome, a reduction in sore throat with the use of a laryngoscope.

Materials and methods: This double blind, randomised controlled trial was conducted at a central hospital. Following institutional and ethics clearance, one hundred non-obese, ASA I or II adult patients with no airway pathology or bleeding disorders were recruited. Patients scheduled for elective surgery of 30 – 120 minutes duration under general anaesthesia with LMA, were allocated a number between one and one hundred with an electronic number generator. Patients allocated even numbers had their laryngeal masks placed according to the standard technique (group S). In the uneven number group, LMAs were placed following displacement of the tongue with a laryngoscope, avoiding contact with the vallecula (group L). Correctly sized UniqueTM LMAs were lubricated and placed by a single operator. The incidence of sore throat, hoarseness and other airway trauma (blood in the sputum, dental damage, lip trauma, tongue bruising) were recorded postoperatively by a blinded investigator.

Results: One patient withdrew consent. Groups L and S consisted of 49 and 50 patients respectively. Groups were comparable for sex, age, Mallampati score and duration of surgery. Fisher’s exact test found significant differences between groups. Sore throat occurred in 10% patients in group L vs 38% in group S (p = 0.002), hoarseness in 6.1% in group L vs 24% in Group S (p = 0.02) and other trauma in 2% in Group L vs 16% in group S; p = 0.03). Risk ratios (95% confidence intervals) for sore throat, hoarseness and other trauma were 0.27 (0.11-0.66), 0.26 (0.08-0.85) and 0.13 (0.02-0.98) respectively.

Conclusion and discussion: We recommend laryngoscope-assisted placement of Unique LMA as this technique significantly reduces postoperative airway morbidity. Laryngoscopes are available in all theatres and are reusable. They should be used to displace the tongue, but should avoid contact with the vallecula. Future research should assess this technique in other types of LMAs and patient categories.

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Abstract Detail
ALCOHOL ABUSE AMONG STUDENTS AT HIGHER EDUCATION INSTITUTIONS

Background: Alcohol abuse is a growing public health and socio-economic burden. Globally, and in South Africa, high prevalence rates of alcohol abuse among students at higher education institutions poses a physical and mental health risk to young people. This study phase aimed to evaluate the current support programs used at higher education institutions in South Africa to manage alcohol abuse among students.

Method: The study followed pragmatist approach conducted in three phases. The first phase (on which this abstract is based), used situational analysis to evaluate existing support programs. A questionnaire was used to gather information from 105 support service staff members at higher education institutions on the management of alcohol abuse among students. Multivariable logistic regression was used to identify associated factors with alcohol abuse. Multi-collinearity was corrected for Strata 1314 software package to achieve the objectives. The questionnaire has Cronbachs alpha reliability coefficient of 0.70 and content validity index of 0.78. Measures of association of alcohol abuse and other factors were evaluated using Chi-square tests.

Results: The results were presented and discussed according to the three pillars of National Drug Master Plan (2013-2017), namely, supply, harm and demand reduction of alcohol abuse. With regards to supply reduction, 93% of respondents indicated that support services attempt to reduce the supply of alcohol to students, both on and off campus. With regards to demand reduction, 11% of respondents showed that their institutions do not have support programs in place, but 80% of respondents indicated that these programs are not alcohol abuse specific support programs. With regards to harm reduction, 100% of respondents indicated that they refer students with alcohol abuse problems for psychological support. This indicates that vulnerable students do receive psychological support.

Discussion and Conclusion: The second phase of the study focused on the development of a comprehensive support program to assist higher education institutions to effectively manage alcohol abuse among students. Such a program could ultimately lead to improvement of students’ performance, reduce dropout rates as well as relieve the economic and social burden of alcohol abuse in South Africa.
Abstract Detail
THE ALVEOLAR MOULDING OBTURATOR (AMO) - AN APPLIANCE DESIGN FOR THE EARLY MANAGEMENT OF CLEFT PALATE NEONATES

Background: Clefting of the lip and palate is one of the most common congenital malformations encountered worldwide. The condition can come as a severe emotional shock to parents, particularly in third world countries where prenatal detection is not affordable and parents cannot be sensitised before the birth of their child. Early intervention into cleft management provides emotional support and can assist in reducing the defect since the maxilla undergoes its greatest postnatal growth change during infancy and early childhood.

Method: The adoption of computer technology and CAD/CAM in particular, offers the potential to design obturators that may alter and direct tissue growth favorably in and around the cleft to facilitate surgical closure. From successive CAD modified images of the patient’s cleft, models may be printed and thermoplastic, visco-elastic Alveolar Moulding Obturators (AMO’s) may be constructed from these models. A total of five AMOs are fabricated from five progressively modified models. These should be supplied and used by the patient successively on a monthly basis for the five months preceding surgical repair.

Conclusion: It is anticipated that the use of progressive modified obturators such as the AMO will assist in approximating the alveolar arches and cleft, ameliorating the surgical corrective procedure.
Abstract Detail

KNOWLEDGE AND ATTITUDES TOWARDS METHYLPHENIDATE USE FOR COGNITIVE ENHANCEMENT AMONG MEDICAL STUDENTS

Background: Methylphenidate is known to be used among students without ADHD for pharmacological cognitive enhancement (PCE) in hope to increase baseline cognitive functions like attention, concentration, memory and creativity. Attitudes towards PCE and prevalence rates differ largely across different populations over the world. It has been suggested that there might be a high incidence rate among medical students, especially as they progress in academic years. Safety, fairness and coercion are main concerns that influence students’ attitudes towards methylphenidate use for PCE purposes.

Methods: Self-administered questionnaires that obtained quantitative data were completed by the second and fifth year medical classes of 2017 in order to investigate if there were a difference in their knowledge and attitudes towards methylphenidate use for PCE.

Results: A total of 353 students participated in the study: 135 second year students and 218 fifth year students. Fifteen students with a diagnosis of ADHD were excluded. Fifth years were significantly more aware of PCE with methylphenidate than second year student (94% versus 87%). Of the second years, 86% and of the fifth years 71% were of the opinion that methylphenidate could enhance academic performance. 66% of students were concerned about the fairness of PCE. 93% of students were concerned about the harmfulness of methylphenidate. 74% students were not in favour of physicians prescribing methylphenidate for cognitive enhancement in non-ADHD patients. Both groups were in favour of a university policy regarding the use of prescription stimulants.

Discussion & Conclusion: Although the majority of students were of the opinion that methylphenidate could enhance academic performance, many studies have shown a negative correlation between PCE and academic performance. Participation in PCE is rather indicative of poor coping skills. There were no significant differences between the second and fifth year medical students’ perceptions of PCE. In both groups the majority of students were against the use of methylphenidate for PCE in students without ADHD. A student’s knowledge gained in medical school, could serve as a protective factor against developing a positive attitude towards PCE. This study supports the literature that highlights the importance on education on PCE.
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Abstract Detail
MEDICAL STUDENT’S PERCEPTIONS OF THEIR CAREER PREPAREDNESS AFTER THEIR CLINICAL ROTATION IN PSYCHIATRY

Background: Primary care physicians in South Africa are mentally ill patients’ first point of contact with the Health Care System. Medical students therefore, need to acquire the knowledge, skills and confidence to treat mentally ill patients. The aim of this study was to evaluate medical students’ perceptions of their preparedness for their careers as future doctors after their clinical rotation in psychiatry.

Methods: Data were collected retrospectively from questionnaires completed by final year medical students (n=869) from 2010 – 2015. Data were analysed overall and by year.

Results: Overall, 93.10% of medical students felt adequately prepared for their role as medical practitioners after their clinical rotation in psychiatry. The proportion of medical students exposed to post-traumatic stress disorder (p=0.012), obsessive-compulsive disorder (p=0.006) and alcohol-use disorder (p=0.046) were found to differ significantly by year. Students were most commonly exposed to psychiatric conditions for which inpatient management is usually necessary, given the impact of the illness on a patient’s functioning. There was no statistically significant association between the perception of career preparedness and exposure to any one psychiatric condition. Factors such as sufficient exposure to patients, psychiatric interviewing skills and knowledge about prescribing appropriate psychiatric medication significantly influenced medical students’ perception of their career preparedness.

Discussion and Conclusions: The undergraduate curriculum for training in psychiatry has value in preparing medical students for their internship. The results indicate that clinical teaching in psychiatry is highly valued by students. This is likely because medical students anticipate the amount of clinical work that is expected of them during their internship. More exposure to disorders such as post-traumatic stress, adjustment, panic and obsessive-compulsive disorders will be beneficial as these are conditions that general practitioners are more likely to encounter in their practice.
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Abstract Detail
CLINICAL ANTICIPATION IN A LARGE FOUR GENERATION SOUTH AFRICAN FAMILY WITH DYT-TOR1A DYSTONIA

Background and aim: DYT-TOR1A (DYT-1) mutations are well known as a cause of young onset generalised dystonia characterized by an autosomal dominant inheritance pattern with low penetrance. Onset of dystonia ranges from 6 to 42 years and phenotypes such as focal limb (writer’s cramp) and cervical dystonia are also encountered. Dystonia caused by DYT-TOR1A mutations are known to respond better to deep brain stimulation treatment than some other forms of monogenetic dystonia. Not many patients with DYT-TOR1A mutations from Africa have been reported and we aim to describe a large four generation family with this condition. To our knowledge, this is also the first report that describes clinical anticipation in a family with a DYT-TOR1A mutation dystonia.

Methods and patients: Members of a large family from the Eastern Cape were seen at a Pretoria neurology practice. The genetic analysis detected a sequence variant (c.904..c.906delGAG) in exon 5 of the DYT-TOR1A gene. In the first generation, patients presented with non-progressive focal dystonia (writer’s cramp and cervical dystonia) mostly in the fifth decade. The average age of onset was younger in each following generation; in the fourth generation, patients presented with severe generalized dystonia. One member of this family from the 4th generation was treated with deep brain stimulation of the internal segment of the pallidum with marked improvement in the Unified Dystonia Rating Scale.

Conclusion: We describe a large family from the Eastern Cape with phenotypically heterogenic dystonia proven to be caused by the sequence variant (c.904..c.906delGAG) in exon 5 of the DYT-TOR1A gene with features of high penetrance and clinical anticipation. Phenotypical anticipation is strongly associated with trinucleotide repeat disorders; however, we speculate that several pathophysiological mechanisms, including gene-gene interactions, or possibly telomere shortening in subsequent generations might explain the clinical anticipation seen in our family.
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Abstract Detail
INTERMITTENT PROXIMAL WEAKNESS WITH INCREASED CREATININE KINASE LEVELS: RAISING AWARENESS OF MULTIPLE ACYL-COA DEHYDROGENASE DEFICIENCY (MADD)

Background: Multiple acyl-CoA dehydrogenase deficiency (MADD), (glutaric aciduria II), is a treatable autosomal recessive disorder due to deficiencies of electron transfer flavoprotein or electron transfer flavoprotein dehydrogenase (ETFPD). The condition is often fatal in neonates, but adults can present with a myopathic syndrome.

Case: A 33 year-old female had presented with two previous episodes of proximal weakness associated with raised CK levels treated as viral myositis and polymyositis with good but partial recoveries. In 2017 she presented again with weakness and developed progressive liver dysfunction, hypoglycaemia and episodic confusion. On genetic testing, a mutation in the ETFDH gene with the patient homozygous for the known c.1448C>T(p.Pro483eu) mutation was revealed.

Outcome: Treatment with Riboflavin, Co-enzyme-Q10 and L-carnitine resulted in good clinical improvement and no new exacerbations.

Conclusion: MADD is a rare treatable condition that can mimic inflammatory myopathies, a common clinical problem, and clinicians should be aware of this clinical entity and its variable presentation.
Abstract Detail

CASE SERIES OF PATIENTS WITH STIFF PERSON SYNDROME AND PERM (PROGRESSIVE ENCEPHALOMYELITIS, RIGIDITY AND MYOCLONUS) VARIANT FROM PRETORIA

Background and aim: Stiff person syndrome (SPS) encompasses a spectrum of diseases characterized by progressive muscle stiffness, rigidity and spasms in the classic type, focal limb stiffness in the partial form, a paraneoplastic type and progressive encephalomyelitis with rigidity and myoclonus in the PERM variant. Blockade of glutamic acid decarboxylase (GAD) contributes to the underlying pathology and autoimmune antibodies against GAD, amphiphysin and glycine are frequently found. To our knowledge, no case of PERM has been reported from South Africa and we aim to describe three patients with SPS, of whom two suffered from PERM.

Methods and patients: A 27-year male presented with progressive stiffness, ultimately rendering him bed-bound. He appeared hypervigilant with autonomic hyperactivity; startle reflex myoclonus, seizures, urinary retention and severe muscles spasms were present. A near complete ophthalmoplegia, bulbar weakness and diffuse upper motor neuron signs were found. Anti-thyroid-peroxidase, anti-GAD and anti-glycine antibodies were positive; imaging, CSF and nerve conduction studies (NCS) were normal; needle examination showed continuous firing in tibialis anterior. PERM was diagnosed and diazepam, baclofen and methyl prednisolone achieved a very good response. A 35-year-old female presented with falls and severe muscle spasms followed by acute psychosis and rigidity, anxiety and convulsions. She was admitted to ICU with a supra-ventricular tachycardia, was lethargic and rigid with startle myoclonus and urinary retention. ANA, anti-GAD and anti-parietal-cells-antibodies were positive; CSF, imaging and NCS were normal. A diagnosis of PERM was made; she was treated with clonazepam, baclofen and sodium valproate and improved remarkably. A 54-year-old female presented with rigidity, falls, urinary retention and severe muscle spasms progressing over three years. She had severe generalized rigidity. Anti-GAD antibodies were positive. Imaging, CSF analysis and NCS were normal; needle examination showed continuous firing of left paraspinal muscles. She was treated with clonazepam, baclofen and gabapentin and was discharged with good mobility.

Conclusion: These cases represent the first descriptions of PERM syndrome from South Africa, and emphasize that this condition should be considered in otherwise unexplained encephalopathy and muscle stiffness. All patients responded well to benzodiazepines and baclofen and were effectively rehabilitated.
Abstract Detail
‘I CARE ♥ R MINE’-CARE JOURNAL

Introduction: In the stressful environment of the Paediatric Intensive Care unit (PICU) health care professionals find it challenging to interact and support families therefore parents often feel neglected and not part of decision-making. Mothers experienced stress due to their inability to help their ill child and find themselves in “darkness and not involved” in the care of their children. Sharing of information regarding their children is frequently inadequate or conflicting and mothers are often not included in decision making concerning care options. The researcher aimed to plan and implement a project that would enable mothers to become more involved in basic care of their sick child and improve the PICU environment to become communication friendly and a safe space for all involved in the care of the critical ill child. Elements 2, 3 and 5 of the family-centred care approach were selected to motivate the mothers to keep a daily care journal of their children. These elements focus on facilitation of family-professional collaboration, exchange of complete and unbiased information between mothers and professionals and the development and implementation of an educational tool that cares for the diverse and unique ways of mothers coping with stress.

Methods: Literature focusing on the use of care journals was reviewed.

Results: A daily care journal named ‘I care ♥ r mine’ was constructed to be given to the primary care giver of each child. Suggested questions such as: does my child has a drip?; where is the drip?; is the drip running?; is the area red, swollen or oozing?; is my child allowed to eat? and is my child restrained are some examples captured in the care journal. The care journal included observations that need to be reported immediately by the mother. The professional nurse responsible for taking care of the child gives the mother a new journal page for the day and communicates the necessary information.

Conclusion: The aim of the care journal is to improve inter-professional communication and the mothers, involve them in the care of their children in an innovate manner, reduce their stress and give them a voice during the care of their child.
Abstract

FOLIC ACID CONTENT OF MAIZE MEAL (DRY AND COOKED) CONSUMED IN THE VHEMBE REGION, LIMPOPO PROVINCE

Introduction: Maize porridge is a staple food in the Vhembe region. Mandatory maize meal fortification, including folic acid, was implemented in South Africa in 2003.

Objective: To determine, by chemical analysis, folic acid content of fortified maize meal and porridges consumed in the Vhembe region.

Methods: As part of a study on environmental health, three bags of two brands super (A; B) and one brand special (C) maize meal were purchased from outlets in Thohoyandou during November 2017. 500g samples were drawn from each brand’s composite. Using brand C, five fieldworkers each cooked three pots stiff and fermented porridge. Composite samples (500g) were taken from each fieldworker and porridge type. Folic acid content was analysed in duplicate by the in-house method of the South African Grains Laboratory and dry sample values compared to fortification standards.

Results: Dry sample folic acid met 103%, 86% and 57% of the fortification standards for brands A, B and C respectively. Mean (sd) maize meal: water ratios were 0.42:1 (0.11) and 0.26:1 (0.03), cooking times 24(9) and 21(4) minutes and end temperatures 88C (2C) and 86C (1C) for stiff and fermented porridges. Mean folic acid contents (as is) for stiff and fermented maize porridge were 51.7 (11.6) and 40.8 (2.5) µg100g.

Conclusion: Dry maize meal folic acid levels were below the standards for two brands while that of fermented porridge was lower than stiff porridge possibly due to a lower pH. The porridge cooking method must be considered when determining folic acid intakes.
Abstract:

ABOUT 1/20 ROAD CYCLISTS REPORT NON-TRAUMATIC INJURIES, WITH 38% OF THE INJURIES BEING SEVERE ENOUGH TO AFFECT CYCLING – A CROSS-SECTIONAL STUDY AMONGST 22 560 CYCLISTS

Background: Road cycling increases in popularity, but there is an increased risk of injury amongst both amateur and professional cyclists. There are sparse data on the epidemiology and risk markers for non-traumatic (chronic, “overuse”) injuries (NTI) in recreational cyclists participating in mass community based cycling events. The aim of this study is to determine the lifetime prevalence of NTI, anatomical areas affected by NTI, and severity of NTI in a large cohort of road cyclist participating in the Cape Town Cycle Tour.

Methods: This is a cross-sectional study on recreational cyclists that participated in the 2016 Cape Town Cycle Tour (109km). 37425 race entrants were required to complete an online pre-race medical screening questionnaire and 22 560 consenting cyclists (60.3%) were included in this study. We report the crude (un-adjusted) lifetime prevalence (%; 95%CI) and common anatomical areas of NTI, and specific cycling NTI’s (% cyclists with NTI; 95%CI).

Results: The lifetime prevalence of NTI is 4.4% (4.1-4.7) and 34.4% of cyclists with NTI reported becoming aware of the injury between 1–6 months ago. NTIs were reported equally on the left (32.1%; 28.2-36.1) and right (32.0%; 28.0-35.9) sides of the body. The most common anatomical areas for NTIs were the knee (27.8%; 24.0-31.6), followed by the lower back (11.10%; 8.4-13.8), and the shoulder (9.8%; 7.3-12.3). NTIs occurred most commonly in muscle (19.0%; 15.7-22.3), and tendon (17.5%; 14.3-20.7) tissue. The most common specific NTIs in cyclists were patellofemoral pain (14.7%; 11.7-17.7), lower back pain (10.3%; 7.8-12.9) and iliobial band friction syndrome (9.8%; 7.3-12.3). In 8.8% (6.4-11.3) and 29.3% (25.5-33.2) of cyclists with NTI, injuries were severe enough to prevent cycling, or interfere with training, respectively.

Conclusion: About 1 in 20 recreational cyclists report ever suffering from a non-traumatic injury. These injuries affect mostly the knee, lower back and shoulder (47% of injuries) and >38% injuries are severe enough to affect training and competition.
Abstract Detail
THE EFFECT OF HIGH SPF SUNSCREEN ON VITAMIN D PRODUCTION

Introduction: Ultraviolet radiation (UVR) from the sun is necessary for normal functioning of the body. It allows for cutaneous synthesis of vitamin D, which supports the physiological status of the skeleton, together with having many other health benefits. However, UVR may also induce many adverse effects, with skin cancer being of high concern. This has led towards the promotion of the widespread use of sunscreens, but has subsequently raised concern about their possible interference with the cutaneous synthesis of vitamin D.

Aim: This study aimed to document vitamin D levels and the demographical factors impacting upon them, in a South African population and to investigate whether high SPF sunscreen has an effect on cutaneous vitamin D production.

Methods: 40 adults of different ethnic backgrounds partook in this study. Baseline serum vitamin D levels were measured and participants were randomly allocated a sunscreen of varying sun protection factor (SPF) levels (30 or 50+), which they applied in an amount in keeping with current recommendations (2 mg/cm²). They underwent three sessions of low dose narrow band ultraviolet B phototherapy and their serum vitamin D levels were measured again post UVR.

Results: The prevalence of hypovitaminosis D in the study population was 68% with a higher prevalence in black compared to white participants (56% vs 44%). Even though not statistically significant, males were found to have a higher vitamin D deficiency compared to females. Of the other factors associated with hypovitaminosis D, obese individuals were more than a 100 times likely to have a vitamin D deficiency compared to their non-obese counterparts. Sunscreens with SPF 30 and SPF 50 were shown to block cutaneous vitamin D production in the study population, however, when SPF 30 and SPF 50 were compared, SPF 50 significantly blocked cutaneous vitamin D production more than SPF 30 (p-value=0.01).

Discussion: Of importance, this study confirms that when applied correctly, high SPF sunscreen blocks cutaneous vitamin D production and of interest, is the first time to show that the higher the SPF value of a sunscreen, the more cutaneous vitamin D production is blocked. In light of ongoing sun protection strategies, targeted prevention in the form of vitamin D supplementation, is recommended for all those using sunscreens regularly.
Abstract Detail
TWELVE TIPS FOR SUPERVISORS TO MOVE TOWARDS PERSON-CENTRED RESEARCH SUPERVISION IN HEALTH CARE SCIENCES

**Background:** Success and quality of postgraduate education is largely dependent on effective and efficient supervision. As supervisors, health care educators play a crucial role in the overall experience, throughput and retention of postgraduate students. The supervisory role is becoming increasingly complex where the postgraduate supervision culture could be described as haphazard, impersonal, pressurised and mechanistic. Therefore, supervision practices appear asynchronous with the teaching pedagogy of nurturing and caring health professionals.

**Method:** We conducted a collaborative, transdisciplinary research project using reflective methods in an effort to synchronise supervision practise with the teaching pedagogy of health care. We reflected on our supervision and explored locating our research supervision practices within a person-centred perspective, which is a proven and effective way of creating collaborative, inclusive and participative ways of engaging. The aim was to derive twelve tips from supervisors’ views of person-centred supervision practices. All healthcare educators involved in postgraduate research supervision were purposively selected to participate in a world café, which provided a space for ideas to flourish and where supervisors could learn from and with others. The café questions stemmed from a person-centred practice framework.

**Results:** Data were analysed using the creative hermeneutic data analysis method from which we identified twelve tips. We present these twelve tips from the perspective of the four constructs of person-centredness: pre-requisites, environment, process and outcomes. The tips are not prioritised in terms of importance.

**Discussion and Conclusion:** Supervision is a dynamic journey. The relationship between the student and supervisor is not straightforward, but it is vital in the success of both parties. We should shake off the legacy, routine, ritual supervision practices that are currently in place and should embrace person-centredness that will put the postgraduate student at the centre of our supervision practices. Developing and adapting supervision practices is a life-long journey for health care academics. As supervisors, we should continuously evaluate our research supervision practices through critical reflection and identify effective means to bring about sustainable change in postgraduate supervision. Applying these tips will move research supervision towards more person-centred practices.
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Abstract Detail
IN-HOSPITAL GROWTH OF PRETERM INFANTS RECEIVING FORTIFIED HUMAN MILK

Background: Fortification of human milk for very low birth weight (VLBW) preterm infants is practised routinely, yet little is known about their in-hospital growth in developing countries. The objective of this study was to describe in-hospital growth of VLBW preterm infants receiving fortified human milk in a tertiary South African hospital.

Methods: For six months daily protein and energy intake of VLBW infants was calculated using published composition of preterm and mature milk (Cormack, 2016) and fortifier (0.2g protein; 3.5kcalg powder). Weight, length and head circumference (HC) were measured at start and end of fortification. Change in Z-scores (Fenton, 2013) for weight (WFAZ), length (LFAZ) and HC (HCFAZ) was calculated as primary outcome. Additionally weight gain velocity (gkgd) (Patel, 2005) and gain in length and HC (cmwk) were calculated.

Results: 58 Infants (52% F; gestational age: 30±2wk; birth weight: 1215±187g) received mothers own milk. Weight at start and end of fortification was 1263±182g and 1570±123g respectively. Protein and energy intake were 3.4±0.2gkgd (95%CI: 3.3;3.4) and 145±7kcalkgd (95%CI: 143;147) respectively. Protein-to-energy ratio was 2.3±0.1g100kcal (95%CI: 2.3;2.4). Change in WFAZ was -0.5±0.5 (95%CI: -0.6; -0.3); Weight gain was 14.5±4.3gkgd (95%CI: 13.4;15.6). Change in LFAZ was -0.3 ±0.5 (95%CI -0.5; -0.2); Length gain was 1.1±0.5cmwk (95%CI: 0.9;1.2). Change in HCFAZ was 0.1±0.5 (95%CI: -0.9;0.2); Gain in HC was 1.0±0.4cmwk (95%CI: 0.9;1.1).

Discussion and Conclusion: Calculated energy intake was adequate but protein intake and protein to energy ratio did not meet recommendations. Growth was inadequate based on change in Z-scores, but may be satisfactory according to secondary indicators.
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Abstract Detail
A SIMPLE QUANTITATIVE METHOD FOR THE EXTRACTION AND DETECTION OF Tazarotenic Acid IN HUMAN PLASMA BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY TANDEM MASS SPECTROMETRY

Background: Tazarotenic acid is the active metabolite of the prodrug tazarotene, a receptor selective acetylenic retinoid used as a transdermal preparation for the topical treatment of psoriasis, acne vulgaris and pigmentation disorders. An oral drug formulation is presently being researched for the treatment of acne vulgaris and psoriasis and in phase two trials to examine the effect of oral tazarotene in patients with chronic liver disease. The aim of this study was to develop and validate a quantitative method to measure tazarotenic acid in human plasma and to apply it to an in vivo clinical study.

Method: The extraction of this very lipophilic compound was simplified and optimised to a two-step protein precipitation and extraction method using pooled human plasma. An Agilent binary 1100 series LC system coupled to Sciex 4000 QTrap tandem mass spectrometer was used for the detection and quantitation of tazarotenic acid with D8-tazarotenic acid as surrogate standard. Analyst software (version 1.5.2) was used for data analysis.

Results: Gradient elution on a Phenomenex Gemini C18 reverse-phase column (100 x 2.1 mm, 3µm) provided a run-time of 4.5 minutes. The method was validated according to the International Conference on Harmonization guidelines with regards to selectivity, recovery, linearity, precision, accuracy and carry-over. The matrix matched calibration curve for tazarotenic acid was linear over a 5 – 400 ngmL concentration range with a coefficient of determination of 0.997. The analytical method was selective and yielded accuracy and precision that were within the acceptable range for tazarotenic acid recovery in human plasma.

Discussion and Conclusion: The validated method was successfully applied to an in vivo pharmacokinetic study quantifying the active metabolite tazarotenic acid in human plasma within a clinical setting after oral dosing with the prodrug tazarotene.
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Abstract Detail
HYPOSPADIAS: DISEASE SPECTRUM AND SURGICAL OUTCOMES AT STEVE BIKO ACADEMIC HOSPITAL

Background: Steve Biko Academic Hospital is the primary referral hospital for the correction of congenital urologic abnormalities for a significant portion of patients residing in Mpumalanga, Gauteng and Limpopo provinces. The disease spectrum of hypospadias, as well as the outcomes after surgical correction have not been evaluated. This study aims to quantify the severity of hypospadias referred as well as the surgical outcomes at Steve Biko Academic Hospital.

Method: A retrospective observational study was conducted by evaluating the patient data from the pediatric urologic population treated at Steve Biko Academic Hospital.

Results: The disease spectrum is of a severe nature, signified by the fact that 43% of patients treated over a three and a half year period presented with a proximal meatus, as well as 34% that had a severe chordee. The surgical outcomes reflected that the incidence of postoperative urethrocutaneous fistula formation of nearly 40% was significantly higher than the accepted international norm of between 9% and 32%.

Discussion and conclusion: In conclusion, the disease spectrum seen at SBAH is severe, and a large proportion of the patients treated have a proximal location of the urethral meatus as well as a severe chordee. While the surgical outcomes of hypospadias repair at SBAH are comparable in terms of chordee correction and the location of the urethral meatus, there seems to be a significantly higher complication rate of urethrocutaneous fistulae.
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Abstract Detail
PREDICTIVE PROBABILITY MODELS FOR TARGETED BIRTH HIV PCR TESTING

Background: Many advances have been made towards the global aim of eliminating infant HIV transmission, but infants born to mothers in high-risk scenarios contribute disproportionally. Appropriate, accurate and cost-effective diagnostic algorithms are needed to guarantee early HIV treatment success. Targeted birth HIV PCR testing constitutes a potential approach.

Materials & Methods: Cross-sectional study was conducted on HIV-exposed newborns at Kalafong Provincial Tertiary Hospital. Maternal and infant characteristics were reviewed, infants clinically evaluated and tested for HIV by PCR < 72 hours. Clinically important risk factors with p < 0.25 in univariate-unweighted models were included in the multivariate regression models. The performance of the risk scores was evaluated using the area under the ROC.

Results: From August 2014 to December 2016 there were 15175 live births, 3356 (22.12%) to HIV-infected mothers. Of 1911 infants screened, 1759 (92%) were enrolled. No ANC was found in 5.7% (971688) with a significant difference in the number-visits between the negative and positive cohorts (p=0.0005). Most mothers knew their status pre-delivery (98.8%) and were on cART (16261704, 95.4%). HIV viral loads was LDL in 595 (60.15%) and 1-in-5 (217990, 21.9%) had VL levels >1000 copiesµL. More than a quarter newborns (4321655, 26.1%) were born <38 weeks. Low birth weight (<2.5kg) was documented in 3981598 (24.55%) of the negative and 1332 (40.63%) of the positive group (p=0.0329). Less than 15% were symptomatic. IUGRSGA were documented in 2041689 (12.08%), six (637, 16.22%) of whom were PCR positive. Symptomatic newborns more frequently tested positive (p=0.0042). PCR positivity rate was 1.8% (311759). Maternal VL, cART <1 month, and an asymptomatic newborn were significant risks predicting infection. Small-for-gestational-age was included with these three characteristics in multivariate analyses and a two-, three-, and four-risk model was developed with a predictive probability score of 0.28, 0.498, and 0.57 respectively.

Conclusions: Models for targeted birth PCR testing in resource-constraint settings are proposed. Access to VL testing is paramount to targeted birth PCR approaches as this remain an important parameter in predicting MTCT. Maternal cART history and infants' birthweight, gestation estimates and symptoms are parameters that can be combined in two-, three-, and four-risk modelling to guide targeted-approach-algorithms.
Abstract Detail

DEVELOPMENT AND CHARACTERISATION OF A TRIPLE-NEGATIVE BREAST CANCER MULTICELLULAR SPHEROIDAL MODEL

Background: In vitro monolayer (2D) cell culture models have limited predictive ability for the clinical outcome of potential anticancer therapies as these models fail to reproduce physiological cues of the tumour micromilieu. Three-dimensional (3D) multicellular spheroids are used as an alternative, as they better resemble the in vivo tumour environment with regards to cellular interactions and chemical gradients. Triple-negative breast cancer (TNBC) is a subtype of breast cancer associated with resistance, relapse and lack of target specificity. This study sought to develop and characterise a 3D- model of TNBC.

Methods: To select a reproducible TNBC 3D model, BT-20 and MDA-MB 231 cell lines were compared and grown using the liquid overlay and hanging-drop assays. Spheroid growth was assessed using phase contrast microscopy and the bicinchoninic acid protein content analysis assay. Viability was assessed using the fluorescein diacetate (FDA)propidium iodide (PI) assay. Haematoxylin and eosin staining was used for morphological evaluation. Susceptibility to doxorubicin was assessed in 2D cultures using Sulphorhodamine B staining, FDAPI-staining, and acid phosphatase conversion. The effect of toxic concentrations of doxorubicin on spheroids’ morphology and enzymatic activity was assessed and compared to 2D cultures.

Results: Only BT-20 cells cultured using the liquid overlay assay formed reproducible spheroids which were used for characterisation. Spheroid diameter decreased from day four (949 µm) to day ten (787 µm), while protein content increased slightly in parallel (7.0 to 8.5 µgspheroid), suggesting spheroidal compaction rather than cell death. The outer spheroid region had viable, well-nourished cells, while smaller, membrane-compromised cells were localized in the inner spheroid region with a clear distinction between the layers. The IC25 (130 nM), IC50 (320 nM) and IC75 (1580 nM) of doxorubicin-induced a dose-dependent reduction of 2D-cell viability and acid phosphatase activity. However, these concentrations did not alter spheroid size and acid phosphatase activity, suggesting resistance incurred by its 3D-conformation.

Discussion and conclusion: Heterogeneous cellular architecture and resistance of the BT-20 spheroids resemble in vivo attributes of TNBC. It is essential to incorporate such a 3D model in preclinical drug screens to facilitate translational cancer research and potentially discover optimally effective drugs against TNBC.
Abstract Detail

EVALUATING THE PHARMACO-ECONOMIC IMPACT OF POST-SURGERY REQUIRED INFUSION TREATMENTS AMONG BARIATRIC PATIENTS.

Background: Bariatric surgery is associated with post-operative malnutrition and associated nutrient requirements. At our center severe nutrient deficiencies are treated by infusion and costs associated with these differ. Worldwide the perception has been that BPD-DS procedures are more costly. We aimed to evaluate the cost difference of post-operative infusion requirements between Roux-en-Y (GBP) and biliopancreatic diversion with duodenal switch (BPD-DS) procedures.

Methods: All patients undergoing GBP or BPD-DS procedures between August 2015 and June 2017 were included. Total amount of patient infusions per procedure were calculated and stratified according to type. Average infusion cost per procedure was calculated.

Results: A total of 372 patients (GBP 66%, BPD-DS 34%) were included in the analysis: GBP and BPD-DS (98) (39.84%) patients and (102) (80.95%) (incl prophylactic infusions) patients required infusions over 3 years. A total of 252 infusions was done GBP vs 299 in the BPD-DS. VenoferSolvitCernevitAddittrace and Aclasta, more infusions in the GBP (P< 0.01) vs BPD-DS. BPD-DS required more Vitalipid infusions (p< 0.01). TPN was required a total of 54 times in 38 BPD-DS vs 27 times in 23 GBP. First 2 y: 3 y 47:7 (13% in y 3) TPN in BPD-DS. 2y: 3y TPN 12:15 TPN GBP. In BPD-DS common channel > 110 no TPN required after 18 months. Two BPD-DS and one GBP had significant costs due to complications. GBP vs BPD-DS: severe hypocalcemia 3 % vs 0%, severe vitamin deficiencies 5% vs 1%; deficiencies requiring revision surgery 2% vs 3%. After 18 months 50% more GBP required Venofer (p<0.01) Average infusion cost per patient in first 3y for the GBP R2689.68 vs BPD-DS was 2616.32.

Discussion and conclusion: 1. Vitamin and iron deficiencies are more common in GBP and can occur as late as 3 y post op. 2. Severe protein malnutrition requiring multiple admissions can happen with both procedures and are mostly related to surgical complications. 3. Late protein malnutrition can occur in both procedures. 4. Osteoporoses and hypocalcemia occur more frequently in GBP. 5. GBP replacement has the same cost implications as BPD-DS and is not less labor intensive.
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Abstract Detail  
CELL CULTURE INDUCED VARIATION OF THE HEPG2 CELL LINE PROTEOME  

Background: Standardizing in vitro pre-clinical hepatotoxicity is confounded by diverse cellular origins, most of which lack representative hepatocellular function. Dedifferentiation and loss of cellular polarity are inherent limitations introduced by long-term cell culture. HepG2 cells, with a stable phenotype in, have been extensively used in hepatotoxicity screening despite poor metabolic competence and a “foetal-like” hepatic phenotype. Three dimensional (3D) culture techniques may serve to better preserve the cellular phenotype. One strategy to investigate hepatic phenotypes is assessing the proteome. The aim here was to determine abundance changes in the hepatic proteome of HepG2 cells when cultured in hanging drop 3D cultures.  

Methods: Replicates of HepG2 cells (as monolayers and spheroids) were collected as whole cell lysates. Fifty micrograms of sample protein was reduced, alkylated, precipitated, digested with trypsin and labelled using isobaric tags. Samples were analysed using a Dionex Ultimate 3000 RSLCnano LC system coupled to a Thermo Scientific Fusion Orbitrap Mass Spectrometer. Peak lists were searched against a UniProtKB-Swiss-Prot human database using SearchGUI with X!Tandem, MS-GF+ and Comet search engines. Post-processing for protein identification and quantification used Peptide Shaker and Reporter software respectively.  

Results: Once processed, 4701, 5030 and 4932 proteins were identified and quantified across replicates 1 to 3 with a protein overlap of 3760. While distinct hepatic marker profiles varied between samples, several notable proteins were up-regulated. Among these were hallmark hepatic proteins albumin and alpha-fetoprotein which increased 3.6 and 6.1-fold respectively in spheroids. Additionally, canalicular specific marker proteins such as dipeptidyl peptidase 4 were identified with a 2-fold up-regulation. Hepatic structural markers such as hepatocyte cell adhesion molecule, collagen, laminin and fibronectin were also up-regulated by more than 2-fold in spheroids. Several phase I metabolizing enzymes and membrane transporter proteins showed variable up-regulation.  

Conclusion: Hallmark hepatic proteins were largely up-regulated, demonstrating alterations in the hepatic phenotype, when cultured in spheroids free from synthetic surfaces. Quantitation of large protein cohorts demonstrated the ability of spheroids to induce changes in the HepG2 cell proteome with some of these changes promoting a mature hepatic phenotype.
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Abstract Detail
NUCLEIC-ACID SURVEILLANCE FOR PARAMYXOVIRUSES OF ZOONOTIC IMPORTANCE IN SMALL MAMMALS FROM SOUTH AFRICA

Background: Bats and rodents have been implicated in some high-impact viral zoonoses, including the Henipa- and Rubulavirus genera in the Paramyxoviridae family. A large number of novel viruses from these genera as well as the Morbillivirus genus and unclassified Morbillivirus-related viruses (UMRVs), have recently been described from bat and rodent species, however there has not yet been any association of these viruses with zoonoses. Viruses in the Henipavirus genus are most notable due to their association with high morbidity and mortality rates in human and animal populations. Limited surveillance in South Africa with regards to rodent- and bat-associated paramyxoviruses have been performed. This study aims to determine the presence and diversity of paramyxoviruses in bats and non-volant small mammals collected from two study areas within South Africa.

Methods: Kidney samples from both bats and rodent species were tested for the presence of paramyxoviral RNA using two broadly-reactive hemi-nested RT-PCR assays. These assays targeted partial gene regions on the highly conserved polymerase gene of the Avula-Rubulavirus (AR) and Respiro-Morbilli-Henipavirus (RMH) genera.

Results: A total of 244 non-volant small mammal and 49 bat kidney samples were tested. None of the samples tested positive with the AR assay. However, the RMH assay detected positive samples from both non-volant small mammals (5.3%) and bats (6.1%). None of the detected viruses were related to zoonotic paramyxoviruses. Phylogenetic analysis placed the detected sequences in the unclassified Morbillivirus-related virus clade.

Discussion and conclusion: Although we did not detect any viruses related to known zoonotic paramyxoviruses, we were able to detect a high paramyxovirus diversity in the populations under study. Since these UMRVs have only recently been described in other studies, their potential as zoonotic pathogens has not yet been assessed. Although measles is a zoonotic disease belonging to the Morbillivirus genus associated with cattles, there has not yet been any zoonotic association of viruses from this genus with both populations under study. This however, highlights the need for assessing the zoonotic potential of these UMRVs recently detected in both mammalian groups. Continued surveillance will contribute towards our understanding of paramyxovirus diversity and host ranges within South Africa.
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Abstract Detail
NUCLEIC ACID SURVEILLANCE FOR POTENTIALLY ZOONOTIC CORONAVIRUSES IN THE SMALL MAMMAL HOST POPULATIONS OF THE MELETSE REGION IN LIMPOPO, SOUTH AFRICA

Background: Coronaviruses are positive sense viruses with the potential to cause respiratory, gastrointestinal, hepatic and neurological ailments in their hosts. They are divided into four genera namely the Alphacoronavirus, Betacoronavirus, Gammacoronavirus and Deltacoronavirus. Alpha- and betacoronaviruses only infect mammalian hosts, whereas the gamma- and deltacoronaviruses infects mammalian, avian and aquatic hosts. Coronavirus research has increased following the Severe Acute Respiratory Syndrome and the Middle East Respiratory Syndrome outbreaks. The identification of bat-associated coronaviruses similar to known human coronaviruses indicated that bats are of great importance to the evolution of mammalian coronaviruses. Detection of these viruses in bats and non-volant mammals (rodents, shrews, and sengis) may provide opportunities for interspecies transmission to other hosts. This study aimed to expand on the surveillance of coronaviruses from South African bat species and provide the first investigation into whether non-volant mammals harbor coronaviruses of zoonotic importance. Due to species diversity and possible overlap of habitats between bats and non-volant mammals, Meletse cave in Limpopo was chosen for this study.

Methods: A hemi-nested reverse transcriptase polymerase chain reaction that targets the most conserved region of the RNA dependent RNA polymerase gene was used to analyze non-invasively collected fecal samples from non-volant mammals and bats.

Results: Both alpha- and Betacoronavirus sequences were identified in seven samples, from Horseshoe bats (Rhinolophus simulator) (n=4) as well as three different rodents including the Bushveld gerbil (Gerbilliscus leucogaster), Natal multimammate mouse (Mastomys sp), and the Namaqua Rock mouse (Micaelamys sp).

Discussion and conclusion: These preliminary results constitute the first sequence data of coronaviruses identified from these species in South Africa. The sequences obtained from the Mastomys and Micaelamys sp. shared a high similarity and the Gerbilliscus leucogaster coronavirus sequence phylogenetically grouped with the identified bat sequences. The results highlight the potential for spill-over events that could occur when susceptible individuals are exposed to contaminated excretions. Furthermore, the recombination capability of coronaviruses may enable a virus to infect a host it was previously not capable of infecting thus resulting in the emergence of new coronaviruses.
CEPHALOMETRIC MEASUREMENTS: A COMPARISON BETWEEN DIGITAL RADIOGRAPHY, FILM RADIOGRAPHY AND CBCT

Background: Cephalometric analysis plays an important role in the diagnosis and treatment planning of the orthodontic patient. Cephalometric errors can be divided into projection (magnification) and tracing errors (measuring, recording, and landmark identification). The objective of this study was to determine the comparability of conventional methods of cephalometric measurements using film radiography and manual tracing to digital radiography and digital tracing. These measurements were then compared to the gold standard of Cone beam computerised tomography (CBCT) measurements.

Aim: The aim was to determine which acquisition method was the most accurate for clinical application.

Methods: Forty two skulls were stabilised in a standardised position and cephalometric radiographs were exposed using a digital and analogue cephalometric machine. The digital radiographs were evaluated digitally by using Dolphin®. The digital radiographs were also printed on film and analysed manually. The radiographs taken on film were manually traced. All the measurements were compared to the digitally analysed CBCT’s. Two linear and three angular measurements were compared for the different methods.

Results: The intraclass correlation of linear analogue measurements compared to CBCT showed poor correlation (ICC=0.22). The correlation for digital linear measurements and CBCT showed a good correlation (ICC=0.82). For all angular measurements an excellent intraclass correlation was found between CBCT and the three other measurements (ICC>0.94). Analogue linear measurements are on average 11.5% larger than CBCT measurements, digital methods differ with maximum of 1.5%. More than 80% of the linear analogue measurements differed with more than 2mm when compared to CBCT.

Conclusion: The calculated magnification is 0.9% larger for the analogue machine when compared to the digital machine. Our study showed that the projection errors (inherent magnification) of the radiographic units had the most significant impact on the reliability and diagnostic value of the linear measurements. Angular measurements were comparable between units as it is only effected by tracing errors. Therefore, no cephalometric analysis should be carried out without calibration to correct magnification. It is concerning that such high variability between methods can exist in a diagnostic method where accurate results are required.
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Abstract Detail
MICRONUTRIENT INTAKES AND RISK OF DEFICIENCY OF VHEMBE MEN BEFORE AND AFTER THE MANDATORY FORTIFICATION OF MAIZE MEAL AND WHEAT FLOUR

Background: Fortification of maize meal and bread with selected micronutrients was implemented in South Africa post 2003 to alleviate targeted micronutrient deficiencies. The micronutrients include vitamin A, thiamine, riboflavin, niacin, pyridoxine, folic acid, iron, and zinc. This study sought to quantify the changes in fortified micronutrient intakes, and the proportion of men in the Vhembe region, Limpopo Province at risk of deficiencies between 2003 and 2016.

Methods: The samples comprised men (18-35 years) (2003: N=470; 2016: N=157); enrolled in an ongoing observational cross-sectional environmental health study in the Vhembe region. The validated quantitative food frequency questionnaire (QFFQ) used in 2004 was re-validated in 2016. Trained local interviewers conducted the interviews using food portion photographs and household utensils to estimate portion sizes. Nutrient intakes were analysed by FoodFinder3 (2004) and the SAFOODS (2016) programs of the Medical Research Council. Median micronutrient intakes were compared by the Mann-Whitney test and proportions of intakes below the Estimated Average Requirements (EARs) by the Chi-squared test (p<0.05).

Results: Median intakes for all fortified micronutrients were significantly higher in 2016 (p<0.0001). Median percentage increases were: iron, 130%; zinc, 139%; vitamin A, 423%; thiamin, 100%; riboflavin, 127%; niacin, 214%; folate, 634% and pyridoxine, 421%. Proportions of intakes below the EAR decreased by 78% (vitamin A, riboflavin) to 96% (folate) and 97% (pyridoxine) (p<0.0001). Fortification provided from 34% (riboflavin) to 78% (folate) of the fortified micronutrient intakes.

Conclusion: Fortification has significantly increased micronutrient intakes and reduced the proportion of the target population at risk of deficiency. The extent of the benefits of fortification to improve nutrient intake, however, varies across micronutrients.
Abstract Detail
CREATING MOMENTS OF PATIENT-CENTRED COMMUNICATION IN THE EMERGENCY DEPARTMENT

Introduction: Effective communication plays a vital role in delivery of quality care, especially in the Emergency Department because of the complex and challenging environment. The patient should be the centre of all communication in the emergency department. The desired outcomes of patient-centred communication are improved patient satisfaction, patient involvement and positive patient outcomes. Healthcare professionals need to understand patients’ needs, values and preferences, provide patients with information to participate in their own healthcare, and build trusting patient-healthcare professional relationships.

Aim: The aim was to explore patient-centred communication in the emergency department.

Methods: Involving patients to participate in their own healthcare is growing. Therefore an experience-based co-design was used. The design provided an opportunity to raise awareness about and understand current communication practices in the emergency department. A total of 18 unstructured observation sessions, 15 semi-structured interviews with healthcare professionals and 13 narrative-based film interviews with patients were done. A co-design event was held, during which patients (2), doctors (6) and nurses (12) collaboratively analysed the data, identified key touch points and then planned strategies to move towards patient-centred communication in the emergency department. Rigour was addressed by involving the healthcare professionals in the observation sessions, analysing the data collaboratively, ensuring transparency in the analysis process and reaching consensus with patients and healthcare professionals on the key touch points identified.

Discussion: Effective communication should be a daily focus to constantly remind healthcare professionals to promote and enhance moments of patient-centred communication experienced by patients in the emergency department. The ideal emergency department patient-centred communication is not realistic because of the chaotic and challenging environment. Patients with life-threatening conditions and injuries will always get priority above patient-centred communication in the emergency department. The healthcare professionals working in the emergency department will always strive to be professional and make patient-centred communication a daily focus. The ultimate emergency department would strive to create moments of patient-centred communication to shape the experience of the patient and healthcare professional.
Abstract Detail

THE CONTRIBUTION OF OCCUPATIONAL THERAPY IN THE HOLISTIC MANAGEMENT OF A CHILD WITH TETRA-AMELIA SYNDROME

Background: Tetra-Amelia Syndrome (TAS) is a rare genetic disorder characterised by the absence of all four limbs. It creates a tremendous physical limitation for children and adults living with this condition. They require continuous support throughout their lives to function as optimally as they can. Occupational therapists often help children and adults with disabilities to participate by adapting activities and environments and applying assistive technology. The objectives of this study was to explore and describe the contribution of occupational therapy for a specific case of TAS with regards to: 1) the importance of early intervention, 2) the implications of assistive devices on functionality, 3) future considerations and obtaining the knowledge and resources to deal with similar cases in the future.

Methods: A single, case study design was chosen to explore and describe the general nature of the case from all angles and in a holistic manner. Multiples sources of data collection included transcribed semi-structured interviews, document analysis (reports, standardised tests) and direct observation (photo and videographic evidence) with regards to participation in play, school and activities of daily living. Data was analysed qualitatively and triangulation of data was achieved. External raters were used to eliminate bias.

Results: Findings from the study was presented using the Occupational Therapy Practice Framework to illustrate the invaluable contribution of occupational therapy intervention on client factors, occupations (ADLs, play and school), performance skills and outcomes like independence, quality of life, participation and wellness; taking into consideration the client’s unique context. Data showed that assistive technology and early intervention play a vital role in enhanced independence and participation in meaningful occupations.

Discussion and conclusion: The results of this study highlight the significance of occupational therapy in the management of TAS and can assist in providing greater independence and quality of life to those born with the condition. It provides a contribution to new knowledge in terms of appropriate intervention approaches, guidelines and clinical reasoning for assistive technology as well as advocacy for individuals living with this rare condition.
Abstract Detail
RADIOGRAPHY BOARD GAME BRINGS LIFE TO TEACHING AND LEARNING

Background: Gamification in education is an instructional method requiring the learner to participate in a competitive activity, to encourage engagement and excitement about the learning at hand. In the Radiographic Practice module, students learn three core radiography performance standards, namely; professional, technical and clinical performance. To address these standards, the lecturers in the radiography department attempted different methods to encourage engagement with the module content, one of which was an image critique form which was a self-learning activity for students during clinical training.

Problem statement: Students only completed the image critique forms when the log-books were due to be collected. Lecturers realised that the use of this self-learning activity did not stimulate engagement and interest to meet the module outcomes.

Question: Can gamification, such as a radiography board game, improve student engagement and interest in the radiography module content to enhance the students' performance?  
Aim: Piloting the radiography board to determine how effective it is in improving engagement and interest with the radiography module and also explore how effective is it for teaching and learning.

Methodology: A qualitative, exploratory descriptive research design was used. Focus group interviews were held with first, second and third year radiography students. This was after they had engaged with the radiography board game. Data was transcribed and content analysis used.

Findings: The radiography board game can be an effective teaching and learning tool. The students recommended some changes and adjustments on the game. They however demonstrated that it was possible to learn whilst engaging with the subject material and group discussions.

Conclusion: The use of board games, can be effectively used as a teaching and learning tool in the Radiographic practice module, to stimulate engagement and learning in the radiography module.
TEN WEEKS OF TRAINING COMBINED WITH CREATINE MONOHYDRATE SUPPLEMENTATION MAINTAINS PHYSIQUE AND IMPROVES RUNNING ECONOMY COMPARED TO PLACEBO IN ULTRAENDURANCE RUNNERS

Background: Creatine monohydrate (CrM) supplementation has been shown to optimize muscle phosphocreatine (PCr) stores, thereby supporting rapid adenosine triphosphate (ATP) rephosphorylation during periods of high energy demand. CrM has, therefore, become one of the most widely used permitted performance-enhancing substances in sport. CrM supplementation is considered necessary to optimize maximal anaerobic exercise performance in strength athletes engaged in resistance training. However, its potential effects on aerobic endurance performance has received much less attention. The aim of this research was to investigate the effects of CrM supplementation in runners adhering to a standardized, individually-tailored endurance training programme.

Method: Seventeen trained male ultraendurance runners paired on fitness were, in a double-blind fashion, assigned to either a group consuming CrM (n = 9; age: 38 ± 8 y; VO2 max: 57.2 ± 5.3 mlkgmin) or placebo (n = 8; age: 37 ± 8 y; VO2 max: 52.1 ± 5.7 mlkgmin). Surface anthropometry measurements were used to calculate somatotype. Running economy was determined from oxygen uptake (VO2) measured via open-circuit pulmonary gas exchange recorded for 5 min of treadmill running at 10.0 kmh and 12.0 kmh. CrM was ingested at 6 gd for 6 d followed by 3 gd for 9 wk. Groups were compared with respect to change from baseline to 10 wk using ANCOVA with covariate baseline value. Effect size was reported as Cohen d (small ≥0.2, medium ≥0.5, large ≥0.8, very large ≥1.3).

Results: Relative to placebo, CrM supplementation caused a retention of 1.0 kg body mass (p = 0.194, Cohen d = 0.7), prevented a loss of 0.3 units mesomorphy (p = 0.037, Cohen d = 0.6), and decreased VO2 at 10.0 kmh (-3.2 mlkgmin, p = 0.015, Cohen d = 1.3) and 12.0 kmh (-2.3 mlkgmin, p = 0.032, Cohen d = 1.1).

Conclusion: Findings of the study are consistent with literature reporting CrM supplementation to augment physiological adaptations to training over that of placebo ingestion. This study is the first to demonstrate that CrM supplementation in conjunction with training may maintain physique and improve running economy in ultraendurance runners.
Developing Expertise in Forensic Anthropology in South Africa

**Background:** Approximately 1200 unidentified persons are recovered yearly in Gauteng, forensic anthropologists are needed to analyse and interpret these skeletal remains. However, educational or professional guidelines do not exist for the development of this type of expertise in the country. The purpose of study was to explore the enabling and constraining factors that lead to the development of expertise among practicing forensic anthropologists in South Africa.

**Methods:** An interpretative, qualitative research design involved six postgraduates who had graduated with a BSc Honours from the Department of Anatomy, University of Pretoria between 2010 and 2016. Participants were required to be working in forensic anthropology either in the forensic science services or in academia. Semi-structured interviews were conducted and assessed using thematic analysis. Expertise development was extrapolated using an analytic framework of the integrative pedagogical model.

**Results:** Distinct variation in attitudes towards forensic anthropology practice among the participants is interpretable through education theory about conceptual, practical and experiential learning as well as learning in the workplace. The development of expertise begins in the classroom, as early as the undergraduate years, and continues into the practitioner's workplace, where daily problem solving is required. The self-reported data suggested internal feedback had a limited impact, indicating that more experienced others were necessary for providing structure and/or scaffolding for further learning. Informal, or formal, mentorship is crucial for novices to develop the schema and attitudes necessary for expertise development and self-regulated learning. Practitioners who encountered constraints, such as a lack of resources and role models, expressed disappointment in their work environment and less confidence than their mentored peers.

**Discussion and conclusions:** Senior mentorship and reflection are key enablers for the development of expertise. Guidance for novice practitioners is only available at universities where forensic anthropology is offered as a postgraduate qualification. Forensic anthropology requires advanced tertiary qualifications, guided learning experiences and continual professional development as a foundation for the development of expertise. Guidelines for best practice and structured internships are needed for forensic anthropologists in South Africa.
Abstract Detail
PELLUCID MARGINAL DEGENERATION: A CASE REPORT

Introduction: Pellucid marginal degeneration is a rare, progressive peripheral corneal thinning disorder and seldom do patients present with corneal perforations.

Case presentation: A 61 year old who presented on two occasions at the Eye Clinic with a corneal perforation in the Right eye and on the 3rd occasion with a corneal perforation in the Left eye. These occasions occurred over a period of 3 years. Investigations revealed no cause of the corneal perforations. It did however show that she is HIV + with a CD 4 count of 378. Because of the asymmetrical nature of the disease and the positive HIV test, various diagnoses were entertained. A diagnosis of Pellucid marginal degeneration was ultimately confirmed with a classical "butterfly" pattern on Pentacam in 2017.

Conclusion: Although spontaneous corneal perforation is a rare complication, clinicians must maintain a high index of suspicion in patients presenting with clinical features suggestive of Pellucid marginal degeneration and spontaneous corneal perforations.
Abstract Detail
A SHARP LEFT INTRA-ORBITAL INJURY WITH FOREIGN BODY REMOVAL. A UNIQUE INJURY AND OUTCOME.

**Aim:** The aim of the study is to highlight the intra-orbital injuries and the good outcomes associated with early intervention and management.

**Methods:** The patient sustained multiple facial stab wounds during an assault. The last stab penetrated the lateral orbital wall and as a result of the tough zygomatic bone, the knife broke and a 7cm knife tip was then lodged. Due to the nature of the metallic object, neither CT-Scan nor Plain X-ray were able to comment or describe the structural integrity of the globeeye. On X-ray Antero-posterior view, the triangular foreign body was extending from the medial orbital wall (BASE), across the lower orbital rim into the orbital cavity and perforated the lateral orbital wall (TIP). After appropriate emergency management and investigation, Intra-operative removal of a metallic foreign body was then carried out and results were outstanding.

**Results:** Eye was grossly intact, periorbital eye lid swelling with no eye lid lacerations, conjunctival haemorrhagic chemosis, corneal intact with no visible abrasions and lacerations, anterior chamber quiet with no cellular activity. Iris sphincter tear and reactive pupil to light, lens optically clear with no opacities. Day one post operatively; Visual Acuity (VA) 630 left eye and 65 Right eye. impaired left abduction, chemosis subsided, unremarkable anterior segment findings and fundoscopy differed due to periorbital swelling with difficult eyelid opening. topical anti-inflammatory and antibiotics prescribed. Day 3 post operatively; VA 615, normal ocular motility, normal anterior segment, fundoscopy showed no commotio retinae, no vitreous haemorrhage, normal optic nerve head and normal blood vessels. patient discharged for one week follow up.

**Discussion and conclusions:** Timeous management of intra-orbital foreign body injuries have excellent outcome and good visual prognosis. The use of appropriate investigation tools and the availability of surgical theater time also contribute largely to the outcome.
Abstract Detail

OESOPHAGEAL CARCINOMA PRESENTING AS A LEFT ATRIAL MASS

**Background:** A 53 year old male, known schizophrenic, presented with dysphagia for solids for three months and dyspnoea.

**Method:** Gastroscopy and transthoracic echocardiogram were done

**Results:** Gastroscopy revealed a large low lying Oesophageal Carcinoma (30cm)

**Discussion and Conclusion:** The heart due to its location can be encroached by masses arising in the anterior, posterior or superior mediastinum. This encroachment can be form of displacement and compression of the cardiac chamber or direct infiltration. Hence the patient may present with signs of a cardiac mass lesion. Echocardiography demonstrated an external mass with severe compression of the left atrium resulting in a left atrial volume of only 5 ml

**Histology:** Confirmed a large oesophageal carcinoma.
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Abstract Detail
HEALTH EXPENDITURE IN AFRICA AND ITS DETERMINANTS, 2005 - 2014

Background: There is limited research focusing on determinants of health expenditure in African countries. The objectives of this study were to analyse the levels and determinants of African government health expenditure (GGHE) for the years 2005 to 2014. Method: Key expenditure indicators for 52 countries and 10 years from the Global Health Expenditure Database were analysed by three income groups (low-income, lower middle-income and upper middle-income). GGHE for 2014 was analysed by country and compared to international benchmarks for expenditure per capita, as a percentage of general government expenditure (GGE) and as a percentage of gross domestic product (GDP). Determinants of GGHE per capita were analysed using a random effects model with 46 countries and 445 observations.

Results: Real 2010 Int$ GGHE per capita increased by 3.7% on average per annum between 2005 and 2014. The highest growth of 5.7% was found in upper middle-income countries and the lowest (1.9%) in low-income countries. In 2014, 34 (65%) out of 52 country governments spent less than US$54/capita, which is the level of expenditure that has been estimated as a minimum to provide a set package of health services. The lowest funded country was Madagascar at $6.6/capita and the highest was Equatorial Guinea at US$511/capita. Only 4 governments achieved the Abuja target of spending at least 15% of their GGE on health and only 7 spent more than 5% of their GDP on health. The random effects model showed that GDP/capita, fiscal effort, external resources for health and adult HIV prevalence had statistically significant positive impact on GGHE per capita. The percentage of population under 14 had a significant negative impact, while time was not statistically significant.

Discussion and conclusions: Despite growth in real terms, government health expenditure in most African countries is arguably insufficient to provide a basic service package. Greater mobilisation of resources is needed if countries are to make substantial progress towards UHC. The study confirmed earlier findings regarding the role of macroeconomic factors, such as income level and fiscal capacity in determining health expenditure and generated novel evidence on the impact of age structure and HIV prevalence.
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Abstract Detail
THE LONELY FOSSILS CONFERENCE: LEARNING ABOUT FOSSIL DATING IN UNDERGRADUATE PHYSICAL ANTHROPOLOGY

Background: The theory of evolution via natural selection forms the basis of the second year undergraduate module, Introduction to Physical Anthropology (ANA 215). In order to understand evolution, learners must be able to conceptualize the vast timescale that is required for macro-evolution to take place. Many undergraduate students are averse to learning about the deep age (4.55 billion years) of the Earth because their belief systems are rooted in understanding the earth to be young. The facilitator must be cognizant of this issue in order to design learning opportunities that engage learners in the critical evaluation of scientific information. One approach is to create an authentic learning environment where knowledge, information synthesis and critical thinking are used: the academic conference.

Method: The Lonely Fossils Conference is a learning opportunity about fossil dating techniques, based on the real-life application of science engagement in higher education. Groups of student scientists do research about fossil dating methods, they submit abstracts, and then present their research at a conference day. Members of the Forensic Anthropology Research Centre (FARC) attend the conference and provide feedback on the presentations. The research presentations are peer- and self-evaluated on the day and the marks contribute to the student’s semester marks. The learning opportunity functions as part of a larger action research PhD, and is therefore subject to the same cycle of improvement.

Results: Learner feedback was collected using open-ended feedback questions designed to enhance reflection. General themes were student learning, thinking about innovative ways to learn about fossil dating, and the mechanics of group work. Facilitators provided feedback in the form of semi-structured observation guidelines and informal feedback. General themes included: inadequacy of the venue, the validity of student learning, and the peer review system.

Discussion and conclusion: The Lonely Fossils Conference fills important gaps in learner understanding: the methods by which fossils are dated, the deep age of the earth and the complexity of scientific research to reach conclusions built on empirical research. The Lonely Fossils Conference is a student-centered, authentic learning opportunity that functions in the organized chaos of action research.
READINESS TO CHANGE HEALTH BEHAVIOUR ASSOCIATED WITH NON-COMMUNICABLE DISEASES AMONG STUDENTS OF THE UNIVERSITY OF PRETORIA

Background: There is a high prevalence of non-communicable diseases (NCDs) in South Africa resulting in 60% of deaths in South Africa in 2015. To reduce the prevalence of NCDs, the individual stage of readiness to change health behaviours needs to be identified to ensure appropriate counselling.

Methods: A descriptive, cross-sectional study in the quantitative domain was employed at the UP diet clinics across the three campuses, namely Prinshof, Groenkloof and Hatfield. The URICA Readiness Score (HABITS Lab) was used to assess readiness to change behaviour, and the German Diabetes Risk Scorer (GDRS) to assess the health risk profile of the participants for contracting NCDs. The sample was conveniently identified and informed consent was obtained. Ethical clearance was obtained from Faculty of Health Sciences Research Ethics Committee (5612017).

Results: The sample (N=27) consisted of 24 females. Majority of the sample (96%) were <35 years of age. The participants either fell into the pre-contemplation (63%) or contemplation (37%) stages of change. The mean BMI of males was 31.9 kgm2 and for females it was 22.9kgm2; 70% of the sample were physically inactive, >50% did not consume whole-grain bread; >60% of the population consumed meat more than 4 times per week; 89% of the sample did not drink alcohol and 4% of the sample had a history of hypertension. Majority had a waist circumference <75cm (GDRS cut off) and were also non-smokers. With all factors considered, the chance of developing an NCD within the next 5 years was below 1% for all participants.

Conclusion: The URICA tool classified the participants into the early stages of change which has implications for the nutrition counselling approach to be followed. The low risk profiles of the participants could be a result of the age range of the participants. Although the health risks were low, the participants could still benefit from nutrition counselling to promote healthy behavioural practices.
Abstract Detail
THE PROPORTIONAL NUMBER OF TOTAL NUCLEATED AND CD34+ CELL COUNTS TRANSPLANTED IS PREDICTIVE OF ENGRAFTMENT IN MULTIPLE MYELOMA PATIENTS: A PILOT STUDY

Background: Haematopoietic stem cell transplantation (HSCT) is routinely used to treat patients diagnosed with multiple myeloma. A key objective for successful HSCT is to obtain adequate and rapid engraftment. HSCs are mobilized from the bone marrow and are identified and enumerated using the cluster of differentiation (CD) 34 antigen. CD34+ and total nucleated cell (TNC) counts in apheresis collections prior to engraftment are currently used to predict engraftment success. However, other haematological factors may have the potential to predict engraftment success. In a collaboration with the Alberts Cellular Therapy (ACT) center, this pilot study aimed to determine whether haematological parameters quantified throughout the harvesting and transplant time-line had any association with engraftment success in a South African patient cohort.

Methods: Epidemiological and haematological data were obtained from 30 patients who underwent autologous HSCT at the ACT center during 2016. Laboratory generated parameters not routinely evaluated in the context of engraftment success were examined, and the archived apheresis flow cytometric data was re-analyzed. Flow cytometric analysis included TNC-, lymphocyte-, monocyte-, neutrophil- and CD34+ expressing HSC counts at multiple time points including pre-harvest, end-harvest and post-thaw. Multi-parametric statistical analysis was used to determine whether there was a significant correlation between the captured data and the time-to-engraftment post-transplant, as determined by neutrophil and platelet threshold counts.

Results: The average age of the patients treated was 56 – 10 years, with equal gender representation. The average number of CD34+ cells transplanted was 5.3 x 10^6 cells/kg. The average number of TNCs transplanted was 287 x 10^6 cells/kg. The results of the pilot study indicated a strong correlation between number of transplanted TNCs and time to engraftment. The data suggested that this is due to the variable proportions of CD34+ and TNC cells within the transplanted product.

Conclusion: Variable CD34+ cell and TNC proportions within the transplanted products are indicative of the time to engraftment. In the presence of a relatively constant CD34+ cell number, rapid engraftment was associated with a proportionally lower number of TNCs while delayed engraftment was associated with a proportionally higher number of TNCs.
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Abstract detail
PHARMACOKINETICS AND PHARMACODYNAMICS OF NOVEL OESTRADIOL ANALOGUES

Introduction: 2-Methoxyestradiol (2ME) is an endogenous 17β-oestradiol metabolite that exerts antiproliferative, antiangiogenic- and antitumour activity in vitro and in vivo. However, the use of 2ME as a potential anticancer agent is limited due to its poor oral bioavailability and short plasma half-life.

Methods: Three sulphamoylated 2ME analogues, namely 2-ethyl-3-O-sulphamoyl-estra-1,3,5(10)15-tetraene-3-ol-17one (C9), 2-ethyl-3-O-sulphamoyl-estra-1,3,5(10)15-tetraen-3-ol-17-ol (C10) and 2-ethyl-3-O-sulphamoyl-estra-1,3,5(10)16-tetraene (C19) were synthesized following in silico design. Pharmacodynamics and pharmacokinetic effects where investigated in vivo. In vitro screening limits of each analogue were set to 5 μg/ml using a liquid chromatography-mass spectrometry/mass spectrometry (LC-MSMS) method by analysing serial dilutions of each compound in serum. In vivo oral studies were conducted in which 150 mg/kg of each compound was administered per os to CD-1 mice. Blood was collected two hours post-dosing and analysed for the presence of intact compound via LC-MSMS. Liver sections were evaluated via immunohistochemical analysis of hypoxia-inducible factor-1 alpha (HIF-1α), carbonic anhydrase IX (CAIX) and proliferating cell nuclear antigen (PCNA) to determine potential hepatotoxicity of the compounds. Systemic toxicity of the compounds was investigated using CD-1 mice treated with 10 mg/kg compound intraperitoneally. Blood and urine samples were collected 24 hours post-treatment and analysed for the presence of the compounds and metabolite. The hypotheses that these oestradiol analogues bypass the first pass hepatic metabolism by binding to CAII in erythrocytes and thereby extends the elimination half-life of the compound was assessed ex vivo using whole blood and serum of CD-1 mice models via the rapid equilibrium dialysis (RED).

Results: LC-MSMS evaluation of serum samples of orally treated CD-1 mice was achieved at 3.9 min C9, 3.76 min for C10 and 5.24 min for C19. The RED system showed specific binding of oestradiol analogues to erythrocytes providing a validation of results discovered in silico and in vitro.

Discussion: Data therefore revealed the potential of the novel drug binding to CAII delaying early metabolism. There was a statistically significant increase in the expression of PCNA, HIF-1α and CAIX with C9 (P<0.001) when compared to the experimental groups. Results from this study indicate that there is merit to further investigate the mode of action of C9, C10 and C19 in vivo
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Abstract Detail
FEASIBILITY OF INTRAUTERINE DEVICE INSERTION AT THE TIME OF CESAREAN SECTION AT KALAFONG PROVINCIAL TERTIARY HOSPITAL

Background: The use of long acting reversible contraceptive (LARCS) is patient independent and does not require frequent clinic visits. Insertion of intrauterine device (IUD) post caesarean has some advantages. The woman is known not to be pregnant, highly motivated for contraception, the placement is convenient for both health care provider and patient, with less patient discomfort and a very low complication risk at insertion.

Objective: To evaluate the feasibility, uptake, expulsion rate, complication, and continuation rate of IUCD insertion at the time of caesarean section.

Methods: Women undergoing elective caesarean section at Kalafong Provincial Tertiary Hospital were recruited. Copper T 380 IUDs were inserted at the time of caesarean section through the uterine incision. Patients were followed up at three and six months after insertion.

Results: One hundred and sixty-five patients were recruited. Forty patients (24.3%) accepted insertion. Their mean age was 29.8 years. Most caesarean sections were performed for previous caesarean section. No complications were associated with insertion. The expulsion rate at 3 months was 17.5%(n=7) and one patient expelled after six months (2.5%). The accumulative expulsion rate at six months was 20% (n=8). The continuation rate for IUDs was 100% after six months, and all were satisfied with the IUCD.

Conclusion: Although IUCD insertion at the time of caesarean section is appealing and safe, uptake of copper T 380 IUD insertion at time of caesarean section was low. Expulsion rate was similar compared to other international studies. There were no complications associated with insertion or cases of infection. The continuation rate and patient satisfaction levels were excellent in patient who accepted IUCD insertion at the time of caesarean section.
Abstract Detail
A PROSPECTIVE STUDY ANALYSING THE INFLAMMATORY MARKERS IN CHILDREN WITH ATOPIC DERMATITIS IN THE GREATER TSHWANE REGION

Introduction: Atopic dermatitis (AD) is a chronic inflammatory disease of the skin commonly affecting children. AD is a disease of skin barrier dysfunction. The exact cause of the disease is unknown. Genetics, environmental and immunological factors are known to interact in the pathophysiology of AD. Its severity is classified as mild, moderate and severe. The objective of this study is to analyze the levels of the inflammatory markers C-reactive protein (CRP), mean platelet volume (MPV) and ceruloplasmin in children with AD in the greater Tshwane district, and also to compare the inflammatory markers levels in different groups in relation to the severity of the disease.

Materials and methods: A prospective study involving 74 children between the ages of 1 -13 years known to have Atopic dermatitis. Severity assessment using SCORAD index on consultation day and blood taken for inflammatory markers done. The levels of inflammatory markers were analysed. The levels were correlated against severity group, age and gender.

Results and discussion: Levels of CRP showed significant abnormality in the moderate group compared to mild and severe AD group. There is no significant difference in MPV over severity, age and gender. No significant difference in the level of ceruloplasmin against age and severity.

Conclusion: Our study is different from the study by Karabudak et al in that there is no difference in the levels of inflammatory markers against severity groups, age and gender.
Abstract
COMPARING VITAMIN D LEVELS IN ADULTS WITH AUTOIMMUNE BULLOUS DISEASES ON LONG-TERM ORAL PREDNISONE WITH THOSE OF NORMAL HEALTHY CONTROLS

Introduction: Autoimmune bullous diseases are a group of conditions that are characterized by manifestation of blisters on the skin or mucous membranes due to loss of cell adhesion and the presence of bound and circulating antibodies directed against the cell surface of keratinocytes. Systemic corticosteroids are the mainstay of treatment. They provide the most rapid and effective control of the disease. Treatment with corticosteroids may contribute to low vitamin D (25-OH) levels in these patients; therefore vitamin D and calcium supplementation are essential to reduce the skeletal side-effects of long-term oral steroid use. The aim of the study is to determine the level of vitamin D (25-OH) in patients with autoimmune bullous diseases on long-term systemic corticosteroid therapy and compare these levels with a normal healthy control population according to age and gender, to ensure that the patients are adequately supplemented with vitamin D during treatment.

Aims and Objectives:
• To determine the levels of vitamin D (25-OH) in adults with autoimmune bullous disease on long-term oral prednisone.
• To compare vitamin D levels, with those of healthy individuals of the same age and sex. The dose of vitamin D supplementation should ensure that the circulating level of 25(OH)D reach minimum threshold of 30ng/ml to maintain skeletal health.

Methods: Vitamin D3 levels were analyzed in 29 patients with confirmed autoimmune bullous diseases on long-term oral prednisone. These levels were compared according to age and gender with those of normal healthy control subjects. 3ml of blood was obtained from each participant and sent to a private laboratory within 24 hrs. Results and Discussion: Vitamin D3 levels were higher in patients with autoimmune bullous diseases than in the control group for all the different ages and genders.

Conclusions: The study demonstrated that the levels of vitamin D3 in patients with autoimmune bullous diseases on prednisone and vitamin D supplementation were higher than those of the normal healthy control group not on any supplementation, confirming the importance of vitamin D supplementation in such patients. It is therefore recommended that vitamin D levels be included as part of monitoring for these patients.
Abstract Detail
NEUROPSYCHOLOGICAL WELL-BEING AND RELATED PHYSIOLOGICAL PARAMETERS IN FUTURE HEALTH PROFESSIONALS

**Background:** Stress is an important psycho-social problem in society and has a growing prevalence. It is both a risk factor and indication of neurological disease, disorder or dysfunction. This study aims to understand the relationship between and analyse the physiological indicators of stress, inflammation and burnout in future health professionals and the comparison of this data to existing brain pathology databases and literature searches. The comparisons will include but are not limited to traumatic brain injury, stroke, depression and concussion.

**Methods:** The non-intervention study of 30 participants and 15 controls will consist of physiological and questionnaire-based assessments that will measure burnout (based on internationally validated burnout inventories), physical and mental wellbeing, malnutrition scores, anthropometric parameters and physiological parameters such as blood pressure and urine inflammation markers (neopterin). The physiological parameters will be measured using the Infiniti Pro Biofeedback apparatus and will include measures of pulse pressure, body temperature and electrodermal response (skin conductivity). Neopterin levels in a midstream urine sample will be quantified using an ELISA protocol.

**Results and discussion:** The expected results will include a possible relationship between high stress levels and an increase in inflammation as represented by increased neopterin levels. Other interesting findings may include establishing links between brain pathology and high stress levels.

**Conclusion:** Potential outputs of the study may include establishing further links between burnout, high stress levels and brain pathology for defining new areas of research.
Abstract Detail
UNIVERSITY STUDENTS' ABILITY TO ESTIMATE PORTION SIZES OF MAIZE MEAL PORRIDGE: COMPARISON OF TWO PORTION SIZE ESTIMATION AIDS

Background: The aim of the study was to determine university students’ ability to estimate portion sizes of three forms of maize meal porridge (soft, stiff and phuthu) using bean bags and food photographs as portion size estimation aids (PSEAs).

Method: In a cross-sectional, comparative descriptive study, a 104 University of Pretoria full time students were recruited. In 12 separate stations participants had to match small (250 mL) or large (500 mL) portions of three forms of maize meal porridge dished up on enamel plates to either a set of bean bags (625 mL, 500 mL, 375 mL, 250 mL, 190 mL and 125 mL) or to life size, colour photographs of the same volumes on the same dishes, in random order. Three test-retest assessments were added to the battery. Body weight (SECA 874 digital scale) and height (SECA 217 height meter) were obtained. Estimations were scored: a perfect accuracy was assigned 0, underestimation got negative values, and overestimation positive values. BMI (body weight[kg] height[m2]) was calculated. Faculty of Health Sciences Research Ethics Approval was obtained (Ethics reference number: 5672017).

Results: From all the participants (age: 20.9±1.97 years), 58 (56%) were females, 18 (17%) were underweight (BMI < 18.5kgm2) and 5 (5%) obese (BMI > 30kgm2). From a total of 1243 estimations, 37.0% were perfect, 23.7% were underestimations, and 36.2% were overestimations. The general trend for soft and phuthu porridge was overestimation (41.1% and 31.1%, respectively), with underestimation for stiff porridge (43.4%). Using bean bags, small and large portion sizes were overestimated (79.5%). Test-retest reliability was acceptable.

Discussion and Conclusion: Bean bags result in overestimation of porridge portions. Food photographs perform better than bean bags as PSEAs, yet; overall, estimation errors were common. These findings have practice implications for portion size estimation of porridge among students. For improved external validity, future studies should include more foods and target groups.
Faculty Day 2018 Abstract 2018062

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Abstract Detail
FREE FATTY ACID RECEPTOR 4 AGONISTS INHIBIT BREAST CANCER-INDUCED OSTEOCLASTOGENESIS IN RAW264.7 MURINE MACROPHAGES, IN VITRO

Background: Bone remodelling is essential for the renewal of bone to maintain its strength and mineral homeostasis. Osteoclasts are large, multinucleated cells responsible for the resorption (breakdown) of bone. A constant balance is needed between the rate of formation and resorption; imbalances may lead to pathological states such as osteoporosis. Bone remodelling is known to be severely affected by cancer. Breast cancer is the most common type of cancer diagnosed amongst woman in South Africa. Most patients in advanced stages of the disease develop osteolytic bone metastases that dissolve bone, causing localised erosion of bone tissue. Natural compounds, have recently received considerable interest due to their presumed safety and potential nutritional and therapeutic effects. Some long-chain polyunsaturated fatty acids (LCPUFAs) have been investigated for their effects on osteoclast formation and bone resorption as well as cancer. The aim of this study was to investigate the effects of an n-3 PUFA docosahexaenoic acid (DHA) and the FFA4 agonist, TUG891, on breast cancer-induced osteoclastogenesis in vitro.

Methods: MCF-7 and MDA-MB-231 breast cancer cells were exposed to DHA or TUG891 (1-100µM) in order to assess their effects on breast cancer cell proliferation, cell migration and bone metastatic genes and proteins. RAW264.7 murine macrophages were subsequently exposed to pre-treated conditioned media of these breast cancer cells and assessed for their effects on osteoclastogenesis, NF-κB activity, osteoclast-specific genes and cell death.

Results: In breast cancer cells, both DHA and TUG891 (100µM) significantly decreased wound healing through inhibition of cell migration; and affected potential metastatic genes and proteins through FFA4 and MAPK signalling pathways. The conditioned media of the pre-treated breast cancer cells significantly decreased osteoclast formation and activity of mature osteoclasts through possible blockage of osteoclastogenic signalling pathways. Osteoclast-specific genes were significantly reduced, thus confirming the inhibition of specific signalling pathways.

Conclusion: This study was the first to demonstrate the effects of DHA and TUG891 on breast cancer-induced osteoclastogenesis in RAW264.7 murine macrophages. Results obtained suggest the potential therapeutic effect of these compounds in controlling the ability of breast cancer cells metastasizing to bone and subsequently reduce the severity of metastatic osteolysis.
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Abstract Detail
THE RELATIONSHIP BETWEEN THE LUMBAR LORDOSIS ANGLE AND LUMBAR SPINE MORPHOMETRICS IN A SOUTH AFRICAN POPULATION

Background: Increased incidence of lower back pain has sparked the investigation into the dynamics of the lumbar spine. The lumbar lordosis angle (LLA) is involved in spine dynamics and affects the material properties of the spine. Because the LLA is believed to be population specific, this study aimed to investigate possible population specific trends in South African lumbar spines.

Method: Computed tomography scans (n= 82) from Steve Biko Academic Hospital were analysed. Forty-six were male (33 = black – BM; 13 = white – WM) and 36 female (22 = black – BF; 14 = white – WF). The mean ages for males and females were 34.24 ± 9.78 and 34.28 ± 11.05, respectively. LLA was determined using the Cobb method: the angle measured at the intersection between two lines drawn from the superior endplate of L1 and the inferior endplate of L5. The bone mineral density (BMD) and morphometrics of the vertebral bodies and posterior elements were determined and correlated with LLA.

Results: The mean angles were: BM = 29.4° ± 1.5°; WM = 32.2° ± 2.0°; BF = 29.2° ± 2.1°; WF = 37.0° ± 2.2°. BMD was inversely proportional to LLA for L4 and L5 in BM and BF and for L3 and L5 in WF. An inverse proportionality was observed in: BF for the transverse process lengths of L4; WF for spinal canal measurements and pedicle height of L1, vertebral body width (VW) of L3 and L5, and posterior vertebral body height (VH) of L2. Direct proportionalities were seen in the pedicle widths of L3 to L5, VW of L2 to L4, vertebral body depth of L5, and anterior VH of L3 and L5 of WM.

Discussion and conclusion: Contrary to our results, other studies concluded that black LLA’s surpass white LLA’s. However, the effects of LLA on morphometrics in our study agreed with previous authors. The inverse proportionality between LLA and muscular support explains the negative correlation between BMD and LLA. Similarities were seen across populations when looking at within group correlations, however between group comparisons produced unique trends in the lumbar spines. These results will aid in the understanding of population specific spine dynamics.
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Abstract Detail  
FACTORS INFLUENCING SUSCEPTIBILITY OF CD4+ T LYMPHOCYTES TO HIV-1 SUBTYPE C AND THE HOST CELL RESPONSE TO VIRUS EXPOSURE

Background: Despite years of intensive research and the implementation of numerous eradication strategies, HIV remains a major healthcare concern. Infection with HIV causes depletion of CD4+ T lymphocytes, leading to severe dysfunction of the immune system if untreated. The development of antiretroviral (ARV) drugs has made the disease manageable but does not eliminate the underlying infection. Alternative therapeutic approaches, informed by a comprehensive understanding of how the host cell responds to infection at a molecular level, must be developed to supplement ARVs. The purpose of this study is to investigate what factors will enable optimal infection of CD4+ T cells in vitro, and to determine the host cell response to virus exposure in terms of gene expression.

Method: CD4+ T lymphocytes, isolated from the peripheral blood of healthy donors via FACS, were activated by co-stimulation with anti-CD3 and anti-CD28 monoclonal antibodies. The effect of activation on the expression of major receptors for HIV (CD4, CCR5 and CXCR4) was assessed by flow cytometry. The susceptibility of these cells to infection with primary HIV-1-C strains at different concentrations was determined using a flow cytometric assay to detect intracellular p24 viral protein. The final component of the study, yet to be completed, is to characterize the gene expression profile of HIV-exposed CD4+ T cells using microarray technology.

Results: Stimulation of isolated CD4+ T lymphocytes using this method leads to robust activation, characterized by massive proliferation and high CD25 expression. Dramatic changes in the expression of the HIV co-receptors was observed – CXCR4 undergoes extreme upregulation, while CCR5 is diminished. The activated cells appear to be susceptible to infection with a dual-tropic HIV isolate. Infection efficiency is positively correlated with increasing quantity of virus used.

Discussion and conclusion: Activation is a major factor influencing susceptibility of CD4+ T cells to infection. Contrary to previously reported findings using other protocols, CCR5 appears to be downregulated, which has important implications for the susceptibility of these cells to CCR5-tropic viruses. Productive infection was definitively demonstrated, which is critical to the larger goal of the planned gene expression study which should provide insight into the host-pathogen interactions at work.
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Abstract Detail
EVALUATION OF THE IMPLEMENTATION OF THE INFANT & YOUNG CHILD FEEDING POLICY (IYCFP) - IN DOCTOR KENNETH KAUNDA DISTRICT

Background: The South African government gazetted the Infant & Young Child Feeding Policy (IYCF) in 2013 in line with the Global Strategy on Infant and Young Child feeding (GS-IYCF) Policy. Objective: To determine the stage of implementation of the IYCF Policy and the level of support, promotion and protection rendered to mothers in Health facilities in line with the South African gazetted IYCF policy.

Methods: Cross sectional study of facilities implementing the Infant and Young Child Feeding (IYCF) Policy through collection of quantitative data from mothers who visit a health facility on the day of the study. A simple random sampling method was used to select the facilities.

Results: 60 mothers participated in the study and 48% of them were between the 25 – 40 years age group. 1out of the 5 health facilities selected from the sample did not have a copy of the IYCF policy. 100% of the Health Care Worker (HCW) in the selected facilities were all trained on the IYCF policy. The responsibility of providing Nutritional Support in the facilities lay in the hands of the Professional Nurse with 73.3% (44) of the responses highlighting that it is the responsibility of the Professional Nurse. During antenatal period, 78.3% (47) of the total participants received education and support on the benefits of breastfeeding and nutrition.

Conclusions: Implementation of the IYCF policy is at an advanced stage in the District considering the fact that most of the requirements of the policy at Antenatal, Intra Partum and Postnatal were met.
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Abstract Detail
KNOWLEDGE, ATTITUDES AND PRACTICES OF YOUNG PEOPLE IN ZIMBABWE ON CERVICAL CANCER AND HPV, CURRENT SCREENING METHODS AND VACCINATION

Background: The National Cancer Prevention and Control Strategy for Zimbabwe (2014-2018) highlighted that despite health education on cervical cancer being unstructured, Zimbabwe does not have a cancer communication strategy that focuses on cancer risks factors as a cancer primary prevention. The aim of the study was to determine the knowledge, attitude and practices of young people in Zimbabwe on cervical cancer, screening, HPV and vaccination.

Methodology: A national cross-sectional survey with a sample of 751 randomly selected young people (15 to 24 years) from five provinces in Zimbabwe was conducted. Data on their knowledge, attitude and practices were obtained through a questionnaire.

Results: Most young people (87.47%) claimed to know what cervical cancer is; 94.27% acknowledged that young people should be concerned about cervical cancer. However, only 43.14% (324) had ever heard of cervical cancer prevention screening and 53% (398) did not know about HPV, how it is transmitted or prevented. Majority of the respondents (96.71%, 646668) chose social media as a platform to educate young people on cervical cancer.

Discussion and conclusions: Although young people in Zimbabwe have an idea about cervical cancer and the seriousness thereof, they lack adequate knowledge on risk factors, especially HPV. Government can generate behavioural changes around cervical cancer by commissioning a cervical cancer communication strategy. A communication strategy that can be integrated in formal education and social media platforms, to disseminate consistent messages to a broader audience and increase knowledge and attitudes of young people.
Abstract Detail
INCLUSION OF YOUNG BOYS AND MIDDLE-AGED HIV-POSITIVE WOMEN IN HPV VACCINATION IN ZIMBABWE: OPPORTUNITIES AND HEALTH SYSTEMS CHALLENGES

Background: As Zimbabwe implement HPV vaccination programme within a health system characterised by challenges, it may be critical to include young boys and middle-aged HIV-positive women in these programmes. The aim of this integrative evidence synthesis is to highlight opportunities in including young boys and middle-aged HIV-positive women in HPV vaccination in Zimbabwe.

Methodology: An integrative synthesis of evidence from a systematic review and a mixed method national cross-sectional survey on the knowledge, attitude and practices of young people on cervical cancer and HPV vaccination in Zimbabwe.

Results: Young men (67.3%, 186275) have an ignorant attitude towards cervical cancer as they view it as a women’s responsibility with 88% not knowing that HPV is a risk factor for cervical cancer. Vaccination of young boys is key to further reinforcement of vaccine protection since they are part of the HPV-chain of infection. Safety and immunogenicity of HPV vaccine is almost comparable in HIV-positive and HIV-negative women. Offering HPV vaccination as primary cervical cancer prevention to HIV-positive women will reduce cervical cancer morbidity.

Discussion and conclusions: Zimbabwe embarked on mass HPV vaccination of young girls in May 2018 through a school-based system, which could include young boys. Opportunities to offer vaccination to HIV-positive middle-aged women through HIV health programmes exist. Such an inclusive HPV vaccination programme might offer effective coverage sooner. Despite challenges, should Zimbabwe’s focus now be on strategies, social and resource mobilisation for HPV vaccination to girls, boys and HIV-positive middle-aged women?
Abstract Detail
PLAIN VERSUS PICTORIAL HEALTH WARNINGS ON CIGARETTE PACKS: THE SOUTH AFRICAN CASE

Background: The 17 Sustainable Development Goal (SDGs) have for the first time a target 3a which is a specific target on tobacco control. Therefore, tobacco control is recognised as an important driver of the SDGs. Tobacco control remains a high priority in the government’s plans to achieve health for all South Africans. The new South African Tobacco Bill proposes introducing plain packaging.

Methods: The study aimed to determine the effectiveness of pictorial warning with or without a plain package on smoking behaviour. A Quasi-experimental mixed methods (cross-over experiment and focus group) study design was used. Participants were requested to assess each of the health warnings (text, pictorial (branded or plain package) and complete health warning rating questionnaire for each of the health warnings. After the assessment of health warnings by participants individually, focus group discussions were then conducted.

Results: The study had a total number of 767 participants with a response rate of 79.9%. There were equal numbers of smokers as non-smokers. Majority of the participants who smoked indicated that they were not planning to quit (64.6%). Overall, smokers found the pictorial warning on lung cancer (31%) the most effective. One out of every three participants felt that the abortion pictorial warning was most effective in making one stop and think about the health effects of smoking. The impotence pictorial warning was rated as likely to be most effective in influencing young people from starting to smoke. Participants indicated that the pictorial warnings on packages without the brand design elements (plain packages) were more effective than the pictorial warnings on packages with the brand design elements (branded packs). The top five most effective pictorial warnings included those related to: lung cancer, impotence, gangrene, abortion, and oral disease.

Conclusion: This study, the first of its kind in South Africa, provides insight into the potential effect of pictorial warnings and suggests that plain packaging will be effective in South Africa.
Abstract Detail
A COMPARISON OF THE ADAPTED SOUTH AFRICAN MINI MENTAL STATE EXAMINATION AND THE ORIGINAL FOLSTEIN MINI MENTAL STATE EXAMINATION FOR DETECTING COGNITIVE IMPAIRMENT IN LITERATE AND ILLITERATE PATIENTS WITH MEMORY PROBLEMS

Background: The Folstein mini mental state (MMSE) exam is the most commonly administered psychometric screening assessment of cognitive functioning. It is used to screen patients for cognitive impairment and track changes in cognitive functioning over time. The Folstein MMSE caters for assessment of cognitive decline in highly educated individuals (with a minimum education of grade 8); however, its utility in individuals with low educational levels is limited. The adapted South African mini mental state examination (SA MMSE) is a tool that has been developed by the Department of Neurology at the University of Pretoria in a previous study to accommodate those patients with low educational levels or who are illiterate. Our aim is to compare the adapted SA MMSE to the Folstein MMSE for detecting cognitive impairment in literate and illiterate patients with memory impairment; ultimately, we would like to show that the adapted SA MMSE is a good tool to detect cognitive impairment in patients with limited literacy.

Methods: Two groups of patients who presented to the Neurology outpatient department with cognitive decline were assessed. The first group consisted of 12 consecutive patients who were literate; the second group consisted of 10 consecutive patients who had a low level of schooling or no education. The patients were assessed with both the Folstein and the adapted South African MMSE. Their scores on each test were recorded and compared for their ability to detect mild, moderate or severe cognitive impairment. The study received approval by the University of Pretoria Research Ethics Committee and the CEO of the Steve Biko Academic Hospital, and informed consent was obtained from the patients or close family members.

Results: For the literate group, the mean original Folstein score was 19.7 and the adapted SA MMSE was 21.9. In the illiterate group, the mean Folstein MMSE was 18.5 and the adapted SA MMSE was 23 (range 20-25).

Conclusion: I1literate subjects showed marked improvement in the adapted SA MMSE vs Folstein MMSE. The slight improvement in the scores of the literate patients may be a result of the fact that the scores were tested in the patients’ home language. The adapted SA MMSE is possibly a more reliable scale to use for testing cognition in illiterate or minimally literate subjects, and more patients will be recruited to confirm these findings.
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Abstract Detail
MEDICAL STUDENTS’ INTEREST IN RESEARCH: THE CARROT AND THE STICK

Background: The competency-based framework of the Health Professions Council of South Africa has research-related competencies linked to the “Scholar” role. There are limited opportunities in the undergraduate curriculum at the University of Pretoria (UP) that are available for medical students to be exposed to research. The purpose of this study was to describe factors that contribute towards the interest in research among medical students.

Methods: A cross-sectional study design using qualitative methods of two student focus group discussions, three key informant interviews and an analysis of previous surveys of an existing research module “SMO 211” was conducted. Validity and reliability was ensured by adapting questions from a similar study. Trained facilitators conducted the FGDs. Participants were purposively sampled. Audiotaping was done with informed consent. Ethical approval was obtained (number 1202016). Thematic analysis was conducted.

Results: Participants concurred that SMO 211 provides a stepping stone in the research induction of students. Data triangulation highlighted challenges in the timing, content and duration of SMO 211 that affected students’ research interest. Role-modelling with an adequate mentor was a critical factor in motivating less confident students to continue research exposure and application. The lack of choice of topics, group members and supervisors were drawbacks of SMO 211. Key informants acknowledged that the “hidden” research ethos that has not filtered to students.

Conclusions: The lack of choice and access to research-related resources were consistently highlighted as barriers. The current university environment with its strategic pillar of research is conducive to stimulate more research awareness with opportunities amongst students. Practical suggestions include an online research-resource platform as well as more active participation of health researchers as mentors andor supervisors.
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Abstract Detail
THE CONTRIBUTION OF AUDIENCE RESPONSE SYSTEMS (ARS) TOWARDS THE ACTIVE LEARNING JOURNEY OF STUDENTS

Background: South Africa has 26 Higher Education Institutions with predominantly formal contact-based teaching. Due to trends and disruptions, the University of Pretoria embarked on hybridization that incorporates technology. Active learning is about “students doing things and thinking about things they are doing”. Audience Response Systems (ARS) were piloted for such learning in the Faculty of Health Sciences.

Methods: A cross-sectional quantitative study with qualitative augmentation was conducted during 2015 to determine whether ARS use had an effect on knowledge retention for Health Sciences students. Ethics approval was granted (number 5012015). An online survey was posted on electronic platforms with an audience of 500 Health Sciences students. Data was analysed using ATLAS.ti and Stata.

Results: Approximately 300 students (67%) from several disciplines responded. ARS were mainly used in 1st semester (daily: 46.8%). 45% of students thought that they had improved understanding and increased peer-lecturer-interactions; 59% felt ARS were used to measure comprehension. 13 thought their marks did not improve. Most participants felt ARS must not be used for attendance. Optimal and frequent ARS use appeared to have a positive learning impact. Students were not averse to manipulate ARS for attendance and assessment.

Discussion and conclusions: There seemed to be a misalignment between the institutional hybrid strategy and technological learning that frustrated students. There was an unintended consequence of marginalization. ARS were perceived as low-hanging fruit but its scale-up and realization of learning outcomes were limited. The digital literacy of support and academic staff and more active participation of students in the hybrid strategic direction of institutions are suggested. ARS can have a positive impact on the active learning experience of students but limitations in the environment must be addressed prior to scale-up in the Faculty of Health Sciences.
Abstract Detail
PELVIC FLOOR MORPHOLOGY IN FEMALE CHIMPANZEE S

Objective: Topographical pelvic floor anatomy plays a significant role in maintaining the structural integrity of the pelvic floor (1). This study evaluated the topographical anatomy of nonhuman primates i.e. nulliparous female chimpanzees using four dimensional (4D) transperineal pelvic floor ultrasound (TPUS).

Methods: This prospective study included 16 nulliparous female chimpanzees (Pan troglodytes) from a chimpanzee sanctuary. As part of a routine health check and medical research, 4D TPUS was performed. Volumes were acquired at rest and prone, with the animal anesthetized without muscle relaxant agents. A GE Voluson S6 BT16 system with RAB 6-RS 2-8MHz was used, and offline analysis was performed using 4D View software (GE, Kretztechnik, Austria). We analysed the appearance of the pelvic floor musculature, mean hiatal distance and levator hiatal area at rest, using standard protocols for pelvic floor ultrasound in humans(2). Ethical approval was obtained from the University of Pretoria Animal Ethics Committee

Results: The mean age was 16 years (13-34 years) and mean BMI 48.8 (36-67). One dataset was excluded due to poor image quality. The appearance of the nulliparous primate pelvic floor is shown in the midsagittal plane in Figure 1A, the levator hiatus in 1B and tomographic axial plane imaging of the levator ani muscle complex in Figure 1C. The mean levator hiatal anteroposterior distance and hiatal area (n=15) at rest were 5.24 (4.12- 6.5) cm and 20.91 (13.99-33.11) cm2 respectively. The anorectal angle seemed to be wider than in human females.

Conclusion: Despite significant differences in pelvic bony anatomy, the gross appearance of the levator ani muscle complex bears some resemblance to that of human females. There seems to be an equivalent to the puborectalis muscle, and an intact muscle insertion was usually identifiable, as it is in human nulliparae. While there are internal and external anal sphincter equivalents, the anal canal may be relatively wider, and the external sphincter may be thinner than in humans. Clinical correlation with cadaveric dissection will allow for a more extensive analysis.
Abstract Detail
THE ANTIPROLIFERATIVE ACTIVITY AND INFLUENCE OF DIALLYL TRISULFIDE ON REACTIVE OXYGEN SPECIES GENERATION IN VITRO

Background: Research has identified a sulfate-containing constituent of garlic, diallyl trisulfide (DATS), as a potential anticancer agent. DATS exhibits antiproliferative activity and induces apoptosis in tumourigenic cell lines. However, the mechanism governing its activity against breast cancer remains elusive. The aim of this study was to investigate the signaling mechanism utilized by DATS in a non-tumourigenic breast cell line (MCF-10A).

Methods: The in vitro effects of exposure to DATS (10 µM, 50 µM, 100 µM and 150 µM) on cell proliferation and morphology were evaluated in the presence or absence of N-acetyl cysteine (NAC) (20mM) for 24- and 48 hours using crystal violet staining (spectrophotometry) and light microscopy to determine if the effects are ROS-dependent. The effects of exposure to DATS (10 µM, 50 µM, 100 µM and 150 µM) on hydrogen peroxide generation after 24- and 48 hours were evaluated with 2,7-dichlorofluoresceindiacetate (DCFDA) and fluorescent microscopy.

Results: Crystal violet revealed that DATS exhibited dose-dependent antiproliferative effects in vitro. Exposure to 10 µM, 100 µM and 150 µM DATS resulted in reduced cell growth by respectively 10%, 50% and 60% after 24 hours. Light microscopy demonstrated dose-dependent effects on cell-rounding with exposure to 50 µM, 100 µM and 150 µM DATS resulting in approximately 9-, 15- and 20 rounded cells per 100 cells after 24 hours. Co-exposure to DATSNAC (10 µM, 100 µM and 150 µM DATS in the presence of 20mM NAC) considerably increased cell growth to 103%, 79% and 81% and decreased cell rounding to 6-, 7- and 10 rounded cells per 100 cells after 24 hours respectively indicating a ROS-dependent mode of action. Oxidative stress induction by DATS was confirmed by DCFDA and fluorescent microscopy in a dose-dependent manner.

Discussion and conclusion: The antiproliferative- and cell-rounding effects of DATS were attenuated by NAC suggesting that DATS-mediated effects are ROS-dependent in a non-tumourigenic breast cell line. Future studies will investigate the role of ROS in DATS-mediated effects on cell cycle progression and apoptosis induction. This study contributes to knowledge known about the role of ROS in the signaling mechanism exerted by DATS in non-tumourigenic cells.
Abstract Detail

ADMISSION ALGORITHM FOR MENTAL HEALTH PATIENTS

Background: In my assigned hospital, there was no fixed admission algorithm for the admission of mental health patients. A problem that could lead to incomplete admission processes, i.e. of history, physical exam, admission investigations and a large amount of nonspecific provisional diagnoses. All of these factors lead to delayed placement and could prolong the formulation of a definitive diagnosis and subsequent treatment plan.

Method: Firstly the staff were interviewed in order to obtain a more contextual view of the problem. Thereafter the admission and discharge diagnoses from the past 5 months of this year were analyzed to conceptualize how many admission diagnoses are nonspecific and how many discharge diagnoses are diagnoses that could have been picked up initially through appropriate admission investigations. Lastly, I did an anonymous survey, focussing on main admission points, i.e. casualty, in which I assessed what doctors currently do, what they don’t do and where their challenges are. I also received feedback on the proposed algorithm I designed- using EML, Mental health act and KZN guidelines.

Results: The diagnoses analysis revealed that majority of the admissions were nonspecific, and a large portion of the discharges were substance-induced psychosis, among others. This one example is a condition which could be recognized early through sufficient examination and investigations. However, in the unpredictable nature of mental health cases this was a poor indicator to use. The surveys provided a more in-depth insight, which demonstrated that many doctors acknowledge that there was no admission algorithm process in this hospital. A large majority were in favour of the proposed algorithm.

Discussion: There are omissions in the admission process which causes uncertainty and delays. A set algorithm will be useful in the admission setting of a wide variety of mental health cases.
Abstract Detail
SELECTING HSPC POPULATIONS FOR ANALYSIS OF HAEMATOPOIETIC POTENTIAL BY CFU-ASSAY AFTER HIV-1 EXPOSURE

Introduction: Chronic HIV-1 infection is characterised by haematological abnormalities such as cytopenias including anaemia and leukopenia. The lytic cycle and intracellular replication processes of HIV alter cytokine profiles which are crucial to maintaining normal haematopoietic function. The haematopoietic system, including all blood and immune cells, consists of a heterogeneous population of haematopoietic stem and progenitor cells (HSPCs) generated through haematopoiesis, a process tightly regulated by cytokines in the bone marrow niche where HSPCs reside. HSPC plasticity is impacted in the bone marrow by altered cytokine profiles originating from circulating infected CD4+ T-cells, monocytes, and dendritic cells. The ability of HIV to infect HSPCs is debated in literature, although recent findings suggest that HIV subtype and tropism are critical to the probability of HSPC infection in vivo.

Methods: Colony forming unit (CFU) assays are used to assess the haematopoietic potential of HSPCs by counting and identifying colonies formed in semisolid media supplemented with cytokines supporting differentiation into myeloid lineages. Here, defined subpopulations of CD34+ cells were assayed from different donors to determine the best population to sort from HIV-exposed HSPCs which will provide the most reproducible data across biological replicates. Umbilical cord blood (CB) mononuclear cells were isolated by density centrifugation and FACS-sorted into semisolid medium, and incubated at 37°C, 5%CO2. Colonies were identified and enumerated after 14 days.

Results: The primitive population of sorted CD34+Lin-CD38- HSPCs produced few to no colonies across six biological replicates, but pockets of expanded cells and apparently live single cells were visible after 14 days in culture. CD34+ and CD34+Lin- populations represent the same population as CD34+ cells from CB were Lin+, and medians for colony-forming capacity were not significantly different. CD34+Lin-CD38+dim populations were similar to CD34+Lin- populations in colony number and diversity.

Discussion: CD34+Lin-CD38- cells are not a suitable population for assaying HPSC plasticity in HIV unexposed CB-derived HSPCs based on preliminary data. The CD34+Lin- subpopulation produces relatively reproducible data from primary cell isolates and is suitable for assaying the colony forming capacity of HIV unexposed HSPCs. Further data will be generated on the colony forming capacity of HIV-exposed CD34+Lin-CD38- cells if possible.
A CASE OF MEVALONATE KINASE DEFICIENCY MASKED BY CMV INFECTION AND PROBABLE ALPHA-1 ANTITRYPSIN DEFICIENCY

**Background:** Mevalonate kinase deficiency is a rare autosomal recessive, auto-inflammatory and metabolic disorder inherent to cholesterol and non-sterol isoprenoid biosynthesis. The enzyme deficiency exists as a continuum of Hyper Immunoglobulinemia D syndrome (HIDS) to Mevalonic aciduria. Mevalonate kinase deficiency is diagnosed by significantly elevated urine mevalonic acid, reduced mevalonate kinase activity and confirmation by MVK gene sequencing.

**Case report:** 5 month old male toddler presented with jaundice and recurrent febrile episodes shortly after birth, followed by distended abdomen and bleeding tendencies. The patient was born via caesarean section with a normal birth weight. He was HIV exposed; mother was on Anti-retroviral treatment during pregnancy. HIV PCR was negative. Patient had failure to thrive and neurodevelopmental delay. He was pyrexial, jaundiced with hepatosplenomegaly, ascites and caput medusae.

**Results:** Patient was diagnosed with congenital Cytomegalovirus infection with a high CMV viral load. The liver histology showed fibrosis with alpha-1-antitrypsin positive granules. DNA analysis was negative for common S and Z allele mutations. Urine organic acid analysis revealed a significantly elevated mevalonolactone. Confirmatory diagnosis was by DNA sequencing which detected compound heterozygous missense mutations on the MVK gene i.e. p.Tyr116His and p.Arg277Cys.

**Discussion:** This case demonstrated a late diagnosis of Mevalonic aciduria set back by the congenital Cytomegalovirus infection. An atypical alpha-1-antitrypsin deficiency was excluded by DNA analysis. Failure of clinical response to Ganciclovir prompted the pediatrician to consider a metabolic disorder. Confirmatory test for Mevalonate kinase deficiency was obtained post-mortem after the patient had succumbed to the disease without necessary treatment provided.
Abstract Detail
OXIDATIVE-STRESS MEDIATED CELL DEATH INDUCED BY DIALLYL TRISULPHIDE IN BREAST CANCER CELLS.

Background: Breast cancer is a global health concern and is the leading cancer in women worldwide. Previous studies have suggested that diallyl trisulphide (DATS), a constituent of garlic, exerts antiproliferative effects in breast cancer cells. The aim of this study was to investigate the role of ROS in the signaling mechanism utilised by DATS in a tumorigenic breast cell line.

Materials and Methods: Triple negative breast cancer cells (MDA-MB-231) were exposed to DATS at 10 μm, 50 μm, 100 μm, 150 μm in the presence or absence of a ROS scavenger, N-acetyl cysteine (NAC) at 2 mM concentration for 24- and 48 hours. The effect of DATS on cell growth and cell morphology was assessed using spectrophotometry (crystal violet staining) and light microscopy respectively. The production of hydrogen peroxide was evaluated by means of flow cytometry using 2,7-dichlorofluoresceindiacetate and fluorescent microscopy.

Results: Results demonstrated that DATS acts in a dose- and time dependent manner that is reliant on ROS. Crystal violet staining revealed that 100 μm DATS exposure for 48 hours inhibited cell growth to 64%. However in the presence of NAC cell growth was increased to 94%, over 48 hours. Light microscopy demonstrated that DATS increased cell rounding in a dose-dependent manner with 9100 cells rounded at 10 μm, and 55100 at 150 μm, whereas in the presence of NAC only 6 rounded cells were found at 150 μm after 24 hours. Fluorescent microscopy demonstrated a dose-dependent increase in hydrogen peroxide generation with a 1.6 fold increase when exposed to 150 μm over 24 hours when compared to media only.

Discussion and conclusion: This study demonstrates that the effects of DATS on proliferation, morphology and hydrogen peroxide production are inhibited by NAC in the MDA-MB-231 cell line suggesting that DATS exerts a ROS-dependent mode of action. The influence on cell cycle progression will be assessed in future via flow cytometry. This study contributes to what is known about the role of oxidative stress in the effects induced by DATS in a breast tumourigenic cell line.
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Abstract Detail
IN VITRO EFFECTS OF GLUTAMINE DEPRIVATION ON CANCER CELL PROLIFERATION AND OXIDATIVE STRESS

Background: Tumorigenic cells possess upregulated glycolysis- and glutaminolysis resulting in glutamine addiction. In addition, glutamine also possesses non-anabolic functions pertaining to oxidative stress and cell survival. Understanding the crosstalk between glutamine, proliferation, oxidative stress and cell cycle progression contributes to molecular determinants in cancer therapeutic regimes.

Materials and methods: The effects of glutamine deprivation (24h, 48h, 72h and 96h) were evaluated in the tumorigenic breast cell lines (MCF-7, MDA-MB-231) and a non-tumorigenic breast cell line, MCF-10. Cell proliferation and antioxidant activity were investigated by means of spectrophotometry. Fluorescent microscopy was conducted to evaluate deoxyribonucleic acid (DNA) damage. Flow cytometry was conducted to assess reactive oxygen species and cell cycle progression.

Results: Cell growth decreased to 87%, 80%, 69% and 62% after 24h, 48h, 72h and 96h of glutamine deprivation in the MCF-7 cell line. The MDA-MB-231 cell line showed 93%, 90%, 88% and 78% proliferation after 24h, 48h, 72h and 96h deprivation from glutamine. Glutamine deprivation (24h) resulted in a 1.5-fold increase in hydrogen peroxide generation. However, a decrease in hydrogen peroxide production was observed to 0.89 fold after 96h deprivation from glutamine in the MDA-MB-231 cell line. Hydrogen peroxide levels also increased in a time-dependent manner in the MCF-10A cell line to 1.2-fold. Oxidative stress was confirmed by aberrant catalase activity where the MCF-7 cell line decreased to 0.76 fold activity after 96h of glutamine deprivation. Furthermore, superoxide dismutase inhibition in the MCF-7 cell line increased to 10% after 96h of glutamine deprivation. Glutamine deprivation resulted in an increase in DNA damage to 1.89 fold in both tumorigenic cell lines 48h after glutamine deprivation. Deprivation from glutamine in the MCF-7 cell line for 72h and 96h resulted in an increase to 34% and 35% in the percentage of occupying the S phase and the G2M phase, respectively.

Discussion and Conclusion: This study demonstrates that glutamine deprivation results in decreased cell proliferation, oxidative stress, and DNA damage with the tumorigenic cell lines being affected most prominently. The knowledge pertaining to how tumorigenic- and non-tumorigenic cells adapt to glutamine deprivation is crucial to therapeutics targeting cancer cell metabolism.
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Abstract Detail
ANGIOGENIC, APOPTOTIC AND AUTOPHAGIC PROFILING OF CHRONIC MYELOID LEUKAEMIA PATIENTS’ PLATELETS EX VIVO BEFORE AND AFTER TREATMENT WITH IMATINIB

Introduction: Chronic myeloid leukaemia (CML) is characterised by a long sub-clinical period wherein there is a slow build-up of abnormal white blood cells. Platelets play an important role in cancer and tumour development, in particular their involvement in angiogenesis in tumours. Therapies directed at specifically targeting angiogenesis is a recognized method of antitumour therapy, however, it is not well researched in haematological malignancies.

Aim: In this ex vivo study the mechanism of CML progression, treatment and the signalling involved in the angiogenic, apoptotic and autophagic profiles and protein levels of these markers in CML patients’ platelets before and after treatment with Imatinib were investigated.

Materials and methods: Blood was collected from five CML patients according to staging and exclusion- and inclusion criteria as well as 30 control participants. Collection of blood from CML patients occurred at diagnosis and after 6 months of treatment with Imatinib (400 mg PO qDay). The angiogenic-, apoptotic- and autophagic profile of CML patients was determined ex vivo on platelets by means of flow cytometry, electron microscopy, and western blot analysis.

Results: Preliminary results indicated an initial high platelet count in CML patients at time of diagnosis. After 6 months of treatment with Imatinib, platelet levels lowered to normal ranges. These results correlated with Annexin-V analysis which indicated a slight increase in apoptosis in CML patients’ platelets. At the time of diagnosis, CML patients presented with platelet dysfunction that may be as a result of the pathogenesis of CML. After 6 months of treatment with Imatinib these levels normalised, either as a result of treatment with Imatinib or as a result of increased apoptosis resulting from treatment with Imatinib.

Discussion and conclusion: The importance of angiogenesis-targeted therapies in CML has recently become evident as the occurrence of tyrosine kinase inhibitor resistance and, specifically Imatinib resistance, increases. In CML this resistance has recently become linked to bone marrow (BM) angiogenesis which aids in the growth and survival of leukaemia cells. This study will enable researchers to focus on affected cellular mechanisms and the identification of targets for therapeutic intervention.
A PILOT STUDY TO IDENTIFY SENSORY INTEGRATIVE DYSFUNCTION IN CHILDREN WITH BILATERAL COCHLEAR IMPLANTS

Background: Vestibular deficits in children with hearing impairments including the surgical impact of cochlear implants (CIs) have been well documented. Koester et al., 2014 found a consistent pattern of vestibular bilateral integration deficits in children from the USA with CIs. The need for further examination of sensory integrative functions in children with CIs during occupational therapy assessment and intervention planning was indicated. An additional study on children with CIs in Iran recommended that vestibular and motor evaluations should be prioritised for children with CIs, as well as interventions to improve balance and motor skills. This study provided the opportunity to examine these areas of sensory integrative dysfunctions in South African children with CIs. A two-folded problem sparked an interest to conduct this study: (i) a lack of available evidence in literature in the context of occupational therapy and sensory integration applied to children with CIs, (ii) role of occupational therapists is underestimated in the cochlear team.

Method: Quantitative data from deidentified records from children 5 years to 8 years 11 months with bilateral CIs in South Africa (SA) was obtained. The Sensory Integration and Praxis Tests (SIPT) were used as the assessment instrument. Descriptive statistics was used to analyse SIPT data from SA. Inferential statistics was used to compare SA results to USA results.

Results: Children in SA with bilateral CIs present with the bilateral integration and sequencing pattern of sensory integrative dysfunction with significantly depressed post-rotary nystagmus (PRN) scores. There were no significant statistical differences between results from SA compared to results from the USA. SIPT scores have been adapted according to SA norms.

Conclusion: Occupational therapists working with children with CIs have a crucial role to play in thoroughly evaluating sensory perception and motor skills including vestibular-related functions to design an effective intervention plan in order to facilitate participation and engagement in occupations.
Abstract Detail
DATA DRIVEN INTERVENTION GUIDELINES FOR OCCUPATIONAL THERAPISTS WORKING WITH YOUNG CHILDREN WITH COCHLEAR IMPLANTS

**Background:** Children are receiving cochlear implants (CIs) at an increasingly younger age to optimise their developmental window for acquiring language. There is evidence of vestibular deficits that often go undetected in these children. Occupational therapy intervention, guided by data from formal and informal assessments, can improve the occupational performance of young children with CI’s, for optimal participation in everyday activities at a critical stage. The aim of this study is to describe intervention strategies for vestibular-cochlear deficits, including Ayres Sensory Integration® principles, that can information clinical reasoning of occupational therapists working with children with CIs aged 2 to 4 years.

**Method:** Surveys have been distributed to occupational therapists working with young children with CIs who have administered structured and unstructured assessments to determine the impact of impaired sensory perception on behaviour and development. Clinical guidelines have been indentified that are being used by occupational therapists in practice to address related sensory, motor and language developmental difficulties in these children.

**Results:** Children with CIs have specific vulnerabilities in vestibular and sometimes other areas of sensory processing in combination with an electronic device that impact on their daily functioning. These difficulties were divided into three categories: (i) difficulties with sensory perception, (ii) difficulties with motor control, and (iii) behavioural and emotional reactions towards environmental sensory input. These difficulties may impact a variety of childhood activities e.g. dressing, feeding, sleeping, playing and interacting with friends. Young children with CIs appear to have similar strengths pertaining to compensation and coping strategies such as visually aware of detail, and good with imitation. Occupational therapists providing early intervention to young children with CIs should consider the role of multisensory perception on performance and provide interventions as appropriate.

**Conclusion:** Practical strategies, considering Ayres Sensory Integration® principles have been identified to guide occupational therapists working with young children with CIs. Young children with CIs will benefit from data driven occupational therapy intervention using an evidence-based sensory approach to increase participation and engagement in childhood occupations. Strengths as well as areas of concern have
Abstract Detail
IDENTIFICATION OF SINGLE NUCLEOTIDE POLYMORPHISMS IN INFLAMMATORY BOWEL DISEASE PATIENTS ON AZATHIOPRINE THERAPY

Background: Azathioprine is an immunosuppressant used in the treatment of inflammatory bowel disease (IBD). However, the side effect profile of Azathioprine has raised concern as >20% of all treated patients present with leukopenia or myelosuppression. Much of Azathioprine’s side effect profile is linked to single nucleotide polymorphisms (SNP’s) in the thiopurine methyltransferase (TPMT) gene- which ensures the metabolism of Azathioprine. Mutated TPMT alleles result in deficient TPMT levels which directly correlate to cytotoxicity when Azathioprine is administered. Knowing a patient’s TPMT status allows physicians to make an informed decision about dosage and be alert to the signs of cytotoxicity. The TPMT SNP profile of American, Asian and European populations have been studied, but little literature is available for the South African population. Azathioprine therapy is an affordable treatment for IBD and while genetic testing expensive, it outweighs the accumulation of hospitalisation and treatment costs associated with cytotoxicity. Thus, is it essential to include "early warning" SNP testing into common practice?

Method: 40 patients with IBD and 40 controls were enrolled. After patient consent, 5ml of blood was collected to determine the presence of TPMT allele SNP *3A, *3B or *3C using RFLP PCR. Patient demographics, diagnosis, ESR, CRP and leucocyte counts prior to Azathioprine dosing as well as 12 months post initial dosing was obtained.

Results: TPMT *3B*3B was detected with statistical significance (p<0.001) in 3340 (82.5%) IBD patients and TPMT 1*3A was present in 740 patients (17.5%). Only 6 control patients presented as TPMT *3B*3B.

Discussion & Conclusion: A unique discovery of TPMT *3B*3B was made; that previously hasn’t been detected in TPMT studies of any ancestry- this may be a result of the diverse and unique South African population. The *3B homozygosity was present in patients both with and without recorded Azathioprine reactions –In future, the enzymatic effect of TPMT *3B*3B should be studied in a larger sample size prior to recommending early warning SNP testing in IBD patient using Azathioprine as these results cannot be ignored.
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Abstract Detail
ASSOCIATION AND DIAGNOSIS OF HUMAN HERPESVIRUS 6 INFECTION IN CHILDREN WITH FEBRILE SEIZURES IN KALAFONG AND STEVE BIKO ACADEMIC HOSPITALS IN GAUTENG, SOUTH AFRICA

Background: Human herpesvirus 6 (HHV-6) is a ubiquitous virus found worldwide with no defined seasonal variation or gender predisposition. There are two species termed HHV-6A and 6B, which are the causative agents of roseola infantum, a benign febrile exanthem of childhood. Roseola usually presents with a high-grade fever and/or a generalized maculopapular rash. Febrile seizures (FS) occur in children with roseola infection due to HHV-6 infection and it is not known whether the mechanism of FS in HHV-6 infection is a result of the high temperature or CNS invasion. Human herpesvirus 6 is not routinely tested for in children in South Africa (SA) and there is no published data on FS due to HHV-6 in South African children. The hypothesis of this study is that there is an association between FS and HHV-6 and therefore the aim was to describe the association between HHV-6 and FS and in children seen at Kalafong Academic hospital (KAH) and Steve Biko Academic hospital (SBAH).

Method: Blood and/or cerebrospinal fluid (CSF) specimens were obtained from 64 children aged between four months and six years from KAH and SBAH, presenting with FS. Immunoglobulin G (IgG) antibody was tested for in only blood specimens (n=54) using an HHV-6 ELISA kit. The presence of HHV-6A and 6B DNA was tested for in 80 specimens using real-time PCR. These specimens included blood (n=54) and CSF specimens (n=26).

Results: Forty-six of the 54 children (85.2%) were positive for HHV-6 IgG antibodies. Thirteen of the 64 children (20.3%) were positive for HHV-6 DNA, detected in two CSF and 11 blood specimens. None of the children had HHV-6 DNA in both CSF and blood specimens. Eight of the children had HHV-6B DNA (61.5%) and five (38.5%) had HHV-6A DNA detected in their clinical specimens.

Discussion and conclusion: In this study, a seroprevalence of 85.2% was shown with the majority of infections occurring in children less than two years old. The results showed that there was an association between HHV-6 and FS in children in Gauteng. Testing for HHV-6 is therefore warranted in order to prevent unnecessary antibiotic use.
Abstract Detail
MERELY MISSING THE PURPOSE OF REPORTING NEAR-MISS EVENTS

**Introduction:** Near-miss events reporting is a process to prevent for adverse events that may result in injury, disability or death of people. The reporting of near-miss events has been successfully introduced and used in the airline, chemical and mining industries to prevent disasters. The healthcare sector has adopted the process in order to improve patient safety as there is an estimated 8000 near-miss events for each adverse event. The reporting of near-miss events has however had a slow-up take in the selected hospital setting.

**Aim:** The purpose of this study was to explore the reasons for the limited reporting of near-miss events.

**Methods:** A qualitative methodology was used and data was collected in two focus groups from the nursing categories involved in near-miss event reporting. The data was then transcribed verbatim and collaboratively analysed by the unit managers responsible for driving the near-miss events process.

**Results:** The findings from the data indicated that the near-miss events process is viewed as a punitive measure and they sometimes get victimized for reporting. Reporting is done when the participants feel threatened or they suspect future litigation. The participants also stated that completing the required documentation is a lengthy process that takes them away from direct patient care. In addition the participants indicated that they never got feedback on their reported near-miss events making it hard to know the purpose of doing it.

**Discussion and conclusions:** The fact that the near-miss events reporting process is perceived as a punitive measure indicate the lack of understanding, the purpose of near-miss events reporting. A more user-friendly system specifically designed for near-miss events could assist with the reporting time and anonymity of the reporter. In order to assist and remind nurses about the importance of near-miss events reporting for patients’ safety the feedback loop must be closed by the people responsible for driving the process.
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Abstract Detail
ATTITUDE, SELF-EFFICACY, EFFORT AND ACADEMIC ACHIEVEMENT OF UNDERGRADUATE HEALTHCARE SCIENCE STUDENTS TOWARDS RESEARCH METHODOLOGY

Background: Research plays a vital role in the Healthcare worker’s careers. Research methodology for Healthcare Sciences (RHC300) students is a new shared module offered to third year undergraduates to equip students with the necessary skills to perform research and apply it in practice through evidence-based theories. The main objective of this study is to describe the attitude, self-efficacy, effort and academic achievement of third year undergraduate Healthcare Science students towards the Research Methodology module.

Methods: A cross-sectional quantitative survey was conducted through the Qualtrics online survey software made available to all students who were enrolled in RHC300 in 2017 which included B Dietetics, B Physiotherapy and B Occupational Therapy students (n=45, response rate=35%). The survey included four sections: evaluating demographics, attitudes, self-efficacy, and effort of the students towards RHC300. Forty-five students completed majority of the questionnaire. Descriptive statistics was used to analyse the data.

Results: Regarding attitudes towards research, majority of participants (78-96%) found it to be useful to their future careers. Majority of participants (52-80%) agreed that they experienced anxiety towards research with most of the B Occupational Therapy students finding it stressful (mode=6-7). There was a mixed response for positive predisposition towards research. Overall, participants had a high perception of self-efficacy towards research, but varied between the degrees. When looking at effort put into RHC300 there was a mixed response although the majority of students (56%) did not complete additional exercises related to RHC300, while 96% read the lecture notes more than once to better understand the module content. The mean academic achievement for all enrolled students were 63% (±7.8%), with higher marks obtained for group work compared to individual assignments.

Conclusion: An overall positive attitude was observed amongst the participants. Although most students scored high on the anxiety scale, this was balanced by the outcome that they find research useful and have positive research predispositions. The participants showed an overall high self-efficacy and effort however, this did not reflect in the overall academic achievement of students.
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Abstract Detail
UNDERSTANDING THE WORKPLACE CULTURE OF MIDWIVES RELATING TO PAIN MANAGEMENT DURING THE FIRST STAGE OF LABOUR

Background: Pain during the birth process is acknowledged for good progress of labour but severe, unbearable pain cause reduced effectiveness of contractions and lead to maternal exhaustion and fetal distress. Non-pharmacological and pharmacological pain relief is available in the hospital, but it is not understood when and how labour pain is assessed and pain relief implemented.

Method: A qualitative design was followed. Convenience sampling was used and 18 observations on pain management during labour were done. Midwives taking care of women during labour took part in the research and their informed consent was obtained beforehand. Data was collected during unstructured observations of pain management during labour. Data was analysed by means of the creative hermeneutic data analysis method.

Results: Four themes were derived from the data: pain assessment, isolation, therapeutic environment and documentation. Based on these themes, strategies for improving pain management during labour were identified collaboratively.

Discussion and conclusion: As pain was not assessed and properly managed during the first stage of labour, patients were left alone for long periods during labour, the environment was found non-therapeutic and pain assessment and management was not documented during labour, strategies for improving pain management during labour were identified collaboratively. Recommendations were made with regard to the workplace culture relating to pain management during the first stage of labour.
Abstract Detail
THE NON-PHARMACOLOGICAL INTERVENTIONS TO LIMIT THE INCIDENCE AND DURATION OF HYPO-ACTIVE DELIRIUM UNDER POST-OPERATIVE CARDIO-THORACIC PATIENTS

Introduction: The prevalence of delirium in Intensive Care Units (ICU) can be as high as 80%. Hypoactive delirium is very difficult to diagnose and a screening tool should be used to diagnose, it is characterized by decreased cognitive function, inattentive thinking, and fluctuation of consciousness, disorientation and confusion. Studies shows that patient that experience delirium have high 6 months mortality and long term cognitive impairment.

Aim: The aim of the study was to assess the effect of non-pharmacological interventions on the severity and duration of delirium in ICU patients following cardio-thoracic surgery.

Objectives: The objectives of the study were to assess the prevalence of delirium during pre-test scoring with the ICDSC tool (08:00) on post-operative cardio-thoracic patients. The second objective was to assess the effect of implementation of non-pharmacological interventions versus standard nursing care on the severity and duration of delirium in (hours) in ICU patients following cardio-thoracic surgery.

Hypothesis: The hypothesis is that the implementation of non-pharmacological interventions would reduce the severity and duration of delirium amongst intensive care participants in the intervention group compared to participants in the control group.

Methods: The ICDSC checklist scores was utilised to assess if non-pharmacological interventions have an effect on the duration and severity of delirium and hypoactive delirium under post-operative cardio-thoracic patients.

Results: A p-value of 0.02 indicated a significant shorter duration from a state of delirium to no delirium in the intervention group in relation to the control group. Thus supporting the hypothesis that the implementation of non-pharmacological interventions decreased the severity and duration of delirium in ICU patients following cardio thoracic surgery.
Abstract Detail
RACE/ETHNICITY DIFFERENCES IN RESTING ENERGY EXPENDITURE IN SOUTH AFRICAN MEN AND WOMEN

Background/aim: Overweight/obesity is a public health problem in South Africa; disproportionately so among the black population. For African Americans a contributory role of a lower resting energy expenditure (REE) has been suggested. This study aimed to compare the measured REE of black and white South African adult males and females.

Subjects/methods: In 328 (63% female; 39% black) healthy South African adults REE was measured with indirect calorimetry (Quark) and body composition with multi-frequency bioelectrical impedance analysis (Quadscan). Body mass index (BMI), fat free mass index (FFMI) and fat mass index (FMI) were respectively calculated as body mass (kg), fat free mass (kg) and fat mass (kg) divided by height (m) squared. Percentage body fat was calculated as fat mass as percentage of body mass. Obesity class was dichotomised, with obese defined as BMI ≥ 30 kgm². Black-white differences in REE, as measured and adjusted (ANCOVA), were determined with fixed effects regression.

Results: Measured REE (adjusted for age along with BMI, FFMI, fat mass, FMI or % body fat) of white subjects was significantly higher (P<0.001 for all) than of black subjects for men and women alike and regardless of obesity class.

Conclusion: The REE of black South African adults is lower than of their white counterparts. This finding has practice implications in the management of obesity in South Africa, in particular for the estimation of dietary energy prescriptions.
Abstract Detail
METABOLIC PROFILES OF TUMOURS IN SERUM FROM BREAST CANCER PATIENTS

Background: Breast cancer is the most frequently diagnosed cancer in women, resulting in the majority of cancer-related mortalities among women. Negative disease prognosis is evident in Africa with a five-year survival rate of 12% attributed to a lack of resources and facilities concerning awareness, detection and treatment. Delayed diagnosis accompanied by a poor clinical response to standard chemotherapy regimens is prevalent in the strained public healthcare system. However, the therapeutic response is primarily dependent on multiple biological features, each with distinct regulatory mechanisms, integrated into tumour phenotypes unique to each individual. Pre-clinical predictive models, including ex vivo platforms, require high throughput and multi-parameter characterization of functional networks in order to accurately simulate the tumour microenvironment. The purpose of the study was to characterise the metabolic profiles of breast cancer tumours and evaluate affected pathways involved for application in the reconstitution of ex vivo cancer models for pre-clinical response prediction of anti-neoplastic agents.

Methods: Breast cancer patients (n=26) were recruited, prior to surgery, at Steve Biko Academic Hospital and matched to control subjects (n=13). Serum samples were pre-processed using a precipitation solution. Untargeted metabolic profiling was then carried out in positive and negative mode using quantitative time of flight mass spectrometry (QTOF-MS). Differences in metabolic profiles were determined between groups was determined using open source software XCMS Online and Metaboanalyst.

Results: Positive mode metabolomics identified 368 features with a significant fold change of 1.5 or higher and the negative mode resulted in 26 metabolic features with a significant fold change of 1.5 or higher. Further statistical analysis using partial of the least square discriminant analyses (PLS-DA) showed clustering in the sample groups.

Discussion and Conclusion: The differences in metabolite abundance suggest altered metabolic pathways in cancer. These differences appear to be significant enough to classify between the two subject groups. Metabolomic characterization from the study forms a component of research conducted into the multiple markers from limited amounts sample which will be combined with cytokine and trace elemental analyses to provide novel insight into disease co-regulation.
Abstract Detail
MELANOMA AND ENDOTHELIOMA CELL LINES: EFFECTS OF VASCULAR ENDOTHELIAL GROWTH FACTOR RECEPTOR-3 BLOCKADE ON ADHESION

Introduction: Melanoma cells overexpress vascular endothelial growth factor-C (VEGF-C). VEGF-C binds the receptor vascular endothelial growth factor receptor-3 (VEGFR-3) expressed on lymphatic endothelial, melanoma and other tumour cells. The binding of VEGF-C to VEGFR-3 enhances receptor phosphorylation that activates signalling pathways, mitogen activated protein kinase (MAP-K) and phosphatidylinositol-3-kinase (PI3K). These signalling pathways are known to regulate cell survival, proliferation and adhesion in response to internal- or external changes. The pathways promote proliferation, migration and adhesion of the tumour cells and therefore enhance metastasis.

Methods: The crystal violet (CV) assay was used to assess growth inhibition of melanoma and endothelioma cells exposed to MAZ-51 in complete medium containing VEGF-C. Cell cycle progression analysis demonstrated the ability of MAZ-51 to halt the cells at the checkpoints Gap1 (G1) and Gap2 (G2) before deoxyribonucleic acid (DNA) synthesis and mitosis would occur. Morphological cell changes were observed via light microscopy (haematoxylin and eosin (H&E) staining). An adhesion assay with collagen I was used to enhance adhesion in melanoma cells. Treatment effects on cell adhesion properties were confirmed by measuring the expression of adhesion proteins paxillin and cadherin using western blot analysis.

Results: MAZ-51 was able to inhibit cell proliferation in B-16 and sEnd-2 cells grown in VEGF-C (P<0.05). Morphological changes detected in the B-16 and sEnd-2 cells after MAZ-51 treatment showed features of apoptosis. MAZ-51 was effective to halt B-16 and sEnd-2 cells at the G1 check point (P<0.05). MAZ-51 was effective to inhibit cell adhesion properties in the B-16 and sEnd-2 cells which was confirmed by the reduction in expression levels of paxillin and cadherin.

Discussion and conclusions: This research has shown that MAZ-51 lead to the inhibition of B-16 and sEnd-2 adhesion, which contributes to reduced metastasis in melanoma- and endothelioma cells. In literature MAZ-51 is known to inhibit tumour cell proliferation and to induce apoptosis. The ability of MAZ-51 to inhibit cell adhesion is novel to this study and shows the ability of the compound to inhibit metastasis in B-16 cells. Findings on the in vitro effects of MAZ-51, may lead to further identification of mechanisms and in vivo studies contributing to the understanding of melanoma metastasis.
Abstract Detail
POPULATION HEALTH AND BURDEN OF DISEASE PROFILE IN UGANDA FROM 1990 TO 2015

**Background:** Uganda is mandated to attain the UN SDGs for health and decrease premature deaths due to communicable(CDs) and non-communicable disease (NCDs) by 40% by year 2030.(1) Objectives: To describe the trends in population health and disease burden in Uganda in the past 25 years and show the pattern of health transition across the country through 1990 to 2015.

**Method:** A cross sectional study design was used in the study of the burden of disease in Uganda from 1990 to 2015. Secondary data was used through complete sampling from the Institute for Health Metrics and Evaluation (IHME) system and analysed through Stata. The GBD metrics used were: Disability-adjusted life years (DALYS), YLLs (Years of Life Lost), YLDs (Years of Life Lost due to disability), HALE (Health Adjusted Life Expectancy), Age-Standardized Death Rate (ASD).

**Results:** Life expectancy (LE) in Uganda for both sexes from 1990- 2015 was 49.10- 61.59, which saw an increase of 25%. The total causes of DALY’s; the rate 113 030 declined to 51 288 (55%) for both sexes. Total causes of YLD in Uganda from 1990-2015: the rate was 10433.96 and declined to 8892.59 with a total 15% decrease. For females at a reproductive age (10- 54 years) total cause of all deaths: rate decreased by 43%.

**Conclusion:** Great strides have been made in accessing health services, continued efforts, preventative strategies and policies need strengthening combat the burden of disease thus reducing mortality and morbidity in Uganda.
PPAR AGONISTS DIFFERENTIALLY MODULATE OSTEOCLAST SIGNALLING IN HUMAN CD14+ MONOCYTES

Background: Osteoclasts are multinucleated cells involved in the resorption or breakdown of bone. They are formed from the fusion of precursors of monocytic lineage in the presence of receptor activator of nuclear factor kappa B ligand (RANKL) and macrophage-colony stimulating factor (M-CSF). RANKL binds to receptor activator of nuclear factor kappa B (RANK) and triggers a signalling cascade involving the phosphorylation of nuclear factor kappa B (NF-κB) and mitogen activated protein kinases (MAPKs). Some unsaturated fatty acids (UFA) have been shown to inhibit osteoclast formation by targeting RANKL signalling. However, the mechanisms of action are not fully understood. Peroxisome proliferator activated receptors (PPARs) are a family of nuclear receptors that are natural ligands of UFAs and are known to be present in osteoclasts. There are three known isoforms of PPARs (PPAR-α, PPAR-βδ and PPAR-γ). In this study we aimed to determine how different families of UFAs activate PPARs and how PPAR activation influences osteoclast signalling.

Methods: Human CD14+ monocytes were purified from peripheral blood of healthy male volunteers. CD14+ monocytes were seeded into cluster plates and exposed to RANKL (30 ng ml-1) and M-CSF (25 ng ml-1) in the presence of PPAR agonists (100 µM), monounsaturated fatty acids (MUFAs) (100 µM) or polyunsaturated fatty acids (PUFAs) (40 µM). PPAR activation, osteoclast differentiation and the expression of key osteoclast regulators were determined.

Results: All the PPAR agonists were shown to upregulate the activity of their respective receptors. PUFAs were shown to increase PPAR-α to a greater extent than MUFAs, while MUFAs favoured PPAR-βδ activation. PPAR-γ was upregulated equally by MUFAs and PUFAs. All PPAR agonists inhibited the formation of osteoclasts, with PPAR-γ agonist showing the strongest effect. The activation of NF-κB and MAPK proteins was inhibited by the PPAR agonists and the expression of key osteoclast genes was further downregulated by all three PPAR agonists.

Discussion and Conclusion: This study reveals how different families of UFAs can modulate PPAR activity in osteoclasts. We further reveal that PPAR activity can modulate osteoclast signalling pathways. PPARs may have potential as targets for bone degenerative diseases such as osteoporosis.
Abstract Detail
TEMPERATURE VARIABILITY AND CARDIOVASCULAR HOSPITALISATIONS IN CAPE TOWN, SOUTH AFRICA

Background: Due to climate change, an increase of 3-4°C in ambient temperature is projected along the South African coast during the next 80 years. Few studies globally investigated the health effects of temperature variation (TV), a composite indicator of intra-day and inter-day temperature fluctuations. This is the very first study on the African continent that investigated the association between TV and CVD hospitalisations.

Method: Admission data from 8 private MediClinic hospitals were obtained, after ethics approval. Meteorological data were obtained from the South African Weather Services. TV was calculated using the standard deviation of the minimum and maximum temperature. TV lags for the preceding 2 up to 8 days’ exposure prior hospitalisation were investigated (TV01 to TV07). The case-crossover epidemiology study design was applied. Quasi-Poisson generalised linear models were combined with a distributed lag non-linear model (DLNM) using R. TV was investigated as a linear term. The daily average temperature (Temp) was adjusted for with a DLNM approach. Lag times of up to 27 days were considered for Temp. Models were also adjusted for seasonal trends (month-year strata) and day of the week. Stratified analyses were conducted by age groups (all ages; 15-64 years; ≥65 years) and seasons: cold (March-August) and warm (September-April).

Results: 32 050 CVD hospitalisations were included in the study. Temp ranged from 7.5 to 27.8°C and TV from 1.5 to 13.0°C. No significant associations across the different age groups were observed when the entire year was considered. Season-stratified analyses indicated stronger detrimental associations in the warmer than colder months for the all ages group (6.6% 95% CI: 2.7%-10.7% versus -0.9% 95% CI: -3.1%-1.3% per°C increase in TV07), with the elderly being more vulnerable (8.6% 95% CI: 3.6%-13.9% versus -0.8% 95% CI: -3.5%-2.0%). In general TV07 displayed the strongest detrimental association.

Discussion and Conclusion: These findings indicate that the cardiovascular health of the South African population living in Cape Town is at risk due to unstable weather conditions, specifically temperature fluctuations, after controlling for Temp. These findings may have implications for developing public health policies to manage health risks of climate change.
WE ARE DOING THE WORK, BUT THE REWARD GOES TO THE CLINIC STAFF”: A FOCUSED ETHNOGRAPHIC STUDY AT SELECTED SUB-DISTRICT IN TSHWANE, SOUTH AFRICA

Background: The National Department of Health in South Africa piloted ward-based primary health care outreach services in 2011. The service is part of Primary Health care re-engineering and it is provided by a team that includes community health care workers. The aim of this study was to explore the perceptions of ward based community health care workers (CHWs) regarding their working conditions while providing primary health care outreach services in a selected sub-district.

Method: A qualitative, focused ethnographic study was conducted to explore and describe the perceptions of Community Health Works. A purposive sampling method was used. Unstructured face to face interviews and reviews of the site documents were used to generate data. Data was analysed using thematic analysis.

Results: The four main themes were revealed as household activities of CHWs, working conditions, benefits to the community and recognition by the Department of Health.

Discussion and Conclusion: Despite the poor working conditions and dissatisfaction among the community health workers, the communities and health facilities are benefiting from this service.
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Oral in the Clinical category

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Abstract Detail
INFANT ARTEFACTS AS THE HEALING OBJECTS IN INFANCY: A SENSORY ETHNOGRAPHIC STUDY

Background: Traditional African remedies like wearing of an amulet on the arm or waist were administered to infants and children in sub-Saharan countries. However, these practices were suppressed by missionaries and the colonization. Colonisers labelled these traditional practices for disease prevention as fetishes and paganism hence they replaced them with Western child health services. In Africa the wearing of artefacts in infancy is amongst the cultural practices that most of African people do. Infants' artefacts differ in their origin, purpose and types. The aim of the study was to explore the different traditional artefacts that infants wear as disease prevention practices during infancy in a designated area in Tshwane District. In South Africa.

Method: This study followed a qualitative research approach that used sensory ethnography as a design. Participants were purposively selected as the caregivers parents of infants who were having visible artefacts on their bodies. Data was collected through the documentation of artefacts and semi-structured interviews. Collected data were analysed using analytic steps as expounded by Roper and Shapiro with the aide of Atlas ti.

Results: Several motifs were revealed in this study. The main motifs were: types of indigenous infant artefacts, infant artefacts as protective measures and healing power of artefacts in infancy.

Discussion and Conclusion: African people continue to perform traditional disease prevention practices in all stages of life, from pregnancy, infancy, childhood to adulthood. Health care professionals in different health setting need to have an understanding and knowledge of different traditional health practices that are performed in the lives of their patients.
ABOUT 1/8 RUNNERS REPORT A NON-TRAUMATIC INJURY ANNUALLY, AND >50% OF THESE SIGNIFICANTLY AFFECT TRAINING. A CROSS-SECTIONAL STUDY IN 29585 56KM RUNNERS

Introduction: Participation in ultra-marathons has become increasingly popular, but there is an inherent risk of injury in these runners. There are little data on the epidemiology of non-traumatic (chronic, “overuse”) injuries (NTI) in ultra-marathon runners. The purpose of the study is to determine the lifetime prevalence, annual incidence, anatomical areas and severity of NTI’s in a large cohort of runners participating in a 56 km ultra-marathon.

Methods: A cross-sectional study was conducted in runners participating in the 56km Two Oceans Marathon races between 2012-2015. 29,585 runners gave consent that their online pre-race medical questionnaire data could be used for research. These data included information on non-traumatic (overuse) injuries they experienced in the 12 months prior to registration. We report the crude (un-adjusted) (%) 95%CI lifetime prevalence, annual incidence, common anatomical areas, specific NTI’s, and severity of NTIs in runners.

Results: 22.3% (21.9-22.8) of runners reported a NTI during their running careers and 13.2% (12.8-13.6) reported a NTI in the previous year (retrospective annual incidence). The most common anatomical regions affected by NTI were the knee (20.9%; 19.6-22.1), calf (12.0%; 11.0-13.1) and the Achilles tendon area (9.4%; 8.5-10.3). Most NTI’s were muscle tissue injuries (42.1%; 40.6-43.7) followed by tendon (25.1%; 23.7-26.4), and ligament injuries (11.0%; 10.0-12.0). The most common specific NTIs were iliotibial band (ITB) syndrome (16.2%; 15.0-17.3), calf muscle injury (10.8%; 9.8-11.7) and Achilles tendinopathy.
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Abstract Detail
ACUTE HEAD AND NECK SIDE-EFFECTS EXPERIENCED FROM INTENSITY MODULATED RADIATION THERAPY WHEN PLANNING WITH MINIMAL NORMAL TISSUE IDENTIFICATION

Introduction: The purpose Intensity Modulated Radiation Therapy (IMRT) is to plan and deliver the radiation treatment (RT) in order to conform the radiation dose to the tumour shape and reduce the dose to the normal structures compared to conventional RT techniques. This is achieved by defining the tumour and normal tissue structures on the CT scans used in the treatment planning process. Normal tissue dose reduction is expected to reduce acute and late radiation side-effects. At the site where this study was conducted, IMRT for head and neck tumours is planned with minimal identification of normal structures. It is therefore unexplored as to the severity and progression of acute head and neck side effects experienced by patients undergoing IMRT using this planning approach.

Method: A descriptive longitudinal research design was used to document and describe the progression and severity of the acute head and neck side effects experienced during the course of treatment. A non-probability, consecutive sampling method was used to recruit patients receiving IMRT treatment but not receiving concurrent chemotherapy. Consenting patients completed the internationally validated European Organization for Research and Treatment of Cancer (EORTC) head and neck cancer quality of life assessment module ((QLQ-H&N35) questionnaire at the beginning, mid-way and at the end of a six (6) week course of treatment. Data was collected from 29th May 2017 to 03 July 2017 as part of an honours research project.

Results: 16 patients were recruited with a retention rate of 81,25% mid-treatment and 50% retention at the end of treatment. Symptoms that progressed to significant severity by the end of treatment were pain in the mouth, ability to swallow solid food, sticky saliva and coughing. There was minimal severity of pain in the throat, ability to swallow liquid and puree foods, dental problems, dry mouth, change of smell and taste, and hoarse voice by end of treatment

Conclusion: Despite using the IMRT treatment, technique patients are still experiencing significant acute side-effects. The need for supportive care in terms of pain control, nutritional care and dental care is relevant.
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Abstract Detail
SOY BEAN (GLYCINE MAX) DIGEST INHIBITS OSTEOCLASTOGENESIS IN RAW 264.7 MURINE MACROPHAGES IN VITRO

Background: Bone is a dynamic organ undergoing constant turnover in response to mechanical strain and damage. Bone cells, namely osteoclasts, are responsible for bone resorption while osteoblasts deposit new bone. Dysregulation of bone remodelling could lead to various bone diseases. Dietary factors could influence bone turnover, therefore dietary modification could be used to slow down bone loss. Phytoestrogens in soy beans may have a bone protective effect. The aim of this study was to determine the effect of a simulated soy digest on osteoclastogenesis in receptor activator of nuclear factor kappa-B ligand (RANKL)-stimulated RAW 264.7 murine macrophages in vitro.

Methods: The effects of the soy digest on cell viability in undifferentiated RAW 264.7 murine macrophages was assessed by an Alamar Blue assay. In addition, cells were seeded at 10 000 cells/cm² and treated with soy digest and the differentiation factor RANKL for five days. The effect of soy digest was subsequently tested on markers of osteoclastogenesis and osteoclast function such as cell morphology, osteoclast formation, tartrate-resistant acid phosphatase activity (TRAP), actin ring formation and bone resorption. RT-PCR was employed to quantify changes in mRNA expression levels of osteoclast marker genes involved in early and late differentiation and resorption. Three independent experiments were conducted in triplicate for each test.

Results: Soy digest had no effect on cell viability in undifferentiated cells but inhibited osteoclastogenesis in differentiating osteoclasts. TRAP positive osteoclasts were decreased significantly in soy digest treated cells and had compromised actin rings, while bone resorption decreased. A lactate dehydrogenase (LDH) assay did not show an increase in necrosis in the digest-treated cells. Soy digest at 1% inhibited gene expression of RANK, nuclear factor of activated T cells cytoplasmic (NFATc1), c-fos, dendritic cell-specific transmembrane protein (DC-STAMP) and TRAP.

Conclusion: This study demonstrated anti-osteoclastogenic as well as decreased resorptive functionality in soy digest-treated cells. Future studies are required to identify the specific bio-actives involved in the anti-osteoclastogenic effect of the soy digest and the possible pathways involved.
Abstract Detail

EBSTEIN’S ANOMALY: A RARE CASE OF RIGHT ATRIAL DILATATION

Background: Ultrasound features that are highly suggestive of Ebstein's anomaly are a massively dilated right heart with apical displacement of the tricuspid valve into the right ventricle. The left ventricle is compressed and small.

Case: We describe a case of a 29 year old patient who presented with dyspnoea and an increased cardio-thoracic index on chest x-ray. An echocardiogram was done and interesting and unexpected features were found.

Discussion: It is a very rare congenital heart disease that occurs in one to five of 200 000 live births, accounting for <1% of all congenital heart anomalies.
Abstract Detail
IS PELVIC FLOOR MORPHOLOGY A PREDICTOR OF SUCCESSFUL PESSARY RETENTION? ORIGINAL RESEARCH AND REVIEW OF THE LITERATURE

Background: Vaginal pessaries are known to be an effective treatment modality for pelvic organ prolapse (POP). Pessaries form an important part of the physicians’ armamentarium in the treatment of pelvic organ prolapse, but currently many of the factors affecting the success of pessary use are poorly understood.

Objectives: This study was designed to determine the association between pessary retention (PR) at one year and functional pelvic floor morphology i.e. Levator hiatal distance and area and Levator avulsion.

Methods: This retrospective study reviewed 73 records of patients with symptomatic POP at a tertiary Urogynaecologic centre. This cohort had previously been studied for pelvic floor morphology in a multi-ethnic population, had 4D trans-perineal pelvic floor ultrasound, and opted for a vaginal pessary as a treatment option.

Results: Our population had a mean age of 59.4 years (range, 32 – 91 years), with a mean BMI of 29.4 kgm2 (range, 20 – 42 kgm2), and POP-Q stage of 3. The level of prolapse was found to be related to PR (p=0.077). We further explored this concept using symmetric measures of association (ϒ=–0.353), indicating that pessary retention decreases with increasing prolapse severity. PR was also found to be inversely associated with prior pelvic reconstructive surgery (n = 63; p = 0.055; ϒ=–0.417). There was a mildly significant relationship (p=0.052) between hiatal distance on contraction and PR.

Conclusion: This study found a significant inverse relationship between pessary retention and hiatal distance on contraction, prior pelvic surgery, and the severity of prolapse. This was a pilot study with a limited number of participants, the authors plan a prospective study to further clarify the association between long-term PR and functional pelvic floor morphology.
Abstract Detail

DOES IN-UTERO HIV EXPOSURE INFLUENCE MACROPHAGE ACTIVATION AND INFANT OUTCOMES? FINDINGS FROM A PILOT STUDY IN PRETORIA, SOUTH AFRICA

Introduction: An increasing number of the ~356,000 children born to HIV-infected mothers each year do not contract HIV. However, HIV-exposed but uninfected (HEU) children are more likely to have growth and neurodevelopmental delay, immune dysfunction, and higher morbidity and mortality than their unexposed counterparts (HUU). Macrophages have two main phenotypes: classically activated macrophages (pro-inflammatory) and alternatively activated macrophages (anti-inflammatory). Classically activated microglia and/or macrophages are known to exert cytotoxic effects on neurons and oligodendrocytes. Aim: Investigate a possible association between HIV exposure, HC and macrophage activation.

Methods: Fifty-five HIV-infected and uninfected mothers and their infants were recruited after giving informed consent. File review and postnatal questionnaires provided data on maternal demographics and pregnancy outcomes. Macrophage activation markers were tested at birth and ten weeks post-partum, using flow cytometry. HC was measured at the same time points. Data analysis was done in Stata14 at 5% significance.

Results: The 55 mothers had a median age of 30 years (IQR 26-34) and infants were delivered at a median gestation of 39 weeks (IQR 37-40). Thirty-three mothers were HIV infected and 29 were on ART. HIV+ and HIV- mothers did not differ in age, parity, duration of gestation or anthropometry. There was no difference between HEU and HUU in weight, height and mid upper-arm circumference. HC was lower in HEU infants (p=0.005). Simultaneous expression of CD14 and CCR2 was higher in HEU at birth (p=0.0005) whereas CD16 was lower at ten weeks (p=0.028). CD16 at ten weeks was lower in infants with HC z-score ≤2 (p=0.03) while CD14 marginally missed significance (p=0.07).

Conclusions: This study confirmed that HC was lower in HEU and their macrophages more likely to express a pro-inflammatory than an anti-inflammatory phenotype, the latter which was also associated with a HC z-score ≤2 at 10 weeks. It is possible that the imbalance in favour of classically-activated macrophages could have neurocytotoxic effects which may be contributing to smaller HC and potentially delayed neurodevelopment in HEU. Further research is needed to understand the causes and long-term sequelae of macrophage activation in HEU.
Abstract Detail
A PROFILE OF THE VAGINAL FLORA IN WOMEN WITH FIRST TRimestER MISCARRiAGE

Background: Underlying infection is believed to be a contributing cause of first trimester miscarriage. A study done at the Termination of Pregnancy clinic at Kalafong Hospital in 2004 found the incidence of Chlamydia trachomatis to be 28.8% in patients presenting for termination of pregnancy in the first trimester. The results of this study have guided us with regards to antibiotic treatment of patients presenting with first trimester miscarriage. The Royal College of Obstetricians and Gynaecologists do not recommend antibiotics as part of their management, while the American College of Obstetricians and Gynaecologists recommend a single dose of Doxycycline prior to evacuation.

Aim: The aim of this study was to describe the spectrum of vaginal flora (sexually transmitted infections) found in the lower genital tract of women with first trimester miscarriages with a view to validating our current antibiotic protocol, as well as to investigate infection as a possible cause for first trimester miscarriages.

Materials and methods: This was a pilot study done at Kalafong Hospital. Fifty participants with first trimester miscarriages were recruited from the gynaecology casualty and another fifty participants with uncomplicated term pregnancies were simultaneously recruited from the antenatal clinic. Vaginal swabs were taken on admission, prior to uterine evacuation. Molecular tests were then performed to determine the presence of important organisms, namely Chlamydia trachomatis, Mycoplasma genitalium, M. hominis, Neisseria gonorrhoeae, Trichomonas vaginalis, Ureaplasma urealyticum, U. Parvum

Results: The following organisms were identified in the miscarriage group: U. urealyticum 18.87%, N. gonorrhoeae 15.09%, C. trachomatis 15.09% and Trichomonas vaginalis 1.89%, while the following were found amongst the term pregnancy group: U. urealyticum 36%, N. gonorrhoeae 32%, C. trachomatis 28% and Trichomonas vaginalis 20%. Co-infections were detected in 20% of patients.

Conclusion: The prevalence of gonorrhoeae, chlamydia and T. vaginalis is high and our current treatment protocol does not treat gonorrhoeae infection. Due to a lack of a simplified and affordable on-site test for the identified organisms, we are currently unable to efficiently test for them. The need for such testing exists, so that all patients and their partners may be investigated and treated within a reasonable time period.
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Abstract Detail
MULTIPLE ORBITAL FRACTURES IN A 12 YRS OLD BOY POST ASSAULT WITH A BRICK: A MEDICOLEGAL CASE OF CHILD ABUSE NEARLY MISSED

Introduction: The incidence and prevalence of child abuse is unknown. The majority of childhood injuries are accidental, but an inflicted injury - missed or improperly evaluated - can escalate to child fatality. Emergency medicine (EM) practitioners need to recognize such circumstances and how to intervene. EM practitioners are obligated to report any reasonable suspicion of child abuse. In most clinical settings, this involves a multidisciplinary team approach.

Case presentation: A 12 year old boy was admitted by maxillo-facial surgeons with multiple facial fractures and a corneo-scleral laceration. Ophthalmologists and Neurosurgeons were consulted for further management. Social workers were consulted by Ophthalmologists and a case of child abuse is currently investigated by the police.

Conclusion: Physical injuries to a minor or a female presenting at casualties, should be properly evaluated for accurate diagnosis and management. A high index of suspicion must be maintained. Appropriate multidisciplinary steps must be taken for a proper holistic management of suspected abuse.
Abstract Detail

AUTOMATED GROWTH MONITORING: CONCEPTUAL AND ARTIFICIAL INTELLIGENCE CONSIDERATIONS FOR COMPUTERISED INTERPRETATION OF THE ROAD TO HEALTH WEIGHT-FOR-AGE CHART IN ASSESSING RISK FOR THE DEVELOPMENT OF SEVERE ACUTE MALNUTRITION (SAM).

Background: Severe acute malnutrition (SAM) affects 6 per 1000 South African children, with case fatality rates exceeding 15% in some districts. Due to implementation problems, routine growth monitoring often fails to identify incipient SAM. Digitisation of growth monitoring can potentially address this. Interpretation of growth is complex. Normal growth follows a consistent z-score, with some intra-individual deviation. Dietitiansclinicians judge childhood growth by subjectively assessing the shape of the growth curve, using clinical experience. Objective differentiation between normal variation and pathological downward deviation is challenging.

Aim: This research aimed to conceptualise a method for automated interpretation of growth curves.

Methods: Conceptualization of a method for automated growth monitoring by extensive consultation with child growth and computer programming experts.

Results: A neural network was selected for the digital interpretation of growth. Rather than being programmed with set criteria, the neural network “learns” to recognise normality and deviance by example. A dataset of ~2000 growth curves, combined with allocated SAM risk of each case, are used to train the neural network. The neural network creates a mathematical model from this data, enabling the computer programme to judge the SAM risk level when presented with any growth curve. To optimise data quality, growth curves representing common clinical scenarios will be rated for SAM risk by child growth experts, yielding a set of 100 growth curves with multiple responses per curve. Validation of the developed programme against actual cases of SAM will determine its predictive ability.

Conclusion: If sufficient predictive validity is demonstrated, automated interpretation of growth curves can be interpreted in the e-Road to Health Booklet and electronic health records. This would improve the early detection of malnutrition, allowing for timeous intervention to prevent progression to SAM. Automated interpretation of growth curves has the potential to transform routine growth monitoring and reduce SAM incidence.
Abstract Detail

USING SCENARIOS TO EXPLORE CONFLICT MANAGEMENT SKILLS OF SOUTH AFRICAN NURSE UNIT MANAGERS IN PUBLIC HOSPITALS

Background: Workplace conflict is not unusual in healthcare settings globally. Learning how to manage it may reduce chances of recurrence and related adverse consequences. The inappropriate management of conflict has been attributed to decreased productivity, poor morale and financial losses for healthcare organisations. As such, Nurse Unit Managers (NUMs) can play a critical role by ensuring that conflict in the units is effectively managed whenever it manifests. The purpose of the study was to explore how NUMs in public hospitals manage conflict in the nursing units. Findings from the study will contribute in developing recommendations on how to support and enhance conflict management skills of NUMs.

Methods: A qualitative, explorative, descriptive and contextual study was conducted to explore how NUMs managed conflict in nursing units. Purposive sampling was used to select NUMs working in three public hospitals. Data was collected in two phases. In phase 1, a conflict scenario between nurses in a nursing unit was developed in consultation with experienced Nurse Managers in public hospitals. The conflict scenario was used during Phase 2, which involved individual face-to-face semi-structured interviews with NUMs until data saturation. Tesch’s method of thematic synthesis was utilised to analyse data. Thereafter, literature review was undertaken to ascertain what is regarded as effective conflict management.

Results: The results revealed that some NUMs managed conflict appropriately, others avoided taking responsibility for managing conflict and others intervened inappropriately when attempting to manage conflict.

Conclusion: While some NUMs managed conflict appropriately, additional and continuous education and training is necessary to optimise the capacity and develop their conflict management competency. The findings could be integrated into the orientation, training and preparation of nurse managers by healthcare organisations and educational institutions.
Abstract Detail
THE BLOODY UMBILICUS

Background: Endometriosis involving the umbilicus is a very rare entity that presents with a discolored mass in the umbilicus, with or without cyclic bleeding.

Case: We present a 22 year old female with a bleeding from umbilicus at every menstrual cycle.
Abstract

ALTERED BIOPHYSICAL PROPERTIES OF RED BLOOD CELLS IN PATIENTS WITH RHEUMATOID ARTHRITIS AS SEEN USING ATOMIC FORCE, SCANNING ELECTRON AND CONFOCAL MICROSCOPY

Background: Rheumatoid arthritis (RA) is an autoimmune disease whose inflammatory effects impact on oxidative status of red blood cells (RBCs). Oxidative stress can be reflected in biophysical changes to the cell membrane. The aim of our study was to assess biophysical and ultrastructural characteristics of RBCs obtained from a cohort of patients and compare them with those of healthy individuals.

Methods: Peripheral blood was obtained from 39 RA patients and 30 control individuals. RBCs were investigated using atomic force microscopy (AFM), scanning electron microscopy (SEM) and confocal microscopy (CM). RBCs were categorized by shape using SEM and cell membrane elasticity was assessed via AFM. CM images were subjected to dimensional analyses using ImageJ.

Results: Statistical analyses of AFM data showed that RA RBCs possessed significantly increased apparent elastic modulus (55,003Pa), implying reduced membrane elasticity relative to that of RBCs from healthy individuals (44,644Pa) (P-value< 0.0001). SEM imaging of RA RBCs revealed increased anisocytes and poikilocytes (poikilocytes included knizocytes, stomatocytes, dacryocytes, irregularly contracted cells, and knot cells). CM imaging of several RA RBCs, spectrin, and band 3 protein networks portrayed similar morphological profiles. Analyses of CM images confirmed changes to distribution of band-3 skeletal protein, a protein critical for gaseous exchange functions of the RBC and preventing membrane surface loss.

Conclusion: Findings confirmed that pathophysiological changes occur to the membrane of RBCs in patients with RA. Decreased membrane deformability impairs the RBC’s capacity to adequately adapt its shape to navigate blood vessels, especially microvasculature, and this decrease is also reflected in the cell’s morphology. Changes to morphology and deformability may also indicate loss of functional domains andor pathological protein and lipid associations on the cell membrane. Findings provide an incentive to monitor RBC integrity in RA sufferers besides serological and clinical factors currently employed.
RESEARCHING PARTICIPANTS WITH POWER AND PRIVILEGE: THE TRIUMPHS AND TRIBULATIONS OF ‘STUDYING UP’

Background: This presentation reports the successes and challenges of researching participants with power and privilege. The presentation emanates from a research project that was aimed to develop an integrated framework for evidence-based prosecution in cases of violence against women. “Studying up” is about researching the social institutions that has power and participants who have power through social, legal, and cultural contexts. Researching such social institutions and participants is usually challenging for the researcher on methodological principles, as well as gaining access to the setting and participants.

Method: This was a multi-phases critical ethnographic study that used recording of the talking heads and observations as data generation techniques. The participants were traditional leaders and court personnel of different ranks currently working and those who used to work under National Prosecuting Authority of South Africa.

Results: The encounters with the participants revealed the following: interrelated issues of access through a range of stratagems, a feeling of reticence by the researcher as well as the preconceived racial and gendered narratives that shape the societies.

Discussion and conclusion: The researcher has less social and perceived power than the researched in “studying up” research project. This stance warrants clear understandings of the research relationship, reflexive processes in research as well the social power connection.
Abstract Detail
ANATOMICAL STUDY OF THE POSITION OF THE COMMON FACIAL VEIN IN NEONATAL CADAVERS

Introduction: There has been a rise in the number of low birth weight infants in the world, especially in developing countries. These infants have poor gastroduodenal coordination and thus oral feeding is difficult. Total parenteral nutrition bypasses the ineffective digestive tract by administering nutrients through an intravenous catheter. Currently, ultrasound guided, peripherally inserted central catheters are the preferred method of obtaining total parenteral nutrition in low birth weight infants. This technique presents with fewer complications than the open surgical cut-down technique, which requires dissection of the skin, to expose the vein before inserting the catheter. The problem is that developing countries often lack the luxury of ultrasound-guidance, and thus often rely on open surgical cutdown methods. With the high percentage of low birth weight infants being born in developing countries, the knowledge of the anatomy and position of the target veins is essential to achieve total parenteral nutrition in these high-risk patients.

Aim: The aim of this study is to observe the anatomy of the common facial vein and determine whether its position and morphology could possibly make it a suitable alternative site for catheter insertion for total parenteral nutrition in low birth weight infants/neonates.

Methods: In order to determine this, the length and circumference of the common facial vein was measured on 25 embalmed neonatal cadavers of very low or low birth weight. The position of the common facial vein in relation to the cricoid cartilage and sternocleidomastoid muscle – both easily identifiable anatomical landmarks – will also be determined.

Results and discussion: Based upon the results of this study, the common facial vein could be used as a primary insertion site for catheters, or as a secondary option for patients with a longer hospital stay. It also provides an anatomical description of the anatomy and position of the common facial vein.
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Abstract Detail
AN EXPLORATION OF THE EXPERIENCES OF WIDOWS REGARDING THE HEALTH SUPPORT RENDERED BY THE PRIMARY HEALTH CARE SERVICES.

Background: Widowhood is a stressful life event demanding practical support which the systems of support seem to lack. The usefulness of this study lies in the primary health care nurses gaining deeper understanding of the health support needs of widows.

Objective: To explore and describe widows’ experiences of support and health support needs of widows that can be addressed by nurses in the primary health care services.

Methodology: A qualitative, descriptive phenomenological approach grounded in Husserl’s philosophy (1859-1938) was followed to explore the experiences of widows regarding the support rendered by primary health care services. Purposive sampling was used until data saturation was reached. Data were collected through unstructured individual phenomenological interviews and analysed through qualitative descriptive phenomenological method.

Results: The essence of widows’ experiences of health support deduced the widows’ need for person-centred care, appropriate referrals and establishment of peer support groups.

Discussion and conclusion: The findings of this study made it clear that a holistic approach and person-centred management approach are necessary to enable the nurses in primary health care services to provide the most appropriate health support for each widow. This study meets the ethical requirements and might benefit widows making use of primary health care services. Training should be provided to all primary health care providers with regard to the management of the widow. This intervention will ensure continued excellence in service delivery.
Abstract Detail
THE EFFECTS OF PATIENT EDUCATION ON THE KNOWLEDGE BASE AND BEHAVIOUR OF DIABETIC PATIENTS WITH HIGH RISK FOR CARDIOVASCULAR DISEASE

Background: South Africa is at the forefront of anticipated increases in diabetes and cardiovascular disease (CVD). An appropriate education intervention in a South African hospital setting, should influence self-management behaviours and lifestyle change; and lead to better control of diabetes and fewer complications in South Africans. The objectives of the study were: 1) To assess the cardiac and diabetic knowledge base and behaviour of patients with diabetes and at least one coronary risk factor in a public South African hospital. 2) To determine the most effective mode of education and measure the effects of an education intervention on the knowledge base and behaviour of diabetic patients 3) To measure the retention of knowledge at a one (1) month follow-up point, and any behaviour modification that had occurred.

Methods: 82 participants (mean age 52.49±14.35) were randomly assigned to an experimental group to partake in an educational intervention – presented as either a verbal and graphic (placards self-made) presentation only (Group p) (n=28), a video only (self-made) (Group v) (n=28), or a combination of a video and verbal presentation (Group vp) (n=26). Data was collected before and immediately after the education intervention, and again at a one (1) month follow-up point.

Results: Non-parametric statistics using the Kruskal-Wallis test no statistical difference in knowledge between pre- and post-education knowledge scores in any of the different groups (p=0.481). There was no statistical significance between the subgroups with their retention of knowledge scores (p=0.635). The difference in knowledge between one (1) month retention scores and scores immediately post-education was also not statistically significant (p=0.307). One mode of education could not be nominated as more effective than another mode of education.

Discussion and Conclusion: Despite the statistical insignificance, the results carry weight in their exposure of the unique circumstances of hospital settings in South Africa, that require specific, customised interventions to bring about effective education. The results and development of education material for this study contribute to practical and logistical guidelines for implementing group education in future studies in resource-constrained, low-socioeconomic scenarios in South Africa.
NEW ADULT PULMONARY TUBERCULOSIS PATIENTS WITHOUT BACTERIOLOGICAL CONFIRMATION OF TB RECEIVING TREATMENT IN THE TSHWANE-METSWEDING HEALTH DISTRICT, SOUTH AFRICA

Background: The importance of early and correct diagnosis of TB is emphasised by the End TB Strategy in the global fight against this universal disease. The sputum of individuals with clinical symptoms of pulmonary TB is tested for the presence of Mycobacteria Tuberculosis in order to confirm TB. When all the microbiological tests are negative, the diagnosis of pulmonary TB is based on clinical assessments including a chest X-ray. Chest X-rays are not specific for pulmonary TB, since many other diseases have a similar radiographic picture, and therefore could result in the overdiagnosis of TB.

Method: A total of 112 new pulmonary TB patients from a clinic in the Tshwane-Metsweding Health District were enrolled in the study. In order to investigate the percentage of patients receiving treatment without bacteriological confirmation of TB, bacteriological test and chest X-ray results were collected for all patients at diagnosis.

Results: Out of 112 patients placed on anti-TB treatment, 100 had all three of the core microbiological tests done including one Xpert assay, one smear examination and one culture. Only 80 of the 100 patients had at least one of these tests come back positive. Therefore, 32 of the 112 (28.6%) patients did not have bacteriological confirmation of TB and were all placed on anti-TB treatment. Twenty-four of the 32 patients (75%) tested negative with all three of these tests. Seventy of the 112 patients (62.5%) had a positive Xpert result at diagnosis. Out of 46 HIV-negative patients, 37 of them (80.4%) had a positive Xpert result, compared to only 25 out of 54 (46.3%) of the HIV-positive patients. For patients with negative Xpert results or where the Xpert was not done, four out of 46 (8.7%) HIV-negative patients and four out of 54 (7.4%) HIV-positive patients had a positive culture result. Two patients (one HIV-positive and one HIV-negative) that had a negative Xpert and a negative culture result at diagnosis were confirmed to have TB by positive smear results (both trace).

Discussion and conclusion: A high proportion of individuals were being placed on TB treatment despite fairly comprehensive investigations and negative results. Further studies are required to investigate the extent of possible overdiagnosis, which could result in unnecessary costly and harmful treatment.
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Abstract Detail
AUTOMATED BREAST ULTRASOUND DETECTING HIDDEN BREAST LESIONS IN MAMMOGRAPHY

**Background:** Ultrasound has been used as a complementary examination in imaging of patients with Breast Diseases. Malignant breast lesions can be obscured by glandularfibrous tissue and easily be missed on mammogram and Ultrasound done by inexperienced Sonographer and it can be time consuming. The new Automated Ultrasound can be operated by a radiographer, provide images in multiple views (3D), and less time consuming.

**Method:** Patients with dense breasts on Mammograms are done ABUS and results are analysed by the Radiologist.

**Results:** The results of ABUS are not operator dependant and images can be saved on the Computer for future reference without quality of images being degraded.

**Discussion:** Automated Breast Ultrasound is time saving and operator independant as compared to hand held 2D ultrasound and more sensitive in detecting lesions that are easily missed on Mammogram.
Abstract Detail
THE BONNY METHOD OF GUIDED IMAGERY AND MUSIC FOR THE CARE OF ONCOLOGY PATIENTS: A SYSTEMATIC MIXED STUDIES REVIEW

Background: The best available research evidence is required to support health care decisions. Evidence based practice implies that the health care decisions and practices are based on knowledge, which is acquired from research evidence. In order to identify research evidence and best practices to support the implementation of Bonny Method of Guided Imagery Music (BMGIM) in cancer care a systematic mixed studies review was conducted.

Objective: To conduct a systematic review to compare the effectiveness of the BMGIM to that of other care methods with respect to the physical, psychological and spiritual wellbeing of oncology patients.

Method: A comprehensive literature search was conducted in various databases, journals and websites. Reference lists and key journals were hand searched. Two reviewers conducted the process. A total of 10 141 studies were identified in the first stage. Based on the inclusion criteria six records of diverse research design proceeded to data extraction. A data extraction form developed on a Microsoft Excel spread sheet guided the extraction of data. Included studies were appraised using critical appraisal tools developed by the Critical Appraisal Skills Programme and the Mixed Method Appraisal Tool. Synthesis of the data was conducted through a narrative approach. The convergent qualitative synthesis design, together with thematic qualitative synthesis, was used to synthesise the findings.

Results: Studies found significantly lower anxiety scores at follow up as well as improved quality of life scores at follow up in participants who received BMGIM. The qualitative study findings included detailed descriptions of participants’ experiences which linked to improved self-awareness, mood and quality of life. Studies identified were few and the appraisal rating of some of the reports was as low as 50%.

Conclusion: BMGIM can be a beneficial supportive cancer care intervention that can contribute towards making excellent cancer care possible.
Abstract Detail

DIETARY HABITS AND MALNUTRITION RISK FACTORS OF UNIVERSITY STUDENTS

Background: University students are prone to being nutritionally compromised as a result of social (demographics, socio-economic status) and psychological factors (i.e. academic stress). Poor eating habits, namely fast-foods and lack of variety (including fruits, vegetables and dairy) are risks factors for malnutrition and non-communicable diseases of lifestyle. There may be a physiological dysregulation or underlying deficiency of important nutrients such as niacin and tryptophan. This is of particular concern for student health and mental well-being as mild forms of niacin deficiency leads to irritability, anxiety, restlessness, memory problems, poor concentration, fatigue, and slow metabolism and sleep disturbances. Reduced tryptophan may imply a decreased availability for serotonin and melatonin biosynthesis. Thus, the importance of this research plan was to investigate student well-being in terms of dietary habits and malnutrition risk. Information generated may hopefully contribute to nutrition programmes and policy change for prevention of non-communicable diseases of lifestyle. The research is already aligned with target 3 of the UN Sustainable Development Goals.

Method: Recruitment of university students at the Prinshof Campus for investigations of dietary habits and well-being. Evaluation of nutritional status and malnutrition scores were conducted by self-reported questionnaires. The questionnaires were designed according to domains such as living conditions, nutrition variety (including niacin and tryptophan-rich foods) and other dietary habits as well as reports of inflammation infections.

Results: Preliminary data, removing race and gender bias from analyses, indicated that 25% of the students surveyed consumed 2 or less meals per day. On average, more than 70% of students reported skipping a meal while on campus owing to university activities, i.e., lack of time. Dietary habits varied and around 1 in 4 students consumed high-fat meat and other related processed foods daily. Less than 50% consumed dairy products and adequate servings of fruit and vegetables weekly. According to malnutrition scores, 1 in 4 students were at moderate risk for malnutrition.

Discussion and conclusion: According to initial analyses, there were primary indications for students to be at potential risk for malnutrition. Variety in healthy diets underscoring niacin and tryptophan were lacking. Further research is warranted and questionnaire surveys are ongoing.
Abstract

ASSESSING GENE EXPRESSION OF COAGULATION FACTORS AND FACTOR XIII POLYMORPHISMS IN TYPE 2 DIABETES MELLITUS

Background: Type 2 diabetes mellitus (T2D) is characterized by chronic hyperglycaemia, inflammation and coagulopathies due cytokine activation of platelets. The aim of the study is to identify factor XIII single nucleotide polymorphisms (SNPs) (Val34Leu and Tyr204Phe) in T2D in a South African cohort, assess FXIII mRNA levels and clot properties.

Methods: Following ethical approval (2692017), control (n=100) and T2D patients’ (n=100) blood samples were collected by venepuncture in citrated tubes. Genomic DNA was isolated from whole blood and used for PCR amplification of FXIII subunit A Val34Leu and Tyr204Phe. Amplicons were restricted enzymatically to assess genotypes. Total RNA isolation followed by cDNA synthesis was used for quantitative PCR to assess FXIII-A mRNA levels, calculated using 2^(-ΔΔCT). Thromboelastography (TEG) was used to assess clot kinetics (reaction time (R-time) and clot strength (MA))

Results: Control and T2D genotype distribution conformed to HWE (p>0.05). There was an increased risk of T2D in patients with the wildtype allele of both genes assessed, Val34Leu (Odds ratio (OR)=2.4, p=0.0039) and Tyr204Phe (O =2.5, p<0.0001). FXIII levels were 2.57-fold higher in T2D compared to controls, with high variance in fold change among patients. Analysis of the presence of the variant alleles showed that theT2D patients with homozygous wildtype ValVal had higher FXIII-A mRNA levels compared to samples with the Leu allele (17.79±16.54-fold, vs. 4.58±2.91-fold, respectively, p=0.267). The T2D patients with wildtype TyrTyr also had higher levels of FXIII-A mRNA (38.95±28.20-fold, vs. control: -4.5±2.83-fold, p=0.006). Clot properties assessed include R-time which was significantly higher in T2D (26.15±2.56min vs. control: 8.48±0.92min, p<0.0001) and MA which was slightly high in T2D (38.84±2.04mm vs. control: 36.29±1.98mm, p=0.196). No significant variation for R time and MA was found between Val34Leu genotypes. Reaction time was longer in T2D patients homozygous for TyrTyr (10.47±1.63min vs. TyrPhe and PhePhe: 6.56±0.73min, p=0.033). MA was slightly higher in T2D patients homozygous for TyrTyr (38.17±2.93mm vs. TyrPhe and PhePhe: 34.5±2.68mm, p=0.55).

Conclusion: The presence of the polymorphic variant of Val34Leu and Tyr204Phe offers a protective effect against T2D. Reaction time and clot strength are higher in T2D, but only significantly influenced by the TyrTyr genotypes in T2D.
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Abstract Detail
MOLECULAR PROFILING OF HPV NEGATIVE ORAL SQUAMOUS CELL CARCINOMA WITH DIFFERENTIAL P16 EXPRESSION PATTERN

Background: Tobacco and alcohol usage as well as HPV infection are the traditional risk factors for the development of head and neck squamous cell carcinoma (HNSCC). HPV infection in HNSCC is characterized by high expression of p16 protein, but this is only true for oropharyngeal cancer and not for oral cancer. Oral cancers, carcinogen induced changes in tumour-adjacent epithelium of the oral mucosal which make them susceptible to developing a multifocal carcinoma is referred to as field cancerization. This study investigated the histology, HPV infection, p16 expression and the mutational landscape of oral squamous cell carcinoma in a patient with a history of smoking.

Method: A 57-year-old HIV negative man with a history of smoking presented with an ulcerative lesion in the left floor of mouth area. Histological examination, analysis for high-risk types of HPV infection and OncoScan® analysis of DNA extracted from two well-defined areas with different p16 expression profiles were performed.

Results: Histological and immunochemical analysis revealed the presence of a dual architectural pattern of squamous cell carcinoma with one half consisting of moderately differentiated non-keratinizing p16 negative cells and the other a moderately differentiated keratinizing invasive p16 positive tumour; both areas were HPV negative. OncoScan® analysis revealed genetic changes characterizing field cancerization of the p16 negative area, which was evident by mosaicism in both loss of heterozygosity and copy number alterations in cancer-associated genes located on 3p, 7p, 9p, 11q and 17p.

Discussion and Conclusion: The presence of a tumor-adjacent (p16 negative) epithelium constituting of many subpopulations of cells with cancer-associated genetic changes of different scale, is indicative of field cancerization in response to tobacco exposure. This area has a high risk of eventually developing into a second primary tumour.
Abstract Detail
CALPROTECTIN S100 A8/A9 IN A SOUTH AFRICAN RHEUMATOID ARTHRITIS COHORT

Background: Calprotectin (CLP) S100 A8A9 are small calcium binding proteins [1] belonging to the group of damage-associated molecular patterns (DAMPs) or alarmins are mainly expressed in monocytes and neutrophils, and play a key role in the inflammatory response in RA. [2, 3] The measurement of CLP S100 A8A9 in serum may be useful to optimize the management of patients with RA.[4]

Objectives: The objective of this study was to evaluate The Calprotectin S100 proteins (A8 and A8A9) levels in a South African RA Cohort to determine their significance in predicting disease severity at presentation in comparison with RA related autoantibodies.

Methods: This was an observational single-centre study, conducted in the Department of Rheumatology, at the University of Witwatersrand, Chris Hani Baragwanath Academic Hospital (CHBAH), South Africa. The cohort consisted of 128 ethnic black RA DMARD naïve patients at first presentation. The study was approved by the local ethics committee and patients gave informed consent to participate in the study. Each patient was evaluated using the Disease activity score 28 (DAS28) and Simplified Disease Activity Index (SDAI). CLP S100 A8, CLP S100 A8A9, CCP, RF and MCV was determined using ELISAs supplied by ORGENTEC Diagnostika GmbH. C-reactive protein was measured by laser nephelometry (Siemens AG).

Results: The baseline demographics and clinical data of the cohort are summarized in Table 1. Calprotectin S100 A8 shows significant statistically significance with disease severity [(both DSI (p=0.005) and DAS 28 (p=0.016) by linear regression analysis. Calprotectin S100A8A9 also showed significant regression with SDAI (p=0.010) and DAS28 (p=0.022) as shown in Figure 1.

Conclusion: In this study we show that calprotectin levels strongly correlate with disease severity when using the SDAI and DAS 28 that are not shown by other autoantibodies in our cohort. Recent advantages in biomarkers such as Calprotectin has opened new ventures to better patient care and outcome in therapeutic areas and removes the area of subjective evaluation of these patients. This data suggests that Calprotectin S100 is a promising biomarker for assessment and monitoring disease activity in Rheumatoid arthritis.
A STUDY TO DETERMINE WHETHER 18-30-YEAR-OLD INDIVIDUALS ARE AT POTENTIAL RISK FOR STROKE

Background: In recent years stroke has become more prevalent in younger populations leading to the interest in potential risk factors. George et al (2011) report that obesity, hypertension, tobacco and alcohol use could be contributors in younger individuals.

Aim: To determine whether 18-30 year old individuals are at potential risk for stroke.

Methods: Design: A cross-sectional, descriptive study was conducted. Sample: A sample of 68 participants were recruited at the Prinshof Campus at the University of Pretoria. Instrumentation: A sphygmomanometer was used to capture blood pressure readings, a stadiometer and digital scale were used to calculate body mass index (BMI), a heart rate monitor and YMCA Step test were used to establish physical activity and an information sheet were used to ascertain information on lifestyle. Data Analysis: SPSS 25 was used to analyse data. Averages, ranges and medians were determined. Paired t-tests were used for comparisons of categories.

Results: 44 of our participants presented with at least one risk factor present. Of these 44, 36 participants presented with 8 risk factors. The most common risk factors in our sample was a poor diet followed by lack of physical activity. Other factors present included stress, inadequate sleep, migraines, smoking, alcohol and use of contraceptives. 26 of the participants had a > 25 BMI. 4 of the 10 male participants and 20 of the 58 female participants had a >25 BMI. 19 participants showed pre-hypertensive readings, whilst one participant presented with a hypertensive reading and was not on medication.

Conclusion: From our study it is evident that 18-30-year-old individuals are at potential risk of stroke due to the various risk factors present. When multiple factors are present, the likelihood of the disease in younger populations is even higher. Changes to lifestyle with regards to diet, exercise and stress management are recommended to reduce these potential risk factors.
Abstract Detail
EARLY DISCONTINUATION OF ETONOGESTREL IMPLANTS AMONGST CLINIC USERS IN TSHWANE

Background: The Etonogestrel subdermal implant, “Implanon®” was introduced in South Africa in 2014 and is one of the few LARC options available. It is a highly effective and easy method and remains effective for 3 years. The study aimed to identify patients who requested early removal of the implant and to further ascertain reasons for removal. Our secondary objectives were to establish whether pre-insertion counselling made any difference and to determine contraceptive method switch.

Methods: a Survey was completed by 152 women who removed their Implanon® before 2.5 years between June 2016 and June 2017 at 4 major clinics in Tshwane. Data analysis was done using frequency tables, chi-squared tests, independent t-tests and logistic regression.

Results: We found that 90(49.2%) chose to use Implanon® because of the long duration of use. Other reasons included the fact that it is safe 49(32.2%), convenient and easy to use 36(23.6), effective 16(10.6%) and 4(2.6%) stated healthcare provider choice as their primary reason for insertion. Ninety-three (61.2%) woman stated side effects as the main reason of removal, with abnormal bleeding and headaches being the most common side effects listed at 85(55.9%) and 70(46%). Twenty-two (14.5%) did not experience any adverse effects. Other reasons for removal include the desire to fall pregnant 15(9.9%), advised to remove due to decreased efficacy while using ARV’s 11(6.6%), contraceptive failure 8(4.7%), pain on insertion site 9(5.9%), partner pressure 7(4.7%) and religion 3(2.7%). Most participants switched to an alternate method of contraception at the time of Implanon® removal with Depo Provera 40(26.3%) and Nur Isterate 24(15.8%) being the most popular choices. Other methods included COC’s 12(7.9%), IUCD’s 6(3.9%) and tubal ligation 1(0.7%). Three (2%) participants re-inserted another implant. The majority of participants recommended Implanon® to others with 54(35.5%) saying it is a bad method of contraception. Pre-insertion counselling had a significant difference on removal before 2.5 completed years (p=0.027) with 28(18.4%) participants reporting that they did not receive any pre-insertion counselling.

Conclusion: Adverse side-effects were found to be the main reason for early discontinuation of Implanon®. Effective pre-insertion counselling made a statistically significant difference in the duration of use and the importance thereof should be reinforced in all healthcare facilities offering contraception.
Abstract Detail

MOLECULAR AND MICROSCOPIC EVALUATION OF CHANGES IN CLOT COMPONENTS AND PROPERTIES IN ASTHMA

Background: Asthma pathophysiology is not only linked to inflammation, but also with activation of coagulation and reduced fibrinolysis due to plasma and locally derived factors in the airways. Alterations to these factors may influence the mechanical properties of coagulation.

Methodology: The aim of this study was to evaluate changes of blood components in asthma patients (n=30) compared to controls (n=30) using a haematology analyser; structural changes and axial ratio analysis using light microscopy, elasticity using atomic force microscopy; ultrastructural changes using scanning electron, transmission electron and confocal microscopy; viscoelastic properties of the fibrin clot using thromboelastography; and mRNA levels of FXIII-A by quantitative PCR.

Results: There was, however, a significantly higher level of circulating monocytes (p=0.0066), erythrocytes (p=0.0004), haemoglobin (p=0.0057) and haematocrit (p=0.0049) in asthma. Eosin stained erythrocytes showed more echinocytes, acanthocytes and ovalocytes compared to controls and higher axial ratio (controls: 1.2±0.22nm vs. asthma: 1.165±0.16nm, p<0.0001) with reduced erythrocyte membrane elasticity (p=0.001). Platelet morphology and ultrastructure showed morphological changes indicative of platelet activation in the asthma samples. Clot kinetics showed a tendency to produce stronger fibrin clots in asthma samples. The reaction time was higher (p<0.0001), alpha-angle was lower (p<0.0001), maximum rate of clot formation was higher (p<0.0001). Densitometry analysis of SEM showed a lower variance in asthma (p<0.0001). A 17.34-fold higher FXIII-A mRNA level was found in asthma patients compared.

Conclusion: Altered erythrocyte and platelet morphology, excess production of FXIII-A, altered fibrin architecture and clot properties affects the coagulation profile in asthma, systemically. Further research is needed to extrapolate exact mechanism by which increased systemic coagulation contributes to the pathophysiology of the disease locally.
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Abstract Detail
EVALUATION OF THREE DIFFERENT LABORATORY METHODS TO DETECT PREFORMED HUMAN LEUKOCYTE ANTIGEN ANTIBODIES IN A SOUTH AFRICAN KIDNEY TRANSPLANT POPULATION

Background: In most countries transplant guidelines advocate the screening of kidney transplant patients’ serum for donor-specific anti-human lymphocyte antibodies (anti-HLA). These autoantibodies play a crucial role in graft rejection and may eventually lead to graft loss post-transplantation. Therefore, detection of anti-HLA antibodies also known as cytotoxic antibodies both pre- and post-transplant is one of the most important investigations undertaken in clinical organ transplantation.

Objectives: Three methodologies for the detection of cytotoxic antibodies were compared to establish which of these is best suited to optimise pre-transplant donor-recipient matching.

Methods: Serum samples from 15 renal transplant recipients awaiting transplantation were tested for the presence of anti-HLA antibodies by i)cytotoxic dependent cross-match (CDCXM), ii)flow cytometric cross-match (FCXM) and iii)Luminex-based donor specific antibody (DSAXM) cross-match methods using donor lymphocytes and recipient sera. Confirmatory tests for the presence of preformed HLA antibodies were tested using Luminex.

Results: Two (13%) of the 15 patients had positive HLA Class I cross-match results using all 3 methods. With the CDCXM Class I, 2 (13%) patients were positive; FCXM Class I, 2 (13%) patients were positive. The two patients’ positive for CDCXMFCXM Class I were identical. DSAXM Class I also 2 (13%) patients were positive, but DSAXM identified 1 patient that is identical to the positive CDCXMFCXM Class I patients. CDCXM assay showed a high percentage of positive HLA Class II (40%) while DSAXM identified only 2 (13%) patients and FCXM 1 (7%) for HLA Class II. When the 4 non-congruent CDCXM HLA Class II positive samples were analysed with the lymphocyte single antigen (LSA) assay, no HLA Class II antibodies were identified, thus indicating all 4 (67%) samples identified by CDCXM were false-positive.

Conclusions: The DSAXM method appears to add value in pre-transplantation screening to identify pre-sensitised patients that may not reject the donor graft because of the absence of donor-specific antibodies.
Abstract Detail

INDIGENOUS KNOWLEDGE HEALING THEORY OF INFANT ILLNESS RIGONI IN VHEMBE DISTRICT OF LIMPOPO PROVINCE

Background: The broad purpose of this paper is to share and contribute new knowledge towards health and illnesses in an indigenous knowledge (IK) perspective. The specific purpose is to contribute and share indigenous knowledge healing theory (IKHT) that was co-constructed by the researcher and participants, explaining and describing management of infant illness rigoni.

Method: A grounded theory approach was used, underpinned by indigeneity lens within indigenous knowledge systems to explore and describe the management of infant illness rigoni by THPs and IKHs. The reservoir of indigenous knowledge were THPs and IKHs who are able to treat and manage rigoni and members of Makhado Traditional Health Practitioners Association (MTHPA) in Vhembe district, Makhado municipality in Limpopo province. Sampling techniques employed were initial, networking and theoretical sampling. Sample size was determined by data saturation during analysis. Individual face-to-face 16 participants were interviewed, lasting for 35 to 45 minutes. A digital voice recorder was used to capture narratives aided by field-notes. Data was analysed through the process of open-, focused- and theoretical coding. Trustworthiness was ensured through verification strategies: methodological coherence, theoretical sampling, concurrent data collection and analysis, theoretical thinking and theoretical development.

Results: The results of the study was a substantive grounded theory: Indigenous Knowledge Healing Theory of rigoni. The theory is contextual as the study was conducted in one substantive area (Vhembe district, with THPs and IKHs in this setting). During focused coding indigenous knowledge healing of rigoni emerged and its elements were used to generate the theory. The elements of IK are interpretation, origin and healing approaches and methods for illness rigoni.

Discussion and Conclusion: The meaning of indigenous healing of rigoni was explored and described in relation to the concepts from the perspective of the participants (THPs and IKHs). A theory has been developed that explores and describes the IK healing of rigoni, providing better understanding of IK healing processes of infant illness rigoni. The theory may assist in collaborating traditional healing and biomedical practices for managing illnesses. IK healing should be integrated into the curriculum of healthcare professions to accommodate cultural and beliefs of diverse clients.
Abstract Detail
THE MOLECULAR EPIDEMIOLOGY, DIVERSITY AND HOST INTERACTIONS OF GASTROENTERITIS VIRUSES IN CHILDREN UNDER THE AGE OF FIVE YEARS IN PRETORIA, SOUTH AFRICA

Background: Gastroenteritis is a leading killer of children. In 2016, it globally accounted for approximately 8% of deaths among children >5 years. Viruses are a common cause of gastroenteritis, infecting millions of people annually. Intermittent, antigen-based testing of rotavirus (RV), adenovirus and astrovirus in South Africa generates a skewed picture of gastroenteritis virus epidemiology, which under represents noro- (NoV) and sapoviruses (SaV). Host susceptibility to NoV and RV is linked to fucosyltranferase-2 (FUT2)-based secretor status. The aim of this study is to investigate the susceptibility to, prevalence of and relationship between gastroenteritis viruses in the paediatric population.

Methods: From July 2016 to December 2017 blood, stool and saliva specimens were collected from 205 children (>5 years) hospitalised with gastroenteritis at Kalafong Tertiary Provincial Hospital. Screening for five gastroenteritis viruses was performed using the Seegene GI-virus multiplex real-time assay. NoV and SaV were genotyped based on conventional RT-PCR, nucleotide sequencing and phylogenetic analysis using MEGA6. RV was genotyped using a multiplex PCR and gel electrophoresis analysis. FUT2 genotyping was performed using a real-time PCR.

Results: To date, 190/205 stool specimens have been screened and 45.7% (87/190) tested positive for at least one gastroenteritis virus. RV predominated (43) followed by NoV (27), adenovirus (15), SaV (6) and astrovirus (3). Thirteen NoV (GI.3, GI.4, GI.7, GIi.21), 14 RV (G2P[4], G2P[8], G3P[4], G3P[8], G8P[4], G9P[4], G9P[8]) and 4 SaV (GI.1, GI.2, GI.4, GI.8) strains have been genotyped, of which norovirus GI.4 and rotavirus G2 and P[4] predominated. FUT2 genotyping of 100 children showed a 67:33 ratio between secretors and nonsecretors. Of these, 28/100 were infected with NoV and/or RV. Eighty-nine percent (25) of the virus infected children were secretors whereas only 11% (3) were nonsecretors.

Discussion and Conclusion: RV is still the leading cause of gastroenteritis hospitalisations in children despite introduction of the RV vaccine. NoV is the second most prevalent virus and is not routinely tested for, although it represents 14% of these gastroenteritis hospitalisations. The preliminary data suggest that NoV and RV preferentially infect secretors, as observed in other studies. Combined analysis of the virus prevalence, diversity and host secretor status data are needed to confirm this observation.
Abstract

THE ANATOMICAL EVALUATION OF THE AXILLARY NERVE USING THE AXILLARY APPROACH FOR NERVE TRANSPLANT OR NERVE GRAFTING

Introduction: The brachial plexus is vulnerable to trauma associated with injuries such as humeral head fractures or shoulder dislocations; or iatrogenic injuries during clinical procedures. The axillary nerve is one of the terminal branches of the brachial plexus and, when injured, may result in axillary nerve palsy, deltoid atrophy, and early muscle fatigue; which are associated with decreased muscle strength and difficulties in external rotation and abduction of the arm. Nerve transfer or nerve grafting are the surgical techniques used for nerve repairs; while the anterior, posterior and axillary approaches are used for the access to the axillary nerve. The anterior and posterior approaches are frequently used; while the axillary approach is reported to be the better approach, although few studies of the anatomy encountered with this approach exists.

Aim: The aim of this study is to clearly visualise and provide an accurate anatomical description of the axillary nerve and its branches using the axillary approach; with reference to its location, course and visible landmarks related to it.

Methods: This study will use 20 formalin-fixed adult cadavers that will be dissected bilaterally, for a total sample of 40 axillae. The axillary nerve will be measured from its origin to where it terminates, as well as from its posterior division to the origin of the teres minor branch.

Results and discussion: The data collected, is essential for deciding whether or not the axillary approach is a suitable method to perform successful nerve transfer or nerve grafting procedures using visible landmarks. This information will help orthopaedics and neurosurgeons to create a safe zone that will allow for the performance of safer surgeries during re-innervations of the axillary nerve and brachial plexus injuries.
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Abstract Detail
ANATOMY OF THE LATERAL FEMORAL CUTANEOUS NERVE IN RELATION TO THE ANTERIOR SUPERIOR ILIAC SPINE AND THE INGUINAL LIGAMENT

Background: Injury to the lateral femoral cutaneous nerve (LFCN) is a risk during operative procedures in the inguinal region. Although several studies have described the course of the nerve as it passes through the inguinal region, this has been shown to be highly variable. The aim of this study was to describe the course and branching patterns of the LFCN and quantify its position in relation to the anterior superior iliac spine (ASIS) and the inguinal ligament (IL), in a South African population.

Method: Dissections were performed on thirty formalin-fixed adult cadavers with no pathologies in the area of interest. The embalmed adult cadavers were dissected within the Department of Anatomy, University of Pretoria. The distance of the LFCN from the ASIS was measured on both the left and right sides of the cadavers. If two or more branches of the nerve were encountered, the most lateral branch was measured. The position of the nerve as it crosses the IL was recorded together with its branching patterns.

Results: The LFCN consistently coursed medial to the ASIS either deep, through, or superficial to the IL. Variable branching patterns were observed and noted.

Discussion and conclusion: Based on these results, it is clear that the exact anatomy of the LFCN is highly variable. However, in this study we were able to obtain a quantitative estimate of the position of the nerve in relation to the ASIS, as well as describe the position of the nerve in relation to the IL. Knowing the anatomy of the LFCN is important to avoid injury of the nerve during surgeries hence the results of this study will provide reference data that is specifically for a South African population in order to avoid such, inadvertent injuries.
Abstract Detail
IN VITRO EFFECTS OF PALMITOLEIC ACID ON EARLY OSTEOBLAST DIFFERENTIATION IN HUMAN ADIPOSE-DERIVED STROMAL CELLS

Introduction: During bone remodelling osteoclasts resorb bone and osteoblasts form new bone. Osteoblasts are derived from mesenchymal stem cells (MSCs) such as adipose-derived stromal cells (ASCs). ASCs are able to differentiate into adipocytes or osteoblasts. The mitogen-activated protein kinase (MAPK) pathway has been shown to interfere with osteoblast differentiation at an early stage. Runt related transcription factor 2 (RUNX2) exerts an effect downstream from p38 MAPK. RUNX2 phosphorylation by p38 MAPK has been found to increase markers of osteoblast differentiation such as alkaline phosphatase (ALP), osteoprotegerin (OPG) and receptor activator of NF-kB ligand (RANKL). Palmitoleic acid (PLA) has been shown to have anti-osteoclastogenic effects through inhibiting MAPK pathways. The effects of PLA on osteoblasts has not been reported and may provide insight into the mechanisms of PLA on osteoblast differentiation. The study examined the effects of PLA on early osteoblast differentiation in ASCs.

Methods: ASCs were seeded at 5 000 cells/cm² in 96-well plates. Resazurin assay was performed in three independent experiments in triplicate to assess the cell viability of the cells after 48 hours of PLA (0-100µM) treatment. Cells were seeded at 5 000 cells/cm² in 48-well plates and differentiated using osteogenic media containing 50µM ascorbic acid, 1µM dexamethasone and 10mM β-glycerophosphate for 21 days with PLA. ALP activity assay and Alizarin Red S staining was performed to detect ALP and calcium mineral matrix deposition. Gene expression was determined by q-PCR for early osteoblast specific genes such as ALP, OPG and RANKL.

Results: Cell viability was not affected by PLA or osteogenic media at treatment concentrations. ALP activity was not significantly increased after PLA treatment in comparison to osteogenic media treatment. Alizarin Red S staining for calcium deposition qualitatively increased as PLA concentrations increased, however, there was no significant increase when measured quantitatively. q-PCR revealed that ALP and OPG were increased while RANKL expression decreased in comparison to osteogenic media only treated cells.

Discussion and Conclusion: Calcium deposition may be increased at higher PLA concentrations. PLA increased ALP markers for osteogenesis, indicating osteoblast differentiation may be stimulated. OPG inhibits bone resorption, thus a high OPG:RANKL ratio is important for healthy bone remodelling.
Abstract


Background: On 7 July 2017, public health authorities received notification of 41 cases of gastrointestinal illness amongst 687 delegates at a training facility. According to the International Health Regulations, 2005, such events are notifiable and require prompt response. An investigation was conducted in order to: identify and eliminate the source, assess the magnitude and extent of the outbreak, provide recommendations and implement interventions to prevent future similar outbreaks.

Method: A case control study was conducted. A case was defined as any delegate who attended training at the Johannesburg training facility (on the 5, 6 and 7 July 2017) having gastrointestinal illness during or immediately after the training. Controls were selected as a convenience sample. A web-based gastrointestinal illness case investigation form (CIF) was developed and sent electronically to 487. Eight patients provided stool specimens for laboratory testing and molecular typing. To further understand food items associated with the illness, bivariate and multivariate analyses were conducted. An observational audit of the training facility kitchen was conducted. Available food items were tested.

Results: Thirty- five cases and forty-five controls participated in the study. The epidemiologic curve suggested a common source outbreak. Twelve cases were hospitalised. females were more affected (64%) and the ages ranged from 21 years – 62 years with the median age of 37 years. Most common symptoms were watery diarrhoea (78%) and abdominal pain (65%). Salmonella Enteritidis was isolated from all 8 stools specimens and they all showed identical molecular profiles. Consumption of scrambled eggs was associated with the gastrointestinal illness (OR=5.4; 95% CI 1.8-16.0). The observed food storage temperatures were within recommended ranges.

Conclusion: Scrambled eggs were significantly associated with the illness and Salmonella Enteritidis was isolated from 8 participants. The outbreak was most likely due to the consumption of scrambled egg contaminated with Salmonella Enteritidis.
Abstract Detail
MEASURING FUNCTIONAL BALANCE IN THE ELDERLY: COMPARISON OF THREE BALANCE TESTS

Introduction: The global population of men and women over the age of 60 years is estimated to be approximately 841 million, and is predicted to reach two (2) billion by the year 2050. Falls in the elderly often lead to hospitalisation and high medical costs and have been attributed to poor balance. Different balance tests are used to measure balance in the elderly but it is unclear whether these tests are interchangeable with one another to render comparisons possible.

Purpose: The aim of the study was to compare the Functional reach (FR) test and the Timed-up-and-go (TUG) test, with the Fall Risk measured by the Biodex balance system SD.

Method: A non-experimental, retrospective descriptive correlational design was used. Data consisting of height (cm), weight (kg), waist-hip ratio, BMI (kg.m2.), FR test (cm), TUG test (sec) and Fall Risk measured with the Biodex SD balance machine, collected in a South African elderly sample (n=31) in 2015, was analysed using nonparametric, descriptive statistics. Spearman rank order correlation was used to assess the relationship between the three (3) balance tests. Alpha was set 0.05 and categories of r classifications were set as weak (r0.6).

Results: A weak relationship with no significant correlation was observed between the FR and TUG tests (r = 0.32, p = 0.866), FR test and Biodex fall risk (r = 0.014, p = 0.941), and between TUG test and Biodex fall risk (r = 0.349, p = 0.055). The TUG test classified all the participants as low fall risk, whereas the FR test and the Biodex Balance System SD both classified two (2) participants as high fall risk.

Conclusion: The FR, TUG and the Biodex Balance System SD assessment cannot be used interchangeably with one another, in an elderly South African population, despite all three (3) tests being considered to be valid and reliable tests to measure balance in the elderly. Further research should investigate the role of obesity on fall risk and the reliability and validity of these balance assessments in the elderly who are overweight or obese.
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Abstract Detail
FREQUENCY OF MUTATION LEU463ARG OF THE KATG GENE IN MULTIDRUG RESISTANCE MYCOBACTERIUM TUBERCULOSIS CULTURE

Background: Globally the rate of MDR-TB has been gradually increasing thus posing a threat in treatment and management of TB. Rapid diagnostic assays have been developed to accelerate the detection of resistance and proper management of drug-resistance in patients. However these assays are missing some cases whose mutations are not included in the assay. The assays which have been endorsed/recommended by the WHO for rapid diagnosis include the Genotype MTBDRplus and XpertMTB/RIF® assay thus mutations targeted by these are katG (S315T) and inhA (C15T A16G, T8C, and T8A) genes and also the Rif resistance determining region (RRDR) respectively. M. tuberculosis lineages are geographically distributed in different regions and they play a role in the virulence characteristic, monitoring of transmission of TB and the most virulent dominate lineage being the Beijing lineage (strain).

Method: In this retrospective study, 24 year old stored MDR cultures confirmed with phenotypic DST and the line probe assay were used to assess the frequency of mutation Leu463Arg on the katG gene. 100 isolates were used, wherein conventional PCR assay was used to amplify katG, rpoB and inhA genes. Analysis of frequency of mutation Leu463Arg was done using illumina Miseq whole gene sequencing system. The association of mutation Leu463Arg with M. tuberculosis lineages was assessed using Spoligotyping.

Results: In the study 88% of the isolates were INH resistant and 7% of the isolates were INH susceptible. The katG gene mutation Ser315Thr was detected alone in 3.06% of the isolates and mutation Leu463Arg in 8.16% of the isolates. Mutation Leu463Arg occurring together with Ser315Thr was found in 53.06% of the isolates. Mutation Leu463Arg and Ser315Thr together with other mutations were detected in 22.44% of the isolates. Mutation Ser315Thr together with other mutation excluding Leu463Arg was detected in 4.08% of the isolates. The total frequency of Leu463Leu was 8.2%. The majority of mutation associated with M. tuberculosis lineages occurred in the T family 28% followed by LAM 20%.

Conclusion: Mutation Leu463Arg is more frequent in isoniazid resistant isolates and should be look out for if the katG mutation is missing with a phenotypic isoniazid resistance. More studies using fresh cultures to check for this mutation MICs in different population are required including its association with M. tuberculosis lineages.
LIFETIME PREVALENCE, ANNUAL INCIDENCE, AND INCIDENCE OF COMMON RUNNING INJURIES DIFFER BETWEEN 21.1KM VERSUS 56KM RUNNERS: A CROSS SECTIONAL STUDY IN 76 654 DISTANCE RUNNERS

Introduction: Long-distance running is very popular, but is associated with non-traumatic (overuse) injuries (NTI). There are little data on the differences in NTIs between 21.1km vs. ultra-marathon (56km) runners. The aim of the study was to compare the lifetime prevalence, annual incidence and types of common NTIs in 21.1 km and 56km runners.

Methods: 76 654 consenting participants in the Two Oceans Marathon races (21.1km=47 069; 56km=29 585) were studied (2012-2015). Non-traumatic (overuse) injuries (NTI) were self-reported as part of an online pre-race medical screening and intervention system administered during the race entry process. Crude (un-adjusted for age, sex) lifetime prevalence, annual incidence, and annual incidence of common running NTIs (% runners; 95% CI) were compared in 21.1km and 56km runners.

Results: The lifetime prevalence of NTI in all runners was 16.8% (16.6-17.1)(12 884 injured runners), and this was higher in 56km (22.3%; 21.9-22.8)(6 608 injured runners) than 21.1km (13.3%; 13.0-13.6)(6 276 injured runners) runners. In all runners reporting lifetime NTIs, the annual incidence of NTI in the previous 12 months was 64.7% (63.8-65.5), and this was higher in 21.1km (70.7%; 69.6-71.8) vs. 56km (58.9%; 57.7-60.1) runners. In runners reporting NTI in the previous 12 months, the annual incidence of typical running injuries differed significantly between 21.1km vs. 56km runners as follows: patellofemoral pain (21.1km=5.0%; 4.4-5.6; 56km=3.7%; 3.1-4.3), ITB (21.1km=19.0%; 17.9-20.2; 56km=16.2%; 15.0-17.3), Achilles tendon injury (21.1km=7.6%; 6.8-8.3; 56km=9.7%; 8.8-10.7), hamstring injury (21.1km=5.1%; 4.4-5.7; 56km=8.8; 7.9-9.7) and calf muscle injury (21.1km=6.6%; 5.9-7.4; 56km=10.8%; 9.8-11.7).

Conclusion: 21.1km runners report a lower lifetime prevalence of NTI but a higher annual (12 months) incidence of NTI vs. 56km runners. The annual incidence of patellofemoral pain and ITB is higher in 21.1km vs. 56km runners, but 56km runners report higher incidence of Achilles tendon, and muscle (calf, hamstring) injuries. Risk factors for running injuries in these race distances needs to be determined to develop appropriate prevention strategies.
Abstract Detail

THE EFFECT OF ADIPOSE-DERIVED MESENCHYMAL STROMAL CELLS ADMINISTERED LOCALLY FOR WOUND REPAIR

Introduction: The treatment of chronic wounds remains a clinical challenge. The use of adipose-derived mesenchymal stromal cells (ASCs) to enhance wound repair is gaining interest. This study set out to establish (i) the distribution and survival of exogenously administered ASCs during physiological wound repair; and (ii) the effect of ASCs during wound repair under pathological conditions of hyperglycemia and ischemia.

Methods: ASCs isolated from rat inguinal fat pads were transduced to express both firefly luciferase (Fluc) and green fluorescent protein (GFP) to facilitate cell tracking. In the physiological model, bilateral wounds were created on the dorsal aspect of the rat's hind paws. In the pathological model, bilateral wounds were created after ischemia was induced in the feet by resection of the femoral artery in hyperglycemic rats. Animals were treated with 2x10^5 ASCs locally into the corners of each wound and were followed at 3h, 24h, 48h, 72h, at 15 and 21 days and at complete wound closure. ASC distribution and survival was followed by bioluminescence imaging (BLI) and histological analysis. Wound healing was assessed by digital photography and immunohistochemistry of the wound.

Results: Under physiological conditions, ASCs remained strongly detectable by BLI for at least 7 days at the injection site. At the histological level, some ASCs migrated into the wound bed over time as detected by GFP staining. Interestingly, physiological wound healing was significantly improved by ASC injection. The effect of ASCs under ischemic and hyperglycemic conditions is still being analysed.

Conclusion: Using a model of physiological wound healing we found that ASCs migrated into the wound bed where they could potentially assist in the wound repair process. Experiments are underway using a model of pathological (ischemia and hyperglycemia) wound healing to determine the effect of ASCs in treating chronic wounds.
Abstract Detail
OUTBREAK OF CULTURE-CONFIRMED CANDIDA AURIS BLOODSTREAM INFECTION IN THE NEONATAL UNIT OF A PUBLIC-SECTOR HOSPITAL, SOUTH AFRICA, JULY THROUGH SEPTEMBER 2017

Background: Candida auris is a multidrug-resistant fungus causing invasive disease healthcare-associated outbreaks. In September 2017, cases of C. auris candidaemia were detected through surveillance in the neonatal unit of a public-sector hospital in Gauteng province, South Africa. Only one case of candidaemia (Candida albicans, June 2016) had been diagnosed in this unit in the preceding 18 months. We describe the outbreak investigation and implementation of infection prevention and control (IPC) measures.

Methods: We defined a case as an infant admitted to the neonatal unit, 27 July-19 September 2017, with C. auris cultured from blood. We collected clinical and laboratory data using a standard medical chart abstraction tool. A cross-sectional survey was conducted among admitted infants (21 September 2017) to determine the prevalence of colonization, defined as C. auris cultured from an axilla groin skin swab without corresponding clinical evidence of candidaemia. After implementing IPC measures (isolationcohorting of infants infectedcolonized with C. auris, amphotericin B treatment of candidaemia and environmental cleaning with hypochlorite-based disinfectants), a second survey was conducted (19 October 2017).

Results: We identified six cases; five were female. The median birth weight was 1205 g (IQR, 1190-1225) and median age at diagnosis 23 days (IQR, 19-27). Five cases were born prematurely with hyaline membrane disease. Prior to diagnosis, all cases received blood transfusions and empirical broad-spectrum antibiotics; five received total parenteral nutrition and fluconazole. Five were treated with amphotericin B after diagnosis. Two of six patients died. Ten of 31 (32%) admitted infants were colonized with C. auris in the first survey, two with concurrent C. auris candidemia. Only 1 of 26 infants was colonized in the second survey. No further cases occurred.

Conclusions: Information provided by colonization surveys, coupled with intensified IPC measures, were likely important factors in preventing further C. auris cases during this outbreak.
Abstract Detail

GENE AND PROTEIN EXPRESSION KINETICS OF FATTY ACID BINDING PROTEIN-4 (FABP4) AND FATTY ACID TRANSLOCASE/CD36 (FAT/CD36) DURING IN VITRO DIFFERENTIATION OF ADIPOSE-DERIVED Stromal cells.

Background: Obesity is a complex metabolic disorder that is primarily associated with excess amounts of body fat, but also has a strong association with other non-communicable diseases, such as cardiovascular disease, diabetes, osteoarthritis and cancer. Successful strategies to combat obesity may consequently contribute to mitigating some of the health costs associated with obesity and obesity-associated non-communicable diseases. The ability of adipose-derived stromal stem cells (ASCs) to differentiate into adipocytes in vitro provides a promising model to study the process of adipogenesis (process of adipocyte differentiation and consequently fat formation) using cells of human origin. One of the key characteristics of adipocyte differentiation is intracellular lipid accumulation. Fatty acid binding protein-4 (FABP4) and fatty acid translocase/CD36 (FAT/CD36) are two of the end-stage adipogenic differentiation proteins that play an important role in intracellular lipid accumulation. The association of increased levels of FATCD36 and FABP4 with various metabolic disorders makes these proteins promising targets as potential biomarkers and/or intervention targets to diagnose and potentially treat various metabolic disorders. A better understanding of the gene and protein expression kinetics of these proteins during adipocyte differentiation may thus potentially lead to improved treatment strategies.

Methods: We monitored FATCD36 and FABP4 gene (using RT-qPCR) and protein expression (using flow cytometry) at several time points (Day 0, Day 1, Day 7, Day 14 and Day 21) during in vitro adipogenic differentiation of ASCs.

Results & Discussion: We observed a gradual increase in both FATCD36 and FABP4 gene and protein expression during a 21-day adipogenic differentiation period. In addition, we observed a good correlation between the respective gene and protein expression levels measured at the various time points. Studies that have investigated FATCD36 or FABP4 as potential therapeutic targets to treat obesity, have only targeted one of the above-mentioned proteins. The excellent correlation that was observed between gene upregulation and increased protein expression of FATCD36 and FABP4 suggest a close relationship between these two molecules; a better understanding as to whether there is a causal interaction is required. Our findings suggest the potential for a dual target therapeutic approach in future studies.
Abstract Detail

CHANGES IN THE FORCE-VELOCITY-POWER PROFILES DURING MAXIMAL SPRINT ACCELERATION IN YOUNG SPRINTERS, OVER TWO CONSECUTIVE SEASONS

Background: The 100m event is the flagship event in track and field competitions. The aim of the study was to examine the relationship between mechanical variables derived from the force-velocity-power profile and sprint performance, and the changes in mechanical variables and sprint performance over two consecutive seasons in young athletes.

Methods: Thirteen athletes participated in the study (6 males, 7 females). The testing took place on the outdoor athletics track over two consecutive seasons. The athlete’s velocity was measured using a Stalker ATS II Radar Gun during a maximum effort 30 m sprint start. Acceleration, force and power were calculated from the speed-time data. The athlete’s season best 100m time in each year was used as the measure of sprint performance.

Results: There were large to very large correlations (r > 0.5) between sprint performance and: theoretical maximum velocity (V0), theoretical maximum horizontal force (F0rel), maximum power (Pmaxrel) and the ratio of horizontal to total ground reaction force (RFpeak). The correlation between sprint performance and the decrement in ratio of force (Drf) was small (r = 0.2). Sprint performance improved from year 1 to year 2 in male (Y1: 10.90s ± 0.38; Y2: 10.74s ± 0.48; ES -0.38) and female (Y1: 12.83s ± 0.43; Y2: 12.63s ± 0.45; ES -0.45) athletes. Small to moderate effect sizes (ES > 0.2) were observed for improvements in F0rel, Pmaxrel and RFpeak in male and female athletes. In female athletes, there was a trivial decrease in V0 and a moderate decrease in Drf. In male athletes, there was a small decrease in V0 and Drf.

Discussion and Conclusion: Theoretical maximum horizontal velocity, maximum power, and the ratio of force have been shown to be differentiating factors between sprint performance levels in adult athletes. In the present study, these mechanical variables were associated with faster 100m times between athletes, however, only force and power improved in conjunction with sprint performance within athletes, while V0 did not. This suggests that year-on-year performance improvements in youth athletes are more reliant on enhancements in horizontal force production capabilities at low velocities than high velocities.
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**Abstract Detail**  
EXPERIENCES OF WOMEN USING ETENOGESTREL SUBDERMAL CONTRACEPTIVE IN A SELECTED HOSPITAL IN LIMPOPO PROVINCE.

**Background:** Contraception is a deliberate birth control method used to prevent women from conception. The South African Constitution and the Department of Health (DOH) have approved different methods of contraceptives such as natural, barrier, hormonal and other available methods to be used by the citizens. The hormonal method is one of the contraceptives freely accessible in all public hospitals and clinics. In South Africa DOH introduced a new hormonal contraceptive, called etonogestrel subdermal, in February 2014, as a female contraceptive to be used throughout the country. The majority of women on etonogestrel subdermal contraceptive revisit the clinic seeking removal of the etonogestrel subdermal contraceptive, complaining of its adverse effects such as vaginal bleeding and much more.

**Aim:** The aim of this study was to explore and describe the experiences of women using etonogestrel subdermal contraceptive in a selected hospital in Limpopo Province and to propose recommendations regarding the strategies to deal with adverse effects of etonogestrel subdermal contraceptive, and promote its optimum utilisation.

**Study design and method:** A qualitative, explorative, descriptive and contextual study was followed. Individual in-depth face to face interviews were conducted to explore the experiences of women when using etonogestrel subdermal contraceptive, using an interview guide. Data was analysed following Tesch’s method

**Results:** Themes and categories were used to explain the results that were discussed with relevant literature to confirm and contest the outcome of the study. The study findings show positive and the negative experiences of women.

**Conclusion:** Women need to be made aware of all possible adverse effects and be given more support once the etonogestrel subdermal contraceptive is inserted. In supporting women’s contraceptive choices, health workers need to accept that some women can tolerate the etonogestrel subdermal contraceptive and that encouraging retention without dealing with distressing adverse effects is counterproductive.
Abstract Detail

EXPECTATIONS AND EXPERIENCES OF PATIENTS DIAGNOSED WITH CANCER AT THE TIME OF THE RADIATION LOCALISATION EVENT

Introduction: In health care, it is important to take cognisance of patient expectations and experiences in order to inform understanding of and communication with the patient-as-a-person. This study explored the expectations and experiences of patients at the time of the radiation localisation event where a number of technical procedures are undertaken by the radiation therapy radiographers (RTs) on a CT Scanner. The purpose of the procedures is to design individualised accessories to be used during radiation treatment and obtain data used in the computerised treatment planning process. The localisation event also marks a transition between the cancer diagnosis and the radiation treatment in the cancer care continuum.

Method: A qualitative research using a phenomenological approach was used to conduct this study. Adult patients attending the localisation appointment were selected using a single phase purposive sampling method. A homogenous sample of ten (10) participants were recruited and interviewed using semi-structured questions, immediately prior to and after the localisation procedure was completed. A hermeneutic approach was used to interpret and analyse the transcriptions of the audio-recordings of the interviews, to develop codes, categories and themes to encapsulate these expectations and experiences.

Findings: The first theme is related to the pre-existing expectations, experiences of the illness, journey through the multi-level health system and coping with day to day activities. The second theme encompassed the experiences of the procedures, care and communication in the health system that shaped the expectations for the localisation event. The recollection of the experience of the event differed from the expectation. The RT communication and the physical and emotional experience of the event marked the third theme. Post localisation event, the participants looked forward to the treatment journey and returning to normalcy.

Discussion and conclusion: Throughout participants were trying to make sense of what was to happen, what happened and why it happened, despite the communication from the health care professionals along the path. Participants attempted to construct and co-construct knowledge, finding meaning and making understanding from various sources. Uncertainty remained and a stance of co-operative behaviour and remaining hopeful was taken.
Abstract Detail
PLATELET MORPHOLOGY AND ACTIVATION IN HEALTHY AND CIGARETTE SMOKING POPULATIONS

Background: Platelets are essential to haemostasis, since they form a temporary platelet plug preventing blood loss. Platelets are proposed to exist in different populations (procoagulant, aggregating and clot retracting). Different populations are thought to contribute to various stages in coagulation. Smokers are known to be hypercoagulable allowing for thrombosis. The contribution of the platelet populations to the hypercoagulable state in smokers is not yet known therefore the aim of this study is to investigate of the effect of tobacco smoking on platelet activation and the prevalence of platelet populations in smokers. These findings could aid a better understanding of the hypercoagulability in smokers and better therapeutic strategies when treating thrombosis.

Method: Blood from 20 voluntary participants (10 non-smokers and 10 smokers) were drawn in citrate tubes. Platelets were purified and labelled with fluorescent markers to identify the different platelet populations and analysed with flow cytometry and confocal microscopy. Flow cytometry was used to determine the prevalence of platelet populations and confocal microscopy was used to study platelet morphology. CD62P was used to detect overall platelet activation. PAC-1 indicated aggregation and clot retracting platelets and Annexin V to detect procoagulant platelets.

Results: Flow cytometric results were compared using a student’s t-test. The results indicated a statistically significant increase in platelet activation of the smokers. Confocal microscopy confirmed a greater degree of activation in the smokers morphologically as indicated by the presence of pseudopodia, platelet spreading and platelet-platelet interactions. No statistically significant difference was present when comparing procoagulant and aggregating clot retracting platelets.

Discussion and conclusions: It has been proposed that different platelet populations exist and contribute to different stages in thrombus formations. Our results show, that although overall platelet activation increased, no difference in the platelet populations exist. This could indicate that another platelet population exists consisting of platelets in the early activation stages. This could be important in the understanding of the contribution of platelets to thrombus formation, since a large number of activated platelets, without the presence of damage to a vessel wall will lead to unnecessary clot formation and thrombosis.
Abstract Detail
EFFECTS OF REACTIVE OXYGEN SPECIES SCAVENGERS ON ADIPOGENESIS

**Background:** Obesity is characterized by excess accumulation of adipose tissue (fat). In South Africa, it is reported that about 68% of women and 31% of men are either overweight or obese. Various studies have demonstrated that at physiological concentrations, reactive oxygen species (ROS) can stimulate adipocyte differentiation (fat cell formation). However, physiologically, the production of ROS is countered by antioxidant defense mechanisms (ROS scavengers). A better understanding of the interplay between ROS and ROS scavengers during adipocyte differentiation may provide a better insight into mechanisms involved during adipocyte differentiation and may potentially provide new knowledge on how to combat obesity. Hence, the purpose of this study is to investigate the effect of the ROS scavengers, Trolox and Apocyanin, on differentiating adipose-derived stromal-vascular cells (ASCs) in vitro.

**Methods:** Human-derived ASCs were induced to differentiate in the presence and absence of ROS scavengers during exposure to exogenous hydrogen peroxide (H2O2). Quantification of adipogenic differentiation and intracellular ROS measurements was performed on days 14 and 21 of induction by flow cytometry. Fluorescence microscopy images were also taken to visually confirm lipid droplet accumulation.

**Results:** An increase in adipogenic differentiation was observed during prolonged exposure to exogenous H2O2 as compared to pre-treatment with H2O2 for 24 hours. Addition of ROS scavengers decreased adipogenic differentiation with a more pronounced effect observed with Apocyanin. The effects observed were more pronounced on day 14 than day 21. None of these observed differences were statistical significantly; this is due to variability observed between primary cultures used in the study.

**Discussion and conclusion:** This study confirms that ROS enhances adipogenesis and provides evidence for a trend showing that this effect is abrogated by the addition of ROS scavengers. The more pronounced effects observed (adipogenic differentiation and scavenger effects) at day 14 compared to day 21 may be due to compensatory mechanisms that the differentiating cells develop to counteract the effects of exogenous ROS. The more pronounced scavenging effect observed with Apocyanin might be due to NADPH oxidase-associated mechanisms. However, the exact mechanisms involved need further investigation.
Abstract Detail
DIETARY DIVERSITY OF HOUSEHOLDS FROM AN INFORMAL SETTLEMENT IN PRETORIA WEST DURING 2018

Background: Dietary diversity refers to increasing consumption of a variety of foods across and within the food groups. There is substantial evidence that dietary diversity is extremely low among rural and informal households in African countries. Nutritionists and Dieticians have long recognized dietary diversity as a key component of healthy diets. The purpose of this study was to determine the dietary diversity score of households in Pretoria West, informal settlement.

Methods: Study design: A descriptive quantitative survey was conducted and data was collected using a researcher administered food consumption questionnaire. Sample size: 80 households were included in the analysis Data analysis: Data was analysed on Microsoft excel spreadsheet and mean, mode and medians were used.

Results: The researchers found that 58% (46) of the households did have an acceptable dietary diversity score. Twenty nine percent (23) of the households had a borderline dietary diversity score, and the remaining 14% (11) had a poor dietary diversity score. On average, staples and condiments were consumed the most, at six days a week, while pulses and dairy were the least consumed at one day a week.

Discussion and conclusion: More than half of the households had an acceptable dietary diversity score. This means that most households were able to consume food from various food groups. A very good dietary diversity score is inconsistent with other study findings from the similar settings, as this population group is resource poor. Home gardening is an acceptable nutrition intervention that can be used to further improve diet diversity. Nutrition education is an important tool in aiding households implement home gardens, changing of eating, and feeding practices.
Abstract

Background: Malaria is endemic in three of South Africa’s (SA) nine provinces and SA is targeting malaria elimination by 2018. Gauteng, a malaria non-endemic province, reports approximately 20% of malaria cases nationally, due to imported cases from neighbouring endemic regions and countries. Since 2007, 80 cases of Odyssean malaria have been recorded in SA, mostly in Gauteng Province. In early October 2017, three clusters of malaria cases were reported in Gauteng. We investigated to assess risk of local transmission.

Methods: Malaria was confirmed by microscopy. We conducted a cross-sectional investigation interviewing cases, reviewing medical records, and doing an entomological investigation, searching for vector larvae around homes of confirmed cases.

Results: Six cases were identified, all hospitalised with Plasmodium falciparum malaria; none of the cases had recent travel history in the preceding two weeks. The median age was 25 years (range 3-46 years). All cases presented with flu-like symptoms. One child and two adults developed severe malaria with acute renal failure, >5% parasitaemia, hypoglycaemia, anaemia, and required intensive care; one adult died. The interval between symptom onset and treatment ranged from 2 to 6 days (mean 4.5). Four of the cases lived in two households 250 meters apart, and within 380m of major roadways that connect to endemic regions with several nearby bus and truck stops. The other two cases were close friends, living in a different urban centre 52 kilometres away. Only culicine larvae were found near residences.

Conclusion: The cases likely acquired malaria from infective mosquitos inadvertently translocated from malaria-endemic areas. Delays in seeking care may have led to more severe outcomes. We recommended that health-care providers in Gauteng Province remain vigilant and consider malaria in the differential diagnosis of acute febrile illness, even in patients without travel history to malaria endemic areas.
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Abstract Detail
THE USE OF PROTECTIVE AMULETS IN CASH-IN-TRANSIT ROBBERY: A CASE SERIES FROM THE PRETORIA MEDICO-LEGAL LABORATORY IN SOUTH AFRICA

Introduction: Traditional medicine forms part of many cultural practices around the world. Traditional healing, particularly in South Africa, is also seen as having a holistic approach, as it targets the mind, body and spirit of patients with traditional healers taking on a multitude of different roles for their patients. People also regularly seek the help of a traditional healer to obtain muthi, for a variety of different reasons. These may include ends such as healing or good luck, or even for the purpose of protecting them during criminal activity such as cash-in-transit robberies.

Case: This article is a case series of the men killed during a cash-in-transit robbery on 14 September 2009, that were found to be in the possession of Islamic protective amulets, which are an anomaly in the South African setting, and highlighted the value of cultural understanding of one's setting in order to assist in the medico-legal investigation.
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Abstract Detail  
TRANSFORMING MIDWIFERY PRACTICE: THE VOICES OF MIDWIVES IN A PUBLIC HOSPITAL IN MPUMALANGA PROVINCE, SOUTH AFRICA

Background: Midwives are a highly specialised and vital resource for health care. Midwives are expected to render quality midwifery care to their clients and are expected to act ethically and embrace professional values as stated in the International Code of Nurses and Midwives. Rendering quality care will enable women to feel safe in the midwifery environment and at the same time facilitate maternal satisfaction. On the contrary, the issue of declined midwifery care is a general problem internationally. The claim was proven by Miller and Lalonde (2015:551) that abuse and disrespectful acts were experienced by the birthing women in USA. In Nigeria, acts of unfriendliness, abuse, disrespect ensued during childbirth (Ishola, Owolabi & Filippi (2017). In South Africa, Jewkes & Penn-Kekana (2015:2) revealed women’s experience of substandard and dehumanising care which ranged from disrespect, verbal abuse violence and more. The results of the National Core standards accreditation for 2015 reflected lack of caring and respectful midwifery care in a Maternity ward in a province in Mpumalanga. As a result, a study to investigate professional value-driven midwifery care in a Maternity ward in Mpumalanga.

Methods: A Participatory Action Research was followed. A Cooperative Inquiry (CI) was conducted. Purposive sampling was used. The sample comprised of midwives only. Three focus group discussions were conducted.

Results: Five major themes emerged. For the sake of this presentation only two themes will be used namely, providing quality midwifery care to the women during childbirth and maintaining ethical midwifery care throughout childbirth will be addressed. Six subthemes namely, enhancement of safer childbirth initiatives, promoting beneficence, avoiding acts of harm and abusive care, portraying respect towards the birthing women, promoting acts of justice towards women, portraying commitment towards the birthing women.

Discussion and conclusion: A CI was followed. Increased cooperation, participation, collaboration took place. The end results of the study was the developed strategies. The implications thereof are increased knowledge development, increased women safety and increased women satisfaction. Contribution was through the developed strategies which when applied carefully will lead to improved value-driven and ethical midwifery care with resultant quality care throughout childbirth.
Abstract Detail
EVALUATION OF NOISE LEVELS FORKLIFT OPERATORS ARE EXPOSED TO AT A FRESH PRODUCE MARKET IN SOUTH AFRICA

**Background:** The fresh produce market is a retail whereby farmers sell fresh food directly to the consumers. Activities that are taking place at the market involves delivering and loading of goods usually in pallets using forklifts. The forklifts used are the main source of noise and therefore put the operators at risk of noise-induced hearing loss (NIHL). The study aimed to determine the noise level exposures to forklift operators and also to determine if the noise levels are complying with related standards.

**Method:** Personal noise measurements were taken from forklift operators according to the SANS 10083:2013 method using noise dosimeters. The dosimeters were calibrated before and after taking measurements. Forklift operators had short interviews to ascertain the awareness regarding noise in the workplace and also to find out about their years of experience in operating forklifts.

**Results:** 53% of the noise dosimetry measurements taken exceeded the noise rating limit of 85 dBA with the maximum being 90.9 dBA. The maximum peak recorded was 143.5 dBA whereas the minimum was 125.4 dBA.

**Conclusion:** Forklift operators at a fresh produce market are exposed to noise levels exceeding 8-hour time weighted average 85 dBA, thus are at risk of NIHL. If the employees are exposed to noise levels exceeding the noise statutory limit, it is a legal requirement to have an effective hearing conservation programme that will ensure that the noise levels are attenuated to below 85 dBA.
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Abstract Detail
ASSESSMENT OF FOOD ACCESSIBILITY OF INFORMALLY SETTLED HOUSEHOLDS IN PRETORIA WEST

**Background:** Worldwide, one in nine people are hungry. In South Africa, there is vast evidence on the status of food insecurity at national level, but little is known about households’ food security status. This is particularly important for the increasing informally settled communities in urban settings. Food security comprises of four pillars, namely: food availability, accessibility, utilization and stability. It is important to investigate the food security status of informally settled households in order to have insight into their access to food.  

**Objective:** To describe food accessibility of informally settled households, using the Household Food Insecurity Access Scale (HFIAS).

**Methodology:** HFIAS questionnaire was administered by the researchers (n=95) with the assistance of local translators in the Zama-Zama informal settlement in Pretoria West. Ethical clearance was obtained from the Faculty of Health Sciences Research Ethics Committee (5692017).

**Findings:** Based on the HFIAS tool, 16% of the sampled households were classified as food secure, 2% as mildly food insecure, 35% as moderately food insecure and 47% as severely food insecure.

**Conclusion:** The study showed that majority of households in the study population were severely food insecure in terms of food accessibility. These findings will help inform interventions aimed at improving food security status within the studied community. Further research is needed into the specific factors that directly affect informally settled communities with regards to food security. Future research should focus on assessing other pillars of food security: food availability, utilization and stability.
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Abstract Detail
ALTERATION OF ANTI-BIOFILM ACTIVITY OF CLINICALLY-USED ANTIBIOTICS WHEN COMBINED WITH SANGUINARINE

Background: Hospitals have become reservoirs for resistant bacteria, resulting in nosocomial infections. These infections are often caused by biofilm-forming bacteria. Such infections may become chronic, and are 10 to 1 000-fold more resistant to antibiotics. As such, pressure is placed on developing alternative regimens that can eradicate bacteria or combination treatments that sensitise bacteria to antibiotics. Sanguinarine, an alkaloid, exerts bactericidal action by impeding bacterial cytokinesis. This study evaluated the antimicrobial activity of sanguinarine against planktonic and biofilm phases of selected bacteria as monotherapy or in combination with clinically-used antibiotics.

Methods: Biofilm formation (Pseudomonas aeruginosa ATCC® 27853™, and Staphylococcus epidermidis ATCC® 1228™ and ATCC® 35984™) was compared using two methods: the static microtitre and minimum biofilm eradication concentration (MBEC™) assays. Susceptibility to sanguinarine and antibiotic combinations was determined with reference to minimum inhibitorybactericidal concentrations (MICMBC; broth microdilution), combination index (checkerboard), biofilm mass (crystal violet), metabolic capacity (resazurin) and morphology changes (livedead staining, scanning electron microscopy).

Results and discussion: Sanguinarine displayed activity against both S. epidermidis strains (MIC = 9.195 µg/mL MBC = 9.195 µg/mL), but was inactive against P. aeruginosa (MIC = >73.56 µg/mL). Both methods enabled biofilm formation. The static microtitre assay led to greater biofilm formation, however, was less susceptible to reduction of biofilm mass and metabolic capacity. Sanguinarine exhibited anti-biofilm properties against S. epidermidis strains (73.56 µg/mL >7.36 µg/mL) but was less effective against P. aeruginosa (no reduction at <63 µM). Microscopically, sanguinarine appeared to inhibit mitosis, however, stimulated P. aeruginosa growth, which displayed elongated bacilli. Antagonism was observed when combined with imipenem and vancomycin at equal ratios for P. aeruginosa and S. epidermidis 12228, respectively, while an indifferent effect was observed in S. epidermidis 35984.

Conclusion: Sanguinarine displayed antagonism or indifference when combined with antibiotics. Implementation of this compound as an adjuvant may not render significant improvement to available treatments. However, supplementary assays may elucidate the downstream effects and benefits of such a combination against S. epidermidis.
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Abstract Detail
CLIENT MOTIVATION AND ENGAGEMENT IN AN OCCUPATIONAL THERAPY PROGRAM FOR STROKE SURVIVORS, A SCOPING REVIEW

Introduction: Motor learning research is based on evidence that motor functioning can be improved after suffering a stroke due to the ability of the brain to re-organised. Cortical re-organisation takes place when a stroke survivor engages in a task that is meaningful to them. Patients who actively engage in therapy have a higher rate of functional improvement in cognitive and motor functioning. A lack of participation and engagement not only affects the brains ability to re-organise appropriately but also has long lasting effects; patients who initially do no engage struggle to adjust to their environments on returning home. It is clear that patients need to be motivated for positive result in therapy, but unclear how to improve patient motivation. The purpose of this scoping review was to explore available literature and discuss current successful methods of addressing apathy, non-compliance and decreased motivation to engage in therapy.

Objectives: To discuss how to improve motivation and engagement of stroke survivors in an occupational therapy program.

Method: A scoping review was conducting using Arkey and O’Malley’s five-stage framework.

Discussion: A few common themes emerged 1) therapists should aim to assist patients to develop a new self-identity; this will ensure that they have better insight into the need for therapy and they will then be more motivated to participate in therapy, 2) therapy should aim to develop a positive sense of self-efficacy by ensuring that patients experience success in therapy. Success can be ensured by using activities that match the patient’s abilities, 3) therapy must be client centred; if goals are set with patients they will be more willing to work towards achieving them.
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Abstract Detail  
USE OF A VISUAL AID TO IMPROVE ESTIMATION OF BLOOD LOSS IN OBSTETRICS

Aim: We aimed to assess the ability of clinicians to estimate blood loss in Obstetrics, and to ascertain if there was any difference in blood loss estimation within years of experience, as well as between the department of Anaesthesia and that of Obstetrics and Gynaecology.

Method: We recruited 61 participants from the departments of anaesthesia (n = 8, 13.1%) and obstetrics and gynaecology (n = 53, 86.9%). This included midwives (n = 18, 29.5%), consultants (n = 13, 21.5%), registrars (n = 18, 29.5%) and interns (n = 11, 18%). A pocket card visual aid was created using labour ward materials and measured blood volumes of expired red pack cells. Artificial blood was used from the skills laboratory for volumes greater than 1000 ml. Two OSCEs were conducted in November 2015 - before visual aid and August 2016 - post visual aid. Each OSCE had 5 stations. Participants were asked to estimate blood loss at each station. Results of both OSCEs were compared. Statistical analysis was done on SPSS using mixed model analysis.

Results: Data distribution was skewed with respect to years of experience, with most participants having less than 5 years' experience 39 (63.9%). On comparison of results from the 2 OSCEs participants moved from under-estimating blood to over-estimation and accuracy. There was also a statistically significant improvement in blood loss estimation. (P value: 0.05) There was no difference in blood loss estimation within years of experience. There was a significant difference in estimation of blood loss, with anaesthetists estimating blood volume more accurately than obstetricians (P = 0.002). Consultants were best estimators with registrars being worst estimators of blood loss (P = 0.47).

Conclusion: Use of the visual aid has a positive impact on blood loss estimation. Education programmes can be used to equip health professionals to improve blood loss estimation, decrease maternal morbidity and mortality and save lives.
Abstract Detail
A NOVEL 2-METHOXYESTRADIOL DERIVATIVE EXHIBITS RADIosenSITIZATION PROPERTIES IN AN IN VITRO BONE METASTASIS MODEL

Background: Targeting the specific metastatic microniche in bone metastasis is of interest in improving outcomes of patients with advanced neoplastic disease. 2-Methoxyestradiol (2-ME) is an anti-cancer compound with radiosensitization properties. 2-Ethyl-3-O-sulphamoyl-1,3,5(10)16-tetraene (ESE-16) is a novel in silico-designed sulphamoylated derivative intended to improve the efficacy of 2-ME. The potential radiosensitizing effects of ESE-16 in an in vitro deconstructed bone metastasis model comprising of breast (MDA-MB-231)- and prostate (DU 145) tumour-, osteoblastic (MC3T3-E1)- and osteoclastic (RAW 264.7) bone cells and human umbilical vein endothelial cells (HUVECs) were investigated in this study.

Methods: Spectrophotometric cytotoxicity studies were completed on all cell lines. The lowest ESE-16 and radiation doses to induce apoptosis were determined (flow cytometry). ESE-16 concentrations of 0.235 μM (DU 145) and 0.176 μM (MDA-MB-231) were used for a 24-hour presensitization period prior to a single dose of 4 Gy radiation. Termination proceeded 2-, 24- or 48 hours post-radiation. Experiments on tumour cells included investigation of their division potential (mitotic index determination via haematoxylin and eosin staining); cell death signalling pathways (spectrophotometric quantification of caspase 3); extent of radiation damage (DNA damage assessment via micronuclei analysis and fluorescent detection of γ-H2A.X foci) and quantification of metastatic signalling protein targets (Western blots). Tartrate-resistant acid phosphatase activity and actin ring formation were investigated in bone cells. Cell migration and invasion assays and Western blot analysis of angiogenic proteins were undertaken using HUVECs.

Results: Cytotoxicity studies revealed nanomolar ESE-16 half maximal growth inhibition values in tumour- and endothelial cells whilst sparing bone cells. Increased mitotic indices, DNA damage with retarded repair and reduced metastatic signalling were observed in tumour cells. RAW 264.7 macrophages retained their ability to differentiate into osteoclasts while migratory and invasive properties of HUVECs were compromised.

Discussion and Conclusion: ESE-16 exerts radiosensitizing effects in tumour- and endothelial cells whilst sparing bone cells. Through preferentially inducing tumour cell death and inhibiting neovascularization whilst preserving bone physiology, this low-dose combination regimen shows promise in treating bone metastasis.
THE LESOTHO ACTION PROGRAMME (LEAP) FOR QUALITY PROGRAMME IN LESOTHO

Background: Lesotho has a population of 2.2 million people and is served by 17 hospitals. The maternal and neonatal mortality in Lesotho have been high in the past decade despite a performance based financing programme by the World Bank.

Summary of the work: The World Bank contracted the SAMRC unit and the Department of Family Medicine at UP to conduct training for doctors and midwives in the Lesotho hospitals in order to improve the health outcomes. A programme was developed according to World Bank specifications, the Lesotho Action Programme (LEAP) for Quality. The first task at hand was to change the checklist that was used to measure the performance of the Lesotho hospitals that participated in the Performance Based Financing (PBF) programme. Based on that a master training was conducted with a focus on maternal and neonatal health (70%) and the rest was devoted to common causes of death such as prematurity, childhood infections, HIVTB and trauma. A week long master training was done for 65 health care workers of district hospitals in March 2018. All 8 hospitals in the PBF programme will conduct weekly training and do fire drills. Based on their performance in maternal, neonatal, HIVTB and emergency skills they will be financially rewarded by the World Bank.

Discussion: Maternal mortality in Lesotho is around 1000/100,000 and neonatal mortality 39/1000 despite good health care facilities and a regional referral hospital. In a twelve month period intensive training will be done for health care providers with material that is specifically developed for this purpose and will be very useful for all district hospitals.
Abstract Detail

CLINICAL IMPLICATIONS OF GENETIC TESTING IN PRIMARY IMMUNE DEFICIENCIES

**Background:** Primary immune deficiencies (PID) are the second most common cause for non-CF bronchiectasis worldwide. Hypogammaglobulinemia may be associated with bronchiectasis and half of the IgG deficient patients are diagnosed as common variable immunodeficiency (CVID). However, CVID is a diagnosis of exclusion and if atypical features are present, genetic exclusion of several known genetic causes of hypogammaglobulinemia may be needed. X linked lymphoproliferative disease (XLP) is characterized by severe dysregulation of the immune system caused by a genetic defect in the SH2D1A gene on the X chromosome. Clinical manifestations include fulminant mononucleosis, B cell lymphoma and dysgammaglobulinemia.

**Methods:** We present the case of a 7 year old HIV negative male patient who presented with bronchiectasis. Blood testing revealed panhypogammaglobulinaemia, decreased class-switched memory B cells and impaired functional humoral immunity with sub-optimal vaccine-induced antibody responses. A working diagnosis of CVID was made but due to the severity of his clinical presentation with end-organ damage, a more severe PID was considered. Family history of another male sibling to the same parents who demised from fulminant liver failure after an acute febrile illness led to the suspicion of XLP. Next generation sequencing of 99 PID genes was done.

**Results:** A variant of exon 2 in the SH2D1A gene was detected in the hemizygous state confirming the diagnosis of XLP. The mother of the patient was found to carry the same variant in the heterozygous state confirming X-linked carrier status. The child is currently treated with immunoglobulin replacement therapy. We monitor for the development of B cell lymphoma clinically and with 4 monthly abdominal ultrasound. Given the good prognosis of the condition after hematopoietic stem cell transplantation (HCT), the child will be offered this treatment in the near future.

**Conclusion:** In this patient with a PID, characterization of the gene defect has led to the diagnosis of XLP. This has had major implications for medical care, including risk counseling to the family, careful clinical monitoring and work-up for HCT, being the only curative therapy for this condition.
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Abstract Detail
TUG-891, A GPR120 AGONIST, INHIBITS OSTEOCLASTOGENESIS AND REACTIVE OXYGEN SPECIES PRODUCTION IN OSTEOCLASTS DERIVED FROM RAW264.7 MURINE MACROPHAGES

Background: Bone is continuously strengthened and repaired through a process known as bone remodelling. This process relies on a fine balance between osteoclasts that resorb bone and osteoblasts that build new bone. When the activity of the osteoclasts exceeds that of osteoblasts, it can lead to several bone diseases, such as osteoporosis. TUG-891, a GPR120 agonist, has shown promising anti-osteoclastogenic potential. The exact mechanisms for the interactions between osteoclasts and GPR120 agonists are not yet fully understood. It is known that both the binding of nuclear factor kappa B (NF-κB) and the production of reactive oxygen species (ROS) are important in the formation and activity of osteoclasts. The study investigated the in vitro effects of the GPR120 agonist TUG-891 on receptor activator of NF-κB ligand (RANKL) mediated osteoclastogenesis as well as ROS production in osteoclasts derived from RAW264.7 murine macrophages.

Methods: RAW264.7 murine macrophages were cultured at 15 000 cell/cm² in the presence of RANKL (30ng/mL), alone or in combination with TUG-891 (1-100 μM) for 24 hours. Alamar blue staining was performed to investigate the effect of TUG-891 on the cell viability of the cells. Tartrate-resistant acid phosphatase (TRAP) staining and TRAP activity assays were performed to determine the effects of TUG-891 on the maturation and activity of osteoclasts after 5 days of exposure. Bone resorption assays were performed to assess the effect of TUG-891 on the bone resorbing activity of mature osteoclasts. Western blotting was performed to determine the expression of ROS related proteins, NQO-1 and HO-1. Experiments were each completed 3 times.

Results: TUG-891 did not affect cell viability of the RAW264.7 murine macrophages at the tested concentrations. Reduced osteoclast formation and TRAP activity was observed in cells exposed to TUG-891 which was accompanied by a decrease in the resorption activity of osteoclasts at the end of culture. An increase in the anti-ROS proteins HO-1 and NQO-1 was observed, suggesting reduction in ROS production.

Conclusion: The study shows that GPR120 may be used as a potential drug target for bone diseases such as osteoporosis.
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Abstract Detail
"WHAT’S HIDING IN THE GEL?": MASS-SPECTROMETRIC IDENTIFICATION OF PLATELET PROTEIN DIFFERENCES BETWEEN DIABETIC PATIENTS AND NON-DIABETIC HEALTHY INDIVIDUALS

Background: Since its earliest conception, huge strides have been made in the field of proteomics which encompasses the use of biotechnology and various scientific disciplines to study the protein load expressed by a cell, tissue or organism. This has made proteomics a valuable and resourceful area of research, particularly in medical sciences where proteomic technologies play an important role in drug discovery, diagnostics and molecular medicine. Several techniques can be applied for proteomic research and these include sodium dodecyl sulphate polyacrylamide gel electrophoresis (SDS-PAGE) and mass spectrometry. In light of these cutting-edge advances, a proteomic approach was used to compare platelet proteins of diabetic patients and non-diabetic healthy individuals to investigate possible differences in protein expression that may contribute to impaired healing of foot wounds in diabetic patients. Foot wounds are one of the most catastrophic and costly complications experienced by diabetic patients and are also accompanied by limited treatment availability, which makes extensive research paramount to improve therapy and minimize the chance of chronic complications. Therefore, the aim of this study was to characterize platelet proteins to further understand the role platelets play in impaired wound healing and provide a possible basis in developing targeted therapies that may enhance wound healing in diabetic patients.

Method: The total protein complement of samples from diabetic patients and non-diabetic healthy individuals was separated using SDS-PAGE. Following this, in-gel and in-solution trypsin digests of selected samples exhibiting protein band differences between the two groups were performed. Peptide sequencing was done using liquid chromatography tandem mass spectrometry (LC-MSMS).

Results: SDS-PAGE results showed similarities in the protein mass fingerprint between the diabetic patients and non-diabetic healthy individuals, yet further analysis of these same samples by LC-MSMS analysis identified and showed differences in abundance of several proteins that could be important in platelet function and consequently play a role in wound healing.

Discussion and conclusion: This study highlighted the superiority of mass spectrometric analysis over SDS-PAGE to positively identify and quantify proteomic differences in disease states. Therefore, LC-MSMS has a strong potential to identify targets for subsequent targeted therapy of diabetic foot wounds.
Abstract Detail

LEARNING IN AN ELECTRONIC DRIVEN WORLD IN HIGHER EDUCATION: CLINICAL ASSOCIATE STUDENTS’ DECENTRALISED TRAINING CASE STUDY

Background: Clinical Associate program under the department of Family medicine is an innovative program that follows self-directed learning in delivering content to the students. In 2013 after a needs assessment, tablets were introduced to enhance the students’ learning experience. However there was need to determine students preference in regards to the electronic resources to be loaded on the tablet.

Methods: In 2014, Bachelor of Clinical Medical Practice students were given a questionnaire to determine their preferred electronic device and the content that could be loaded on it. Out of 166 students, 149 students consented to respond to the questionnaire. Data was analysed in STATA 14 and qualitative student responses were grouped in themes and displayed in quotes. Ethical clearance to conduct this study was obtained from University of Pretoria.

Results: The mean age for the students who participated was 21.82 years; 58 % were females while 42 % were males. Students who had smart phones were 39% while a further 40 % had tablets. The tablets were mainly used for academic purposes (71 %) as opposed to social media (4 %). Samsung tablet was the students’ preferred tablet due to its ability to accommodate different apps, get repaired locally and user friendliness as stated by students “I like Samsung and it does not give much problems. furthermore, sumsung stores are easily accessible” and “beacuse it is reparable anywhere unlike a cracked lenovo screen which cant be fixed.”

Conclusion: Self-directed learning of students in the BCMP programs would improve by choosing the most useful electronic resources that would enhance learning. Preloaded electronic devices with medical applications and study materials that can be accessed offline can further support student interaction with the study material.
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Abstract Detail
THE IMPACT OF HIPPOTHERAPY ON PHYSIOLOGICAL COST INDEX (PCI), WALKING SPEED AND PARTICIPATION IN SCHOOL RELATED ACTIVITIES IN ADOLESCENTS WITH DIPLEGIA.

Background: Hippotherapy is a specialised treatment strategy that utilises the movement of a horse as part of an integrated program to achieve functional outcomes. Occupational therapists use hippotherapy to treat clients with diplegia. Clients with diplegia often walk slower than their peers due to different gross motor function impairments. Restrictions in walking may lead to restrictions in school activities and may become severe without intervention therapy. These clients may benefit from hippotherapy. Therefore this study investigated the effect of hippotherapy in this regard and specifically focused on an adolescent population.

Objectives: The objectives were to describe the impact of hippotherapy on: i. Physiological cost index (PCI), ii. Walking speed, iii. Participation in school activities from the adolescent’s own perspective.

Method: A single system multiple baseline design across subjects was implemented to measure PCI and walking speed as outcome measures for walking. Five semi-structured interviews determined participation in school activities. Three females and seven males were included through target sampling. Horses were specifically paired with each client to maximise the impact of individualised 30-minute hippotherapy sessions once a week over a 12-week period. Sessions were conducted by an occupational therapist, a side walker and horse-handler. Average baseline measurements were compared with measurements taken during each session and to post-intervention measurements.

Results: One participant’s PCI values decreased significantly (p=0.014). Average walking speed increased significantly over the course of treatment from the 6th intervention session (Wilcoxon Signed Rank Test, p=0.024 for post intervention). Three themes emerged that influenced school activities, namely improved rest and sleep, improved functional ambulation, and improved neuromusculoskeletal functioning.

Discussion and conclusion: Hippotherapy had a physical impact on the participants that might be due to Hippotherapy simulating pelvic movement of normal walking and influencing gross motor function. Hippotherapy also had a positive impact on the adolescent’s perception of their participation in school activities.
Abstract Detail
A STUDY ON THE COVERAGE AND CHALLENGES OF ISONIAZID PREVENTIVE THERAPY IN CHILDREN IN THE TSHWANE DISTRICT OF GAUTENG, SOUTH AFRICA

Background: Isoniazid preventive therapy (IPT) offered to child contacts of adult tuberculosis (TB) cases is an important childhood TB prevention strategy. The main study aims were to establish whether child contacts were receiving IPT as per National guidelines (2013), to measure the knowledge on IPT in adult TB patients and health care workers (HCWs), and to determine challenges in IPT-delivery to eligible children.

Methods: This descriptive, cross-sectional study was done at primary health care clinics in South-West Tshwane, Gauteng Province, South Africa. Structured interviews were conducted with adult TB clients to obtain socio-demographic data, TB and HIV history, data on child contacts and IPT knowledge. A separate questionnaire probed HCWs’ knowledge on IPT. Patient folders of adult TB cases and children on IPT were also assessed.

Results: Twenty-eight child contacts who were eligible for IPT were identified during interviews with 100 adult TB patients (18 households with single child contacts; 5 households with 2 child contacts). Six (21%) child contacts were receiving IPT as per protocol. Movement of children between households was the most common reason for sub-optimal IPT provision (43%). Adult TB patients deemed daily cigarette smoke exposure as more important in terms of childhood TB risk than a weakened child immune system (40% vs 27%). Seventy-one HCWs were interviewed (92% female, mean age 42 years (range 25-72)). Only 37% of HCWs were knowledgeable regarding the IPT eligibility criteria in children, with 63% unaware that all HIV-infected children (irrespective of age) with an adult TB contact qualify for IPT.

Conclusions: Coverage of IPT provision in child TB contacts was only 21%. Changes in household composition was the most common reason for child contacts not receiving IPT. Training of HCWs on IPT guidelines requires attention in terms of own knowledge and their ability to transfer knowledge to their TB clients.
Abstract Detail
ROLE OF OXIDATIVE STRESS IN APOPTOSIS INDUCED BY A SULPHAMOYLATED ESTRADIOL ANALOGUE IN BREAST CELL LINES

Background: It has been reported that in silico-designed estradiol analogues including 2-ethyl-13-methyl-17-oxo-7,8,9,11,12,13,14,15,16,17-decahydro-6-cyclopenta[a]phenanthrene-3 sulphamate (ESE-one) exert antiproliferative- and antimitotic activity correlating with increased reactive oxygen species (ROS) production. However, the mode of action utilized by ESE-one remains to be elucidated. The aim of the study was to investigate the role of oxidative stress in the mechanism of action utilised by ESE-one in breast tumourigenic cell lines.

Methods: The effects of 0.5 μM ESE-15-one (24 hours) on proliferation and morphology were investigated in the presence or absence of various ROS scavengers in breast cancer cell lines (MCF-7 and MDA-MB-231). Cell growth was spectrophotometrically evaluated by means of crystal violet staining. Light microscopy was used for morphological studies. Fluorescent microscopy was used to evaluate the amount of ROS induced by ESE-one.

Results: Antiproliferative activity was demonstrated by ESE-one with 60% cell growth. Antiproliferative activity exerted by ESE-one was abolished by Tiron (superoxide radical scavenger) in both cell lines. N,N’-dimethylthiourea (hydrogen peroxide scavenger) exposure inhibited the antiproliferative activity exerted by ESE-one in the MCF-7 (100%) and MDA-MB-231 (80%) cell lines. Combination exposure to ESE-oneTrolox (peroxyl radical) resulted in partial restoration of cell growth in MCF-7 (75%) and MDA-MB-231 (70%) cell lines. Light microscopy data revealed an appearance of rounded cells following ESE-one exposure. However, combination exposure to ESE-oneTiron, ESE-one N,N’-dimethylthiourea and ESETrolox resulted in less rounded cell when compared to ESE-one-treated cells (69%, 91% and 81% respectively). Fluorescent microscopy confirmed increased ROS production induced by ESE-one.

Discussion and conclusion: This study suggests that the mechanism of action utilised by ESE-one to induce antiproliferative activity and cell rounding in breast tumourigenic cell lines is dependent upon superoxide production with further involvement of hydrogen peroxide and peroxyl radicals. Future studies will involve investigating the effects of ESE-15-one on antioxidant activity (catalase and superoxide dismutase) and its influence on mitochondrial membrane potential. This study contributes towards knowledge regarding the oxidative-stress signaling pathways utilised by antimitotic sulphamoylated compounds.
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Abstract Detail
ESTABLISHING THE CORE IN AN UNDERGRADUATE VOCATIONAL REHABILITATION CURRICULUM FRAMEWORK: THE USE OF A NOVEL PROCESS

Background: Occupational therapists are prepared to meet the vocational rehabilitation or work practice demands at an undergraduate level through education and training programs at eight South African institutions of higher learning. However occupational therapy graduates exit programs with differing levels of vocational rehabilitation knowledge and skills notwithstanding the minimum standards for the education of occupational therapists from the professional board. Although occupational therapy educators are known to each other, there is no collegial curriculum collaboration. This has resulted in the absence of a national collective curriculum in vocational rehabilitation. This study was therefore undertaken to develop a curriculum framework for the undergraduate program of which establishing core curriculum themes would be essential.

Methods: A sequential mixed methods design was employed with data obtained from various sources representing the planned, delivered and experienced curriculums as well as published research in the field. Data was collected during semi-structured interviews conducted with occupational therapy educators, a document review of curriculum documentation, an on-line graduate survey and a publication audit. A co-constructed description by the educators facilitated the establishment of core curriculum themes through a process of commonality. The core curriculum which emerged during data analysis was common to all data sources.

Results: Data analysis revealed 135 curriculum topics which converged around 46 curriculum themes. The level of commonality was determined at 75%. Nine curriculum themes were identified as being common to the educators, graduates and published research.

Discussion and conclusion: The core curriculum within a curriculum framework serves as a minimum education standard for each institution of higher to consider with the impact thereof to be noted in vocational rehabilitation service delivery. It allows for flexibility in curriculum development and implementation and facilitates graduate preparation for practice. This study reflects a first South African occupational therapy study in the area of curriculum framework development using multiple data sources. A novel process was used to establish commonality in curriculum themes.
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Abstract Detail  
CHARACTERISATION OF POTENTIAL NOVEL SMALL MOLECULE THERAPEUTICS TARGETING THE GROWTH HORMONE RELEASING HORMONE RECEPTOR

Background: Growth hormone releasing hormone (GHRH) regulates growth hormone (GH) secretion from the anterior pituitary. Disorders can occur upon dysregulation of this signalling axis. In addition, GHRH has extrahypothalamic effects (e.g. some cancers). GHRH elicits its effects through binding to the GHRH receptor (GHRHR), a G protein-coupled receptor (GPCR). Although GHRH and GHRHR are important therapeutic targets, no non-peptide therapeutics targeting the GHRHR currently exist. Therefore, the aim of this project is to test putative small molecule GHRHR-binding compounds, to determine their in vitro activity at the GHRHR, and to further refine and test any identified ‘hit’ compounds which could be optimised as potential therapeutics.

Methods: Using in silico docking based on models of the GHRHR extracellular and transmembrane domains, 50 putative GHRHR interactive compounds have been identified. These compounds have been synthesised and their in vitro agonist and antagonist activity tested using HEK 293-T cell lines expressing GHRHR, utilising a CRE-luciferase reporter assay and a cAMP ELISA assay. GHRH and the peptide antagonist JV-1-36 were used as positive controls for GHRHR agonism and antagonism, respectively. Crystal violet assays were performed to assess cell viability/compound toxicity upon treatment.

Results: An initial CRE-luciferase assay screen identified four agonist compounds which showed significant levels of receptor stimulation. This screen also identified several putative antagonists able to reduce GHRH-induced stimulation of GHRHR more effectively than the peptide antagonist, JV-1-36. However, data generated indicated that interaction with the GHRHR resulted in alterations in gene expression, bringing the suitability of the CRE-luciferase assay for measurement of activation/inhibition of this receptor into question. Therefore, a cAMP ELISA assay was also utilised and identified other potential GHRHR agonists/antagonists. Crystal violet assays showed that the compounds did not have a toxic effect on the cells.

Conclusion: Several small-molecule GHRHR interactive compounds have been identified, thus confirming the validity of in silico docking as an approach for GPCR-targeted drug development. The ‘hit’ compounds will now be further refined and tested through “in catalogue” screening, and their specificity/selectivity’s determined, aiding in the process of producing new effective non-peptide therapeutic compounds targeting the GHRHR.
INTUBATING CONDITIONS FOLLOWING FOUR DIFFERENT DOSES OF PROPOFOL IN CHILDREN

**Background:** The appeal of day case surgery is in the advantages offered to the patient, their family and the performing institution. Children are excellent candidates for day case surgery; they are generally healthy and often require surgical intervention of short duration. Day case surgery requires rapid emergence from anaesthesia, minimal delay in recovery and rapid readiness for discharge from the ward. The ideal anaesthetic agents should have rapid onset, short duration, minimal side effects and minimal residual effects. Commonly used muscle relaxants provide excellent intubation conditions, but their duration of action often exceed that of the procedure, risking residual paralysis during recovery and delaying discharge from the day unit – thereby nullifying most of the advantages of day case surgery. The pharmacodynamics and -kinetics of propofol and alfentanil are well suited for day case surgery, but optimal dosing schedules for intubation for day surgery while maintaining haemodynamic stability, warrants refinement.

**Method:** Fifty nine children (aged 3-10 years) presenting for dental extractions were induced with sevoflurane (in 50% oxygen:nitrous oxide), then received propofol (0.5, 1, 1.5 or 2mgkg) and alfentanil (10mcgkg) to aid intubation. For each dose of propofol, the ease of intubation (assessed by the Helbo-Hansen score) was correlated with blood pressure (prior, during and after intubation) to determine the propofol dosage that allowed adequate intubation conditions but caused the least haemodynamic fluctuations.

**Results:** Overall adequacy of intubating conditions improved significantly (p=0.0079) as propofol dose increased. Similarly, decrease in vocal cord movement (p=0.0341), incidence of coughing (p=0.0379) and limb movement (p=0.0165) was observed. Ease of laryngoscopy and jaw relaxation did not improve significantly (p = 0.1319 and 0.1971 respectively). Decrease in blood pressure as propofol dose increased was almost significant for diastolic (p=0.0514) and mean arterial pressure (p=0.0616).

**Discussion and conclusion:** Propofol in a dose of 1.5 to 2 mgkg (when used in conjunction with alfentanil (10mcgkg) after sevoflurane induction) allow adequate intubating conditions whilst maintaining cardiovascular stability. The decrease in blood pressure, although not statistically significant, may become clinically relevant in children with underlying cardiovascular disease.
Abstract Detail
INTERPROFESSIONAL COLLABORATION BETWEEN SPEECH-LANGUAGE AND OCCUPATIONAL THERAPY STUDENTS IN A LOW-RESOURCED COMMUNITY

Background: The University of Pretoria’s Faculty of Health Sciences established a clinic in 1964 for the purpose of training medical students and rendering services to the surrounding communities. Today this clinic is a well-known service learning platform where students from different professions and year groups are trained. This primary healthcare clinic serves a low socio-economic community and the population presents with complex health needs and social difficulties. Purpose: Further challenges faced by the community are insufficient number of allied health professionals and the burden of infection is high which obscures developmental difficulties. These challenges impact on social, academic, emotional and economic outcomes of the community. The paediatric cases seen at the clinic prompted the collaboration between speech-language therapy and occupational therapy students. This interprofessional education is aligned with the principles of the ICF-CY which promote a holistic approach to early childhood intervention. The University of Pretoria has highlighted skill development in the community in their strategic plan for 2025.

Methods: Third and final year students were asked to treat two children jointly by formulating functional outcomes. This process was facilitated by a lecturer from each department. The students’ conflicting schedules encouraged them to find hybrid methods of communicating. Sessions were planned together via ‘WhatsApp’. Once goals were established joint therapy sessions commenced at the clinic weekly.

Results: The benefits of joint therapy sessions for the children included improved interaction, increased communication attempts and enhanced attention during activity participation. A further benefit was that the activities were play-based, addressing the child’s needs and interests. These outcomes facilitate the generalisation of functional targets stimulated in therapy.
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Abstract

A CASE OF X-LINKED CHILDHOOD CEREBRAL ADRENOLEUKODYSTROPHY

Background: X-linked Adrenoleukodystrophy is a peroxisomal inborn error of metabolism arising from a mutation in the ABCD1 gene which encodes the adrenoleukodytrophy protein. The defective gene leads to impaired transportation of very long chain fatty acids across the peroxisomal membrane for oxidation. The accumulation of VLCFA causes a neuro-inflammatory demyelination of the central nervous system and degradation of adrenal glands.

Case Study: 8 year old male diagnosed with childhood Epilepsy controlled with Valproate. He then presented a month later with remarkable regression of milestones, visual and hearing impairment. He was born normally at term with no complications and birthweight was 3kg. His parents and three siblings were healthy with a non-contributory family history.

Results: The brain MRI reported an abnormal high signal in the splenium, corpus callosum and corticospinal tracts. The patient’s VLCFA analysis revealed a significantly elevated C26 and a resultant increased C26C22 ratio. C24C22 was also prominently raised. p.Ser108Leu mutation in the ABCD1 gene was detected.

Discussion: Childhood cerebral X-linked Adrenoleukodystrophy is the severe form, presenting with a progressive demyelinating pattern. The patient exhibited typical clinical features supported by typical signal changes on the MRI. The significantly elevated VLCFA was diagnostic and this was confirmed by the mutation in the ABCD1 gene.
Abstract Detail
REGIONAL AND SYSTEMIC CYTOKINE RESPONSE TO ACUTE APPENDICITIS IN HIV POSITIVE AND HIV NEGATIVE PATIENTS AT STEVE BIKO ACADEMIC AND KALAFONG HOSPITALS

**Background:** Acute appendicitis is a common surgical emergency and perforated appendicitis a leading cause of mortality and morbidity. In South Africa 17.98% of the population is HIV positive with 25.03% deaths HIV/AIDS related. HIV positive patients have a four-fold increase in appendicitis. HIV negative appendicitis patients have a peritoneal pro-inflammatory response, precipitating a systemic anti-inflammatory response, exaggerated in severe appendicitis. In contrast, HIV infection is characterized by a constant severe systemic pro-inflammatory response.

**Methods:** Prospective Observational Descriptive Case-Control Study performed at Steve Biko Academic and Kalafong Hospitals. Aim: Investigate for differences in the pro- and anti-inflammatory response in HIV positive and negative patients with the same surgical stage of acute appendicitis. Approval obtained from the Human Ethics Committee of the Faculty of Health Sciences of the University of Pretoria.

**Results:** Complicated appendicitis found in 66% of Low CD4 patients (50% perforated appendixes), despite similar symptoms duration in HIV negative patients (p=0.012). Complicated appendicitis found in 25% of HIV negative patients (9.3% perforated appendixes). Low CD4 patients had a stronger systemic pro-inflammatory response and much weaker peritoneal pro-inflammatory response, compared to HIV negative patients. ICU (all Low CD4) patients were shown to have an unmitigated systemic pro-inflammatory response compared to other Low CD4 patients.

**Conclusion:** Low CD4 patients have a poorer peritoneal immune response against infection compared to HIV negative patients, resulting in fewer immune cells mobilizing to the area of infection, with poor local control of infection and more patients with complicated appendicitis. Low CD4 patients also have a stronger systemic pro-inflammatory response, resulting physiologically in sicker patients.
Abstract Detail
DEVELOPING NUCLEIC ACID DETECTION ASSAYS FOR RODENT BORNE HEMORRHAGIC FEVER MAMMARENA- AND HANTAVIRUSES

Background: Mammarena- ( Arenaviridae ) and hantaviruses ( Hantaviridae ) are rodent-borne viruses that cause cross-species transmission through excreta ( urine and faeces ) resulting in profound pathology in humans. Hantaviruses can cause human hemorrhagic fevers with a mortality rate of 40% and lassa virus causes 100,000-500,000 human infections annually in West Africa with up to 20% mortality. Nine novel hantaviruses have been identified in African rodents, shrews and bats and limited surveillance in South Africa detected mammarenaviruses in South African rodents. Lujo virus ( a zoonotic virus imported to Johannesburg from Zambia ) was isolated in a nosocomial outbreak, but the reservoir host is still unknown. Genetic variability within the genera are high and therefore assays must be developed to detect the full spectrum of genetic diversity. This study aimed to optimize and implement suitable detection assays that would identify diverse mammarena- and hantaviruses in African rodents, shrews and sengis.

Methods: Primers from published literature were evaluated against reference genomes and conserved regions were identified in the RdRp gene. Representative mammarena- and hantavirus positive controls were synthesized and used with selected primers to optimize a mammarenavirus RT-PCR (395bp) and a hantavirus nested-RT-PCR (412bp). A mammarenavirus nested-RT-PCR was adapted to also detect Lujo virus.

Results: The specificity of the assays were demonstrated with a panel of in vitro transcribed RNA derived from Old World mammarenaviruses and both Old and New World hantaviruses. The sensitivity analysis could detect 10 RNA copies. The mammarenavirus RT-PCR detected 10,000 copies of Lujo RNA, which was adapted to a nested-RT-PCR to detect 10 copies of Lujo RNA.

Discussion: The sensitivity of the mammarenavirus RT-PCR was increased to detect diverse and novel mammarenaviruses. The broadly reactive detection assays are able to detect various mammarena- and hantaviruses from different clades allowing for the detection of known and novel species.

Conclusion: The need to identify mammarena- and hantaviruses in South Africa underlines the importance and usefulness of these assays. The assays can be used to identify novel Old World mammarenaviruses and hantaviruses that may be aetiological agents of disease and identify potential reservoir hosts to known or novel mammarena- or hantaviruses.
Abstract Detail

HEPATITIS A VIRUS IN WASTEWATER DISCHARGE: THE GREAT ESCAPE

Background: Hepatitis A virus (HAV) infection is a significant cause of morbidity worldwide with unique strains of HAV circulating in South Africa (SA). The virus, which has a low (10-100 virions) infectious dose, is stable in the environment. HAV has been detected, but not quantified, in water sources in the Vaal catchment area. This study aimed to quantify and characterise HAV in treated and untreated wastewater to estimate the efficacy of wastewater treatment processes for HAV.

Method: Over a period of one year (April 2015 to March 2016) water samples (n=120; sewage, wastewater discharge, dam) were collected from five wastewater treatment plants (WWTPs) and downstream dam in the Vaal catchment area. Viruses were recovered and concentrated from the water samples. After nucleic acid extraction, HAV was quantified in the virus concentrates by real-time qRT-PCR using the hepatitisA@ceeramTools™ kit. Detected HAV strains were characterised by nucleotide sequence and phylogenetic analyses of the VP1 genomic region.

Results: A total of 72% (86120) of the water samples tested positive for HAV. The HAV concentration ranged from 1.34 x 10⁷ to 3.94 x 10⁹ genome copies (gc) per 1 L of sewage sample and 3.40 x 10⁶ to 1.65 x 10⁹ gcL of treated wastewater discharge. None of the dam water samples tested positive for HAV. The concentrations of HAV remain constant throughout the sampling period and no seasonal pattern was observed. The highest concentrations of HAV in sewage samples and corresponding discharge were recorded from a single WWTP in August and September, respectively. Phylogenetic analyses revealed that HAV genotype IB strains unique to SA circulated in the region, with the presence of three potential antigenic escape variants, one of which was detected in a treated discharge.

Discussion and Conclusion: High concentrations of HAV are being released into downstream water sources by the five WWTPs sampled in this study, one of which has discharged potential antigenic or vaccine escape variants of HAV. Although the potential infectiousness of the detected HAV has yet to be determined, the use of water sources downstream of the WWTPs for domestic, recreational and irrigation purposes is a cause of concern.
Abstract Detail

PLATELET ACTIVATION AND THE PRESENCE OF PLATELET POPULATIONS IN HEALTHY AND TYPE II DIABETIC INDIVIDUALS.

Introduction: Platelets are anuclear cell fragments that play a crucial role in haemostasis. In the intact vasculature, platelets circulate in an inert state however upon vascular damage platelets are rapidly activated through the numerous receptors on their membrane surface. Type II diabetes mellitus is associated with unnecessary platelet activation which predisposes these individuals to heart attacks and strokes. Anti-platelet agents have been used to prevent platelet activation in type II diabetic individuals. Numerous studies have however demonstrated that anti-platelet therapy does not fully prevent platelet activation in type II diabetes mellitus since, upon exposure to an agonist, not all platelets will respond in a similar manner. We hypothesize that this response heterogeneity may underlie resistance to antiplatelet therapy. This study investigates platelet activation and the presence of platelet populations in healthy and type II diabetic individuals.

Materials and methods: Forty voluntary participants were recruited for this study. After full-written informed consent was obtained, blood was drawn. Platelets were purified and analysed either in their inert or activated state. Platelet activation status was quantified using flow cytometry. The markers for platelet activation were P-selectin, αIIbβ3 integrin in the active conformation and phosphatidylserine (PS) exposure. The surface morphology of the activated platelets was visualised using confocal microscopy and scanning electron microscopy.

Results: In both healthy controls and type II diabetic patients, a platelet population was detected that expressed P-selectin without the presence of the other surface markers. The platelets exposing αIIbβ3 integrin and PS were low in both populations. Upon thrombin addition the expression of P-selection was found to increase in a statistically significant manner while αIIbβ3 integrin- and PS exposure remained unchanged. Morphological analysis revealed that platelets show characteristics of platelet activation such as pseudopodia formation, membrane spreading and platelet-platelet interactions. The presence of a platelet population positive for platelet activation (P-selectin positive) while being negative for PS and αIIbβ3 integrin indicate that a third platelet population could be identified. This shows that anti-platelet medication currently used, does not address the P-selectin positive platelets, perhaps indicating a new therapeutic target that may prevent hyperreactivity of diabetic platelets.
Abstract Detail
THE ROLE OF PREF-1 IN IN VITRO ADIPOGENIC DIFFERENTIATION OF MESENCHYMAL STROMAL/STEM CELLS

**Background:** Obesity is a health burden world-wide. The condition is characterized by an excessive amount of body fat which can negatively affect health. A better understanding of adipogenesis would aid in finding sustainable solutions to this global health challenge. The ability of mesenchymal stromal/stem cells (MSCs) to differentiate into adipocytes holds great promise to serve as an in vitro model to study human adipogenesis. It is known from the literature that MSCs from different sources within the body may differ in their adipogenic differentiation potential. Previous work conducted in our laboratory has shown that MSCs derived from adipose tissue (adipose-derived stromal/stem cells - ASCs) have greater adipogenic differentiation potential when compared to MSCs derived from Wharton’s Jelly (WJSCs). Gene expression data suggested that Pre-adipocyte factor 1 (Pref-1), an inhibitor of adipogenesis, may be responsible for the lack of differentiation in WJSCs. The aim of this project is to further study the effect of Pref-1 expression on the adipogenic potential of WJSCs and ASCs in vitro.

**Method:** Mesenchymal stromal/stem cells were isolated from adipose tissue and umbilical-cord derived Wharton’s Jelly. The cells were then induced to undergo adipogenesis for 21 days. During this time period, the adipogenic differentiation potential of the cells was measured by means of flow cytometry and microscopy. The level of Pref-1 protein expression was determined by flow cytometry, ELISA and Western blot assays.

**Results:** Adipose derived mesenchymal stromal/stem cells exhibited greater adipogenic differentiation potential. However, contrary to what was expected, flow cytometry data revealed ASCs to have greater levels of Pref-1 on the cell surface. ELISA assays were unable to detect any Pref-1 protein in the supernatant collected at each time point.

**Discussion and Conclusion:** The current data suggests that the Pref-1 protein may not be responsible for the lack of adipogenesis observed in WJSCs. Most of the current studies investigating Pref-1 in adipogenesis are done using murine cell lines which may not be reflective of what happens in vivo. Therefore, the use of human primary cells in this study represents a better model for investigating the role of Pref-1 in MSC adipogenesis.
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Abstract Detail
MECHANISMS OF INSULIN RESISTANCE CAUSED BY ANTI-RETROVIRAL DRUGS: INVESTIGATION OF THE ROLE OF MICRNARAS

Background: Highly active antiretroviral therapy (HAART), although not curative, significantly reduces the mortality and morbidity of those infected with the human immunodeficiency virus (HIV) and has increased their life span by as much as 10 years. However, with prolonged use, the drugs induce the development of various metabolic disorders such as insulin resistance. The exact mechanism of how HIV antiretroviral drugs cause insulin resistance is yet to be elucidated. MicroRNAs play critical roles in the development of pancreatic β cells, insulin secretion and insulin sensitivity. Alterations in the expression levels of these microRNAs lead to the development of insulin resistance and consequently diabetes mellitus. Elucidating the molecular mechanisms through which highly active antiretroviral drugs induce insulin resistance will help design drugs that have no adverse effects and treatment regimens that may ameliorate HAART associated metabolic disorders. The study also has the potential to improve current understanding of insulin resistance i.e. its development and progression in the seronegative population. The microRNAs could also potentially be used as biomarkers to predict the onset of HAART-associated metabolic disorders. This study seeks to investigate the effects of HAART on the expression of microRNAs 29a, -93 and Let-7.

Method: Chinese Hamster ovary cells transfected with high levels of human insulin receptors (CHO-IR) were used as the cellular model and were exposed to the HIV protease inhibitor, tenofovir (TDF). The microRNA fraction was extracted from the TDF treated CHO-IR cells and quantified using real time quantitative PCR following a brief stimulation with insulin (100 mg/ml). Insulin-stimulated signalling was also assessed in parallel by immunoblotting.

Results: Let-7 was found to be upregulated in the treated cells compared to the controls and mir-29 was down-regulated. These changes may explain the effects of HAART on insulin sensitivity.

Discussion and Conclusion: These results shows that one of the ways in which HIV protease inhibitor TDF induces insulin resistance is through the up-regulation of let 7 that negatively regulates IRS1 and Akt: key molecules in the insulin signal cascade.
Abstract:

Molecular characterisation of methicillin-resistant Staphylococcus aureus outbreak isolates collected from public hospitals in Gauteng

Background: Methicillin-resistant Staphylococcus aureus (MRSA) is an important pathogen associated with several hospital-associated (HA-MRSA) and community-associated (CA-MRSA) infections ranging from minor skin and soft tissue infections to severe infections such as pneumonia. The global burden of these infections is largely attributed to S. aureus antibiotic resistance which is due to the acquisition of the methicillin A (mecA) gene that encodes for a modified penicillin-binding protein (PBP2a) with a low binding affinity for β-lactam antibiotics. The antibiotic resistance mecA gene is carried on a staphylococcal cassette chromosome mec (SCCmec) element. Community-associated MRSA normally carry a pvl gene that encodes for the Panton-Valentine leucocidin (PVL) toxin. Several typing methods are employed to characterise MRSA strains as either HA-MRSA or CA-MRSA by determining the SCCmec types and subtypes carried by MRSA. Rapid and reliable typing methods are crucial for proper understanding of S. aureus epidemiology. The aim of this study was to use multiplex PCR (M-PCR) assays to identify and characterise clinical MRSA isolates collected (2015 to 2016) during outbreaks in neonatal and burn wards at public hospitals in Gauteng.

Methods: Multiplex-PCR assays were used to detect the Staphylococcus-specific 16S rRNA gene and the species-specific nuc, mec and pvl genes and to determine the SCCmec types of stored MRSA isolates.

Results: Preliminary results showed that none of the isolates were positive for the pvl gene. The SCCmec results showed: 33.3% of the MRSA isolates were positive for SCCmec type I, 22.2% were positive for SCCmec type III, 22.2% were positive for SCCmec type IV, 11.1% were positive for SCCmec V while 11.1% of the isolates were non-typeable.

Discussion and conclusion: The majority of MRSA isolates were positive for SCCmec type I which is associated with HA-MRSA. This is significant because HA-MRSA typically possess large SCCmec elements that can carry more antibiotic resistance genes making treatment of the infections more difficult. These results indicate the necessity for continuous monitoring and surveillance of MRSA strains circulating in these hospital wards to prevent outbreaks.
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Abstract Detail
INCIDENCE OF INJURY AND ILLNESS IN SOUTH AFRICAN PROFESSIONAL MALE FOOTBALL PLAYERS: A PROSPECTIVE COHORT STUDY

Background: Medical illnesses and sports-related injuries both have an effect on athlete health and performance. Epidemiology of injury and illness has been extensively researched during international football tournaments and the European football season. Reports on injury location and severity differ across geographical regions, and there is limited information on injury epidemiology in African football leagues. No studies have investigated the illness burden in football in Africa.

Method: This was a prospective cohort study involving two football teams over the 10-month duration of the 201516 Premier Soccer League in South Africa. Team medical staff recorded daily football exposure, illness and injuries. Team-based match and training exposure was calculated and used to determine injury and illness incidence and burden over the football season.

Results: Overall injury incidence was 2.2 1000 h, with match injury incidence of 24.8 1000 h and training injury incidence of 0.9 1000 h. Time loss injuries accounted for 33 of the 44 injuries recorded. The most common time loss injury location was the knee (14 injuries, 42%). There were 7 minimal, 4 mild, 12 moderate and 10 severe injuries. Sprainligament injury (8 injuries) was the most common type, followed by meniscuscartilage injury (7 injuries). Eleven illnesses were reported during the season, with an incidence of 0.7 1000 player days, and most were minimal in severity (811). The illness burden was 1.7 1000 player days. The respiratory (46%) and gastrointestinal (36%) systems were most commonly affected.

Conclusions: The incidence of injury was comparable with data reported internationally and mirrors the increased risk of injury during matches versus training. The nature of injury differed in that the knee was more frequently affected than the ankle or thigh, joint injuries were more common than muscle injuries, and there was a larger proportion of severe injuries. The illness burden was very low.
Abstract Detail
EXERCISE MAY DECREASE SYNCOPE SECONDARY TO POSTURAL CHANGE IN FEMALES WITH RA: PILOT STUDY

Background: The autonomic nervous system (ANS) regulates heart rate via sympathetic and parasympathetic influences. Literature has shown that rheumatoid arthritis (RA) patients suffer from autonomic dysfunction. This may consequently lead to syncope with possible falls after posture change i.e. rising from supine to standing position. Previous research has shown general improvement of the ANS after exercise, but not in specific relation with posture change.

Objective: Determine the effect of exercise on posture change (supine to standing position) in females with RA as measured by short-term heart rate variability (ANS function).

Methods: Patients with confirmed RA were randomly selected to a control group (RAC) or an exercise group (RAE). RAE group (n=19) trained two to three times per week under supervision. RAC group (n=18) continued with their current sedentary lifestyle. The medium intensity exercise programme lasted 12 weeks. No change in medication was allowed during this time. ANS function and balance were determined by quantification of the variability of the inter-beat interval detected with the Polar 810i heart rate monitor system. Frequency domain analyses were used for quantification, including LF (ms²) – indicating mainly sympathetic influence, HF (ms²) – indicating parasympathetic influence, and LFHF – indicator of autonomic balance.

Results: The two groups matched regarding baseline demographic data (age, sex, disease activity, disease duration). Due to small sample sizes and variables not following a normal distribution, non-parametric Mann Whitney U analyses were performed on heart rate variability parameters. Comparing posture change (i.e. standing value minus supine value) from pre- to post intervention, all frequency domain parameters changed as anticipated (i.e. vagal withdrawal and increased sympathetic influence) for the RAE group. The RAC group measurements deteriorated. LF (ms²): RAE -1.03 to 22.03 (stronger sympathetic influence); RAC 43.45 to -31.21 (weaker sympathetic influence) HF (ms²): RAE -24.03 to -33.34 (better vagal withdrawal); RAC -191.7 to -114.1 (less vagal withdrawal) LFHF: RAE 10.57 to 15.04; RAC 2.9 to 7.6

Conclusion: From these preliminary results it appear that exercise may indeed improve autonomic function in RA patients, in such a way that posture change will not be an added burden for falls in an already otherwise compromised population.
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Abstract Detail
VALIDATION OF AUTOMATIC LANDMARKING ON 3D SURFACES FOR FACIAL APPROXIMATION USING SOUTH AFRICAN CONE BEAM COMPUTED TOMOGRAPHY (CBCT) SCANS.

Introduction: Developments in digital imaging techniques have resulted in the collection of large databases of 3D representations of the face. Researchers in the field of craniofacial reconstruction utilise these sources of information and develop computer-assisted methods involving manual placement of landmarks. Manual landmarking is extremely time consuming on large 3D surface samples and may induce important observer subjectivity rendering the analysis less repeatable and accurate for the facial approximation process. We are developing an automated 3D method based on an automatic landmarking method using non-rigid surface registration.

Aim: The aim of this study was to validate this method by comparing the measurement errors (ME) between automatic and manual landmarking.

Methods: The ME is defined as the difference between repeated measurements of the same variable made by the same (i.e., INTRA-OE) or different observers (i.e., INTER-OE). INTRA-OE and INTER-OE observer errors were analysed by registering automatically and manually, 41 craniofacial landmarks from 10 hard-tissue surfaces and 21 capulometric landmarks from 10 soft-tissue surfaces of the same individuals. The automatic landmarking was performed using in-house developed MeVisLab-based software. The precision and the accuracy of landmark positioning between methods were statistically tested through repeated measures of ANOVA, intraclass correlation coefficient, and the standard error.

Results: Results obtained validated the accuracy and precision of the automatic placement of landmarks. Compared to the manual landmarking method, automatic landmarking presented with lower F-values and higher ICC-values. Generally, the ME in landmark positioning were smaller in the automatic compared to the manual observations.

Discussion: This research provides a validation of the precision of the automatic placement of landmarks on 3D hard- and soft-tissue surfaces. Furthermore, the automatic landmarking method allows us to reduce intra- and inter-observer errors, as well as to conveniently include more samples and populations, possibly leading to improved facial approximations.
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Abstract Detail
EVALUATION OF THE NEUROTOXICITY OF PENTACHLOROPHENOL AND ITS ACTIVE METABOLITES ON SH-SY5Y NEUROBLASTOMA CELLS

Introduction: Pentachlorophenol (PCP) is a ubiquitous pesticide and a persistent environmental pollutant. Knowledge regarding its neurotoxic mechanisms is limited, thus the aim of the study was to evaluate the effects of PCP and its metabolites, tetrachloro-1,4-benzoquinone (TCBQ) and tetrachlorohydroquinone (TCHQ) in human neuroblastoma SH-SY5Y cells.

Method: Flow cytometry was employed to investigate effects on cell cycle, mode of cell death, reactive oxygen species (ROS) generation, and mitochondrial membrane potential (ΔѰm) at different time points. Caspase-3 activity and glutathione (GSH) was assessed using fluorospectrometry, and cell morphology visualized using fluorescence microscopy. Effects on acetylcholinesterase were assessed using the Ellman esterase assay.

Results: TCBQ had the most pronounced effects on the parameters tested, while PCP exhibited the least pronounced effects. TCBQ and TCHQ were found to induce changes more rapidly than PCP, with S phase and G2M blocks observed for the compounds respectively, after 12 h exposure. A G1 block occurred after 24 h exposure to PCP. The predominant mode of cell death after PCP exposure was necrosis, whereas TCBQ induced apoptosis. The switch from apoptosis to necrosis after cells were exposed to TCHQ is attributed to an overwhelming ROS insult on apoptotic machinery. All compounds resulted in an increase in caspase-3 activity. Decreased ΔѰm was an early event for all compounds, which ultimately increased ROS production. Oxidative stress was a result of PCP and TCBQ toxicity, while a switch from reductive to oxidative stress in cells exposed to TCHQ was indicated by increased GSH and transient ΔѰm recovery. Acetylcholinesterase inhibitory activity was exhibited only by TCHQ.

Conclusion: In conclusion, this study shows that PCP, TCBQ and TCHQ exhibited different mechanisms of toxicity toward SH-SY5Y cells. This study provides new insight into the toxic effects of PCP and its metabolites in neuronal cells, and highlights the importance of assessing the action of metabolites in conjunction with the parent compound, as extrapolation of effects cannot be assumed from the parent compound alone.
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Abstract Detail  
INFECTIONS OF THE GASTRO-INTESTINAL TRACT ACCOUNT FOR >20% OF ALL ILLNESS DURING THE SUPER RUGBY UNION TOURNAMENT – A PROSPECTIVE STUDY INVOLVING 80 167 PLAYER DAYS

Background: Illness accounts for a significant proportion of consultations with a team physician travelling with elite athletes. The purpose of this study is to determine the incidence, type, and severity (time loss >1 day) of gastro intestinal illness in rugby union players participating in the annual 16-week Super Rugby tournaments.

Methods: A cohort of 868 elite rugby players from 5 South African teams participating during 2013 to 2016 in the Super Rugby tournaments, were recruited. All players were followed daily over the 16-week competition period for each year (80 167 player days over 4 years). The team physicians completed a daily illness log with 100% compliance on all medical illnesses reported during the annual competition period. Information included the daily squad size and illness details including the body system affected, the suspected cause (infection or not), and trainingmatch days lost.

Results: The incidence of illness (illness per 1000 player days) in rugby players in the 4-year period were as follows: A total of 389 illnesses were reported, resulting in an overall incidence of illness of 4.9 1000 player days (95% CI, 4.4 – 5.4). The gastro-intestinal system were responsible for the second highest proportion (%) of all illness (20.1%), after the respiratory tract (69.7%). The suspected cause of illness was infections for most illnesses (75.3%); with infections in the gastro-intestinal system accounting for 15.4% of all illness. A time loss of > 1 day was reported for 33.5% of all illnesses.

Conclusion: During the Super Rugby tournament, infective illness involving the gastro-intestinal system accounts for more than 20% of all illness. Future studies should therefore be directed at determining risk markers for these illnesses, so that preventative measures can be designed and implemented to protect the health of these athletes.
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Abstract Detail
AGE ESTIMATION FROM RADIOGRAPHS OF THE DISTAL RADIUS AND ULNA: A RE-EVALUATION OF CURRENT STANDARDS

Introduction: A forensic anthropologist’s primary role involves establishing a biological profile from unknown skeletal remains. Extensive research has been conducted on methodology to construct the biological profile from adult remains. However, the estimation of subadult biological parameters is lacking, mainly as a result of the paucity of known skeletal material for research. Numerous methods have been assessed to conduct subadult age estimation, with epiphyseal fusion being the preferred method for the adolescent age cohort. The application of epiphyseal fusion has been extensively researched on several populations; differences in the maturation rate of populations have been observed and demonstrate the need for population-specific standards. While some studies have been conducted on South Africans, the approach lacks the robust statistical component to make the method compliant with standards of best practice required of forensic methodology.

Aim: The aim of the current study was to re-evaluate age estimation standards from epiphyseal fusion of the distal radius and ulna.

Methods: A sample of 782 hand-wrist radiographs of male and female black and white South Africans were collected from Mediclinic, Bloemfontein. The ages ranged between eight and 30 years. Degree of epiphyseal fusion for the radius and ulna was assessed and scored using a four-stage system. Differences in the rate of fusion between the radius and ulna, the sexes, as well as the population groups were assessed with a Kruskal-Wallis test. Transition analysis and Bayesian statistics were applied to obtain the maximum likelihood age estimate and the average age of transition among the stages, respectively.

Results: No significant differences were noted between the fusion of the radius and ulna. Furthermore, there were no significant differences between males and females. While significant differences were noted between black and white South Africans, the differences only amount to a few months and therefore do not justify separating the populations for the creation of standards, as group separation would affect the practical applicability of the standards. Complete fusion was observed between the ages of 16 and 19 years in the pooled sample (95% CI). The results indicate an earlier age of complete fusion compared to previous South African studies, particularly for the males.
Abstract Detail
ETHNOMEDICINAL EXTRACTS OF THREE GHANAIAN PLANTS ATTENUATE OXIDATION IN SC-1 FIBROBLASTS, WHILE PERTURBING CELLULAR MIGRATION

Background: Ethnomedicinal preparations have for many years served as medication for treatment of diverse diseases. These possess various pharmacologically-active phytochemicals which may be harnessed for the treatment of diseases such as wounds. This study investigated the ability of ethnomedicinal extracts prepared from Aspilia africana CD Adams, Boerhavia diffusa L. and Erythrina senegalensis DC. to alter reactive oxygen species (ROS) release and cellular migration in SC-1 fibroblasts as surrogate markers for wound healing.

Methods: Extracts were screened for major phytochemical classes using thin-layer chromatography and ultra-performance liquid chromatography coupled to time of flight mass spectrometry (UPLC-TOF-MS). Cytotoxicity in SC-1 fibroblasts was assessed using sulforhodamine B staining, and morphological examination via microscopy. The effect on AAPH-induced ROS release was measured using dichlorofluorescein diacetate activation. The effect on cellular migration was determined microscopically using the scratch wound method.

Results: Phytochemical classes such as alkaloids, flavonoids and phenols were identified in all three extracts. Chromatograms created using UPLC-TOF-MS showed the absence of ascorbic acid, and kaempferol, whilst traces of neobavaisoflavone was detected in E. senegalensis. None of the extracts was cytotoxic. E. senegalensis reduced intracellular ROS and cellular migration by 35% and 65% at 100 µg/mL, respectively.

Conclusion: Although E. senegalensis reduced oxidative stress, cellular migration was hindered. Free radicals are associated with activation of proliferative and migratory pathways, and thus may be implicated in the reduced migration observed. The latter may result in reduced wound healing. Further investigation is necessary to identify bioactive components, and elucidate the mechanistic pathways involved.
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Abstract Detail
ABC TRANSPORTERS AND “SIDE POPULATION” IN HUMAN ADIPOSE-DERIVED STROMAL CELLS

Introduction: Adipose-derived stromal cells (ASCs) can be defined as a heterogeneous population of cells, isolated from adipose tissue, containing multipotent stemprogenitor cells that have the capacity to differentiate into various cell types. Increasing interest has been shown in using these cells in cell-based therapies. There is however, still much to learn about these cells before they can be used with confidence in the clinical setting. An inherent characteristic of ASCs that is poorly understood is their heterogeneity, although very little is known about the various sub-populations that make up the isolated ASC population. It is assumed that one of the sub-populations include stemprogenitor cells, but in general, stem cell biology suffers from the lack of specific cell surface markers that can unambiguously identify a true stem cell population. One of the methods currently being used in an attempt to identify a sub-population in a heterogeneous cell population is the side population (SP) assay. The assay is based on the differential ability of cells to efflux a fluorescent dye. This ability is attributed to the expression of one or more members of the ATP-binding cassette (ABC) transporter protein family. It is theorized that the degree of efflux activity of SP cells correlates with their maturation state, such that cells exhibiting the highest efflux activity are the most primitive.

Methods: In this study, the SP assay was used to study human ASC efflux capacity with the focus on potentially identifying a sub-population of ASCs with more primitive characteristics. We also examined levels of ABC transporter gene expression and assessed the expression of selected ABC transporter proteins in ASCs as they expand in culture.
DIVERSITY OF STAPHYLOCOCCUS AUREUS AND PSEUDOMONAS AERUGINOSA POPULATIONS IN A CYSTIC FIBROSIS CLINIC INDICATES GOOD INFECTION CONTROL MEASURES

Background: Cystic fibrosis is an autosomal recessive multi-organ disease, primarily affecting the lungs. The disease results in an ionic imbalance, dehydration of the mucus and impaired mucociliary clearance in the lung. Pathogen removal from the lungs is compromised and pathogens, such as Pseudomonas aeruginosa and Staphylococcus aureus can colonise the lungs. In South Africa there is limited data available with regards to the prevalence and genetic relatedness of these pathogens.

Methods: A longitudinal study was conducted at a CF clinic in Pretoria, South Africa with two distinct study periods (20132014 and 20162017). Sputum specimens andor cough swabs were collected from these patients as part of their routine care and were processed by the Diagnostic Division of the Department of Medical Microbiology (UPNHLS). Additional specimens were requested from the patients and were cultured onto chromogenic media (bioMérieux, Marcy-l’Étoile, France). For the second study period, only the routine specimens were utilised, if the patient was unable to produce more than one specimen. All presumptive S aureus and P. aeruginosa isolates were confirmed using matrix-assisted laser desorption ionisation-time of flight. Genotyping was performed using ERIC-PCR assays (for P. aeruginosa isolates only), multi-locus sequence typing (MLST) (on selected isolates) and pulsed field gel electrophoresis (PFGE) (all S. aureus and P. aeruginosa isolates).

Results: In the first study period (20132014), 19 patients were enrolled. Eleven of the 19 patients were colonised with S. aureus (33 isolates) and five with P. aeruginosa (23 isolates). In the second study period (20162017), 18 patients were enrolled. Five of the 18 patients were colonised with S. aureus (five isolates) and five with P. aeruginosa (five isolates). Dendrograms constructed based on PFGE and ERIC-PCR results showed diverse populations (done for each period separately). The MLST analysis showed different sequences types detected in each study period for both the S. aureus and P. aeruginosa isolates.

Discussion and Conclusions: This study showed a reduced prevalence of S. aureus in the CF patients. However, the prevalence of P. aeruginosa remained the same. This reduced prevalence along with the genetically diverse populations, with different STs detected in each study shows good infection control measures.
Abstract Detail
THE CAPTURE AND REVERSE-TRANSCRIPTION OF SINGLE-CELL ADIPOSE-DERIVED STROMAL CELLS USING FLUIDIGM’S C1 TECHNOLOGY

Introduction: In the last decade, the use of adipose-derived stromal cells (ASCs) for cell-based therapies has gained increasing attention. This has lead to the need to fully understand and characterize these cells. One of the problems faced with the characterization of ASCs is that the isolated cells are a heterogeneous population and only one of the sub-populations is believed to be a true stem cell population. Heterogeneity in cellular populations plays an important role in many biological processes and may influence the outcome of stem cell-based therapies. The absence of stem-cell-specific markers limits our ability to obtain a pure cell therapy product. By understanding the heterogeneity of ASCs, researchers may be able to eliminate possible interfering cells from the heterogeneous population, thereby allowing for the design of more effective therapies. One method for studying heterogeneity is single cell transcriptome analysis, which is used to study the complete complement of mRNA molecules expressed by a single cell at a given moment in time. Transcriptome analysis allows for the study of expression patterns of thousands of genes simultaneously in order to provide a profile of gene expression in the selected cell. By identifying gene expression patterns between individual cells, cell identity and possible clustering of cells can be determined.

Methods: We report here the capture and preliminary analysis of over 700 single human ASCs from 4 individual donors using Fluidigm’s C1™ technology. This includes capture and reverse-transcription to cDNA in preparation for sequencing of the transcriptome, as well as the creation of a bioinformatics pipeline and preliminary analysis of a limited number of single cells. This is an ongoing project and we provide here a summary of our progress thus far.
Abstract Detail
INTEGRONS ASSOCIATED WITH CARBAPENEM RESISTANCE IN ENTEROBACTERIACEAE ISOLATED FROM CLINICAL SPECIMENS AT A TERTIARY ACADEMIC HOSPITAL IN PRETORIA

Introduction: Enterobacteriaceae are pathogens associated with health care and community associated infections. The development of carbapenem resistance in Enterobacteriaceae is major concern worldwide due to lack of treatment options leading to mortality. The high prevalence of carbapenemase genes on mobile genetic elements (MGEs) such as integrons, plasmids and transposons promotes the spread of antimicrobial resistance and play an important role in dissemination of carbapenemase genes by horizontal gene transfer inter- and intra-species. There is a strong association between class 1 integron and multidrug resistance in Enterobacteriaceae. In South Africa, there is limited information about the prevalence of integrons and their association to drug resistance, particularly carbapenem resistance.

Material and Methods: Hundred presumptive CRE isolates were obtained from NHLS Laboratory, Tshwane Academic Division and selected using random systemic sampling. Antimicrobial susceptibility testing was done by disc diffusion using a 10 µg ertapenem disc on Mueller Hinton agar. Overnight culture in Brain Heart Infusion (BHI) was used for the extraction of genomic DNA. Multiplex PCR was used for the detection of 3 locally common carbapenemase genes (blaOXA-48, blaNDM-1, and blaVIM-2) and integrase genes (intI1 and intI2) which determine an integron class.

Results and Discussion: Reduced susceptibility could be presumptively confirmed in 64% of the CRE isolates. Thirty percent of the isolates were resistant and 34% showed an intermediate resistance to ertapenem. Carbapenemase genes were detected in 64% of the isolates, the predominant genotype was the blaOXa-48, which was detected in 36% of the isolates. The second predominant genotype is blaNDM-1, which was detected in 27% of the isolates. The blaVIM-2 was only detected in two isolates. Class 1 integron was detected in 70% of all the selected CRE isolates, and it was the most prevalent in this study. Class 2 integron was detected in 17 isolates, and of these, 16 were combination of class 1 and class 2 integron which were detected in P. rettgeri (n = 14) and E. cloacae (n = 2).

Conclusion: The high prevalence of integron class 1 and class 2 in this study shows a potential for dissemination of antimicrobial resistance among clinical isolates.
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Abstract Detail
SURFACE ANATOMY OF THE STERNAL ANGLE IN A SOUTH AFRICAN ADOLESCENT POPULATION USING CT IMAGING

Background: Surface anatomy is an essential part of clinical examinations, interpreting diagnostic images or performing interventional procedures and surgery and as such forms an integral part of our anatomy education programs. Our current knowledge of surface anatomical landmarks and planes routinely taught in anatomy curricula derive from standard anatomical textbooks which are derived from cadaver dissection, despite the reported range of normal variation. An example of an important surface anatomical landmark is the sternal angle. The sternal angle, or the angle of louis, is an anatomical superficial landmark which forms a horizontal plane which indicates the level of a series of anatomical events. The beginning and the end of the aortic arch, the bifurcation of the trachea and pulmonary trunk as well as the junction of the azygos vein to the superior vena cava, are a few of the landmarks that are commonly associated with the plane. Several recent publications have highlighted the importance of recognizing both age-related and possible population specific differences in surface anatomy. And as such, the aim of this study was to appraise the surface anatomy of a sample of South African adolescents.

Method: Fifty-seven thoracoabdominal CT scans of patients between the ages of 12 - 18 years of age were obtained from the Department of Radiology (Steve Biko Academic Hospital). Scans with an abnormal degree of kyphosis andor scoliosis; space-occupying lesions and those with obvious visceromegaly were excluded from the study. The vertebral level of the sternal angle itself was measured as well as the average distance of the landmarks (mentioned above) to the plane itself. The results of this study were then compared to that of other local and international studies which highlighted the age-related and population specific similarities and differences.

Results and discussion: It is clear from the results that surface anatomy is not a static thing and thus should not be treated as such. This is important as not only is accurate information regarding surface anatomy essential, but so too is an understanding of the possible variations that one might encounter.
Abstract Detail

SENSORY MODULATION PATTERNS IN CHILDREN WITH CEREBRAL PALSY: A COMPARATIVE-DESCRIPTIVE STUDY

**Background:** Cerebral palsy (CP) causes complex motor and sensory impairments. There is growing evidence that children with CP have sensory modulation disorders (SMD). Sensory modulation disorders are identified when children are unable to adequately regulate and grade their responses to sensory inputs to such an extent that it significantly impairs their ability to participate in their occupations. The Sensory Profile, a standardised parent questionnaire, has been used extensively to identify SMD in children with various conditions. Experts have proposed that different types of CP present with different sensory modulation patterns (SMP). Although studies have confirmed the presence of SMD in children with CP, there is no evidence that different types of CP present with different SMP.

**Method:** The Sensory Profile 2 was completed by 154 parentsguardians of learners diagnosed with CP, aged 5.0 to 14.11 years old. The study aimed to (i) describe the predominant SMP in the quadrants, sensory systems and behavioural systems in the ataxic (AT), dyskinetic (DY), spastic diplegic (SD), and spastic hemiplegic (SH) subtypes; and to (ii) determine whether differences existed between the subtypes in the quadrants, sensory systems and behavioural systems.

**Results:** The registration and avoiding patterns occurred in all the subtypes. Seeking patterns were more prevalent in the AT and the DY subtypes than the spastic subtypes. The AT and DY subtypes appeared to have more SMD than the other subtypes. The SH subtype had the highest prevalence of tactile difficulties. The SD subtype presented with fewer SMD than the other subtypes. There was a statistically significant difference found in the body position processing section (p=0.000) between the subtypes. Proportional differences were observed between some subtypes in the sensitivity (AT>SD) and registration (SD>SH) quadrants, as well as in the body position (SD>SH; DY>SH) and the auditory processing (SH>SD) sections.

**Discussion and conclusion:** The study confirmed the presence of SMD in children with CP and provided some statistical evidence that different types of CP present with different SMP. These findings will assist occupational therapists to assess and treat SMD in different types of CP more effectively.
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Abstract Detail
MULTIPLEX QUANTIFICATION OF LACTOBACILLI AND BACTERIAL VAGINOSIS-ASSOCIATED BACTERIA IN PREGNANT AND NON-PREGNANT WOMEN FROM CLINICS IN PRETORIA, SOUTH AFRICA

Background: Bacterial vaginosis (BV) is the most common vaginal syndrome in women of reproductive age, which is characterised by depletion of lactobacilli and an overgrowth of multiple anaerobic bacteria. In South Africa, quantification data of lactobacilli and BV-associated bacteria is limited despite high BV prevalence rates. This study aimed to detect and quantify two Lactobacillus species and seven BV-associated bacteria in pregnant and non-pregnant women using multiplex quantitative real-time PCR (qPCR) assays.

Method: Two vaginal swabs were collected from pregnant and non-pregnant women attending clinics of a tertiary academic hospital in Pretoria, South Africa. The first swab was used to diagnose BV using the Nugent scoring system, while the second swab was used to extract genomic DNA. Multiplex qPCR assays were performed to detect and quantify Lactobacillus species (L. crispatus and L. iners) and BV-associated bacteria (Atopobium vaginae, Gardnerella vaginalis, Megasphaera type 1, Mobiluncus curtisi, M. mulieris, Prevotella amnii and P. bivia).

Results: Sixty-nine pregnant (69198; 34.8%) and 129 non-pregnant women (129198; 65.2%) were enrolled. Nugent scoring revealed that 54 women had BV (54198; 27.3%), 25 had intermediate microflora (25198; 12.6%) and 119 had normal microflora (119198; 60.1%). The qPCR results showed that A. vaginae, G. vaginalis, Megasphaera type 1, M. curtisi, M. mulieris and P. amnii were present in significantly higher amounts in BV-positive women than in women with normal microflora (p<0.0001), while the opposite was observed for L. crispatus (p=0.009). Lactobacillus iners showed no significant difference in concentrations and was detected in all women (198198; 100%). Megasphaera type 1 was present in significantly higher median concentrations in pregnant than in non-pregnant women (p=0.015).

Discussion and Conclusion: This study found that L. iners is abundant in the studied women regardless of BV statuses, while L. crispatus showed significantly higher amounts in women with normal microflora. As Megasphaera type 1 produces sialidase that may cause preterm birth in pregnant women, screening for Megasphaera type 1 could be useful to prevent preterm birth. This study highlights the importance of the inclusion of the six BV-associated bacteria that showed significantly higher amounts in BV-positive women as screening targets for BV detection.
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Abstract Detail
PLATELET ACTIVATION IN HEALTHY INDIVIDUALS AND SMOKERS: PLATELET MAPPING AND MORPHOLOGY.

Background: Recent studies have suggested a cell-based model for coagulation in which platelets and the coagulation cascade interact in order for haemostasis to occur. The majority of platelets that circulate throughout the body remain dormant until activated with their activation usually occurring to vascular damage. It has become apparent that other factors increase platelet activation and therewith the risk of developing thrombosis. One such factor is smoking. Habitual smoking creates a chronic inflammatory state in the body, which in turn increases platelet activation, which is associated with an increased risk of thrombosis. The aim of this study was to determine if tobacco smoke affects the contribution that platelets make to overall clot strength, the method of platelet activation responsible for platelet hyperreactivity and whether we can observe whether morphological alterations reflect the specific platelet populations.

Materials and Methods: Twenty voluntary males (10 smokers, 10 non-smokers) were included in this study. Blood was drawn once informed consent was obtained. Platelet-rich plasma was obtained. Platelet mapping and Thromboelastography was used to assess the contribution of platelets to clot strength and the agonist responsible for activation by pooling the plasma of smokers or non-smokers and running three repeats. Scanning electron microscopy was employed for morphological analysis of the platelets.

Results: Platelet mapping and Thromboelastography revealed that platelets contribute to clot formation to a greater extent in smokers than in non-smokers. The reaction time was decreased in the smokers indicating that the thrombus formation occurs faster in the chronic inflammation associated with smoking. Scanning electron microscopic analysis indicated a greater degree of platelet activation with the presence of platelet pseudopodia, platelet spreading and platelet-platelet interactions.

Conclusion: Overall it appears as if platelets are hyperactivated in smokers and therefore contributes to a greater degree to overall clot strength. This results in the formation of a stronger clot that is resistant to lysis. Thrombosis treatment in smokers should therefore be aimed at the prevention of platelet activation prior to thrombus formation.
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Abstract Detail
ACCURACY AND RELIABILITY OF THREE-DIMENSIONAL (3D) MACROSCOPIC AND MICROSCOPIC MEASUREMENTS PERFORMED ON CONE BEAM COMPUTED TOMOGRAPHY AND MICRO-FOCUS COMPUTED TOMOGRAPHY -BASED RECONSTRUCTIONS OF THE MANDIBLE

Introduction: Cone-Beam Computed-Tomography (CBCT) is widely employed in clinical context (e.g., in dentistry), as it provides easy, safe and quick information on patients’ dental tissues and maxillo-facial skeleton. The accuracy of CBCT-based 3D reconstructions and measurements on dental samples has been extensively studied. However, the reliability of using CBCT in assessing microstructural parameters in large fields of views, has not been fully ascertained yet.

Aim: We aim here to assess the accuracy and reliability of CBCT-based linear and volumetric measurements in comparison to micro-focus computed-tomography (micro-CT), which has been considered the gold standard.

Methods: The sample, comprising 24 dried mandibles from the Pretoria Bone Collection (UP), was scanned by both micro-CT (resolution: 68-78 µm) and CBCT (resolution: 200 µm). Reconstructions in 3D and segmentations were performed in order to collect external measurements between landmarks, cortical thicknesses on cross-sections, and histomorphometric parameters.

Results: The two volumes obtained for each mandible were aligned and registered using the micro-CT-volume as reference. Colour-coded deviation maps were generated to visualise the general volumetric discrepancies between the two scanning modalities. ANOVA and paired Wilcoxon tests were performed and showed no significant differences between CBCT and micro-CT for the external measurements or the cortical thicknesses. However, regarding the histomorphometric parameters, cortical bone densities were statistically different between the two modalities, even if in strong agreement according to Bland-Altman plots. The maps showed that the maximum discrepancies were mainly localised at the ramus, and more particularly at the upper parts (condylar and coronoid processes). A good correlation was demonstrated for the linear measurements between micro-CT and CBCT, confirming the versatility of CBCT, even with a relatively low resolution of 200 µm and a large field of view. However, the uncertainty still associated with the histomorphometric parameters must be taken into account if used in a clinical setting.
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Abstract Detail
IN VITRO VALIDATION OF THE LHR-CHAP/LUTEINIZING HORMONE RECEPTOR BINDING SITE

Background: The luteinising hormone receptor (LHR) is a G protein-coupled receptor (GPCR) found in the gonads of both males and females. Loss-of-function mutations in GPCRs often result in protein misfolding which results in defective trafficking of mutant receptors to the cell surface. Pharmacological chaperones (pharmacoperones) are small cell-permeant molecules able to enter cells, bind specifically to mutant, misfolded receptors, correct their folding, and allow for trafficking to the cell surface. One such molecule is LHR-Chap, which is able to ‘rescue’ cell surface expression of mutant LHRs. However, LHR-Chap only rescues a subset of mutant LHRs, and it is hypothesised that this is due to the interactions it makes with the receptor. Although the binding of this compound to the receptor has been modelled through in silico docking, it is not known exactly where on the receptor LHR-Chap binds. Therefore, the aim of this study is to experimentally validate the in silico modelling data to confirm the predicted binding site.

Methods: Predicted interaction residues were determined based on the LHRLHR-Chap model and suitable mutations of these residues were selected. Site-directed mutagenesis was then performed to introduce these mutations into a mammalian expression vector which were subsequently used to transfect HEK 293-T cells. Receptor cell surface expression was determined by a receptor ELISA assay.

Results: Several suitable LHR mutations were identified for testing: F515A, I531A, A589G, A589I, A593G, A593I, L608A, V609A and Y612A. Following site-directed mutagenesis, Sanger sequencing was utilised to confirm the presence of only the desired mutations which were then introduced into mammalian cells. Receptor ELISA assays were performed to confirm their expression at the cell surface.

Discussion and Conclusion: Several identified putative interaction residues are predicted to be involved in LHR-Chap binding to the LHR. These residues have been mutated to disrupt these predicted interactions. A receptor signalling assay (inositol phosphate accumulation assay) will now be performed in order to compare the signalling competence of these mutant receptors in response to stimulation with LHR-Chap and the natural hormone to confirm whether LHR-Chap interactions have been disrupted.
Abstract Detail
THE ASSOCIATION BETWEEN THE MECHANISM OF INJURY AND THE VISUAL MRI PATHOLOGY OF ACL INJURIES

Background: Anterior cruciate ligament (ACL) injuries are common among athletes and the general public. These injuries may lead to significant absence from activity with an associated financial and social burden. No definitive association has been described between mechanism of injury and pathology, to implement preventative measures in order to limit these injuries.

Aim: Determine whether there is an association between the mechanism of injury and pathology seen on a magnetic resonance imaging (MRI) scan in ACL injuries.

Methods: A cross-sectional analytical study of 87 male patients with ACL injury, who had an MRI scan of the knee within the last two years. Participants were contacted for consent in this study. The mechanism of injury and pathology seen on the MRI scan was noted and categorised into different injury and associated pathology groups. Statistical analyses included a summary of data and association between the mechanism of injury and pathology. A modified version of the chi-square test for independence was used to analyse the multiple pathology responses to each mechanism.

Results: MRI scans of ACL injuries indicated the mechanism of a solid foot plant with rotation of the knee has a greater tendency to be associated with medial meniscal injuries (77%), and also a 54% possibility to be associated with lateral meniscal injuries. A solid foot plant with a valgus stress on the knee showed a higher incidence of associated medial collateral ligaments (MCL) injuries (41%) and femoral bone bruising (62%). These two mechanisms of injury are the most common in ACL injuries and contribute to the clinical significance found in this study. The p-value was however not statistically significant (p=0.44, chi-square value=20.27, df=45) for any association between pathology and mechanism of injury.

Conclusion: Some injury mechanisms causing ACL injury were more common than others and also had more associated pathology. The most common mechanism of injury noted is a solid foot plant with either rotation of the knee or valgus stress on the knee. Strengthening tissue structures involved in those movement patterns that cause these mechanisms can possibly limit ACL injuries in athletes and the general public.
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Abstract Detail
EFFECTS OF CIGARETTE SMOKE CONDENSATE (CSC) ON CLARITHROMYCIN-MEDIATED ALTERATIONS IN RESISTANCE GENE EXPRESSION BY STREPTOCOCCUS PNEUMONIA

Background: Streptococcus pneumoniae (the pneumococcus) is a leading cause of morbidity and mortality worldwide. Of major concern is the prevalence of antibiotic-resistant pneumococci reported in various countries. Notably, cigarette smoking also has devastating effects worldwide with an estimated >1 billion smokers and ~3 million tobacco-associated deaths annually. Smoking has been linked to, amongst others, bacterial mutagenesis. The present study examines the effects of CSC, alone and in combination, with the macrolide, clarithromycin, on the expression of the macrolide resistance genes, mef(A) and erm(B), in strains 521 and 2507 of the pneumococcus respectively, as well as that of the ABC-transporter gene, SP2003, which may also be involved in the development of antibiotic resistance.

Method: Following exposure of the S. pneumoniae strains 172 (macrolide-susceptible, control strain), 521 and 2507 to CSC (80 and 160µg/mL) and clarithromycin (0.125µg/mL), individually and in combination, the RNA was extracted, cDNA synthesised and real-time qPCR performed. Data was analysed by comparing the relative change in expression of the target genes to that of the reference genes and is expressed as fold increase.

Results: Exposure to clarithromycin was found to increase the relative gene expression of SP2003 in all 3 S. pneumoniae strains investigated, as well as expression of the mef(A) and the erm(B) genes in the respective macrolide-resistant strains. Interestingly, exposure to CSC also resulted in increased expression of SP2003 in all 3 strains investigated to a greater extent than that observed with clarithromycin alone. CSC was also found to cause a slight increase in the expression of the macrolide resistance genes by clarithromycin.

Discussion and Conclusion: Exposure of the pneumococcus to CSC prior to treatment with clarithromycin resulted in increased expression of all three resistance genes, suggesting that smoking could favour the selection of macrolide-resistance in this dangerous pathogen. The findings of this study shed new light on the link between smoking and increased resistance gene expression by the pneumococcus. A previously undocumented role for the ABC-transporter is proposed.
Abstract Detail
PRE-OPERATIVE UPPER GI Endoscopy IS ESSENTIAL BEFORE CHOLECYSTECTOMY FOR PRESUMED SYMPTOMATIC GALLSTONES.

Background: Upper abdominal symptoms, including dyspepsia of ulcer or non-ulcer origin, may occur as a result of either upper gastro-intestinal (duodenal or gastric) pathology or gallstone disease. Concurrent presence of different upper gastro-intestinal pathology in patients with known gallstones in South Africa is unknown currently. Gallstones are very common in many “Western” countries, but the majority give no symptoms. Many patients continue to have symptoms attributed to post-cholecystectomy syndromes. These may be due to other pathology.

Aim(s): To determine concurrent presence of upper gastro-intestinal pathology in patients with symptomatic confirmed gallstones in the Pretoria Academic Hospitals Complex.

Methods: Descriptive cross-sectional study performed at Steve Biko Academic and Kalafong Hospitals. Patients with sonographically proven gallstones were prospectively submitted to UGI endoscopy pre-cholecystectomy. Approval obtained from the Human Ethics Committee of the University of Pretoria.

Results: Of the 62 patients included in the study, 17 patients (27.42%) were endoscopically diagnosed with upper gastro-intestinal pathology. Of these, 12 had gastritis, 2 had peptic ulcers, 3 had duodenitis and 2 had oesophagitis.

Conclusion/Recommendations: This study shows that 27.42% of patients with gallstone disease in our population have concurrent upper gastro-intestinal pathology on upper gastro-intestinal endoscopy. It is therefore recommended that UGI endoscopy be performed in all patients with presumed symptomatic gallstones before cholecystectomy.
THE EFFECT OF PRE-EXERCISE STANDING POSTURE ON RUNNING PERFORMANCE IN ADOLESCENT MALES.

Introduction: The effect of pre-exercise standing posture on running performance in adolescent males. Duncan Sutcliffe, Dr Steve Olorunju and Dr Kim Nolte Department of Physiology, Division of Biokinetics and Sport Science Background Limited research has focused on the possible effects of standing posture on running performance. The aim of the study was to assess the relationship between postural assessment scores and running performance results, and to further compare the postural assessment scores between the participant groups (elite running academy and private high school).

Method: The sample consisted of (n = 30) from an elite running academy and (n = 60) from a private high school in Pretoria (age = 15.51 ± 1.63 years). A modified technique of Watson and Mac Donncha which assesses eleven common areas of postural problematic areas was used. Sprint speed ability was assessed using the 10, 20 and 40 metre sprint tests. The 20-metre shuttle run test (Bleep test) was conducted to assess the aerobic endurance abilities of the participants.

Results: Overall posture rating (mean ± SD) of the elite athlete group (48.20 ± 4.09) was higher than the private high school group (44.83 ± 4.42) (p = 0.00). The Bleep test results (mean ± SD) was also superior for the elite athlete group (10.59 ± 1.88) in comparison to the private high school group (8.26 ± 1.94) (p = 0.00). Furthermore, sprint speed (10, 20 and 40 m) (mean ± SD) was superior for the elite athlete group (1.81 ± 0.12s, 3.02 ± 0.23s, 5.39 ± 0.31s, respectively) in comparison to the private high school group (2.07 ± 0.27s, 3.50 ± 0.34s, 6.35 ± 0.62s, respectively) (p = 0.00). Moderate negative correlations were found between overall posture rating and the 20M and 40M sprint test results (r = -0.47, p = 0.00; r = -0.54, p = 0.00 respectively). Moderate positive correlations were found between overall posture rating and the Bleep test results (r = 0.43, p = 0.00)

Discussion and Conclusion: From the results of this study, higher overall posture ratings (better posture) are correlated with better speed and aerobic endurance. Therefore, good posture may not only have important health implications but also may be beneficial for sports performance in speed and endurance related sports and activities.
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Abstract Detail
ASSOCIATION BETWEEN REGISTERED NURSES’ EXPERIENCES OF CONTINUING PROFESSIONAL DEVELOPMENT AND THEIR SHARING OF INFORMATION GAINED

Background: The goal of continuous professional development (CPD) is to improve the quality of healthcare practice and maintaining up-to-date knowledge and skills (Van Vuuren & Nel, 2013). Nurses should share the knowledge acquired at CPD events. Despite vast amounts of money spent in the name of CPD, the quality of these programs is questionable, as there has been no improvement in healthcare (Gitonga & Muriuki 2014). The purpose of the study was to determine the association between how registered nurses’ experience CPD events, and their practice of sharing the information gained at these events.

Method: A descriptive quantitative design was used to conduct the study in a regional hospital in Mpumalanga province. The population was 126 registered nurses who complied with the criterion of working for at least one year at the regional hospital. Total population sampling was used for sampling. A structured questionnaire was used to collect data. The research ethics committee of the Faculty of Health Sciences approved the study and permission was obtained from the provincial and hospital authorities. Of the 126 questionnaires distributed, 75 were returned. Descriptive statistics were used to analyse the data. The t-value was used to assess the experiences of registered nurses of CPD and the Chi-square to assess the level of association between registered nurses and sharing of information.

Results: The majority of the registered nurses who attended CPD events are those who have less experience in the profession. An association between how the registered nurses experienced the CPD activities, and the way in which and with whom they shared the information gained, exists. Only 5.33% of the registered nurses indicated that they do not share the information with colleagues. Recommendations, based on the results of the study were made for the registered nurses and nursing managers.

Discussion and Conclusion: The findings may assist nursing managers to encourage registered nurses who attend CPD events to share the knowledge gained, as knowledge sharing is essential for creating new knowledge and innovation. to uplift the standard of nursing care.
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Abstract Detail  
THE EPIDEMIOLOGY OF ILIOTIBIAL BAND FRICTION SYNDROME (ITBFS), AND RISK FACTORS ASSOCIATED WITH ITBFS, IN 21.1KM AND 56KM DISTANCE RUNNERS

Background: Iliotibial band friction syndrome (ITBFS) is the most common overuse injury affecting the lateral aspect of the knee in distance runners. Novel factors such as medical conditions and medication use are related to other overuse injuries in runners, however, there is limited data on their link to ITBFS. Objective: To identify the risk factors associated with ITBFS in distance runners.

Methods: Participants (n=12 659) in the Two Oceans races (21.1km, and 56km) completed a pre-race medical history screening tool including: training, cardiovascular disease (CVD), risk factors for, and symptoms of CVD, history of diseases affecting major organ systems, cancer, allergies, medication use, and running injury. Runners were grouped as having a past history of ITBFS (hITBFS group n=509) and a control group (n=12 150).

Results: Independent risk factors associated with a higher risk of a history of iliotibial band friction syndrome (hITBFS) compared to runners with no history of these factors were as follows: any risk factors for CVD (PR=1.5; p=0.0002); any respiratory disease (PR=1.5; p=0.0004); any endocrine disease (PR=1.7;p=0.012); any GIT disease (PR=2.7; p<0.0001); any nervous system psychiatric disease (PR=1.8; p=0.005); a history of any allergies (PR=1.7; P<0.0001); the use of any analgesic anti-inflammatory medication (AAIM) during a race or in the week before a race (PR=5.8; p<0.0001) and intermediate category of runners (PR=1.4; 95%CI: 1.1-1.8).

Conclusion: Novel independent risk factors associated with ITBFS in long distance runners were participation in running for <3 years, being an average runner, having any risk factor for CVD, having a history of disease (i.e. respiratory, endocrine, GIT, central nervous system CNS), allergies and the use of AAIM medication a week prior to the race. Future longitudinal research is needed to assess the cause effect of these risk factors during distance running and for developing preventative strategies.
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Abstract Detail  
ASSESSING THE EFFECT IF A NOVEL SIRTUIN INHIBITOR, BB6, ON CELL VIABILITY, METABOLISM, OXIDATIVE AND NITROSATIVE STRESS IN A BREAST CANCER AND HEALTHY ENDOTHELIAL CELL LINE / /

Background: Breast cancer is the most common type of cancer among South African women affecting all race groups. Sirtuins regulate cell proliferation therefore they are potential anti-cancer targets. Therefore we investigated a novel Sirtuin inhibitor, BB6, and its effect on breast cancer cells and endothelial cells.  
Methods: Breast cancer cells (MCF-7) and endothelial cells (Ea-hy86) were incubated in complete culture medium (DMEM, 5% foetal calf serum, 1% L-glutamine, 1% Penstrepfungizone), vehicle control (VC, 0.001% DMSO) and BB6 [2µM - 20µM] at 37°C for 48 hours at a density of 5000 cellswell. The crystal violet assay was used to determine cell viability following incubation, the dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay was used to assess metabolic activity, the thiobarbituric reactive substance (TBARS) assay was used to assess lipid peroxidation and the Greiss assay was used to evaluate nitrosative stress.  
Results: There was a decrease in cell viability in both the MCF-7 and Ea-hy86 cells following incubation with BB6 at high concentrations and an inhibitory concentration for 50% of cell growth was determined as 17.63µM for MCF-7, and 37.51µM for Ea-hy86 cells. The metabolism in MCF-7 cells was significantly reduced at 8µM (74%), 10µM (49%), 15µM (51%) and 20µM (45%) BB6 treatments (p<0.05). The metabolism in Ea-hy86 cells was only significantly reduced at 10µM (63%) 15µM (75%) and 20µM (57%) BB6 treatments (p=0.0043). The levels of nitrates and nitrates was only significantly reduced at 20µM BB6 compared to the VC, p=0.012 in MCF7; and at 4µM in Ea-hy86, p=0.032). Lipid peroxidation was unchanged in BB6 treated MCF-7s and Ea-hy86. The cell cycle and number of mitotic cells were altered in both MCF-7 and Ea-hy86 cells when treated with the IC50 of BB6.  
Conclusion: Although BB6 did not influence lipid peroxidation, it reduced cell viability in breast cancer cells more significantly than endothelial cells, altered nitrite and nitrate levels and cell cycle progression. The mechanism by which BB6 affects cell viability and cell cycle progression.
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Abstract Detail

EXPERIENCES OF THIRD-YEAR MEDICAL STUDENTS DURING THEIR MANDATORY ELECTIVE PERIOD.

Aim: The aim of this study is to investigate the experiences of the University of Pretoria’s (UP) third-year medical (MBChB III) students during their mandatory elective period.

Introduction: The study programme for third-year medical students at the UP includes a four-week compulsory elective (Special Activity 10 in the curriculum) which runs from October to November. Students are encouraged to engage in a field of study in which they are interested during the elective. Those who want to spend time at another institution or practice are required to make their own arrangements with the prospective supervisor and the institution or practice.

Methods: They are required to fit into the projects and programmes of their host and are also responsible for all their subsistence, accommodation and travel expenses. Data was collected by distributing feedback questionnaires to the students before they left for their elective rotations. The questionnaire included both open-ended and closed-ended questions. At the end of the elective period students submit completed feedback questionnaires together with a structured report on their practical experience and a certification form signed by the supervisor or head of the unit (indicating whether the student has completed the period satisfactorily or not). Quantitative data was analysed using excel spreadsheets and charts while qualitative data was analysed using Atlas Ti.

Results: Preliminary results indicate that the elective period had a great influence on the students’ choice of future area of specialisation. The majority of students were kept busy most of the time and were given some compulsory reading by their supervisor. In addition, most students initiated their own activities and additional reading.

Discussion: There was a relatively larger proportion of students who indicated that they did not receive adequate guidance in compiling the elective report. Some students felt that the responsibility to organise an elective rotation should not be entirely left to the students but implored the school to provide assistance in placing students. The study provides the university with an opportunity to use the feedback to optimise the quality of students’ learning during their elective period, thereby producing a higher quality of medical doctors.
Abstract
COMPARING SELF-REPORTED LIFESTYLE AND STRESS PROFILES WITH MEASURED HEALTH RISK PROFILES OF UNIVERSITY STAFF

Introduction/Aim: There is an increasing problem with the prevalence of non-communicable diseases in South Africa and their associated modifiable factors (such as hypertension, hypercholesterolaemia and sedentary lifestyle). The university staff members take sick leave for these diseases associated with lifestyle factors which affects productivity. Due to these diseases being a result of lifestyle factors, the university could benefit from a system of health and wellness assessments which will help to determine the amount of staff members at risk and which of them could benefit from interventions.

Methods: The project compares a perceived-stress questionnaire to health-related screenings, specifically heart rate variability, blood pressure, cholesterol and InBody body indices, to identify the potential contributing factors of the lifestyle diseases (such as cardiovascular and respiratory diseases).

Results: In participants with high blood pressure and high cardio stress index results, there may be a higher score on their questionnaire, giving an indication of the stress effects on heart health. Sub-optimal InBody results may be associated with higher cholesterol and blood pressure.

Discussion and Conclusion: Decreased heart health not associated with questionnaire scores may suggest existing risk factors other than stress. InBody results may lead to modified lifestyle practices, and overall results will be used to determine appropriate interventions to be put in place. These findings will help to determine which pathologies or associated risk factors may be prevalent among the staff members, and these may be used to implement disease prevention strategies.
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Abstract Detail
EVALUATION OF NOISE LEVELS IN THE KITCHEN OF STEVE BIKO ACADEMIC HOSPITAL

Background: Conferring to the Noise-Induced Hearing Loss (NIHL) Regulations, an employer or self-employed person should not allow any person to enter any place or area and work where they will be exposed to noise at or above the 85 dBA noise-rating limit. Due to various changes in the running of the Steve-Biko Academic Hospital (SBAH) kitchen over the years, where new equipment and processes were implemented, some of these changes may have contributed to the noise-levels which the employees complained about. An employee with NIHL is more prone to experience accidental injuries at work as well as may find it difficult to hold a normal conversation with others.

Objectives: The objectives of this project include: 1.To evaluate personal noise levels employees are exposed to in the kitchen scullery, portioning and food production area of SBAH, 2.To identify personnel exposed to noise at or above the equivalent noise rating level of 85 dBA, in the kitchen scullery, portioning and food production area, 3.To provide recommendations in terms of control measures that may assist in managing the noise levels that are at or above the noise rating level of 85 dBA.

Method: Personal noise exposure was monitored by using Personal Noise Dosimetry which was placed on the employee’s waist area with microphone positioned between employee’s most exposed ear and outer edge of their shoulder. Each employee was briefed on the purpose of the project and were informed on how the instrument works. Two employees from the food production area were sampled as well as six employees from the scullery over a period of four days. Area noise monitoring was done in the scullery, portioning and production areas; using an integrating sound level meter.

Results: It was found that 60% of the employees sampled in the scullery were exposed to noise levels above the noise rating limit of 85 dBA. Employees working in the portioning and production area were exposed to lower noise levels; as a result of working for shorter periods of times and the nature of their work.

Discussion and Conclusion: In conclusion, the noise levels in the scullery of SBAH kitchen is a major hazard and employees working there are at a risk of developing NIHL overtime. It is recommended that this issue be attended to immediately by implementing the hierarchy of control ensuring that less employees are exposed for the shortest periods of time. Employees should be adequately trained and provided with well-maintained equipment.
Abstract Detail

CYTOKINES FOR THE EX VIVO EXPANSION OF HEMATOPOIETIC STEM AND PROGENITOR CELLS

Introduction: Hematopoietic stem cell transplantation (HSCT) is a well-established treatment option for haematological disorders. Umbilical cord blood (UCB), previously thought to be a medical waste product, is a rich source of hematopoietic stem and progenitor cells (HSPCs). The CD34 cell surface marker is primarily used to identify and isolate HSPCs that are present at frequencies of less than 1% in UCB. The current limiting factor in using UCB as a regular source for HSCTs is the number of CD34-positive HSPCs that can be isolated from a single unit. Ongoing studies aim to expand UCB-derived HSPCs, while maintaining the ‘primitive population’ of these cells present in UCB. HSPCs are generally cultured in the presence of cytokines; however, no uniform cytokine combination exists for the ex vivo expansion of these cells. The cytokine combinations used vary depending on laboratory applications. In the present study, the aim was to determine the effect of different combinations of cytokines on the expansion of HSPCs.

Materials and methods: Umbilical cord blood derived CD34+ cells were cultured in serum-free medium supplemented with the following cytokine combinations: (1) SCF, TPO, FLT3L and IL3; (2) SCF, TPO, FLT3L, IL3 and G-CSF; (3) SCF, TPO, FLT3L and IL6; (4) SCF, TPO, FLT3L, IL6 and G-CSF. The following end-points were used in this comparative study: proliferation, HSPC-associated phenotype and side population analysis.

Results: Expansion occurred in cultures with all four cytokine combinations. Although not statistically significant, cultures supplemented with IL3 showed increased proliferation of total cells, CD34+ cells and HSPC-associated phenotype cells compared to cultures supplemented with IL6. Cultures supplemented with GCSF further increased the above-mentioned parameters. The proportion of CD34+ HSPCs was higher in cultures supplemented with IL6 compared to cultures supplemented with IL3.

Discussion and Conclusion: The addition of GCSF to frequently used cytokine combination SCF, TPO, FLT3L and IL3 showed the best potential for the expansion of HSPCs ex vivo. However, further research will need to be conducted to determine the combined effect of these cytokines on the short- and long-term engraftment potential of the expanded cells in vivo following an HSCT.
Abstract Detail
UNDERLYING CHRONIC DISEASE, MEDICATION USE, HISTORY OF RUNNING INJURIES AND BEING A MORE EXPERIENCED RUNNER ARE INDEPENDENT FACTORS ASSOCIATED WITH EXERCISE-ASSOCIATED MUSCLE CRAMPING: A CROSS-SECTIONAL STUDY IN 15778 DISTANCE RUNNERS

Background: Exercise-associated muscle cramping (EAMC) is a significant medical complication in distance runners, yet factors associated with EAMC are poorly documented.


Methods: Participants completed a prerace medical history screening tool including: training, cardiovascular disease (CVD), risk factors for, and symptoms of CVD, history of diseases affecting major organ systems, cancer, allergies, medication use, and running injury. Runners were grouped as having a history of EAMC (hEAMC group 5 2997) and a control group (Control 5 12 781).

Results: Independent factors associated with a higher prevalence ratio (PR) of hEAMC were any risk factor for CVD (PR 5 1.16; P 0.0002), symptoms of CVD (PR 5 2.38; P , 0.0001), respiratory disease (PR 5 1.33; P , 0.0001), gastrointestinal disease (PR 5 1.86; P , 0.0001), nervous system or psychiatric disease (PR 5 1.51; P , 0.0001), kidney or bladder disease, (PR 5 1.60; P , 0.0001), haematological or immune disease (PR 5 1.54; P 5 0.0048), cancer (PR 5 1.34; P 5 0.0031), allergies (PR 5 1.37; P , 0.0001), regular medication use (PR 5 1.80; P , 0.0001), statin use (PR 5 1.26; P 5 0.0127), medication use during racing (PR 5 1.88; P , 0.0001), running injury (PR 5 1.66; P , 0.0001), muscle injury (PR 5 1.82; P , 0.0001), tendon injury (PR 5 1.62; P , 0.0001), and runners in the experienced category (PR 5 1.22; P , 0.0001).

Conclusion: Novel risk factors associated with EAMC in distance runners were underlying chronic disease, medication use, a history of running injuries, and experienced runners. These factors must be identified as possible associations, and therefore be considered in the diagnosis and treatment of EAMC.
Abstract Detail

CLINICAL PARAMETERS THAT AFFECT THE RATE OF ENGRAFTMENT IN MULTIPLE MYELOMA PATIENTS: A PILOT STUDY

**Background:** Haematopoietic stem cell transplantation (HSCT) is a well-established treatment option for haematological and other disorders. Achieving adequate engraftment success following transplantation is one of the challenges associated with HSCT. In a preliminary study, performed in 2017, it was concluded that a variable proportion of total nucleated cells (TNC) within the transplanted products is indicative of the time to engraftment. It was found that rapid engraftment was associated with a proportionally lower number of TNCs, while delayed engraftment was associated with a proportionally higher number of TNCs. However, many other factors may influence engraftment such as CD34+ HSPC population heterogeneity as well as various clinical parameters. In a collaboration with the Alberts Cellular Therapy (ACT), Netcare Pretoria East Hospital, the objective of this pilot study was to identify factors that could potentially contribute to the rate of engraftment.

**Method:** This retrospective study focused only on autologous HSCT recipients treated for multiple myeloma (MM) at the ACT center in 2016 (28 patients). All laboratory-related parameters, engraftment data and clinical data were captured into a database. The clinical parameters investigated included the mobilization and conditioning agents used during patient preparation for a HSCT. Previous chemotherapeutic cycles were also recorded. CD34+ HSPC heterogeneity (based on differences in the expression intensity of CD34) was also analysed.

**Results & Conclusion:** The data from this pilot studied indicate that previous cycles of chemotherapy as well as the mobilization agent(s) used have an effect on the relative proportions of CD34+ HSPC and TNCs collected during a harvest. However, a limiting factor of the study is the small patient number of patients analyzed (n = 28), resulting in inconclusive findings. Thus in an ongoing study the number of patients analyzed will be increased by including all MM patients that received an autologous HSCT at the ASC from 2012 – 2017.
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Abstract Detail
UNDER REPORTING OF WORKPLACE VIOLENCE BY NURSES IN A REGIONAL HOSPITAL IN SOUTH AFRICA

Background: Workplace violence as a threat to nurses while on duty (Esmaelpour, Salsali & Ahmad, 2010). It can result in physical and psychological deterioration and reduced job satisfaction and performance (Schat & Frone, 2011). However, nurses underreport acts of violence, as they perceive it as part of their job, they were not physically harmed, and it is too time consuming (Pompeii et al. 2016). The researcher whilst working in the hospital selected for this study, observed acts of violence directed to nurses. However, the researcher could not find any statistics as nurses did not report it to management. If unattended to, the care of patients could be compromised, as nurses may develop a change of attitude towards patients and avoid these patients (Kennedy & Julie, 2013).

Method: Quantitative, descriptive research was used to conduct the study in a regional hospital in Mpumalanga province. All permanently employed nurses (123) were invited to participate. A structured questionnaire was used to collect data. The research ethics committee of the Faculty of Health Sciences approved the study and permission was obtained from the provincial and hospital authorities. Of the 90 questionnaires distributed, 88 were returned. Descriptive statistics were used to analyse the data.

Results: Nurses were exposed to physical (44%) or psychological workplace violence (69%), and the majority of these acts of violence was not reported. Perceived reasons for underreporting violence are: it is only necessary when an injury is sustained (65%), and violence is seen as part of daily life and the job itself (54%). The nurses indicated the unavailability of a workplace violence policy (61%), perpetrators of violence not being dealt with (50%), and nurses not receiving in-service training (58%).

Discussion and Conclusion: Based on the results, the researcher developed recommendations for hospital management, unit managers, and the nurses to address the identified issues to ensure a safe working environment for the nurses in the hospital. Underreporting of workplace violence is a concern as the lack of data restricts knowledge about the extent of the problem. Inadequate knowledge could lead to nursing managers not emphasising workplace violence in healthcare settings sufficiently, thereby exacerbating the problem of underreporting.
Abstract Detail
A POSSIBLE ROLE OF AMYLOIDOGENIC BLOOD CLOTTING IN THE EVOLVING HAEMODYNAMICS OF MIGRAINE PATHOPHYSIOLOGY

Background: Previous research has shown extensive evidence for migraine as a systemic inflammatory condition of the vascular system. As such migraine is associated with endothelial dysfunction, increased fibrinogen levels, increased platelet aggregability and hypercoagulability to name a few. This vascular inflammatory state activates a neurological pain receptor system, resulting in an abnormal pattern of glutamatergic neuron transmission known as cortical spreading depression. Despite this extensive body of research, there is very little evidence indicating what changes from baseline to the migraine headache. A hypothesis of interest suggests that episodic migraine sufferers experience an evolving inflammatory state which may induce an amyloidogenic change in the tertiary structure of fibrinogen to one rich in β-sheets.

Method: In this study a combined analysis of whole blood morphology and coagulation dynamics was performed to evaluate haemodynamics through the phases of migraine. Blood was drawn from sixteen migraine patients at baseline and during the headache phase of migraine. Whole blood thromboelastography (TEG®) was performed using a TEG 5000 computer-controlled device (Haemoscope Corp., Niles, IL, USA). Samples were prepared for confocal microscopy by treating fibrinogen with 5 mM thioflavin T (Abcam, ab120751) – a marker of β-amyloid protein.

Results: Thromboelastography showed a decrease in clotting reaction time; increased clot strength; and increased clot density in migraineurs from baseline to the headache phase of migraine indicating a change to a hypercoagulable state during the headache phase. Confocal microscopy showed definitively for the first time β-amyloidogenic fibrin formation in migraine sufferers both at baseline and at further increased levels during the headache phase of migraine.

Discussion and conclusion: This combined analysis indicates a severe inflammatory insult to haemostasis in migraine patients surrounding the headache phase. This not only emphasises the need for anti-coagulant therapy in migraine management, but also support the necessity for further investigation into the pathophysiological links between migraine and other neurological and systemic conditions with amyloid characteristics.
Abstract Detail

STATISTICAL METHODS TO EXPLORE THE RELATIONSHIP BETWEEN ILLNESS AND INJURY IN THE SUPER RUGBY TOURNAMENT

Background: The epidemiology of injuries and illness in Rugby Union players is well documented. We are not aware of any studies that addressed a possible relationship between injuries and medical illness.

Objectives: The aim of this study is to develop statistical methods that can be used to explore a possible relationship between illnesses and injuries among the players of the South African Super Rugby teams over a 4-year period.

Methods: Daily injury and illness data from 869 consenting South African Super Rugby players who participated in a 4-year period (2013-2016) prospective study was used as the principle dataset for this exploratory study. The number (and %) of all players that suffered from both an illness and an injury were included in the analysis. The observed agreement between illness and injury is reported and kappa is reported as a measure of agreement for each year, as well as combined over the 4 years. The main outcome is the risk of an injury when an illness was also observed in the same player during the tournament (Risk Ratio, 95%CI).

Results: The number (and %) of ill (IL) and injured (IJ) players in each year was as follows: 2013 [IL=58 (32.2%); IJ= 90 (50.0%)], 2014 [IL=75 (38.1%); IJ=103 (52.3%)], 2015 [IL=86 (39.5%); IJ=110 (50.5%)] and 2016 [IL=75 (27.4%); IJ=111 (40.5%)]. The measure of agreement (kappa) between illness and injury occurrence for each year was as follows: 2013=0.11, 2014=0.16, 2015=0.14 and 2016=0.28. The overall kappa for the 4-year period was 0.18. The risk ratio (with 95%CI) for injury when an illness was observed in the same year was as follows: 2013=1.3 (1.0-1.7), 2014=1.4 (1.1-1.8), 2015=1.3 (1.0-1.7) and 2016=2.0 (1.6-2.6). The overall risk ratio for injuries when an illness was observed for the 4-year period was 1.5 (1.3=1.7).

Conclusions: The overall agreement between injury and illness status in Super Rugby players over 4 years is 18%. In players with an illness during the tournament, the risk ratio of having an injury in the same tournament is 1.5.
Abstract

SPERM FRIENDLY LUBRICANT: FACT OR FICTION

Background: Infertile couples may require coital lubricants for a variety of personal and gynaecological reasons. While some coital lubricants are purported to enhance conception, the effects of these lubricants on sperm motility is largely unknown. The objective of this study was to rigorously assess the effects of so-called “sperm-friendly” as well as other coital lubricants on sperm motility in order to better inform couples who are trying to conceive.

Methods: This study compared the effects of five lubricants (Optilube®, Pre-Seed®, Yes Baby®, olive oil and egg white) on sperm motility in 60 normozoospermic semen samples obtained from 60 men attending a private fertility clinic. Samples were exposed to each of the lubricants, with untreated samples serving as controls, and examined microscopically at 4 defined time points from 2-72 hours post liquefaction. Sperm motility was graded according to World Health Organisation (WHO) criteria.

Results: With the exception of egg white, all lubricants caused significant (p < 0.001) reductions in sperm forward progression (FP) compared to untreated controls until 24 hours post liquefaction. Furthermore, between group comparisons of the commercially available lubricants revealed statistically significant differences in FP motility: Pre-Seed® was superior to Optilube® (p<0.001), which in turn was superior to Yes Baby® (p<0.001) at 2-4 hours post-exposure. Significance (p<0.001) between Pre-Seed® and Yes Baby® was maintained until 24 hours.

Discussion and Conclusion: Although sperm exposed to Pre-Seed® demonstrated greater motility than sperm exposed to Yes Baby®, claims that these lubricants are “sperm-friendly” were refuted. Parabens in Pre-seed® may account for its spermicidal effects, while the plant extracts, in particular Aloe vera, in Yes Baby® are known causes of spermatotoxicity. Conversely, egg white, which has a high antioxidant albumin content, was shown to be a “sperm-friendly” option for couples who are trying to conceive.
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Abstract Detail
CLINICAL SURVEILLANCE FOR NOROVIRUS IN A PAEDIATRIC POPULATION, SOUTH AFRICA

Background: Norovirus (NoV) is a leading cause of viral gastroenteritis in all age groups. NoV GI.4 is the predominant genotype with a new variant emerging every 2-3 years. Norovirus surveillance is an important tool in monitoring the spread of GI.4 variants as well as emerging non-GI.4 genotypes. The study aimed to conduct NoV surveillance in children from the Tshwane region, Gauteng and to genotype NoVs detected during sentinel surveillance activities.

Methods: From January 2016 to March 2018, 757 stool specimens from children <13 years, hospitalised with gastroenteritis in the Tshwane region and submitted for virology testing, were collected. From January 2017, 25 NoV strains detected during national surveillance were submitted for genotyping. Nucleic acid was extracted from 10% stool suspensions using the automated EasyMAG® platform. Real-time RT-PCR targeting the ORF1/2 junction was used for detection of NoV GI and GII. Detected NoV strains were genotyped using nucleotide sequences and phylogenetic analysis of the partial polymerase and capsid regions. Additional enteric viruses were detected in Tshwane specimens using commercial EIA/rapid kits, according to manufacturer’s instructions.

Results: NoV was detected in 13.3% (101/757) of specimens from Tshwane. Of these, genotypes GI and GII represented 9.9% (10/101) and 89.1% (90/101) of NoV cases, respectively, with only one GI/GII coinfection. Fourteen NoV capsid types (GI.3, GI.4, GI.5, GI.6, GI.7, GI.2, GI.3, GI.4, GI.6, GI.7, GI.9, GI.14, GI.15, GI.17) were identified in 90% (91/101) of specimens. Other enteric viruses detected included rotavirus in 13.9% (105/757), adenovirus in 8.5% (64/757) and astrovirus in 3.8% (29/757) of cases. Thirteen percent (13/101) of NoV cases were co-infected with these enteric viruses. The sentinel surveillance specimens comprised 12% (3/25) NoV GI and 88% (22/25) GII strains with eight NoV capsid types (GI.3, GI.4, GI.5, GI.1, GI.2, GI.3, GI.4, GI.12) identified. Overall, 12 previously described recombinants were detected, four for the first time in South Africa.

Discussion and Conclusion: NoV GI.4 Sydney 2012 was the most prevalent genotype detected, representing 50% and 52% of NoV(+) specimens from the Tshwane region and national surveillance, respectively. Globally emerging genotypes GII.2 and GII.17 were detected at low levels and may replace GI.4 as the predominant genotype.
TRAUMATIC INJURIES IN A 94.7 KILOMETER CYCLE RACE: A 3-YEAR CROSS-SECTIONAL STUDY IN 67 417 CYCLISTS

Background: Traumatic injuries (including serious life-threatening injuries) have been recorded during road cycling events. However, the incidence of traumatic injuries in a community-based road cycle challenge has not been well described.

Objective: To document the incidence and nature of traumatic injuries during 3 consecutive years of 94.7 Cycle Challenge races.

Design: Prospective study.

Setting: 94.7 Cycle Challenge (94.7km cycle race)  
Participants: All cyclists who entered and participated in the 2014, 2015 and 2016 races.

Methods: Traumatic injuries (defined as any trauma or injury sustained by a cyclist and requiring medical attention at the race or hospital) were recorded in each of the 3 years of the study period. These results were then analyzed and categorized by area of injury and final diagnoses.

Results: The overall incidence of traumatic injuries 2014-2016 was (7.4 per 1000 participants). Incidence (per 1000 participants) of all traumatic injuries was 6.34 for males, and 11.05 for females. Females compared to males had a higher risk of sustaining traumatic injuries than males. Participants 15 years and younger had a higher risk of sustaining traumatic injuries (16.32 per 1000 participants). Most traumatic injuries affected the musculoskeletal area of the body (3.50 per 1000 participants).

Conclusion: This study indicated a wide spectrum of traumatic injuries, the musculoskeletal system being the most commonly affected area of the body. Serious traumatic injuries included fractures with an incidence of 0.30 per 1000 participants. Information regarding type and severity of traumatic injuries can be important for planning, prevention, and management of similar events.
Abstract

WHOLE GENOME SEQUENCING REVEALS MUTATIONS ASSOCIATED WITH BEDAQUILINE AND CLOFAZIMINE CROSS-RESISTANCE IN VITRO

Background: Tuberculosis (TB) threatens good health and well-being for ~10 million people annually (World Health Organisation, 2017). Drug-resistant TB (DR-TB) has lower cure rates, longer treatment times and fewer available drugs for treatment. The drug arsenal is further diminished through shared drug targets (cross-resistance). Cross-resistance has been investigated for two multidrug-resistant TB drugs, clofazimine and bedaquiline. Mutation of an efflux pump transcription regulator, rv0678, is postulated to be the shared target. We aim to determine if cross-resistance could be developed through exposure to a single drug within the pair.

Method: In vitro mutants to bedaquiline or clofazimine were isolated through a fluctuation assay. Fully susceptible and pyrazinamide-resistant ATCC cultures were diluted to $10^3$ cells/mL and used to create 12 parallel cultures. Each culture was then grown to log phase and exposed to 1 µg/mL, corresponding to 4× the proposed CC (0.25 µg/mL) for bedaquiline or clofazimine. Six putative mutant colonies for both drugs were used for MIC determination, followed by cross-resistance determination (in triplicate) on the alternate drug. Whole Genome Sequencing (WGS, Illumina) was used to identify resistance associated genetic variants.

Results: All clofazimine-resistant mutants displayed clofazimine MIC values of 1-4 µg/mL with triplicate bedaquiline MIC values of 4-8 µg/mL and rv0678 mutations. Six bedaquiline-resistant mutants possessed MIC values for bedaquiline of 4-8 µg/mL. Three of these mutants exhibited cross-resistance as they possessed clofazimine MIC values of 2-4 µg/mL. However, WGS only revealed rv0678 mutations in two of these mutants. A low frequency rv0678 mutation was identified through Sanger sequencing of DNA extracted from the cross-resistant tube (i.e. clofazimine resistant colonies). For the remaining three bedaquiline-resistant mutants, triplicate clofazimine MIC values were 0.25-0.5 µg/mL and only atpE mutations were identified for these.

Discussion and Conclusion: Resistance to bedaquiline or clofazimine can be induced through rv0678 mutations due to exposure to a single drug within the pair. The use of bedaquiline could be restricted through previous exposure to clofazimine, but the same does not hold true for clofazimine if only atpE mutations arise in response to bedaquiline exposure. This work emphasises the need for genetic screening of the rv0678 prior to regimen design and employment for DR-TB.
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Abstract Detail
DERMATOLOGICAL CONDITIONS IN RECREATIONAL ATHLETES PARTICIPATING IN A MASS COMMUNITY-BASED RUNNING EVENT /

Background: Dermatological conditions experienced by runners are recognized to be of increasing significance because of high incidence rates noted at running events. It is therefore important to investigate the incidence rates and associated risk factors so that preventative measures can be implemented.

Objective: To determine and compare the incidence rate (IR) of, and risk factors for dermatological complications in the Two Ocean’s half marathon (21km) and ultra-marathon (56km) runners, and to investigate if the specific year of observation, type of race event (Half vs. Ultra marathon), gender, experience and age group affect the incidence.

Methods: Dermatological complications (defined as any runner with a skin complication during the race, requiring assessment by a clinician) were recorded over an 8-year period of observation at the Two-Oceans marathon race event (2008-2015). A binomial regression model was used to directly estimate incidence rates (IR1000 starters).

Results: A total of 153 206 runners (92 038 males and 61 168 females) participated over an 8-year period. The age group with the highest participation across genders was in the 31 - 40-year category. The incidences of dermatological complications from 2008 - 2015 differs significantly per year of observation (IR=1.24; p = 0.0128 for half marathon and (IR=1.6; p <0.0001 for ultra-marathon). No statistically significant differences were observed between the two gender groups for either the half-marathon (p = 0.1138) or full-marathon (p = 0.8783). Half marathon: males IR=1.04, females IR=1.41 and Ultra marathon: males IR=1.46; females IR=1.38. Half marathon runners over 51 years of age have a higher risk (IR=2.34) for developing dermatological complications (p=0.0173) compared with younger age groups (IR between 0.94 and 1.08). Significant differences (p=0.034) were noted for the ultra-marathon participants in terms of experience but not for the half-marathon (p=0.79). Inexperienced runners (0 – 1 Marathon) showed the highest incidence of dermatological complications (IR=1.48) followed by the experienced runners (5+ marathons) with IR=1.40 and the runners with some experience (2 - 4 Marathons) indicating the lowest rate: IR=1.40. Race pace in the Half marathon did not influence the IR of dermatological complications (p = 0.1732).
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Abstract Detail
DIETARY SUPPLEMENTS AND HERBAL/NATURAL SUBSTANCES USED BY ELITE SOUTH AFRICAN SOCCER AND RUGBY PLAYERS

Background: There has been an exponential growth in the use of performance-enhancing substances in sports in South Africa. Little is known on the use of traditional/herbal substances in conjunction with western supplements, by athletes in South Africa to improve their sport performance.

Objective: To determine the use of dietary supplements and herbal substances by elite South African Soccer and Rugby players.

Methods: A questionnaire was used to investigate the use of supplements by elite South African soccer and rugby players to enhance their performance. The questionnaire included demographic and sport specific queries, average training hours/week and reasons for using supplements. Players who were consuming supplements for the past 12 months selected the consumed products from the list of substances which included herbals and also added supplements that were not listed. A total of 120 partakers completed the questionnaires.

Results: The key finding of the research was that 88,3% rugby and 76,7% soccer players use supplements to enhance their performance. Results showed that 72,3% of the rugby players took the supplements to increase or maintain muscle mass, strength and/or power; whereas the most soccer players (47,4%) took supplement to improve exercise recovery and to increase energy levels (38,9%). Furthermore, it was found that 90% of the soccer players and 76,7% of the rugby players have never attended any workshop about supplements, relying heavily on coaching and training staff in terms of knowledge on product risks and information without independent information sourcing. This increases high-risk factors associated with the use of supplements.

Conclusion: This study indeed shows that the vast majority of elite rugby and soccer players do use supplements to enhance their performance. Natural/herbal supplements were not common, with very few if any athletes taking natural supplements or nutritional advice from traditional healers. There is a vast need for players’ education on the use of supplements and the benefit of having proper balanced dietary plan to replace the supplements.
Abstract Detail
CRITICAL VALUE REPORTING IN A TERTIARY HOSPITAL: EFFECTIVENESS OF TELEPHONIC REPORTING.

Background: Reporting of critical values is a regulatory requirement and one of the important quality indicators. Critical values are those that significantly deviate from the reference range and require prompt reporting to ensure effective patient management.

Objective: Our main objective was to evaluate how critical results data were handled. To achieve this it was necessary to assess the efficiency of each sample handling step, which included collection, reception, registration, testing and results reviewing.

Method: Retrospective critical values data were obtained from the National Health Laboratory Service (NHLS) archives of samples analysed at Chemical Pathology laboratory Tshwane Academic Division (TAD) between January and December 2015. The data were grouped according to patient location and further into specific units to assess which patient profiles were mostly affected. Analyses were performed for various sample handling steps including collection, receiving, registration, testing and review of values.

Results: A total of 7197 critical values were generated. A significant lapse time was observed between collection and receiving of the samples. Patient data on the request form was registered as soon as possible across all patient locations. On average there was a prolonged interval (2 ± 1.87 hrs) between testing and critical values reporting. More than 40% of critical values from emergency units were not reported within 60 minutes.

Discussion and Conclusion: There appears to be a significant lag time between receiving and testing. As samples are mostly registered as soon as they are received, this pattern indicates that samples have a longer waiting period at the processing bench. Most samples have multiple tests across various pathology disciplines thus extensive aliquoting. This time wasted at this bench does not only increase the TAT of the entire chemistry tests, but also contribute to delay in testing of the samples that may potentially have critical results, thus negatively impacting on reporting. The study demonstrated that as a result the high volumes of tests request sent to the laboratory studied, telephone reporting of critical results does not keep up with the required efficiency of critical results reporting.
Understanding Elliott

PHYSICAL PERFORMANCE AND PHYSIQUE DIFFERENCES COMPARED ACROSS STAGES OF MATURATION IN ACTIVE YOUTHS

Background: Different physical performance capabilities between children of similar chronological age but different maturational status have practical utility in sport and exercise when assessing or training for physical fitness. Knowledge of biological age in addition to chronological age allows trainers to adjust their expectations and demands on youth athletes accordingly. Understanding these differences has implications for safety, fairness and efficacy of preparation in sport and exercise. The aim of this study was to compare physique and selected measures of physical fitness in active youth who were grouped according to similar biological age. It will be investigated whether comparisons within and between the maturity groups are of any significance to the practitioner.

Methods: One hundred and forty-three active youths aged (mean ± standard deviation (SD)) 12.0 ± 0.8 y were separated into one of three different groups according to maturity status using Mirwald’s maturity offset methods. Pre-peak height velocity (pre-PHV) (girls n=37, boys n=25); PHV (girls n=52); and post-PHV (girls n=29). Physique and performance in tests of strength, power, muscular endurance and flexibility were compared between maturation categories in girls, and between sexes in the pre-PHV group using One-way ANOVA and the t-test statistical analysis.

Results: Pre-PHV and post-PHV groups were significantly different (p < 0.05) in terms of body fat percentage, relative leg length and relative seated height. Pre-PHV boys showed significantly better isometric handgrip strength bilaterally (right: 27.4 ± 3.9 versus 18.2 ± 4.0 kg; left: 26.5 ± 4.3 versus 17.0 ± 3.8 kg) and vertical jump displacement (41.3 ± 10.7 versus 33.0 ± 8.0 cm) than girls. Relative to stature, boys scored worse than girls in the modified sit-and-reach test (0.19 ± 0.03 versus 0.24 ± 0.07 cm•cm⁻¹). Pre-PHV boys and girls were not significantly different in prone bridge time to exhaustion (100.8 ± 9.8 versus 116.4 ± 10.2 sec). Only isometric handgrip strength showed significant differences (p < 0.05) between maturation groups in girls.

Conclusion: Physique and strength are significantly different at different periods of maturation relative to PHV in active youths. It may be beneficial to group youth participants according to biological maturity rather than chronological age when similar physique and/ or strength ability is a requirement in selection, assessment or training practices for this populatio
Computer-Aided Sperm Analysis (CASA) A Suitable Tool for Epidemiology and Reprotox Studies

Introduction: Basic Computer-aided sperm analysis (CASA) was first developed in the 1980s to track sperm motion. However, considerable advances were made during the 1990 - 2000s. Although CASA was found to have limitations in a clinical setting, it was useful for research applications in human and animal studies. Today, CASA systems have improved significantly and are considered a reliable and objective research and diagnostic instrument in human and animal studies. Due to these improvements, current CASA systems are user-friendly, fast and able to produce vast amounts of data, not only for sperm motility (including kinematics), concentration, but also improved imaging for sperm morphology. Additionally, certain systems are able to assess a number of other parameters related to sperm functionality including DNA fragmentation. This is very useful for epidemiology and reproductive toxicology studies, as evidenced in the number of publications on the use of CASA systems for human and animal sperm analysis.

Objectives: Most importantly, CASA systems differ with respect to settings and technical conditions for recording. Therefore, attention should be given to the individual parameters and settings in order to avoid erroneous conclusions. Differences in results may be due to system operator error; therefore the individual should be well versed and trained in CASA technology. While there are a number of systems available, the Hamilton Thorne and SCA Microptic are two widely used systems.

Methods: The Andrology lab, in the Environmental Chemical Pollution and Health Research Unit at the University of Pretoria, has used both CASA systems to assess sperm kinematics in a human epidemiology study in a malaria endemic area in Limpopo Province, where DDT is used for malaria vector control. The Hamilton Thorne system was used in the early 2000s (2003-2005) and the SCA Microptic system from 2012 to assess additional sperm parameters. It was also used in a rat reproductive toxicology study analyse rat morphology.

Discussion and conclusions: CASA has developed significantly in the past two decades and the number of applications are continuously been improved and are becoming suitable to assess sperm concentration, motility, kinematics and morphology, and eventually sperm functional assessments, and perhaps even incorporating molecular biological aspects of sperm analysis.
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Abstract Detail
HUMAN LEUKOCYTE ANTIGEN (HLA) DIVERSITY IN SOUTH AFRICAN POPULATIONS

Background: African populations including South Africans, have been shown to be genetically diverse [1], although HLA diversity data for this population is limited [2]. This impacts on donor-recipient matching, donor recruitment strategies, population specific vaccine development, and general understanding of human genetic diversity. The high disease burden in South Africa highlights the need to understand the HLA genetic diversity. We sought to describe HLA diversity amongst South African populations.

Methods: HLA diversity data was retrieved from Pubmed literature searches. Additionally we retrospectively accessed mixed resolution HLA typing from the SABMR, NHLS and SANBS. Population comparison, and allele and haplotype frequencies were analysed in Arlequin ver3.5.2, Hapl-o-Mat, Pypop and Gene[rate] tools of the HLA-net.

Results: Most reported sub-Saharan HLA alleles were from southern Africa. The most frequent alleles and haplotypes from SAMBR were HLA-A*02:01 (0.1067), HLA-B*07:02 (0.0921), HLA-C*07:02 (0.1617), HLA-DRB1*15:01 (0.0870), HLA-DQB1*03:01 and HLA-DQB1*06:02 (0.1402) and A*03:01~B*07:02~C*07:02~DRB1*15:01~DQB1*06 (0.0202), A*69:01~B*35:08~C*12:03~DRB1*14:54~DQB1*05:03 (0.0025) respectively. The most frequent haplotypes in SABMR were not reported in the AFND [3]. Stress values for global genetic comparisons of NHLSSANBS HLA data using non-metrical multidimensional scaling (NMDS) were: HLA-A (stress = 7.39e-05), HLA-B (stress = 0.1915), HLA-C (stress = 8.57e-05), HLA-DQA1 (stress = 0.1174), HLA-DQB1 (stress = 0.1659) and HLA-DRB1 (stress = 0.199).

Discussion and Conclusion: There is generally limited HLA diversity data for southern African populations. Allele and haplotype frequencies from SAMBR, NHLS and SANBS may be a useful reference for anthropological studies and for HLA based population genetics studies of South Africans in general. Furthermore, these findings may better inform donor recruitment strategies into the SABMR. NMDS show a distinct difference between South Africans and other global populations across HLA-A, -B, -C, -DQA1, -DQB1 and -DRB1. There is a suggestion of less diversity in global populations in HLA-A and HLA-C and high genetic diversity in HLA-B, -DQA1, -DQB1 and -DRB1 using NMDS.

Abstract Detail

Background: Rugby union is a high-intensity, contact sport and is therefore associated with significant injuries. Muscle and tendon injuries form a major proportion of these injuries. Objective: The objectives of this dissertation were to determine the associated risk factors of muscle musculotendinous (MMT) injuries amongst elite rugby players over a three-year period (2013 to 2015) of the annual Super Rugby Tournament.

Methods: Elite male South African rugby players (n= 594) that participated in the annual Super Rugby competition, for a period of 3 years. Data collected daily by each team physician during the tournament period, included injuries sustained in training or match-play.

Results: A total of 51 952 player-hours were monitored over the 3 year period (4 620 match player-hours; 47 333 training player-hours). A total of 578 injuries were documented, of which 278 were MMT injuries (48%) sustained during this period. MMT injuries accounted for the majority of tissue-type injuries overall, and were more frequent during match-play (IR 51.91000 match player-hours (95% CI 45.6 - 59.0)) compared to training over the 3 years of the tournament. The incidence rate of MMT injuries during match-play for 2013 (68.41000 player-hours; 95% CI 55.9 - 82.9) was significantly higher (p<0.05) than the incidence of MMT injuries in 2014 (35.81000 player-hours; 95% CI 26.8 - 46.8) and 2015 (51.21000 player-hours; 95% CI 40.8 - 63.5). The most common anatomical site for MMT injuries is the lower limb, the mechanism of MMT injury is mostly contact related (tackle), and MMT injury incidence rate is also greater in back player positions when compared to forward positions. Severity of MMT injuries from a ‘time-loss’ perspective were mostly minimal (2-3 days).

Conclusion: The results of this study confirm that MMT injuries form a significant part of the injury burden in South African teams during the annual Super Rugby tournament. Most MMT injuries occur during match-play.
Abstract Detail

GENETIC RELATEDNESS AND CHARACTERISATION OF ANTIBIOTIC RESISTANCE AND VIRULENCE GENES OF ESCHERICHIA COLI O157:H7 ISOLATED FROM PIGS IN GAUTENG PROVINCE, SOUTH AFRICA

Background: Escherichia coli belongs to the normal intestinal microbiota of animals and humans. Most E. coli strains are not harmful, however, some strains harbour virulence factors and can cause diseases in animals and humans. Although many studies have been conducted on the prevalence of E. coli O157:H7 in pigs, there is limited information available on the molecular characteristics of E. coli O157:H7 isolates from pigs in Gauteng. The purpose of this study was to isolate and identify E. coli O157:H7, determine the prevalence of antibiotic resistance and virulence genes and the genetic relatedness of the E. coli O157:H7 isolates.

Methods: A total of 195 presumptive isolates were collected from combined nasal and rectal porcine swabs. Methods used confirming and identifying presumptive E. coli O157:H7 isolates were: ChromID™ O157:H7 agar, MALDI-TOF analysis and a Multiplex PCR (M-PCR) assay [detecting O157 antigen (rfbE) and H7 flagella (fliC) genes]. M-PCR assays were performed to detect selected virulence [Shiga toxin 1 and 2 (Stx1 & Stx2), intimin (eae) and haemolysin (hlyA)] and antibiotic resistance [sulfonamide (sul1), tetracycline (tetA & tetB), chloramphenicol (cmlA), trimethoprim (dhfr1), aminoglycoside (aadA)] genes. Pulsed field gel electrophoresis (PFGE) was used to determine the genetic relatedness of the E. coli O157:H7 isolates.

Results: Six isolates tested positive for the fliC and rfbE genes confirming E. coli O157:H7. The hlyA gene was detected in all isolates followed by the eae gene in five and the stx2 gene in two of the isolates. The aadA gene were detected in all isolates, the tetA, dhfr1 and sul1 genes were detected in three of the isolates and the tetB and cmlA genes were detected in four of the isolates. The PFGE results showed three distinctly groups.

Discussion Conclusion: The detection of E. coli O157:H7 and presence of three important virulence genes (stx2, eae and hlyA) presents a potential health risk to close human contacts (abattoir workers) and consumers of undercooked meat products. This study showed a high prevalence of antibiotic resistance to multiple antibiotic classes. The E. coli O157:H7 isolates were genetically diverse, therefore continuous surveillance for E. coli O157:H7 is important at the human-animal interface.
HEAD AND NECK INJURIES SUSTAINED DURING THE SUPER RUGBY TOURNAMENT: A PROSPECTIVE STUDY INVOLVING 6520 PLAYER HOURS

Background: Professional rugby union is a high-intensity collision sport and is known to have a risk of head and neck injury. The aim was to determine the incidence rate of head and neck injuries (HNI) during the 2013 - 2016 Super Rugby Tournaments, and identify the associated injury risk factors.

Methods: All elite male South African rugby players (n=868) that participated during the 2013 - 2016 annual Super Rugby competition were included. Injury and exposure (days) data (training and match) was collected daily by each team physician, through a secure, web-based electronic platform.

Results: Thirteen point three percent (13.3%) players sustained HNI during the 4 year period of the tournament was with an overall incidence rate (IR1000 player-hours; 95% CI) of 1.5 (1.2-1.8). Match HNI were significantly higher (16.4; 13.4-19.8) compared with training HNI (0.1; 0.0-0.2). The headface region was more commonly injured (70.4%) than the neckcervical spine area (29.6%) for all injuries, as well as during match play for both areas: 72% vs 28% respectively. The majority of injuries were of minimal or mild severity (>57.4%). Moderate and severe injuries accounted for 35.7% and 7.0% of all injuries, respectively. In the headneck region, match injury to the brainCNS (53%) were nearly four times higher than injury to muscletendons (14%), jointligaments (9%), and skin or bone (11% each). Tackling was indicated as the main mechanism of injury in concussion injuries (52%), brainCNS (50%) and headneck (44%) injuries, followed by being tackled (25%, 24% and 19% respectively) and collision (14%, 15% and 13% respectively). Front line players had a higher incidence of overall HNI (front line=1.7; 1.3-2.1: backline = 1.3; 0.9-1.7 ) and match HNI (front line=18.7; 14.4-23.8: backline = 13.8; 9.9-18.7).

Conclusion: The overall incidence of HNI in Super Rugby is 1.51000 hours play with a 10X higher incidence during matches (16.4). Most HNI are to the brainCNS and occur as a result of tackling or being tackled. Front line players are at a higher risk compared with backline players. Risk management structures need to be developed to reduce the risk of HNI in Super Rugby.
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Abstract Detail
EXPLORING CHEMICAL SPACE USING IN SILICO STUDIES TO IDENTIFY NOVEL INHIBITORS OF ACETYLCHOLINESTERASE, A TARGET FOR ALZHEIMER’S DISEASE

Introduction: Alzheimer’s disease (AD) is the leading cause of dementia. The number of AD cases is increasing at an alarming rate, which is mostly the result of increases in both the population and the average life expectancy due to advances in modern medicine. AD has been shown to be twice as prevalent in African-Americans, calling it the “Silent Epidemic of Alzheimer’s Disease”. This suggests that the disease is particularly relevant to South Africa and Africa due to its demographics. As such, there is a dire need for the development for effective treatments of AD. Acetylcholinesterase (AChE) is a protein that has been identified for the treatment of AD, with four AChE inhibitors having been approved for treatment by the FDA. These inhibitors have significant side-effects and/or short-term bio-availability. It is suggested that AChE inhibitors can act as dual inhibitors by both inhibiting AChE and preventing Amyloid Beta (Aβ) aggregation also associated with AD. The binding pocket of AChE is ~20 Å deep gorge which is highly solvated. It has been shown that the majority of the side-chain residues are highly flexible and this flexibility should be considered when screening is performed. In addition the entrance of the binding pocket known as the Peripheral Anionic Site (PAS) contributes to Aβ aggregation.

Methods: Using High Through-put Virtual Screening (HTVS), potential inhibitors of AChE from the BioFocus library of 20'000 housed at the CSIR were identify in using ensemble docking. Significant validation testing was done on the HTVS model to check that an acceptable enrichment was obtained by testing the model against known active compounds and decoys. The majority of the receptor structures were obtained from the Protein Database (PDB). To improve the model further, more receptor structures were generated by performing Inducted Fit Docking (IFD) with compounds that were false negatives during the initial HTVS model.

Results: Promising hits identified from the BioFocus library are currently being screening at the CSIR to confirm inhibition against AChE and Aβ aggregation.
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Abstract Detail  
RELIABILITY AND USEFULNESS OF A PERFORMANCE-BASED TESTING BATTERY IN YOUTH SPORT ACADEMY ATHLETES

Background: Knowledge of the normal variation and the smallest meaningful difference in measurements is an essential but all-too-frequently ignored part of evaluating any clinical test results. This is especially true in sport and exercise science, with practitioners frequently unclear about the magnitude of change test scores that represent a real change in a physical attribute. This study aims to evaluate the between-day reliability and usefulness of four common field methods used for assessing reaching, jumping, stabilizing and sprinting attributes in youth athletes in attempt to resolve the abovementioned issue.

Methods: Approximately fifty youth athletes aged 13 to 18 years from sport academies will voluntarily participate in the study following appropriate informed consent and assent procedures. Participants will complete the modified sit-and-reach test, countermovement vertical jump test, maximum prone bridge test, and the 40m sprint test under standardized and accepted conditions, on two occasions separated by seven days. Typical error (TE) expressed as a coefficient of variation (CV) will be calculated to assess between-day reliability of the test scores, and the smallest worthwhile change (SWC) will be used in relation to TE to ascertain the usefulness of the tests. All analysis will be performed using Microsoft Excel® spreadsheet software.

Results: It is expected that CV will be less than SWC for the modified sit-and-reach test, countermovement vertical jump test and the maximum prone bridge test. The expected outcomes of the study is that methods used to assess reaching, jumping and stabilizing will be reliable and show “good” usefulness, whereas sprint tests when using timing gates will show “substantial reliability” with “OK” usefulness.

Discussion and Conclusion: The aim of this study is to evaluate the between-day reliability and usefulness of a performance-based testing battery in youth sport academy athletes. As a consequence of the abovementioned expected results, the modified sit-and-reach test, countermovement vertical jump test, and the maximum prone bridge test will be able to detect smaller changes in performance with greater certainty compared to protocols that make use of timing gates.
Abstract Detail

ANTIMICROBIAL RESISTANCE PATTERNS AND GENETIC RELATEDNESS OF ENTEROHAEMORRHAGIC ESCHERICHIA COLI O157:H7 ISOLATES IN GAUTENG REGION, SOUTH AFRICA

Introduction: Enterohaemorrhagic Escherichia coli (EHEC) O157:H7 is a major foodborne and waterborne pathogen causing bloody diarrhoea and severe disease such as haemolytic uremic syndrome. Humans acquire EHEC O157:H7 by direct contact with healthy ruminant animals or via the ingestion of contaminated food or water. Although antibiotics are not recommended for the treatment of EHEC O157:H7, many isolates carry resistance to various antimicrobials. In South Africa, limited information is available on the antimicrobial resistance patterns of EHEC O157:H7.

Aim: The aim of this study was to characterise and determine the antimicrobial resistance patterns of EHEC O157:H7 isolates in Gauteng region, South Africa.

Methods: Samples were collected over a 12 months period. Phenotypic and molecular methods were used for the characterisation of EHEC O157:H7 isolates. Antimicrobial susceptibility testing was done using the Vitek® 2 automated system. Genetic relatedness of isolates was determined using pulsed-field gel electrophoresis (PFGE).

Results: A total of 520 samples were analysed of which 9% (48520) were identified as EHEC O157:H7 by multiplex PCR assay. Run-off water represented 90% (4348) and stool specimens represented 10% (548) of isolates. The uidA (β-glucuronidase) gene was present in all the isolates, confirming E. coli. The rfbEO157 (somatic-O) and fliCH7 (flagellar-H) genes were detected in 44% (2148) and 50% (2448) respectively. All the selected isolates (29) were susceptible to tigecycline, amikacin and gentamicin. The EHEC O157:H7 isolates showed 62% (1929), 20% (629), 17% (529), 14% (429) and 7% (229) resistance to ampicillin, trimethoprim-sulfamethoxazole, imipenem, meropenem and colistin respectively. The Stx-1, Stx-2, hlyA and eae genes were present in 10% (548), 19% (948), 6% (348) and 16% (848) respectively. The EHEC O157:H7 isolates were genetically diverse based on PFGE.

Conclusion: This study reported the presence of EHEC O157:H7 in the clinical specimens showing the under reporting and miss diagnosis of 10% stool specimens. The inclusion of molecular testing can improve the detection of this pathogen in this clinical setting. This study reported the presence of colistin resistance in environmental samples. This is a concern because colistin is considered as the last resort antibiotic for the treatment of Enterobacteriaceae. Environmental surveillance plays an important role in reducing the potential public health risk.
Abstract Detail
THE EFFECT OF INFRA SLOW FREQUENCY NEUROFEEDBACK ON QUANTITATIVE ELECTROENCEPHALOGRAM AND AUTONOMIC NERVOUS SYSTEM FUNCTION IN ADULTS WITH ANXIETY AND RELATED DISEASES

Background: Over the last decade it has been observed in clinical practice that Infra Slow Frequency (ISF) training shifts clients in physiological state during training. ISF electroencephalographic (EEG) biofeedback focuses on the low energy signals produced by the brain. This includes frequencies of less than 0.1 Hz. Evidence suggests that these slow oscillations play a role in synchronizing faster activity and modulates cortical excitability. The ANS is an important role player in maintaining sympathetic-parasympathetic and cardiovascular homeostasis. It includes vagal cholinergic and sympathetic noradrenergic nerves that supply the heart and sympathetic noradrenergic nerves that enmesh arterioles. Therefore clinicians and researchers have long sought valid, non-invasive, quantitative means to identify patho-physiologically relevant abnormalities of these systems.

Aim: This study hypothesizes that ISF training has a measurable physiological effect on an individual by measuring certain autonomic functions viz. HRV, muscle tension, skin temperature, skin conductance, heart rate, respiration rate and blood pressure. Also, to demonstrate how ISF training impacts the resting state EEG.

Methods: Thirty adults between the ages of 18 and 55 with primarily anxiety will receive a Quantitative Electroencephalogram (QEEG). The participants will then receive ISF neurofeedback training for 10 sessions while continuous monitoring of ANS changes will be done to determine if there are measurable changes. After 10 sessions we will repeat a QEEG to determine what changes occurred. The same process will be completed for a control group. The control group will receive one channel power training where Theta and Hibeta activity will be inhibited at 3-7Hz and 22-30 Hz respectively and Lobeta 12-15 Hz activity enhanced at the C4 location on the head. The Protocol was submitted to the Ethics committee (2162018).

Anticipated results: Preliminary results and a pilot study conducted show significant changes that have been observed in participants trained in ISF neurofeedback, both in the activation patterns when looking at the QEEG and the autonomic functions that were measured. No significant changes have been seen thus far in the control group.

Conclusion: The study will possibly demonstrate that autonomic functions are affected by ISF neurofeedback training and that changes occur in the resting state EEG of participants trained.
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Abstract Detail
ASSESSING THE EFFECT OF A NOVEL SIRTUIN INHIBITOR, BB1, ON CELL VIABILITY, METABOLISM, OXIDATIVE AND NITROSATIVE STRESS IN A BREAST CANCER AND A HEALTHY ENDOTHELIAL CELL LINE

Background: Breast cancer affects one in eight women. Treatments are legion but due to resistance adjunct therapy development is important. Sirtuins are class III histone deacetylases effecting metabolism, inflammation, the cell cycle and tumorigenesis. This study assessed the effect of in silico designed sirtuin inhibitor, BB1, on MCF-7 breast cancer cells and EA-hy86 endothelial cells.

Methods: MCF-7 and EA-hy86 cells were incubated (37°C) in complete culture medium (DMEM, 5% foetal calf serum, 1% L-glutamine, 1% Penstrepfungizone), vehicle control (VC, 0.001% DMSO) and BB1 [2µM - 20µM] for 48 hours at a density of 5000cells/well. Following treatment, crystal violet assays were used to determine cell viability, dimethylthiazol-2-yl-2,5-diphenyltetrazolium bromide (MTT) assays to assess metabolic activity, a thiobarbituric reactive substance (TBARS) assay to assess lipid peroxidation and the Greiss assay was used to evaluate nitrosative stress.

Results: There was a dose dependent decrease in cell viability in both the MCF-7 and Ea-hy98 cells following incubation with BB1, an inhibitory concentration for 50% of cell growth was determined as 12.84µM for MCF-7, and 11.91µM for EA-hy86 cells. Metabolism in MCF-7 cells was significantly reduced at 2 (69%), 4 (79%), 8 (77%), 10 (66%), 15 (49%) and 20µM (40%) BB1 treatments (p<0.0001). Metabolism in EA-hy86 cells was only significantly reduced at 15 (60%) and 20µM (53%) BB1 (p=0.0003). The levels of nitrates and nitrites were elevated at 2, 4 and 8µM but reduced at 10, 15 and 20µM BB1 compared to the VC, p<0.05. Lipid peroxidation was unchanged in treated MCF-7s. Nitrate and nitrite levels were elevated at 4 µM and reduced at 8 and 15µM BB1, compared to the VC, p<0.05. The cell cycle and number of mitotic cells were altered in both MCF-7 and EA-hy86 cells when treated with the IC50.

Conclusion: BB1 reduced cell viability in breast cancer cells more significantly than endothelial cells, altered nitrite and nitrate levels and cell cycle progression, with no effect on lipid peroxidation. The mechanism is to be elucidated.
Abstract Detail
FACILITATING CHANGE IN ORDER TO IMPROVE EDUCATIONAL PRACTICES

Background: Clinical reasoning is the ability to reason as a clinical situation changes and is an essential component of competence in nursing practice. However, some traditional teaching and learning strategies do not always facilitate the development of the desired clinical reasoning skills in nursing students (Levett-Jones, et al 2010:515). The aim of the study was to facilitate a process of change towards improving educational practices in order to promote the development of student nurses’ clinical reasoning skills.

Method: Action research was used to conduct the research study. During Phase 2: the Action Research Process phase, an action research group was established to co-construct an action plan to address nurse educator challenges. Four, action research cycles each comprising four steps, namely plan, act, observe and reflect were implemented.

Results: The challenges, identified during Phase 1, were prioritised by the action research group into four strategies: teaching, learning and assessment strategies; the clinical learning environment; continuous professional development; and support and selection of students and nurse educators. An action plan was co-constructed by the action research group. The action research process contributed to the professional development of the nurse educators and resulted in the utilisation of more student-centred teaching, learning and assessment strategies. Recommendations are proposed for nursing education and training, practice and, lastly, for future research.

Discussion and conclusion: Addressing nurse educator challenges in collaboration and empowering them with the means, opportunity and skill to utilise student-centred teaching and learning strategies may contribute to the development of student nurses’ clinical reasoning skills.
Abstract Detail

PHARMACOLOGICAL CHAPERONE RESCUE OF FUNCTION OF INACTIVATING MUTATIONS IN THE HUMAN NK3 RECEPTOR

Background: Neurokinin B and its cognate G protein-coupled receptor (GPCR), NK3R, are highly expressed within the central nervous system and play a role in the control of the hypothalamic-pituitary-gonadal (HPG) axis responsible for sexual development and reproduction. Inactivating mutations of GPCRs have been described in humans, with the majority of these mutations causing receptor misfolding, intracellular retention and diminished trafficking to the cell surface. Cell-permeant small molecules termed pharmacoperones, interact with and are believed to stabilise the folding of retained mutant GPCRs, thus restoring receptor trafficking and function. This project aimed to identify pharmacoperones able to rescue cell surface expression of mutant NK3Rs, identified in patients suffering from reproductive dysfunction.

Methods: Mammalian expression vectors encoding mutant NK3Rs were created and used for transfection of HEK293T cells. A receptor ELISA assay was performed to determine cell surface and total cellular receptor expression to identify mutations that caused intracellular receptor retention and to identify if any small-molecule NK3R selective ligands had pharmacoperone activity. To evaluate function of rescued receptors in terms of hormone responsiveness, an inositol phosphate accumulation assay (IP) was performed following pharmacoperone treatment. Confocal microscopy was used as a qualitative measure of cell surface expression and western blots to examine protein expression, with or without pharmacoperone treatment.

Results: Five of the seven identified mutations (G93D, H148L, Y256H, Y267N and P353S) were retained intracellularly. Cell surface expression of all retained mutants was restored by the cell permeant small-molecule NK3R antagonist, M8 to wild-type values, except G93D, which was increased from 10% to 28% of wild-type which was corroborated by both receptor ELISA and confocal microscopy. Total receptor expression, as determined by both western blotting and receptor ELISA, was also increased to levels comparable to wild-type NK3R. Importantly, M8 pre-treatment was found to increase the amount of functional mutant receptors able to signal at the cell surface.

Discussion and Conclusion: A small molecule NK3R analogue, M8, may be used as a pharamacoperone to restore cell surface expression and signalling of inactivating human mutations of NK3R, thus enhancing its therapeutic potential.
Abstract Detail
DERMATOFIBROSARCOMA PROTRUBERANS

Introduction: The treatment of recurrent peri-orbital dermatofibrosarcoma protuberans. An eye saving procedure which had not been done in over 40 years.

Method: Patient Mr. X has had a couple of surgical treatment for removal of left inferior canthal mass: 1- on 20032015- excision biopsy showed resection of mass identified as Bednar tumour (a variant of pigmented dermatofibrosarcoma protuberans). 2- on 0706.2016- left lower lid mass excision showed features in keeping with dermatofibrosarcoma protuberans. Mr. X presented on 22022017 with a mass involving the lateral canthus. Mass was 20mmX20mm, well circumscribed, firm, non-tender, non-pulsatile and the overlying skin had normal appearance with no signs of on inflammation. The affected left eye had visual acuity of 66, pinhole 66 with normal range of movement, normal ocular and intra-ocular examination At the discussion of the head and neck meeting, the following plan was proposed: Wide excision of the lateral canthus with margins extending 4 cm from the orbital rim including exenteration, free flap to cover the defect, followed by radiotherapy However, due to good motility of the eye, normal ocular and intra-ocular examination with visual acuity of 66. Exenteration was deferred and wide excision of the mass and reconstruction with free flap from the thigh was done.

Discussion conclusion: There was no ocular involvement of the dermatofibrosarcoma protuberans to warrant exenteration. Complete resection of the mass with clear margins done followed by free flap from the thigh to reconstruct the defect Mr. X is currently undergoing radiotherapy
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Abstract Detail
DISTRIBUTION OF OPTIMUM FREQUENCIES IN INFRA SLOW FLUCTUATION NEUROFEEDBACK TRAINING IN PATIENTS WITH MIGRAINES AND ANXIETY

Background: Infra slow fluctuation (ISF) neurofeedback training is the newest form of neurofeedback training and centres around cortical activation. This training is focussed on the lowest frequency in the brain (0.1Hz) with the aim of reaching homeostasis via shifts in our parasympathetic response. This point of homeostasis is accompanied by an optimum frequency and a new mental state, where patients are left feeling relaxed, comfortable and alert. In a time where stress and anxiety are becoming ever more prevalent, this new technology provides the ability to safely return (shift) to a calm relaxed state, without the use of dangerous substances or unusual therapies.

Aim: The aim of this research project is to investigate the distribution of optimum frequencies in ISF neurofeedback training in a large population. To accomplish this, we will use both ISF training along with a quantitative electroencephalogram to track brain activity along the way.

Methods: This is a retrospective study using a Quantitative Electroencephalogram (qEEG) that provides information about imbalances and irregularities which could be related to neurological disorders. ISF uses this brain map to improve brainwave activity by shifting between ‘states’ in pursuit of the individual’s optimum frequency. The study population will include 3 groups. The first group will include individuals suffering from migraines. The second group will be individuals experiencing anxiety. The third group will be our control group. This protocol has been submitted to the Ethics Committee (239)

Results: All results and observations will be recorded on session sheets, then converted to spread sheets and stored in this manner. Data required from each participant in the study include: age, gender, ethnicity, diagnosis, optimum frequency, optimum electrode placement and the device that was used.

Discussion and Conclusion: By determining the optimum frequencies and state of homeostasis for a certain population (namely individuals who diagnosed with migraines and anxiety) we can determine a narrowed possible range for trainers thereby reducing time taken to reach these frequencies. This narrowed range will improve the efficiency of ISF training and ensure faster relief of symptoms.
Abstract Detail
A STUDY TO ESTABLISH NORMAL REFERENCE VALUES OF URINE FLOW PARAMETERS IN A HEALTHY AFRICAN AND CAUCASIAN FEMALE SOUTH AFRICAN POPULATION AGE 18-60 YEARS.

Introduction: The pathophysiology of female lower urinary tract (LUT) dysfunction is still poorly understood. It is a common condition among females with a significant negative impact on various quality of life domains. Uroflowmetry is regarded as the first-line screening test in females with suspected LUT dysfunction. It is an important and simple investigative tool and currently there is a lack of standardized population specific nomograms.

Objective: This prospective study was performed to determine reference values for various uroflow parameters in a healthy South African female population. Secondly, to determine ethnic variation in measured parameters.

Methods: Healthy female volunteers, aged of 18-60 years were recruited during September to November 2017. Hospital staff, including nursing students and females from the general gynecology clinic were invited to participate. The study protocol was approved by the institutional ethics committee and informed consent was taken from each participant before enrollment in the study. The exclusion criteria included women who reported to be having lower urinary tract symptoms, previous pelvic surgery or radiation, neurological disease, diagnosed with a pelvic mass, pelvic organ prolapse, HIV and pregnancy. Participants were asked to report with a comfortably full bladder to the Urogynaecological department where the uroflowmetry was performed in a private room. The study was performed in accordance with the International Continence Society Good Urodynamic Practice recommendations (3). Data of voided volumes less than 50ml were not included in the data analysis. The average flow rates (Qmax), maximum flow rate (Qave), voided volume (VV), time to peak flow (TQmax), voiding time (TVV) and post-void residuals (PVR) were recorded and analyzed. Quantile regression statistics was used to determine centile curves.

Results: Out of 216 volunteers, 169 participants were eligible for analyses. The mean age was 35.3 years (range, 20-60), mean parity 1.1 (range, 0-5). 72 (42.6%) females were nulliparous. Their mean average flow rate was (Qave) 10.20 ± 4.70mL/sec, peak flow rate (Qmax) 20.33 ±8.66mL/sec , voided volume 157.33 ± 99.53mL, time to maximum flow 5.40 ±3.94 sec and voiding time 21.95 ±14.04 sec. Age and parity were controlled for in the analysis of covariates.
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Abstract Detail
EFFECT OF THE LIMITLESS YOU PEAK PERFORMANCE PROGRAM ON THE BRAIN, HEALTH AND SKILL-RELATED FITNESS OF RUGBY REFEREES

Introduction: Rugby is growing into one of the biggest sports in the world, because of this, rugby referees are under immense pressure to perform at an optimal level and be able give the performance the players, coaches and fans expects and deserves. It is paramount that a rugby referee must not only know the laws of the game extremely well but must be in top physical condition. This physical condition does not only consist of physical fitness, but brain fitness and skill-related fitness as well. Being physically fit does not necessary mean someone is brain fit or has proper eye-vision skills. The Limitless You Peak Performance Program (LYPPP) is a highly developed training and assessment program, designed specifically to enhance three core areas which include the following; reducing overall stress, improving cognitive intelligence and the enhancement of the overall performance of the athlete. This program also serves to strengthen the brain-body balance by assessing and training the three core areas of being a high-performance athlete namely; brain performance, health-related fitness and skill-related fitness.

Methods: With the objective of enhancing the overall physical conditioning of rugby referees in mind, the three core areas of being a high-performance athlete, brain-related fitness, health-related fitness and skill-related fitness components, will be measured during a pre- and post-assessment test. These assessment tests consist of a complete battery of tests and will provide a holistic view of the overall conditioning of the rugby referees. In between the two assessment tests, the LYPPP will be followed for a total fifteen intervention session carried out twice per week. Each intervention session will contain a balance of physical exercises as well as skill-related eye-vision exercises. This Protocol was submitted to the MSc Committee as well as the Faculty of Health Sciences Ethics Committee (Protocol Number: 2462018)

Anticipated Results and Conclusion: Rugby referees have been searching for the ultimate training program to enable them to prepare optimally for a rugby season for a long time and It is hypothesized that the LYPPP will significantly improve the brain, health and skill-related fitness of rugby referees. Therefore, the LYPPP could be the complete training program which will significantly improve all three core areas required to be a high-performance athlete and give them the extra edge required to become an elite rugby referee.
LEARNING PERSON CENTEREDNESS THROUGH A QUALITY IMPROVEMENT CYCLE: RANDOMISED CONTROLLED TRAIL

Background: It is essential that clinicians master person-centred practice. BCMP Clinical Associate students train mostly through service learning in a decentralised platform which includes daily consultations supervised by qualified health professionals.

Method: This study aimed to determine the effectiveness of peer review and reflection in a quality improvement cycle for learning person-centred consultation skills. Through stratified sampling an intervention group was selected and the rest of the students in the second and third years of the course served as controls. Students in the intervention group formed small groups of 2 to 4 students, observed one another’s consultations, gave feedback and reflected in at least two cycles. Person centeredness was measured with the SEGUE measurement tool before and after the intervention on consultations audio recorded in OSCE stations.

Results: Pre- and post-intervention scores were available for 30 students in the intervention group and 34 students in the control group. On average SEGUE scores improved from 49.6% to 54.3% (p = 0.005). The difference between the two groups was not significant. Detailed analysis of each of the 30 questions and 6 domains in the SEGUE tool did not reveal significant differences between the control vs intervention groups. Some trends will be presented. Third year students improved three times more than second years (p = 0.037) and male students had double the improvement of female students.

Discussion and conclusion: In the BCMP curriculum person centeredness increase over time and this increase is significantly more in 3rd year students than in 2nd years. Evaluating the learning of person centeredness is difficult and interventions should be carefully considered and implemented. In this research the intervention did not demonstrate a significant improvement over the usual training. However this apparent lack of impact may also be attributed to the measurement tool or measurement process not discriminating accurately between various degrees of person centredness. In addition to the measurement difficulties the implementation of the intervention were not rigorous and consistent across the intervention group.
Abstract Detail

20.7% CYCLISTS ENTERING A 109KM RACE REPORT RISK FACTORS FOR CVD, AND 3.7% REPORT EXISTING CVD: PRE-PARTICIPATION SCREENING AMONG 22 650 CYCLISTS - SAFER CYCLING

Introduction: There are European guidelines for the pre-participation screening of masters and leisure athletes to identify which athletes who should undergo a medical assessment prior to moderate- to high-intensity sports participation. These guidelines follow a pre-exercise screening process for risk factors of cardiovascular disease (CVD), other chronic conditions, and medication use. The purpose of this study is to determine the prevalence of CVD, risk factors for CVD, presence of other chronic diseases, and other risk factors for medical complications in cyclists participating in a community based mass participation cycling race using current European guidelines.

Methods: This is a cross-sectional study on entrants that participated in the 2016 Cape Town Cycle Tour (109km). 37 425 race entrants were required to complete an online pre-race medical screening questionnaire. We determined the crude (unadjusted) prevalence (% with 95% CI) of history of existing CVD, risk factors for CVD, history of chronic disease in other organ systems, and other risk factors for medical complications during moderate- to high-intensity sports participation in 22 560 consenting participants (60.3%).

Results: 3.7% (3.5-4.0) cyclists reported existing CVD, and 1.1% (0.1-1.2) reported existing symptoms of CVD. Risk factors for CVD were present in 20.7% (20.2-21.3) cyclists and the prevalence of a history chronic diseases in other organ systems was as follows: respiratory (11.4%; 11.0-11.8), gastrointestinal (5.4%; 5.1-5.7), nervous system (3.4%; 3.3-3.8), metabolichormonal (3.8%; 3.6-4.1), kidneybladder disease (3.0%; 2.8-3.2), bloodimmune disease (1.4%; 1.2-1.5), cancer (3.2%; 3.0-3.5), allergies (13.6%; 13.1-14.0). The prevalence of other possible risk factors for medical complications were as follows: chronic prescription medication use (25.3%; 24.7-25.8), use of medication before or during races (8.7%; 8.3-9.0) and a history of collapse (0.8%; 0.7-0.9).

Conclusion: > 20% cyclists entering a community based mass participation cycling race report risk factors for CVD, while 3.7% report existing CVD, and 1 in 4 use prescription medication. We suggest that further research is conducted to determine if pre-race medical screening, using the European guidelines, together with educational intervention can reduce the risk of medical complications during community based mass participation cycling events.
Abstract Detail
EFFECT OF AN INHIBITOR OF EPIGENETIC READER PROTEINS IN COMBINATION WITH AN ANTIMITOTIC ESTRADIOL ANALOGUE ON ANTICANCER SIGNALING PATHWAYS IN VITRO

Background: The development of anticancer drugs that are more selective for target cancer cells is one of the main goals of modern cancer research. One of the most promising avenues in the development of efficient drugs with minimal side effects for chemotherapeutic management of cancer is combination drug therapy. In this project it was examined whether the combination of novel in silico-designed compounds namely ethyl 2-[6-(4-chlorophenyl)-1-methyl-4Hbenzo[e][1,2,4]triazolo[3,4-c][1,2,4]triazepin-4-yl]acetate (ITH-47) (bromo-domain protein 4 inhibitor) with 2-ethyl-3-O-sulphamoyl-estra-1,3,5(10),15-tetraen-17-ol (ESE-15-ol) (an antimitotic compound) will produce a synergistic effect on the inhibition of cell growth and apoptosis induction in breast cancer cells.

Methods: In this study flow cytometry (cell cycle progression, annexin V-FITC and mitocapture assay), fluorescent microscopy (Histone H3K9me2), ELISA (p21 and p53) and western blotting (c-Myc and BRD4) were employed.

Results: Cell cycle progression analysis revealed an increase in the number of cells that were in the sub-G1 fraction (suggesting the presence of apoptosis) of compound-treated cells. The annexin V-FITC assay further confirmed the induction of apoptosis by these compounds. Protein expression studies were conducted to quantify c-Myc, BRD4, p21 and p53 proteins in MDA-MB231 and MCF-7 cells. In MDA-MB-231 cells ITH-47 in combination with ESE-15-ol resulted in a significant decrease in c-Myc protein levels, as well as a decrease in BRD4. Analysis of ESE-15-ol and the combination of ITH-47 test conditions did not increase p53 protein levels in both cell lines. Studies on histone H3K9Me2 revealed that the combination-treated MDA-MB-231 cells resulted in a significant increase in histone H3K9me2 levels.

Discussion and conclusion: This study is the first to report on the in vitro mechanistic effect of the combination of a BRD inhibitor, ITH-47 and in silico-designed estradiol analogue, ESE-15-ol on breast cells. The investigation contributes to unraveling the in vitro molecular mechanisms and signal transduction associated with a novel combination of BRD inhibitors and antimitotic agents. Understanding the in vitro molecular mechanisms of novel combinations of anticancer compounds will enable researchers to evaluate these combinations as possible candidates for use in anticancer chemotherapy paving the way for future in vivo studies.
Abstract Detail
Occurrence of selected human enteric pathogens in water samples and sediments in the Vaal catchment area

Background: Water quality monitoring schemes usually focus on quantifying microbial and chemical water contaminants in the water column. The viral pathogens that adsorb to particles and accumulate in the sediments are not routinely monitored. The resuspension of particle-bound viruses into the water column can not only impact the water disinfection but also poses a potential health risk to individuals exposed to the water sources. Despite the public health significance, there is paucity of data on occurrence of human enteric viruses in sediments in South African water bodies.

Methodology: From July 2017 to May 2018 water samples (10 L) and sediments (100 g) were collected monthly from four critical points on the Vaal Dam and one downstream reservoir. Viruses from water samples were recovered by a glass wool adsorption-elution technique, while those from sediments were recovered following USEPA 1992 guidelines. Selected viruses were detected and quantified by quantitative RT-PCR and virus isolation was used to detect infectious viruses. A student t-test was used to compare the abundance of the viruses between the two sample types.

Results: Ninety samples, including sediments (40) and corresponding water column (50) were collected over the ten month period. Enteric viruses, namely adenoviruses (87%), rotaviruses (87%), reoviruses (85%), norovirus GI and GII (55% each) and hepatitis A virus (25%), were detected in water samples from the reservoir while only rotaviruses were detected in water from two [30% (310) and 10% (110)] of the Dam sites. No viruses were detected in the sediments from the Dam, while adenovirus (50%), rotavirus (30%) and norovirus GII (10%) were present in the sediments from the reservoir.

Discussion and conclusion: Human enteric viruses were present in the dam water and in both water and sediment samples from the reservoir, highlighting the role of sediments in virus preservation in water bodies. The presence of sediment-bound viruses is a concern as they are not effectively inactivated by chemical water treatment which may affect the quality of downstream potable water. The results support the inclusion of viral analysis of water sources.
Abstract Detail

BACTERIOPHAGE DIVERSITY OF PANTON-VALENTINE LEUKOCIDINE POSITIVE CLINICAL STAPHYLOCOCCUS AUREUS ISOLATES IDENTIFIED IN SOUTH AFRICA AND NIGERIA

Introduction: The presence of the Panton-Valentine leukocidine (PVL) gene in Staphylococcus aureus has been associated with severe necrotising pneumonia and necrotising fasciitis. Ten PVL bacteriophage types belonging to three morphologically distinct head-groups have been reported to aid in the horizontal gene transfer of PVL genes. Bacteriophage non-typeability has been previously reported suggesting the presence of novel PVL-encoding bacteriophages or variants.

Aim: The aim of this study was to investigate the prevalence of PVL-encoding bacteriophages in clinical S. aureus isolates obtained from South Africa and Nigeria.

Methods: A total of 70 previously stored MSSA and MRSA isolates from South Africa and Nigeria were collected from the culture bank in the Department of Medical Microbiology, University of PretoriaNHLS. A III Part bacteriophage typing scheme consisting of part I: identification of morphology head-groups (icosahedral head-group I, II and elongated head-group), part II: linking of morphologically specific tail genes to the lukSF-PV genes and part III: identification of the specific bacteriophages; was performed using multiplex polymerase chain reaction (M-PCR) assays. Isolates that were positive for part I and III but negative for part II were defined as ‘phage-like’.

Results: Six known bacteriophages carrying lukSF-PV genes were identified. The prevalence of the bacteriophages was as follows, South Africa: ΦPVL [73% (3649)], ΦSa2usa [69% (3449)], Φ108PVL [18% (949)], Φtp310-1 [14% (749)], ΦSa2958 [8% (449)] and ΦTCH60 [2% (1)], Nigeria: Φ108PVL [43% (921)], ΦSa2usa [20% (1021)], ΦPVL [19% (421)] and 5% (121) for ΦSa2958, Φtp310-1 and ΦTCH60. All isolates were negative for part II therefore; all detected bacteriophages were phage-likes. Four bacteriophages were not detected in the study population. These bacteriophage-like types were distributed among the morphology head-groups as follows: icosahedral head-group II [73% (5370)], elongated head-group [70% (4970)] and icosahedral head-group I [29% (2070)]. Bacteriophage non-typeability was 18.5% in this study.

Conclusion: Results indicated that methicillin-resistant S. aureus strains harbor more than one prophage in the genome, contributing to the virulence of the pathogen. The prevalence of the PVL-encoded bacteriophages suggests similarities in the study population site. Whole-genome sequencing (WGS) can be used to further investigate non-typeable bacteriophages.
Abstract Detail
D-LYS6GnRH-OESTRADIOL CONJUGATES VERSUS TRIPTORELIN: EFFECTS ON THE PLASMA TESTOSTERONE, PROSTATE AND SEMINAL VESICLE WEIGHT OF MALE RATS

**Background:** Prostate cancer is a major cause of morbidity and mortality in men worldwide. Prostate cancer develops in the presence of androgens and thus responds to androgen deprivation therapy. GnRH analogues, used to inhibit the synthesis of androgens, results in the concomitant depletion of oestrogens, which causes adverse side-effects including hot flushes and loss of bone and libido. **Aims:** GnRH analogues conjugated to oestrogens could achieve both androgen deprivation and oestrogen replacement with resultant amelioration of side-effects.

**Methods:** We administered low dose Tripotrelin (0.1moles/day) (synthetic GnRH agonist), D-Lys6GnRH-estradiol conjugate (0.1nmole) and D-Lys6GnRH-genistein conjugate (0.1nmole) intraperitoneally to adult male rats for 3 weeks followed by the administration of the same drugs at higher doses (0.05µmoles day) for a further 3 weeks.

**Results and discussion:** Rats that received high dose GnRH-E had significantly lower concentrations of plasma testosterone compared to low dose (low dose: 12.17ngmL (10.87-14.11) vs. high dose: 2.38ngmL (0.92-10.1), p<0.05). Rats that received GnRH-E had lighter prostate glands than rats that received GnRH-G (GnRH-E: 0.278g (0.22-0.49) vs. GnRH-G: 0.61g (0.49-0.675), p<0.05). Rats that received GnRH-E had lighter seminal vesicles compared to the control (GnRH-E: 0.62g (0.39-0.755) vs. Control: 1.26g (1.19-1.33) p<0.01)). We did not observe any changes in testes weight and bone density.

**Conclusion:** These findings suggest that GnRH-oestrogen conjugates have a more potent androgen deprivation than a synthetic GnRH agonist in vivo.
Abstract Detail
13% of 56KM, AND 4% OF 21.1KM RUNNERS USE ANALGESIC/ANTI-INFLAMMATORY MEDICATION DURING EVENTS: A CROSS-SECTIONAL STUDY OF 76 654 DISTANCE RUNNERS

Introduction: Mass participation distance running events have increased in popularity. Distance running is associated with a risk of injuries, and there is some evidence that runners use analgesic-anti-inflammatory medication (AAM) during events that may compromise their health. However, there are few data on actual patterns of AAM use by runners. The purpose of this study is to determine the prevalence of AAM use in 21.1km and 56km marathon runners, as well as any differences in usage patterns between 21.1km and 56km runners.

Methods: 76 654 consenting participants in the Two Oceans Marathon races (21.1km=47 069; 56km=29 585) were studied from 2012-2015. Data on AAM use (7 separate medication types) from an online pre-race medical screening and intervention system administered during the race entry process were analysed and crude (un-adjusted for age, sex) frequencies (% runners; 95% CI) of AAM use and type are reported.

Results: A total of 8 288 (10.8%; 10.6-11.0) runners reported using AAM in the week before an event, and this was significantly (p<0.05) higher in 56km (16.0%; 15.6-16.5) vs. 21.1km (7.5%; 7.3-7.8) runners. 56km runners also used significantly more pain medication during an event (13.6%, 13.2-14.0) compared to 21.1km runners (4.1%, 3.9-4.3). The most common type of AAM used in the week before an event was non-steroidal anti-inflammatory drugs (NSAIDs), and use was significantly higher in 56km (9.7%; 9.4-10.1) vs. 21.1km (4.7%; 4.5-4.92). Similarly NSAIDs use was the most common type of AAM used during an event and this was also significantly higher in 56km (6.9%; 6.6-7.2) vs. 21.1km (2.1%; 1.9-2.2) runners.

Conclusion: 10% of the total runners reported use of analgesic-anti-inflammatory medication in the week before an event, while use during an event was 13.6% and 4.1% for 56km and 21.1km runners respectively. The most common medication type used by both 21.1km and 56km runners were the NSAIDs. These medications have the potential to negatively influence health, and performance of the athletes, and may be associated with increased risk of medical complications during events.
Abstract Detail

FLAVIVIRUSES DETECTED IN WILDLIFE AND LIVESTOCK IN SOUTH AFRICA

**Background:** Many Flaviviruses (family Flaviviridae) are arboviruses of medical and veterinary importance. The Flaviviruses genus consists of over 70 viruses including Zika-, Dengue-, West Nile- (WNV) and Wesselsbronvirus (WSLV), many of which are zoonotic in nature. West Nile virus is endemic to South Africa and cause sporadic outbreaks in humans and horses. In humans WNV present as mild flu-like symptoms with a rash in 20% of reported cases and fatal neuroinvasive disease in 1% of reported cases. Previous studies have shown WNV as a cause of neurological disease in horses with a fatality rate of 35% in South Africa. This study, as a follow up to surveillance in horses, aims to investigate Flaviviruses, from 2010 to 2018, as cause of disease in wildlife, livestock and domestic species in South Africa and to identify possible reservoir hosts.

**Method:** Veterinarians across Southern Africa send specimens from animals with unexplained neurological-, febrile- or respiratory disease or sudden unexplained death (SUD) to the CVZ. All specimens were tested with a Flavivirus genus nested real-time PCR. Positive specimens were subjected to sequencing and phylogenetic analysis.

**Results:** Flaviviruses were detected in 17557 (3.0%) clinical sick or fatal animals. WNV was detected in 5332 (1.5%) wildlife, 3154 (2.0%) livestock and 122 (4.5%) domestic dogs. Bagaza virus (BAGV) was detected in 849 (16.3%) avian (all domesticated exotic pheasants). Phylogenetic analyses confirm WNV lineage 1 in the lion and the remainder as lineage 2. Flavivirus PCR positive cases were mostly associated with neurological signs (1017, 58.8%) followed by respiratory signs and sudden unexpected death (317, 17.7% respectively). Most WNV cases were reported in Gauteng Province (49, 44.4%) followed by Free State Province (29, 22.2%). All BAGV positive cases were from Gauteng.

**Conclusion:** From 2010-2018 we detected two Flaviviruses; nine WNV and eight BAGV cases in wildlife, livestock and avian. Neurological signs were the most common clinical sign associated with Flavivirus infection. This study suggest wildlife, livestock and domestic animals may also be affected by WNV and less well known Flaviviruses such as BAGV in Africa and investigation of reservoir or amplifying host species are required.
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Abstract Detail
UNUSUAL CASE OF SUPERIOR SEMICIRCULAR CANAL DEHISCENCE (SSCD) AND ANOMALOUS MASTOID EMISSARY VEIN PRESENTING WITH PULSATILE TINNITUS: CLINICAL AND IMAGING CORRELATION

Background: We present a rare and unusual case of SSDC with pulsatile tinnitus from a mastoid emissary vein anomaly. Patients with SSDC -"third window effect" syndrome , present with vestibular and auditory symptoms without pulsatile tinnitus ,and signs from dehiscence of the overlying superior semicircular canal bone of the inner ear system.Auditory manifestations include autophony(increased resonance of one's own voice),hypersensitivity to bone-conducted sound, and an apparent conductive hearing loss on audiometry. Patients may have vertigo and oscillopsia(the apparent motion of objects that are known to be stationary)evoked by loud noises(Tullio's phenomenon), by increasing middle ear pressures.

Diagnosis and Conclusion. Pulsatile tinnitus is very rare and unusual in SSDC .The presence of congenital mastoid emissary vein anomalies could explain the tinnitus.Imaging aids in confirming the diagnosis and treatment planning.
Abstract Detail
HAMARTOMAS IN THE OPERCULA OF FOUR UNERUPTED PRIMARY MOLARS: A CASE REPORT.

Background: Eruption cysts (ECs) are usually asymptomatic and conservatively left to rupture spontaneously when the underlying tooth erupts. However, surgical intervention should be considered if the ECs cause pain or discomfort, infection or interfere with normal function (i.e. mastication/breastfeeding). Persistent, multiple EC’s overlying deciduous molars are a rare occurrence.

Methods: A healthy, 19-month-old boy presented with bilateral swellings involving all four unerupted primary molars, gradually increasing in size, for approximately eight months. A clinical diagnosis of multiple eruption cysts was made. All four cysts were surgically removed by an elliptical incision with a surgical blade and the excised tissues submitted for histopathological analysis.

Results: At the follow-up, all deciduous molars were clearly visible and a significant improvement in feeding was reported by the mother. Histological analysis of the excised tissues confirmed the diagnosis of multiple eruption cysts with the presence of odontogenic giant cell fibromatosis (OGCF) in the overlying mucosa.

Discussion: The term OGCF was first used to describe an odontogenic hamartomatous lesion present within the opercula of permanent molars with delayed eruption. Histologically, OGCF presents as a non-encapsulated lesion consisting of dense fibrous connective tissue containing a large number of spindle-shapedstellate cells and multinucleated giant cells, islands and strands of odontogenic epithelium with occasional squamous cell metaplasia, without the presence of calcifications. Additionally this case showed a focal area of dyskeratotic cells in the wall of the cyst, which is a rare phenomenon, but well documented in odontogenic cysts.

Conclusion: In this rare case, the delayed eruption of the primary molars was attributed to eruption cysts, uniquely with the presence of OGCF hamartomatous lesions in the opercula. Failure to spontaneously resolve and the reduced ability to breastfeed, resulted in a decision to treat the cysts surgically. Conservative surgical intervention resulted in the successful eruption of all four primary molars, improved function and overall quality of life.
Abstract Detail

CASE REPORT: SUPRASELLAR ARACHNOID CYST PRESENTING WITH BOBBLE HEAD DOLL SYNDROME

Case Report: Suprasellar arachnoid cyst presenting with bobble head doll syndrome. Bobble-head doll syndrome (BHDS) is a rare syndrome with repetitive anteroposterior head movements. It may be associated with expansile lesions in the third ventricular region, including suprasellar or third ventricle cysts, aqueductal stenosis, or patients with a malfunctioning shunt. We present a case of an 8 year old child with a giant suprasellar arachnoid cyst causing bobbling head movements. Removal of the cyst resulted in improved clinical outcome.
Abstract

GROUP A STREPTOCOCCUS OUTBREAK IN A LONG-TERM CARE FACILITY, JOHANNESBURG, SOUTH AFRICA, 1 SEPTEMBER — 31 OCTOBER 2017

Background: Residents in long-term care facilities (LTCF) are at increased risk of acquiring group A streptococcus (GAS) disease because of their older age, poor skin integrity and limited mobility. On 9 October 2017, the National Institute for Communicable Diseases was notified of three residents in a LTCF in Johannesburg, who died of necrotizing fasciitis due to culture-confirmed GAS infection.

Aim: We aimed to determine the extent of the outbreak and identify risk factors associated with GAS disease.

Methods: We conducted a cohort study consisting of residents and staff members in the LTCF. We defined a case as an illness in a resident or staff member in the LTCF between 1 September and 31 October 2017 with symptoms compatible with GAS disease. Cases were confirmed if GAS was isolated from a sterile (invasive) or a non-sterile (non-invasive) site with sore throat, respiratory illness with cough or fever. Symptomatic individuals without laboratory confirmation were suspected cases. Available GAS isolates were emm-typed.

Results: We identified 11 GAS cases: 4 among residents (3 confirmed invasive and 1 suspected invasive) and 7 among staff members (all confirmed non-invasive disease) during 1 September – 31 October 2017. Of the four cases in residents, three (75%) died. Risk factors associated with GAS among residents included <8 weeks’ arrival at LTCF [ odds ratio (OR) 14.3, 95 % confidence interval (CI) 1.3 – 159.7]. Sequence type (ST) and emm-type were determined for 7 isolates. Two of the invasive isolate were available and both were single-locus variants of ST-28. For the non-invasive cases, five isolates were typed; 45 were ST-28 (emm1) while the remaining isolate was ST-15 (emm3), an unrelated lineage.

Discussion and Conclusion: Residents presented with invasive GAS disease with high case fatality rate. Closer monitoring of new residents for GAS infection was highly recommended to reduce the risk of morbidity and mortality.
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Abstract Detail
PERCUTANEOUS NEUROLYTIC CELIAC PLEXUS BLOCK

Background: Percutaneous neurolytic celiac plexus block is an effective procedure for patients with intractable abdominal pain due to upper abdominal malignancies or chronic pancreatitis.

Aim: To present an unusual procedure which has the potential of multiple applications for pain management.

Case: A middle aged male presented with severe abdominal pain due to inoperable pancreas carcinoma. The patient was on heavy doses of opioids as without this he was unable to sleep. In consultation with the Department of Internal Medicine, a celiac block under CT guidance was performed. The patient was placed in the prone position on the CT table and bilateral needles were inserted through paravertebral muscles into the para-aortic area at the level of celiac trunk. Lignocaine was injected initially and the patient’s response was observed for three to five minutes. The patient felt better immediately. 100% alcohol was injected into each needle. The aim was to achieve neurolysis of the splanchnic nerves around the celiac trunk.

Discussion and conclusion: Percutaneous neurolytic celiac plexus block is an effective procedure for intractable pain relief if performed carefully under CT guidance.
Abstract

FUNCTIONAL CHARACTERISATION OF GONADOTROPIN-RELEASING HORMONE-ESTROGEN CONJUGATES AS POTENTIAL THERAPEUTICS FOR PROSTATE CANCER

**Background:** Prostate cancer (PC) is one of the most common cancers in men. It is an androgen-dependent disease and androgen deprivation therapy (ADT) an effective treatment. The hypothalamic–pituitary–gonadal axis, controlled by gonadotropin releasing hormone (GnRH) is responsible for regulating reproduction puberty and production of androgens in men. GnRH analogues (which downregulate the axis) are therefore the foremost ADT agents. GnRH analogues may also have direct anti-proliferative effects in prostate cancers. ADT is associated with negative side effects such as loss of bone mass, hot flushes and loss of libido, due to a concomitant decrease in estrogen and androgen. We hypothesise that a molecule which retains GnRH receptor (GnRHR) activity while simultaneously replacing estrogen activity may therefore be beneficial. The role that estrogens play in PC development is still under debate. However, phytoestrogens (e.g. genistein) selectively activate an anti-proliferative estrogen receptor (ER) isoform. Therefore, conjugates of GnRH analogue with either 17β-estradiol (E2C) or genistein (GenC) have been explored in vitro to evaluate their potential as novel PC therapeutics.

**Methods:** Preparation of E2C and GenC was commissioned. Their GnRHR activity was tested by inositol phosphate assay in cells expressing GnRHR, and ER activity in a cell line co-expressing ERs with a luciferase gene under the control of an estrogen-response element. Anti-proliferative effects were assessed in PC cell lines by crystal violet assay and their potential bone-protective capability measured by their ability to inhibit RANKL-induced osteoclast differentiation of Raw 264.7 macrophages.

**Results:** E2C and GenC elicited strong, potent stimulation of GnRHR and their estrogenic activities were confirmed by their ability to inhibit osteoclast differentiation to the same degree potency as unconjugated estrogen. No direct antiproliferative effects on PC cells were observed for neither the conjugates nor GnRH, indicating that GnRHR may not be expressed in these cell lines (to be confirmed by qRT-PCR).

**Discussion and Conclusion:** Both E2C and GenC displayed good GnRHR and ER activities indicating that conjugation has not affected their functionality. These favorable results form the basis for taking these novel conjugates into in vivo studies in which their effectiveness as ADT agents with reduced side effects will be confirmed.
Abstract Detail
EVALUATION OF THE SOUTH AFRICAN CONGENITAL RUBELLA SYNDROME SURVEILLANCE SYSTEM

Introduction: The extent of Congenital Rubella Syndrome (CRS) is not well defined in South Africa. The South African CRS surveillance system was established in 2015, with the aim of describing the epidemiology of laboratory-confirmed CRS cases in the country. This study’s aim was to evaluate the performance of this surveillance system since it was established.

Methods: CRS cases are identified at sentinel sites (28 regionaltertiary hospitals and five National Health Laboratory Services virology laboratories) on a continuous basis. Demographic, clinical, laboratory and outcome information of CRS cases as well as clinical and vaccination history of the cases’ mothers is completed on case investigation forms (CIF) by designated surveillance focal persons. Data should ideally be sent to the system coordinator on a monthly basis and entered into a database. Acceptability of the system was objectively assessed by the participation rate (proportion of focal persons eligible to participate in the system who were actively involved in reporting CRS cases over a one-year period). Data quality was determined by the proportion of required variables that had complete data fields. Timeliness of the system was assessed by determining time intervals between each of the steps in the system.

Results: From 2015-2017, 53 CRS cases were identified: 37 in 2015, 8 in 2016 and 8 in 2017. Most (1953) of the cases were from Western Cape Province. On average, participation rates were 44%(818) in 2015, 37%(1027) in 2016 and 29%(828) in 2017. The proportion of required variables with complete data fields were: demographic(100%), laboratory(100%) and outcome(100%) variables. There were 92%(4953) variables regarding maternal history that had complete data fields. Missing maternal information included vaccination history and rubella symptoms during pregnancy. Average time intervals were: arrival of bloodurine specimen at the laboratory:0 day; rubella result feedback from the laboratory to clinicians:3.5 days; CIF completion:39 days.

Conclusion: The system’s database was generally comprehensive, however the timeliness of CIF completion suggests that CIF’s did not reach the coordinator within the ideal monthly period. There are currently no standards for evaluating the performance of CRS surveillance systems in the African region. Establishing surveillance indicators for this system is recommended.
Abstract Detail
LONG TERM OUTCOME OF CATHETER-DIRECTED THROMBOLYSIS FOR ILIOFEMORAL DEEP VENOUS THROMBOSIS

Introduction: Post-thrombotic syndrome (PTS) is a chronic complication of proximal deep vein thrombosis (DVT). More than 90% of patients managed with anticoagulation alone will have significant symptoms. PTS results in significant disability and impaired quality of life. The goal of the study is to assess the long term outcome of patients who had been managed with catheter-directed thrombolysis for iliofemoral deep venous thrombosis. Aim(s): To assess incidence and the severity of post-thrombotic syndrome after catheter directed thrombolysis. And to assess iliac veins patency.

Methods: A retrospective Cohort Study of patients who were managed with CDT for iliofemoral DVT for the last 11 years. These patients are assessed clinically and had a venous duplex performed. Ethics Approval Reference No: 5292017 University of Pretoria Results: A total of 35 patients were managed with catheter-directed or pharmaco-mechanical thrombolysis. Predominantly female 28 (80.0%), mean age 36.4 years. Twenty eight (80.0%) had left iliofemoral DVT, only 3 (8.6%) had thrombus extension into the IVC. CDT used on 17 (48.6%), angiojet thrombolysis on 18 (51.4%). And angioplasty 23 (65.7%) and stenting 13 (37.1%). Eight patients died, one in hospital from intracranial bleeding due to thrombolysis, and the other 7 were out of hospital deaths not related to the procedure. On Ultrasound 18 (51.4%) had no residual thrombus and 17 (48.6%) residual thrombus. One (2.9%) had an early occlusive re-thrombosis. Eight (22.9%) developed PTS, 4 (11.4%) moderate and 4 (11.4%) severe. Seventy seven percent has no PTS.

Recommendations / Conclusion: It would appear that CDT and angiojet thrombolysis does reduce the incidence and severity of PTS from this study. Overall, there do not appear to be consistent relationship between age or sex and the development of PTS. And the presence of residual clot appears not to be a risk factor for development of PTS because more patients had residual thrombus with no clinical manifestations. The combination of angiojet, balloon angioplasty and stenting seem to be the best modality of treatment for prevention of post-thrombotic syndrome. However this modality of treatment needs to be evaluated further and be validated by a prospective study and longer follow-up.
Abstract Detail
DEVELOPMENT OF IMPROVED MOLECULAR ASSAYS FOR EPIDEMIOLOGICAL CHARACTERISATION OF SHUNI VIRUS

Background: Emerging and re-emerging infectious diseases are an important global problem as they can lead to major disease outbreaks. Arboviruses (arthropod-borne viral diseases) contribute significantly to such diseases worldwide. Shuni virus (SHUV) is a suspected re-emerging arbovirus of the Orthobunyavirus genus and Peribunyaviridae family. It was previously identified in neurological cases in animals and serological evidence suggests it has the potential to infect humans. This study aims to compare and evaluate two molecular assays for the detection of SHUV and use it to screen recent cases of neurological disease in horses and humans.

Methods: SHUV specific molecular tests were performed and evaluated for diagnostic and screening purposes. This was achieved by comparing the specificity and sensitivity of two real-time PCR assays: i.e. a SHUV specific HybProbe nested real-time PCR and a TaqMan Orthobunyavirus one-step genus specific PCR both targeting the nucleocapsid (S-segment). Sensitivity was assessed against a dilution series of a SHUV isolate while specificity was determined against both a series of previously isolated SHUV clinical specimens as well as screening of new neurological cases.

Results: Comparison of the two assays suggested that the TaqMan Orthobunyavirus one-step genus specific PCR was more sensitive than the SHUV specific HybProbe nested real-time PCR. The HybProbe SHUV assay could only re-amplify 413 (30.8%) archived SHUV positive clinical samples while the Orthobunyavirus assays detected 813 (61.5%). Screening of cases using the TaqMan Orthobunyavirus assay identified 4124 (3.2%) new Shuni-like virus cases in neurological animals in 2018 and 7129 (5.4%) Shuni-like human cases in 2017. Sequencing suggest these viruses are closely related to SHUV with 86-99% identity to the prototype strain and previously identified strains in humans. None of the samples tested positive with the SHUV HybProbe real-time PCR.

Discussion and Conclusion: The TaqMan Orthobunyavirus one-step genus specific PCR showed to be a reliable and rapid screening method to use for the detection of SHUV and other orthobunyaviruses compared to the SHUV specific HybProbe nested real-time PCR. The assay performed well in a surveillance program and could be used in a diagnostic setting. This study suggest that SHUV has been missed in the past as a potential cause of neurological diseases in animals and humans in South Africa and should be investigated further.
Abstract Detail

COMPARISON OF THE FUNCTION OF KISSPEPTIN AND ITS RECEPTOR, KISS1R, IN BREAST AND PROSTATE CANCER BIOLOGY

Introduction: Kisspeptin (KP-10) is a regulator of the hypothalamic-pituitary-gonadal (HPG) axis, controlling sexual development, and reproduction. Additionally, KP-10 and its receptor Kiss1R have been implicated in the metastatic spread of some cancers. Metastasis leads to worsened prognosis and death. Recently, the KISS-1 gene has been associated with the suppression of metastasis in different cancers (pancreatic, ovarian and prostate cancer), where increased expression levels of KP-10 or Kiss1R results in suppression of cell migration and invasion. In contrast, increased levels of expression of KP-10 and Kiss1R in breast cancer have been associated with increased metastasis, indicating possible differences in signalling pathways or other uncharacterised mechanisms. To understand how KP-10 and its receptor Kiss1R differentially regulate cancer progression, we sought to investigate KISS1R expression and KP-10 effect on cell growth and migration in different breast and prostate cancer cell lines.

Methods: Different concentrations (1 μM to 1 pM) of KP-10 were administered to 3 breast (MCF-7, MDA-MB-231, BT-20) and 3 prostate cancer cell lines (DU145, LNCaP, PC3) to determine its effect on cell growth. Cell numbers were determined using crystal violet. A cell migration assay was performed to determine the metastatic influence of KP-10. Expression levels of KP-10 and KISS1R were determined through q-rPCR, while protein expression levels of Kiss1R were determined by Western blotting.

Results: The addition of KP-10 did not influence cell growth or survival of any of the cell lines tested. Western blot data showed high KISS1R expression in breast, and no expression in prostate cancer cell lines. Preliminary migration assays show that KP-10 did not influence breast cancer cell migration, even though they express KISS1R.

Discussion: KISS1R expression is differentially regulated in breast and prostate cancer cells. Prostate cancer cells seem to have lost KISS1R expression while the non-metastatic BT-20 cells have very high expression, even among the other breast cancer cell lines. However, expression did not influence cell growth, survival or cell migration in response to KP-10 exposure. Therefore, our initial study shows that breast, and not prostate cancer cell lines express KISS1R, suggesting that they may respond differently to KP-10 although exposure does not influence cell survival or migration.
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Abstract Detail
THE EFFECTS OF CRANIAL ELECTROTHERAPY STIMULATION ON THE HEART RATE VARIABILITY OF MUSICIANS.

Introduction: Performance anxiety can be debilitating, particularly in the presence of a large audience. Anxiety impedes on cognition, attention and working memory which in turn influences performance. Cranial electrotherapy stimulation (CES) is a U.S Food and Drug Administration approved non-invasive procedure for the treatment of insomnia, drug addiction, depression and anxiety. CES is a form of alternating current stimulation consisting of the application of oscillating, low intensity [less than 600 microampere (µA)] current produced by a 9volt battery via electrodes placed on the scalp or earlobes of the patient as an approach to accomplish neuromodulation, without operative procedures, for the melioration of executive functioning and mental health.Aim: The purpose of this study is to investigate the effect of CES on heart rate variability (HRV) of musicians during mock auditions.

Methods: Thirty volunteering music students from the University of Pretoria will be selected for the study and will act as their own controls. Participants will be asked to play a ±5 minutes long musical abstract in front of a panel of judges, during mock auditions. HRV, heart rate (HR) and cardio stress index (CSI) will be recorded in real time during performances following an initial baseline testing phase. All participants in the study will undergo CES therapy twice a week over a period of a one month intervention, in efforts to modulate the activity of the autonomic nervous system (ANS) via its central nervous system cirucuity and associated neurotransmitters in an effort to diminish symptoms of anxiety and stress. Each CES administration period will last 30 minutes. Protocol was submitted to ethics committee (number: Temp2018-00725).

Outcomes: The potential outputs of the project include the improved ability to facilitate self-regulatory functions in response to overwhelming external stressors without compromising ones performance or higher order cortical resources.
Abstract Detail
INFANT FEEDING WITHIN HIV/AIDS CONTEXT: AN ASSESSMENT OF PROFESSIONAL NURSES’ KNOWLEDGE AND PRACTICES AT SELECTED RURAL PRIMARY HEALTHCARE FACILITIES IN MAKHUDUTHAMAGA MUNICIPALITY, LIMPOPO PROVINCE.

Background: Infant feeding is an essential component in the prevention of mother to child transmission. The World Health Organisation recommends that all babies should be exclusively breastfed for the first six months irrespective of the mother’s HIV status. This study was conducted to assess the knowledge and practices of professional nurses regarding infant feeding in the context of HIV and AIDS as they are the first contact caregivers in primary healthcare facilities.

Method: A quantitative, descriptive and cross-sectional design was used. A convenience sampling method was used to select professional nurses and data was collected using a structured self-administered questionnaire. One hundred and five questionnaires were distributed and 94 responded, giving a response rate of 89.5%. Data was analysed using the Statistical Package for Social Sciences version 23. The study followed ethical considerations such as: privacy, autonomy, confidentiality, fair treatment and right to self-determination.

Results: The results show that the majority (56%) of respondents have received training on HIV and infant feeding. Seventy-five percent were knowledgeable about safe infant feeding options and 83% indicated that they recommend exclusive breastfeeding to all infants irrespective of the mothers HIV status. Only 50% reported that they counsel women about HIV and infant feeding and 40.9% indicated that they promote and create conducive environment for male partner involvement on HIV counselling and infant feeding. About 56.6% indicated that they encourage women to disclose their HIV status and 62.2% indicated that they encourage women to avoid mixed feeding.

Discussion and conclusion: The results show that the majority of professional nurses were more knowledgeable about safe infant feeding options and most recommended exclusive breastfeeding. It is alarming that few were counselling women on HIV and infant feeding and very few respondents created a conducive environment for male partner involvement on HIV and infant feeding. Therefore this study recommends that all professional nurses should receive training on HIV and infant feeding.
Abstract Detail
THE EFFECT OF COHERENT BREATHING ON THE PERFORMANCE OF MUSICIANS

Introduction: Performance anxiety in singers and musicians is a contributing factor to the performance quality during auditions or a live performance. Finding an appropriate treatment option for anxiety that still allows the musician to remain focused and perform continuously for a long period of time carries great value. Heart rate variability (HRV), is a non-invasive method which can be used as a measure of parasympathetic and sympathetic activity. In this study HRV, heart rate (HR), Cardiac Stress Index (CSI), State Trait Personality Inventory (STPI) assessment, Brain driver assessment and a performance-grading assessment will be used as measures of anxiety experienced by musicians in a mock audition setting. With the use of certain techniques like breathing exercises it could be possible to help alleviate performance anxiety experienced by musicians and help them to be more relaxed and perform better.

Aim: To investigate the effect of a coherent breathing technique on the graded performance of musicians during a mock music audition. Coherence breathing techniques will be used as intervention to decrease anxiety levels of musicians during live performance.

Methods: Musicians will do a fitness assessment, brain driver assessment, personality assessment and questionnaire in a mock audition where they will be required to perform randomly selected music pieces and be graded by a panel of experience judges. During the audition, live recordings of HRV, HR and breathing rate (BR) of the musician will be measured with the BioHarness heart monitor device. Following the mock audition coherent breathing techniques will be used as an intervention plan for three times per week for 30-45 minutes. After the intervention another mock audition will be setup and all measures will be repeated. Protocol was submitted to the ethics committee (2412018).

Possible outcomes: It is hypothesized that breathing exercises might help decrease the anxiety experience by musicians and increase the performance outcomes of participants as evaluated by independent assessors.
Abstract Detail
DETERMINING THE BIOPHYSICAL AND BIOCHEMICAL PROPERTIES OF ERYTHROCYTES IN ELITE-LEVEL RUGBY UNION PLAYERS

Background: Professional rugby players are subject to high levels of physical stress due to strenuous exercise regimes and the high-impact nature of the sport. These factors predispose such individuals to the risk of inflammation and oxidative stress that could alter the normal functions of red blood cells (erythrocytes) and the blood clotting system (coagulation). Adverse changes to these key physiological systems may negatively impact a player’s athletic performance, to the detriment of the individual’s career and the performance of his team.

Methodology: The aim of the study was to compare the changes in biophysical and biochemical properties of red blood cells in elite level rugby-players (n=25) and controls (n=10) using thromboelastrograpy (TEG) to determine viscoelastic properties of blood; haematology analysis; ultrastructural changes of blood using scanning electron microscopy (SEM); anaerobic performance by measuring blood lactate concentration; presence of systemic inflammation measured through erythrocyte sedimentation rate (ESR); rugby-related fitness assessments to determine individual player performance.

Results: Statistical analysis of sample collection data will be completed by comparing values of both experimental group (rugby players) and controls using ANOVA with Tukey’s test or Student’s t-test where appropriate. P-values given as p<0.05 will be considered as statistically significant.

Discussion: The principal investigator hypothesizes, upon reviewing literature of related studies, that inflammation would be present due to high levels of exercise in elite-level rugby players. The presence of inflammation would cause structural changes of erythrocytes and changes in the viscoelastic properties of blood. Further investigation is required to determine if there is a relationship between these biophysical and biochemical changes in blood and elevated blood lactate concentrations observed following strenuous exercise, and the mechanisms through which high exercise load affects normal functioning of erythrocytes and the coagulation system.
Abstract Detail
INVESTIGATING THE EFFECT OF LHR-CHAP AS A NOVEL PHARMACOLOGICAL CHAPERONE FOR THE RESCUE OF FUNCTION OF MUTANT FOLLICLE-STIMULATING HORMONE RECEPTORS

Introduction: Follicle-stimulating hormone (FSH) functions within the Hypothalamic-Pituitary-Gonadal axis, and plays a role in both male and female gamete formation as well as in the differentiation of secondary sex characteristics. FSH acts through its cognate G protein-coupled receptor (GPCR), the follicle-stimulating hormone receptor (FSHR) to mediate these functions. Mutations in GPCRs, such as FSHR, often cause misfolding of the receptor, affecting receptor trafficking with reproductive dysfunction being a possible outcome. Small cell-permeant molecules called pharmacological chaperones have been shown to rescue misfolded receptors to the cell surface thereby restoring function. LHR-Chap is a pharmacological chaperone that has been shown to successfully rescue some mutant LHR receptor mutations. Since LHR-Chap is also able to bind the FSHR, we hypothesise that LHR-Chap may also therefore be an effective treatment for the rescue of retained FSHR mutations.

Methods: Several suitable FSHR mutations were identified from literature. Mammalian expression vectors encoding these were created by site-directed mutagenesis of the wild-type human FSHR and were transfected into mammalian cells. Cells were then treated with LHR-chap and total and cell surface receptor expression levels measured by receptor ELISA.

Results: Many FSHR mutants displayed a decrease in cell surface expression and, when treated with LHR-Chap, cell surface expression of some of these retained mutants was increased indicating successful trafficking of the receptor to the cell surface.

Conclusion: LHR-Chap treatment showed rescue of some mutant receptors while others remained intracellularly retained, correlating with the location of the different receptor mutations within the receptor structure. Receptor signalling assays will now be performed to examine the functionality of the LHR-Chap resp
Abstract Detail
AN EVALUATION ON THE ACCURACY OF VISUAL GLUCOSE ESTIMATES BY HEALTHCARE PROVIDERS AND PATIENTS AT KALAFONG HOSPITAL, CITY OF TSHWANE, SOUTH AFRICA.

Background: The prevalence and incidence of Diabetes Mellitus (DM) has been on the rise globally and in South Africa specifically, hence the disease has now been considered an epidemic. Diabetes Mellitus is a metabolic disease that is characterised by either a hyperglycaemic or hypoglycaemic state which results from defects in insulin secretion or action. Both hyperglycaemia and hypoglycaemia are problematic and can lead to complications, which makes the treatment and management of the disease a paramount aspect of addressing the epidemic. This paper examines the ability of patients and healthcare providers to visually estimate glucose concentration using colorimetric strips.

Method: It draws from a cross-sectional diagnostic study conducted in 2017 at the diabetes clinic, Kalafong Hospital in Tshwane, South Africa that examined the accuracy of techniques used for treatment and management of DM. Fifty-three patients attending the diabetes clinic, and 10 healthcare professionals working in the clinic were conveniently sampled. Enrolled participants estimated glucose concentration of five solutions of known glucose concentration using colorimetric glucose strips.

Results: Research findings indicated that, 95% CI of mean estimates given by patients did not intersect with the true readings despite showing proportional change in estimates. Univariate analysis of the potential predictors yielded no significant findings with LDL p-value 0.099, the closest explanatory variable.

Discussion and Conclusion: The study concluded that colorimetric matching to estimate blood glucose is an inexact science and should only be used in the absence of another technique to measure blood glucose. More so, predictors on how well one can estimate blood glucose visually remain speculative.
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Abstract Detail
MIDDELBURG AND SINDBIS ALPHAVIRUSES AS A CAUSE OF FEBRILE AND NEUROLOGIC DISEASE IN HORSES AND HUMANS IN SOUTH AFRICA

Background: Alphaviruses belong to the family Togaviridae and include zoonotic pathogens that cause disease ranging in severity from mild febrile illnesses and arthritis, to severe encephalitis. We previously reported that two alphaviruses, Middelburg: (MIDV) and Sindbis-virus (SINV) were detected in horses with neurologic disease in South Africa. Horses may serve as an early indicator of circulating arboviruses with zoonotic potential.

Method: Clinical samples (EDTA blood, serum and organs) of horses with acute or fatal neurologic and febrile infections, were submitted to the CVZ, as part of an established surveillance program. Human CSF specimens sampled between February-May 2017 from patients with unexplained neurological symptoms were collected from the National Health Laboratory Service, Tshwane Medical Virology laboratory, UP. Two veterinary students who displayed neurological signs and fever during this period were also included in this study. All specimens were processed, followed by RNA extraction and screened via real-time RT-PCR for Alphaviruses.

Results: From 2014 till 31 May 2018, 6% (691084) of horse specimens tested positive for MIDV and 1% (111084) for SINV. Of these positives 9% (669) of MIDV and 18% (211) of SINV were fatalities. For MIDV cases 65% (4569) had neurologic signs, 29% (2069) only fever; the remaining 6% (469) were either, abortions, presented with icterus or for which there was no clinical information available. For SINV 55% (611) had neurologic signs, 36% (411) only fever and 1 case only pneumonia. From human CSF samples, 3 MIDV positives were detected: a 49-year-old male, a 30-year-old female and a 2-year-old boy, all with neurological signs. Of the 2 veterinary students one tested positive for MIDV but made a full recovery. No SINV cases were detected amongst neurological human cases.

Discussion and Conclusion: The ongoing surveillance program has demonstrated that MIDV and SINV are circulating annually in South Africa and are a cause of morbidity and mortality in horses and possibly humans and highlights the importance of surveillance for the detection of emerging pathogens.
Abstract Detail
OCCUPATIONAL THERAPY FOR VULNERABLE COMMUNITIES: LESSONS FROM COLLABORATIONS BETWEEN MAJORITY AND MINORITY WORLDS

Introduction: Occupational therapy need to train students as global citizens. Therefore, international collaboration is a valuable way of augmenting curricula with global reality and knowledge. Reality and knowledge differ across borders. Knowledge sharing between majority and minority worlds can enhance occupational therapy practice and health for all. Objectives To explore the differences and similarities of occupational therapy services for vulnerable communities in South Africa and United States as a precursor for model development.

Methods: Theory generation using reflexive practices.

Results: The model includes a systematic process that was followed by one majority and one minority world context to explain different occupational therapy practices among vulnerable communities in South Africa and the US. Enablers and barriers were identified and through a reflexive process and topics were endorsed. This initial development of the model will lead to further evaluation for successful implementation across borders that are symbiotic and bi-directional.

Conclusion: This model suggests how recognition of reciprocal learning between majority and minority worlds lead to better health for all and the cultivation of global citizens in the occupational therapy community. The benefits are numerous and varied and promotes health for all.
Abstract Detail

RESTORING THE FUNCTION OF INACTIVATING MUTATIONS OF G PROTEIN-COUPLED RECEPTORS

Background: Inactivating mutations of G protein-coupled receptors (GPCRs) often result in receptor misfolding and subsequent retention and degradation by cellular quality control systems, resulting in physiological dysfunction. Cell-permeant molecules termed pharmacological chaperones (PCs), have been demonstrated to interact with misfolded proteins, promoting correct folding, enhancing trafficking to the cell membrane, thus “rescuing” GPCR function. The aim of this study was to determine whether cell membrane trafficking function of misfolded mutants of GPCRs involved in reproductive neuroendocrinology can be restored by conferring cell-permeability to endogenous peptide ligands.

Methods: HEK293T cells were transfected with plasmids encoding luteinising hormone receptors (LHRs), kisspeptin receptors (KiSS1Rs), or neurokinin B (NKB) receptors (NK3Rs) containing mutations identified in human patients suffering from reproductive dysfunction. A cell-penetrating peptide (CPP) cocktail (Takara XfectTM Protein Transfection Reagent) was used to confer cell permeability to endogenous peptidprotein ligands and a receptor ELISA was used to quantify receptor cell surface expression in the presence/absence of CPP-hormone treatment or existing small-molecule pharmacological chaperones.

Results: Protein transfection by CPPs was optimised with a β-Galactosidase control protein. Cell surface expression of none of the KiSS1R mutants was significantly impaired and therefore these mutants were not explored further. However, many LHR and NK3R mutants displayed poor cell surface expression. Unlike the pharmacological chaperone LHR-Chap, which could increase cell surface expression of many retained LHR mutants, treatment with CPP-human chorionic gonadotropin complexes did not affect the cell surface expression of any of the tested mutants. CPP-neurokinin B complex treatment of mutant NK3Rs demonstrated some degree of rescue of one mutant receptor while treatment with the small molecule NK3R pharmacological chaperone, M8, rescued cell surface expression of all retained NK3Rs.

Discussion and conclusion: CPP-mediated hormone treatment does not appear to result in effective rescue of retained GPCRs, unlike the cell-permeant small molecules M8 and LHR-Chap. This is possibly due to limited internalisation of the CPP-cargo or entrapment of cargo in endosomes upon cell entry which will now be further investigated by confocal microscopy.
Abstract Detail
THE INTERACTION EFFECT OF CLIMATE CHANGE AND AIR POLLUTION ON HUMAN HEALTH IN SOUTH AFRICA

Introduction: Climate change is expected to lead to an increase of 3-4°C in ambient temperature along the South African coast during the next 80 years. Several studies have reported that the occurrence of unintentional injuries increase with high temperatures. This is the very first study on the African continent that investigated the association between ambient apparent temperature (Tapp) and unintentional injuries.

Methods: Unintentional injury (excluding suicides, poisoning, violence and accidental drug overdose) data for Cape Town, Durban and Johannesburg for the years 2001-2007 were obtained from the National Injury Mortality Surveillance System of the South African Medical Research Council. Unintentional injury counts were aggregated by day and merged with daily weather data. The case-crossover epidemiology study design was applied. Generalised linear models with a distributed lag non-linear model (DLNM) component was applied to derive specific estimates of the effect of apparent temperature (Tapp) which combines temperature and relative humidity, on unintentional injury deaths of up to 27 days, adjusted for time trends (month-year strata), day of the week and public holidays. The median Tapp values were used as the reference Tapp.

Results: The range of Tapp was 5-30°C, 9-33°C and 0-27°C for Cape Town, Durban and Johannesburg, respectively. 10492 (all ages) and 8502 (14-65 years) unintentional injuries were included in the models. The city-specific median Tapp values were 16°C, 22°C and 15°C, respectively. The city-specific 75th percentile Tapp values were 20°C, 26°C and 18°C, respectively. The cumulative effect of hot temperature at the city-specific 75th percentile Tapp over 27 days increased unintentional injuries for all ages by 14.1% (95% CI -10.5%; 45.5). For the 14-65 year group this was 3.3% (95% CI -35.3%; 65.0). The association is stronger for all ages than for 14-65 year olds.

Conclusion: These results are in agreement with studies that reported an increase in unintentional injuries with increasing Tapp under non-heat wave conditions. Next confounding by criteria air pollutants will be investigated.
Abstract Detail
EPIDEMIOLOGICAL REVIEW OF ALL DEATHS OF CHILDREN, AGED 0-14, INVESTIGATED BY PRETORIA MEDICO-LEGAL LABORATORY

Introduction: Mortality rates for children is high in low- and middle-income countries. There is no single, accurate or complete data system for the evaluation of child mortality in South Africa. This study will add to South Africa's overall understanding of unnatural deaths and that it may assist in identification of patterns or trends in deaths, especially amongst the younger population. The aim of this study is to epidemiologically review of all deaths of children, aged 0-14 and investigated by Pretoria Medico-Legal Laboratory, 2012-2017.

Methods: Departmental statistics were analyzed to get DR numbers of children. Post-mortem reports relating to deaths was obtained from the PMLL death register. Demographic information, case-specific information such as external circumstances cause of injury; scene where the incident occurred; apparent manner of death; medical cause & mechanism of death will be captured into the datasheet. Each death will be classified as: (1) natural deaths, (2) unnatural deaths, (3) sudden deaths (known preexisting conditions), (4) sudden unexpected deaths (natural cause), (5) unexpected sudden deaths, in which the cause of death was unascertained. Epi info was used to assist in data capturing, data analysis and statistical calculations.

Results: Most infant deaths are due to natural causes, while a large number of deaths in the older age groups were due to injuries. The leading cause of death was due to a natural cause such as, respiratory tract infection (RTI), in infants. Homicide was the second most common cause of death in all age groups of the children. Other contributing factors were child abuse and neglect; drowning, burns and sudden deaths.

Conclusion: Further research in this field is required as it is vital to continue to strengthen the data sources that are used for the evaluation of child mortality as well as to encourage the linkage of data sources to gain an accurate as possible picture of child mortality relating to unnatural deaths, to assist in prevention thereof.
Abstract Detail
ANTIBIOTIC RESISTANCE OF LINEZOLID RESISTANT STAPHYLOCOCCI AND ENTEROCOCCI COLLECTED IN GAUTENG, SOUTH AFRICA

Background: Staphylococci and enterococci are Gram-positive bacteria that cause opportunistic hospital- and community-associated infections, such as skin and soft tissue infections, endovascular infections, pneumonia, septic arthritis, endocarditis, osteomyelitis, foreign-body infections and sepsis. The management of staphylococci and enterococci infections relies on fast accurate detection and effective treatment to reduce morbidity and mortality and to prevent potential outbreaks. Linezolid is one of the few antibiotics available for treatment of staphylococci and enterococci, therefore detecting resistant isolates is essential. While information regarding linezolid resistance mechanisms is available for many countries in the world, very little information pertaining to this is available for South Africa. This study identified the resistant species of staphylococci and enterococci while investigating the prevalence of the mechanism of linezolid resistance in clinical isolates obtained from the public and private sectors in Gauteng, South Africa.

Method: Bacterial isolates collected from the National Health Laboratory ServiceTshwane Academic Division and Ampath Laboratories from 2014 to 2107 were utilised for this study. Phenotypic methods were used for the identification and antibiotic susceptibility testing of the isolates. The VITEK 2 automated system (bioMérieux, France) was used to identify and to speciate isolates followed by determining the antibiotic susceptibility of the isolates.

Results: Phenotypic testing indicated four Staphylococcus epidermidis, two Staphylococcus haemolyticus, four Enterococcus faecalis and one Enterococcus faecium isolates. Linezolid resistance ranged between 4 μg/mL and 64 μg/mL. The S. epidermidis isolates were also resistant to cloxacillin, gentamicin, clindamycin, erythromycin and cotrimoxazole. The S. haemolyticus isolates were resistant to cloxacillin, gentamicin, clindamycin, erythromycin and fusidic acid. The E. faecalis isolates did not show resistance to these antibiotics, while the E. faecium isolate was resistant to ampicillin and gentamicin.

Discussion and Conclusion: Linezolid is a vital treatment option for staphylococci and enterococci infections. The high prevalence of antibiotic resistance to linezolid and other antibiotics of the S. epidermidis isolates are worrisome, since it limits the possibility of effective antibiotic treatment options of patients.
Abstract Detail

PRE-EXPOSURE OF MCF-7 CANCER CELLS TO A NOVEL MICROTUBULE INHIBITOR ENHANCES CELL DEATH INDUCED BY RADIATION

**Background:** Radiotherapy may be used as an effective treatment modality in cancer therapeutic regimens. However, it has detrimental side effects as cells at target sites are irradiated indiscriminately and this induces deoxyribonucleic acid (DNA) damage in healthy cells. Another potential obstacle in radiotherapy is that certain cancer cells may be intrinsically radioresistant, or repetitive doses of radiation may result in radioresistance in cells. In this light, radiotherapy in combination with chemotherapy could be a more effective strategy in treating cancer. The aim of this project was to determine whether a reduced dose of radiation could possibly be administered effectively by presensitizing MCF-7 breast cancer cells with a 2-methoxyestradiol analogue, C34, in vitro.

**Methods:** MCF-7 cells were propagated in medium and allowed 24 hours to attach. The half maximal growth inhibitory concentration (GI50) of C34 determined from crystal violet staining was used to treat both nonradiated and radiated samples 24 hours prior to radiation (6 Gy). Termination occurred 24 hours after radiation. Medium only and dimethyl sulfoxide were used as negative- and vehicle controls and the positive controls included 2-methoxyestradiol and colchicine. Light microscopy was used to examine the morphology of cells exposed to the combination treatment for evidence of cell death. Haematoxylin and eosin staining was performed to determine the mitotic indices. Histone γH.2AX foci and micronuclei quantification via microscopy was utilized to examine whether DNA damage was increased by the presensitization.

**Results:** The GI50 of C34 determined from crystal violet staining was 0.07μM. Light microscopy showed evidence of increased apoptotic cell death, namely shrinkage and the presence of apoptotic bodies. The mitotic index determined from haematoxylin and eosin staining increased, indicating a G2M block, likely due to the microtubule disruption. An increase in double-stranded breaks and increased presence of micronuclei was observed in the combination treatment samples.

**Discussion and Conclusion:** C34 treatment combined with radiotherapy induced a metaphase block and subsequently, an increase in cell death. Flow cytometry will be conducted to quantify these morphological characteristics. Reactive oxygen species response will also be investigated to determine the mechanism of action, in which C34 may sensitize the cells to radiation.
Abstract Detail
PERCEPTIONS OF NURSES REGARDING COMPANIONSHIP DURING LABOUR & CHILD BIRTH IN SELECTED PRIMARY HEALTHCARE FACILITIES AT MAKHUDUTHAMAGA SUB-DISTRICT, LIMPOPO PROVINCE

Background: Companionship is one of the pillars of mother-friendly care and it is associated with positive labour experience. The World Health Organisation recommends that all women should be given an opportunity to bring their companion of choice throughout labour and childbirth. Companionship during labour and childbirth is reported to have both psychological and emotional support benefits to the mother. The main purpose of this study was to explore and describe the perception of nurses about companionship during labour and child birth in selected primary healthcare facilities at Makhuduthamaga sub-district.

Method: A qualitative, exploratory, descriptive and contextual research design was used. The population for this study consisted of all nurses working in the selected primary healthcare facilities. The sample was saturated at 45 nurses who were made up of 27 professional nurses, 10 enrolled nurses and 8 auxiliary nurses who were purposefully selected. Data were collected through focus group interviews and analysed using eight steps as described by Tech’s open coding.

Results: Three themes emerged from the raw data which are: Positive perceptions about companionship, perceived challenges about companionship and strategies for promotion of companionship.

Discussion and conclusion: The study found that nurses had positive perceptions about companionship during labour and childbirth and they were aware of its benefits for the labouring woman and to their practice. The study recommends that all mothers should be allowed to bring their companions of choice during labour and child birth and, that all nurses should receive training on mother-friendly care with the aim of aligning their practices to the WHO strategy on Intra-partum Care.
Abstract Detail

EFFECTS OF EXPOSURE TO SELECTED ENVIRONMENTAL ENDOCRINE DISRUPTORS ON RAT SPERM MORPHOLOGY AND MORPHOMETRIC PARAMETERS

Introduction: Exposures to endocrine disrupting chemicals (EDCs), particularly during hormone-sensitive windows in early development, may affect male reproductive health later in life. EDCs have the potential to interfere with normal hormonally dependent process, including spermatogenesis. Thus, maturation of the germ cells to spermatozoa may be adversely affected resulting in impaired semen quality, sperm concentration and sperm morphological changes.

Methods: Using a modified Organisation for Economic Cooperation and Development (OECD) 415 reproductive toxicology protocol male Sprague-Dawley rats were exposed for a lifespan (while in utero, during lactation and directly) to EDCs found in a malaria area: cottonseed oil (control: group A), 1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane (DDT) (group B), 1,1-dichloro-2,2-bis(p-chlorophenyl)ethylene (DDE) (group C) and a mixture of DDT, deltamethrin (DM), p-nonylphenol (p-NP), phytoestrogens (group D). Following 104 days of dosing, semen was isolated from the cauda epididymis. Sperm concentration was determined using a Neubauer counting chamber and computer-aided sperm morphometry analysis (CASMA) was used to determine sperm morphometric features (such as head, acrosome, and mid-piece).

Results: Exposure to the selected EDCs caused increased head defects (98%) in groups B-D, with increase micro (34-40%) and macro (29-36%) sperm heads in Groups C and D compared to the control group. Compared to the control group, the arc (sperm head length), sperm head width and angle were all smaller in the exposure groups (groups B-D). No change was observed in the sperm chord length, however a higher linearity (ChordArcc100) was observed in groups B and C. While not significant, the sperm counts in all three exposure groups were lower compared to the control group.

Discussion / Conclusions: The findings of this study suggest that exposure to EDCs has an effect on various sperm morphometry and morphology parameters. Since limited evidence-based information is available on effects of exposure to complex mixtures of EDCs at environmentally-relevant concentrations, standard reproductive toxicology protocols may not provide the full spectrum of effects on the testes. The addition of CASMA to standard protocols has the possibility to provide more comprehensive information in future studies focused on sperm formation, sperm quality assessment, including prediction of the effects of reproductive toxicants.
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Abstract Detail
COAGULASE-NEGATIVE STAPHYLOCOCCUS IDENTIFIED FROM BLOOD CULTURES FROM NEONATES IN THE PRETORIA REGION

Introduction: Coagulase-negative staphylococci (CoNS) are one of the major nosocomial pathogens found in patients who are immune-compromised, neonates and elderly patients. Coagulase-negative staphylococci colonizes the skin, nares, umbilicus and pharynx of neonates within a few days after admission to the neonatal intensive care unit (NICU). Staphylococcus epidermidis is one of the most common opportunistic pathogens of the CoNS that are found in neonates, especially those who have been exposed to central venous catheters; mechanical ventilation or total parenteral nutrition. The aim of this study was to accurately detect and identify coagulase-negative staphylococci from blood cultures from neonates in the Pretoria region.

Methodology: Staphylococcal isolates associated with bloodstream infections in neonates were collected from the National Health Laboratory Service Tshwane Academic Division (NHLSTAD). Gram-staining was performed on all isolates to confirm that the isolates were Gram-positive and pure. Phenotypic identification and antibiotic susceptibility testing were performed using the VITEK® 2 automated (bioMérieux, Marcy l’Etoile, France) Gram-positive card system.

Results: Preliminary results showed that the most common CoNS isolated were Staphylococcus epidermidis with only one S. capitis identified. The majority of S. epidermidis isolates showed resistance against Benzylpenicilllin, Erythromycin, Clindamycin, Oxacillin and TrimethoprimSulfamethoxazole while the S. capitis isolate showed resistance to Benzylpenicilllin, Erythromycin and Clindamycin.

Conclusion: The health burden from these infections remain high, especially in neonates, despite the precaution already taken. The high prevalence of antibiotic resistance of the S epidermidis isolates are cumbersome since it leaves limited treatment options available for this vulnerable patient population.
Abstract Detail

FIVE YEARS CONFIRMED EFFICACY OF PYRETHROID-IMPREGNATED POLYETHYLENE WALL-LININGS – WHAT DOES THAT MEAN?

Background: The dramatic, global decline in malaria burden over the past couple of decades is largely attributed to the success of insecticide-based interventions to control mosquito vectors. The WHO advocates the use of insecticide treated nets (ITNs/LLINs) and/or indoor residual spraying (IRS) as the principal methods of vector control. The malaria burden in Africa has been halved since 2000 in spite of each method’s respective drawbacks, shortcomings and challenges. A drastic scaling-up in intervention implementation was encouraged in 2010, but the sustainability of insecticide-based methods was not considered. The WHO and UN’s Sustainable Development Goals (SDGs) proposes that malaria cases and mortality will be reduced by at least 90% and that malaria will be eliminated in 35 countries by the year 2030. However, the most recent World Malaria Report estimates that around 316 million malaria cases were reported for the year 2016 – five million more than in 2015. Malaria control seems to have reached a threshold and the disease appears to be “fighting back” by encroaching upon areas where it had been successfully controlled or eliminated. One major concern of IRS is the loss of spray residue due to dusting, resulting in a decrease in insecticide efficacy on surfaces and an increase in the human exposure potential. A possible safer and more sustainable alternative to IRS could be the use of polyethylene extruded wall-lining with insecticide incorporated in the fibre during production.

Methodology: Participant acceptance, lining durability and laboratory-confirmed efficacy of monofilament pyrethroid-impregnated polyethylene wall-linings was observed over a five-year long trial in homes in rural Vhembe. Efficacy was determined using WHO recommended cylinder bioassays employing WHO efficacy criteria for IRS of >95% KD and >80% mortality post exposure.

Results: The linings practically displayed 100% mortality after five years exposure to natural conditions and participants expressed interest to keep the linings for their insect-killing capability. A major challenge and concern is the widespread occurrence of vector resistance to pyrethroids though; the only insecticide formulation used in LLINs. Alternative new insecticide- and repellent formulations are being researched for use in the polyethylene mesh and this including other mesh-utilising techniques will be reported on.
Abstract Detail

Background: To assess the influence of local meteorological and environmental variables on the incidence of malaria in the four Local Municipalities (Mutale, Musina, Makhado and Thulamela) of the Vhembe District Municipality (VDM).

Methods: A prospective historical study design was used, which involved time series analysis of weekly malaria incidence from 2005 – 2015 in the municipalities. Malaria cases, daily temperature (minimum, maximum and mean), rainfall and normalized difference vegetation index (NDVI) data were aggregated weekly and analyzed using Principal Component Analysis (PCA). Lags were defined using Generalized Additive Model (GAM) in a univariate approach. Relationships were defined using a multivariate model after shifting the data where necessary by the lags, taken into account non-linear relationship between meteorological factors and malaria using spline functions.

Results: Mutale had the highest incidence of 235 per 100,000 person-weeks in March 2008 and overall the highest incidence for the entire study period. PCA component selected were temperature, temperature variation, rainfall and vegetation. The lag periods in all four municipalities were three weeks for temperature, nine weeks for temperature variations, four weeks for rainfall and zero week for NDVI in Musina. Musina reported the lowest number of cases. Meteorological and environmental factors differed substantially across the four municipalities.

Discussion & Conclusion: Variation in the climatic conditions experienced in all four municipalities should be considered when developing a tool to determine malaria trends for designing appropriate interventions for VDM. Meteorological factors and the specific climate classification of the area could explain differences in the incidences observed. The study also showed that Mutale was the highest risk area for malaria.
Abstract Detail

AEDES MOSQUITOES AS ARBOVIRUS VECTORS AT SENTINEL SITES IN GAUTENG, LIMPOPO, MPUMALANGA AND KWAZULU-NATAL PROVINCES, SOUTH AFRICA (2016-2017)

Background: Recent epidemics have increased the importance of the Aedes species globally as arbovirus vectors. There is limited recent data about the vectors of arboviruses endemic to South Africa. Entomological surveillance was conducted in 3 different provinces (Gauteng, Limpopo and Mpumalanga) in South Africa, from January 2016 to May 2017. From 2017, an additional site was included in Kwazulu-Natal.

Methods: Sampling was conducted for 2 consecutive nights per month, using 3 types of CO2 baited traps: Tent, CDC light and BG sentinel. Mosquitoes were morphologically sorted according to species and pooled in groups of 50. Female aedine mosquitoes were screened by RT-PCR for 3 viral genera associated with zoonotic arboviruses: Flaviviridae (Flavivirus), Togaviridae (Alphavirus) and the Bunyavirales (Orthobunyavirus and Phlebovirus).

Results: A total of 25,771 adult mosquitoes were collected, 6286 in 2016 and 19,485 in 2017. In 2017, a total of 3633 was collected in Marakele, 3020 in Lapalala (Limpopo), 957 in Boshkop, 3699 in Kyalami (Gauteng) and 3980 in Mnisi (Mpumulanga), between January to May. In Jozini (KZN) a total of 5161 mosquitoes were caught, from January, March, July and December of 2017. Culex was the most abundant in all provinces although important Aedes spp were identified in all sites. Ae mcintoshi was the most common aedine found in Limpopo and Mpumalanga in 2017, Ae quasiumnivittatus and Ae dentatus group in Gauteng, and Ae durbanensis in KZN. In 2016, one pool of Ae. aegypti tested positive for cell agent fusing virus and a pool of Ae. hirsutus from Gauteng for an unidentified Flavivirus. Two pools from Mpumalanga tested positive for the Orthobunyavirus Shuni virus (SHUV): one Ae. mcintoshi and one Aedes spp. For 2017, identified 3 pools (Ae quasiumnivittatus, Ae mcintoshi and Ae aegypti) in Gauteng and 2 pools (Ae durbanensis and Ae aegypti) from KZN that were positive for unidentified Flaviviruses. One positive pool of Ae dentatus group tested positive for Middelburg in Gauteng.

Discussion and Conclusion: Further investigations are needed to determine the importance of the unidentified flaviviruses. This study highlights the importance of continuous entomological surveillance to define arboviruses ecology and predict potential outbreaks in Africa.
Abstract Detail
THE EFFECT OF INFRA-SLOW FLUCTUATION TRAINING ON DEVIAN'T BRAIN ACTIVITY IN PRE AND POST QUANTITATIVE ELECTROENCEPHALOGRAMS

**Background:** Infra-Slow Fluctuation (ISF) training is a relative new technique which is used together with quantitative electroencephalograms (QEEG) in neurofeedback. ISF is used as a training technique for the brain to decrease deviant brain activity and to ensure an overall balance of the different brainwaves (Gamma, Alpha, Beta and Delta). ISF training tries to balance the brain by addressing the over- or under stimulation of certain brainwaves. In this manner it can potentially decrease deviant brain activity. Therefore, it is necessary to determine what potential it holds and what ISF training is capable of doing physiologically.

**Aim:** The aim of the project is to determine whether ISF training has a significant effect on deviant brain activity in participants who decided on their own volition to undergo neurofeedback training.

**Method:** The method that will be used, entails generating data by performing pre- and post- QEEGs on the participants selected from KB Neurofeedback cc. The ISF training will occur between QEEG measurements. The data will then be analysed to determine whether there was an significant effect of the training on brain activity. The program, QEEG Pro, will use a database to produce a detailed report which will provide a holistic view of the dynamics of the different brainwaves and the effect of the ISF neurofeedback training on the brain. This protocol was submitted to the ethics committee (2382018).

**Potential Results:** The project output will be to potentially demonstrate whether ISF training has a significant impact on brain functionality by decreasing deviant brain activity and improving overall performance. Improved overall performance would be the result of balanced brainwaves in the post EEG.

**Potential Discussion and Conclusion:** Potentially we can conclude that ISF training can improve overall performance by balancing the excessive activation and deactivation network relations. Ultimately, this project has the potential to have a valuable impact as it can possibly verify the validity of the ISF neurofeedback training technique.
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Abstract Detail
AGE ESTIMATION IN A SOUTH AFRICAN POPULATION BASED ON VERTEBRAL RING APOPHYSIS OSSIFICATION USING CEPHALOMETRIC RADIOGRAPHS

Background: Ossification of the anterior vertebral-ring apophysis of the cervical vertebrae can play an important role in age estimation in living individuals. These regions are easily visible on standard cephalograms and do not require additional radiography.

Aim: The aim of this study was to decide whether a person is legally an adult, in other words, what is the probability of an individual being younger than 18 years, based on cervical vertebrae development.

Materials and methods: This study was designed to assess the development of the anterior ring apophysis associated with the inferior margins of C2, C3 and C4. Retrospective cephalometric radiographs of Black and White individuals living in South Africa aged 15 to 23 were used. A newly developed 4 stage classification with set criteria was used. The ossification stage for each individual was determined and scored according to these criteria. The probability of having reached a specific age between 15 and 23 years, at a given stage, was determined for each population and sex. This included a 95% confidence interval.

Results: Preliminary results indicate that Stage 1 ossification starts at age 15, and that ossification is complete in all individuals by age 20. This method shows considerable promise in age estimation of the living, especially if used in conjunction with third molar development.
Abstract Detail

MOLECULAR CHARACTERISATION OF HIV GROUP-SPECIFIC ANTIGEN GENE FROM PARTICIPANTS WITH EARLY AND CHRONIC HIV-1 INFECTION IN THE TSHWANE DISTRICT OF SOUTH AFRICA

Introduction: The group-specific antigen (gag) gene is a highly conserved region on the HIV genome, hence it is used as a target for most diagnostic assays. Gag epitopes elicit effective cytotoxic T cell immune responses that control HIV viraemia during early HIV infection. As a result, gag gene epitopes are incorporated into most HIV vaccine candidates. The aim of the study is to molecularly characterize the HIV gag gene from participants with either early or chronic HIV-1 infection.

Methods: This is a retrospective study that characterises gag gene from stored samples that were obtained from participants with early or chronic HIV infection in five clinics in the Tshwane district of South Africa. Published nested polymerase chain reaction (PCR) is used for amplification of the complete gag gene of HIV. Sanger sequencing will be done on all samples with positive PCR results. CLC Main Workbench programme will be used for editing and analysing the sequences and then a phylogenetic tree will be constructed using Mega programme. The sequences from participants with early HIV infection will then be compared to those of participants with chronic HIV infection.

Results: Gag will be amplified from a total of 60 participants’ samples. The median age of all participants is 28 (interquartile: 24 - 32). The published PCR has been tested and optimized to yield stronger bands on gel electrophoresis. The gag gene from 15 participants’ samples have since been amplified, 12 of which tested positive. The remainder of the samples will be tested before the end of June. Sanger sequencing data will be available by the end of July.

Conclusion: The role that the gag gene plays in the virology of HIV has made it an important gene for research, especially that there is still no successful HIV vaccine. Further characterisation of the gag gene could provide important knowledge for future HIV vaccine or diagnostic assay development.
Abstract Detail
INVESTIGATING CARDIAC STRESS AND HEART RATE VARIABILITY DURING THE ASSESSMENT OF VISUAL PERFORMANCE

Background: A study conducted by Tyrell et al supported the behavioural link between oculomotor control and the cardiovascular system. The exact mechanism is currently unclear and therefore this study is being conducted to further investigate the autonomic mechanism in control and regulation of accommodation- referring to the adjustment of the eye done automatically by flattening or thickening the lens; vergence- describing movement of the pupils of the eye simultaneously towards or away from each other when focussing; and other visual skills.

Aim: The aim of this study is to determine characteristics of continuous heart rate variability and physiological stress during the battery of visual skills assessments.

Methods: The study consists of 50 volunteers who fill in and sign a consent form. Visual skills assessments: visual acuity, eye dominance, focussing test, tracking test, vergence, sequencing, visualization and ice cube catch are performed while heart rate variability is monitored using the Zephyr BioHarness.

Results: The mean of the heart rate, breathing rate and heart rate variability is calculated for each assessment related event and the changes of each parameter between each assessment related event within each participant is correlated with performance parameters in the visual skills assessments. Video recordings during are made during each assessment for timestamps of significant events such as the start and end of an assessment and if mistakes are made. All assessment data is captured onto an excel data sheet. The data recorded by the Zephyr Bio-harness is exported into proprietary data files, as well as excel data sheets from each device’s proprietary software. All video recordings, data sheets and data files will be stored on a secured cloud drive.

Discussion: The results can indicate how heart rate variability is affected during visual skills assessment, and the results may give insight into a possible causal link between demanding visual tasks, eye strain and cardiac stress. It is hypothesised that during visual skills assessment there is a noticeable change in heart rate variability and physiological stress. Future research can be done in trying to find ways to reduce negative physiological stress during demanding visual tasks.
EVALUATION OF FACTORS AFFECTING THE OUTCOME OF RADIO-IODINE TREATMENT FOR HYPERTHYROIDISM

**Background:** Hyperthyroidism occurs due to excessive production of thyroid hormone by the thyroid gland. One modality of treatment is radio-iodine ablation but there is uncertainty of the factors that influence its effectiveness.

**Aims:** Our aims were the following: 1) Determine the cure rate in hyperthyroid patients treated with radio-iodine ablation from 6 months onward. 2) Identify factors which influence outcome such as: dose, antithyroid drugs, type of hyperthyroidism, age or gender of patient.

**Methods:** Retrospective analysis of patient record from Steve Biko Academic and Kalafong Hospitals with approval from the Human Ethics Committee of the Faculty of Health Science of the University of Pretoria.

**Results:** There were 205 patients collected with a female predominance of 83.8%. Females presented older compared to males (67% females vs 40% males were 40 years or older). Graves’ disease was most common diagnosis, 88.6%. Cure rate was 90.8%, with no statistical difference between the different gender and ages. Patients who received a second dose had a poorer outcome (r=0.32, p<0.001). Cure rate for those that received 1 dose was 94.8% (147155) and those who received 2 doses was less, 60% (1220). Patients older than 60 years tended to require only one dose of radio-iodine ablation(p=0.027). A Chi-squared test showed an association between dose and cure rate, low dose (<=15mCi) 86% vs high dose(>15mCi) 96% (p=0.05). Antithyroid drugs resulted in higher number of treatment failures (pre-ablation p=0.04 and post-ablation p<0.001) and correlated with the number of doses received (r=−0.38, p<0.01), implying the patient was more likely to receive a second dose.

**Discussion and Conclusion:** Patients who received antithyroid treatment or received more than 1 dose of radio-iodine ablation did poorly. These outcomes can help clinicians to identify patients at risk of failure and increase the initial dose of radio-iodine ablation.
Abstract Detail
DEVELOPMENT OF A SOLID-PHASE EXTRACTION UPLC-QTOF METHOD FOR DETECTION OF CARBAMATE PESTICIDES AND THEIR METABOLITES IN SUSPECTED POISONING CASES

Introduction: Pesticide poisoning is a major global public health concern, with an estimated annual incidence of more than three million cases. Among the numerous pesticides that can result in death, organophosphorus insecticides are the major cause of acute pesticide poisoning. In South Africa, aldicarb, also known as “Two-Step” or “Galephirim”, is commonly sold in the informal sector as a rodenticide and has resulted in numerous cases of acute poisoning. However, there is a paucity of data regarding the true incidence and circumstances of pesticide poisoning fatalities. The identification of pesticides in post-mortem biological samples is mandatory in forensic toxicology.

Aim: The aim of this study is to develop a sensitive method for the determination of carbamate and its metabolites in biological samples using the ultra-performance liquid chromatography coupled with quadrupole-time of flight mass spectrometry (UPLC-QTOFMS).

Methods: Chromatographic separation of the ten carbamate standard mix solution and internal standard was achieved with gradient elution on an Acquity HSS T3 C18 column after solid-phase extraction of spiked biological samples (blood and urine) using OASIS Prime HLB cartridges. Mobile phase buffers consisted of 10 mM ammonium acetate with 0.1% formic acid in water (Buffer A) and methanol (Buffer B). Detection and quantification were carried out on a Synapt-G2 QTOF mass spectrometer. Masslynx™ and Quanlynx™ software was used for identification and quantitation of analyte ions.

Results: The method was validated for the determination of 10 carbamates in biological samples according to sensitivity and detection limits. Accuracy and precision for all analytes were within the acceptable range of 15% with limits of quantification between 1 and 5 ppm. Good linearity was achieved for all analytes with correlation coefficients between 0.98 and 0.99.

Conclusion: The developed method for the detection of ten carbamate pesticides in biological matrices was successful and will be further used to assess decay kinetics with reference to matrix storage conditions in post-mortem toxicology laboratories.
Abstract Detail

CHANGING PATTERN OF THYROID CANCER POST IODINE SUPPLEMENTATION AT STEVE BIKO ACADEMIC HOSPITAL AND KALAFONG HOSPITAL.

Introduction: Thyroid cancer is the most common endocrine carcinoma. Thyroid follicular cell cancer predominates in iodine-deficient and papillary cancer predominates in iodine-replete populations. Since introduction of compulsory standardized iodination of table salt in South Africa in 1995, the frequencies of different types of thyroid cancer has not been studied in our practice. Our aim was to determine the relative frequencies of different types of thyroid cancer at Kalafong Hospital and Steve Biko Academic Hospital, and to compare the patterns of different types of thyroid cancer pre- and post-iodine supplementation.

Methods: A retrospective analysis of patient records (1990-2016) at Steve Biko Academic Hospital and Kalafong Hospital was done with approval from the Human Ethics Committee of the Faculty of Health Science of the University of Pretoria.

Results: We reviewed 191 patients diagnosed with thyroid cancer. Majority 82.7% (158) were females, 85.3% (163) were blacks, 48% (92) were between 41-60 years, mean age 45.92 with SD 15.27. Papillary carcinoma was the predominant thyroid cancer with 51.31% (98), followed by follicular carcinoma with 37% (71), medullary carcinoma with 6.81% (13) and anaplastic carcinoma with nine (4.71%) patients. Follicular carcinoma predominated the pre-iodine era (1990-1999) with 50%, and papillary carcinoma accounted for 42%. Papillary carcinoma predominated the post-iodine era with 53.1% (2000-2009) and 55.4% (2010-2016) followed by follicular carcinoma with 28.6% (2000-2009) and 34.8% (2010-2016) (p-value 0.026).

Discussion and Conclusion: Papillary thyroid carcinoma is the predominant cancer of the thyroid across all races, gender and age at Kalafong and Steve Biko Academic Hospitals. The introduction of standardized iodination of table salt in South Africa in 1995 has changed pattern of thyroid carcinoma in our practice from a predominantly follicular carcinoma in a pre-iodine era to a predominantly papillary carcinoma in post-iodine supplementation era.
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Abstract Detail
PREVALENCE OF ST307 CLONE IN EXTENDED SPECTRUM BETA-LACTAMASE PRODUCING KLEBSIELLA PNEUMONIAE ISOLATES CIRCULATING IN THE TSHWANE DISTRICT

Background: Klebsiella pneumoniae is a Gram-negative bacillus and is an opportunistic human pathogen. The acquisition of drug resistant strains of K. pneumoniae, especially in nosocomial infections, is a research area of interest in medical microbiology and epidemiology. Mechanisms of drug resistance in K. pneumoniae sequence type (ST) 307 include, but are not limited to, the production of K. pneumoniae carbapenemases (KPC), oxacillinase (OXA) carbapenemases and extended spectrum beta-lactamases (ESBLs). The evolution of these drug-resistance mechanisms was sequential following the initial production of ESBLs in ST307.

Aim: This study aims to investigate the prevalence of ST307 K. pneumoniae producing ESBLs in hospitals in the Tshwane district in South Africa.

Methods: Consecutive, non-repeat ESBL producing isolates were collected from the National Health Laboratory Service (NHLS). Only isolates that tested positive for ESBL production using VITEK® 2 Compact were used for further laboratory analysis. An in-house validated polymerase chain reaction (PCR) assay for detecting ST307 was performed on the extracted DNA.

Results: Forty-three ESBL positive K. pneumoniae isolates were collected after VITEK identification. The PCR screening results showed that 70% (n=3043) of the isolates tested positive for ST307. Analysis of specimen type showed that out of the blood cultures that were tested, 72% (1318) tested positive for ST307 and urine cultures only 30% (310). The examination of patient records, corresponding to the ST307 positive isolates, found that gender distribution of the patients was 65% male and 35% female. The ST307 positive isolates originated from patients from various different wards in the hospitals.

Conclusion: Preliminary data show that K. pneumoniae ST307 is responsible for most of the bloodstream infections caused by ESBL positive K. pneumoniae. The ESBL positive K. pneumoniae ST307 clone is circulating in different wards of the hospitals and is not limited to only one or two wards. This clone is one of the new high-risk clones, known to acquire several additional resistance mechanisms and causing nosocomial outbreaks worldwide. Improved infection control and prevention strategies are imperative to controlling the spread of this clone.
Abstract

BINDING EFFECTS OF NOVEL IgG1 MONOCLONAL ANTIBODIES TO MYCOBACTERIUM TUBERCULOSIS AND OTHER MYCOBACTERIAL SPECIES: AN IN VITRO ASSESSMENT

Background: Antibodies are produced during the course of tuberculosis (TB) infection; however, their protective role has been questionable. Research on the use of anti-TB monoclonal antibodies (MABs) as adjunct treatment to TB chemotherapy has shown promising results in animal models. A better understanding on the general or unique binding activity of selected MABs to different clinically relevant mycobacterial species and their sub-types is important for future work on the elimination of TB. The binding specificity of these antibodies will determine whether they can be used as universal immunotherapeutic agents. The binding effects of two selected novel monoclonal antibodies (JG7 III D3I F9; GG9 II G2) to Mycobacterium tuberculosis and Mycobacterium smegmatis were investigated to describe common or unique binding activities across species.

Methods: Mycobacterium tuberculosis ATCC 25177 and Mycobacterium smegmatis ATCC 19420 were cultured on Middlebrook 7H9 broth on the BACTEC MGIT 960 system. Acid-fast staining and the MPT64 antigen test were performed on culture positive tubes. Serial dilutions (10⁻⁵ to 10⁻¹⁰) of the bacterial suspension were plated on Middlebrook 7H10 agar for cell enumeration while an enzyme-linked immunosorbent assay was performed simultaneously.

Results: Comparison of MAB binding to both strains at early log phase versus mid-log phase indicated better binding in the latter. Better binding was also observed as the MAB concentration increased with best binding observed at the highest MAB concentration of 25 µg/ml in most experiments. Generally, MAB JG7 performed better than MAB GG9 with regards to binding affinity and consistency between duplicate assays and repeat ELISAs.

Discussion and Conclusion: A better understanding of the binding specificity of monoclonal antibodies will impact the decision to implement these MABs as adjunctive therapy to be administered together with chemotherapy, in a bid to shorten treatment regimens, improve host immunity especially in immunocompromised individuals and ameliorate the drug resistance epidemic. Information on varying binding affinities at different MAB concentrations may provide a starting point for research on the possible dosage options for patients.
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Abstract Detail
POTENTIAL RADIOSENSITIZATION OF TRIPLE NEGATIVE BREAST CANCER CELLS BY PRE-EXPOSURE TO A LOW-DOSE 2-METHOXYESTRADIOL ANALOGUE

Background: Compound 34 (C34) is a 2-methoxyestradiol microtubule disrupter demonstrating anti-mitotic properties in commercial cancer cell lines. Ionizing radiation induces oxidative- and deoxyribonucleic acid (DNA) damage leading to cell death. These mechanisms are harnessed in breast cancer treatment. The cytotoxic effects of radiotherapy may be enhanced by pre-treatment with chemotherapeutics.

Aim: The aim of this study was to investigate the potential radiosensitizing effects of C34 on breast cancer cells in vitro.

Methods: After seeding and a 24-hour attachment policy, MDA-MB-231 cells were exposed to C34 for 24 hours prior to 6 Gy radiation, followed by a 24 hour incubation. Negative controls included cells exposed to medium only and to the dimethyl sulphoxide (DMSO) vehicle. The half maximal growth inhibitory concentration (IG50) of C34 was determined alone and in combination with 6 Gy radiation spectrophotometrically using crystal violet staining. Polarization-optical differential interference contrast (PlasDIC) microscopy was used to examine morphological characteristics of cell death. Colchicine served as a positive apoptosis control. Haematoxylin and eosin (H&E) stains, which differentially stain the nuclei and cytoplasm of cells, were used to quantify mitotic indices visualized by light microscopy. 2-Methoxyestradiol was used as a positive control for mitotic block. Micronuclei scoring using light microscopy was used to assess DNA damage with etoposide as a positive control.

Results: Results of the compound-and-radiation combination treatments were compared with individual drug- and radiation treatments. The IG50 of C34 was 0.06 μM. PlasDIC showed an increased number of apoptotic cells in the combination treatments. Mitotic indices revealed an increased number of cells present in metaphase suggesting that a mitotic block had occurred in the combination treatment. C34 in combination with radiation yielded higher micronuclei scores indicating increased DNA damage.

Discussion and conclusion: Preliminary studies show that C34 potentially radiosensitizes MDA-MB-231 cells, demonstrating metaphase arrest and cell death. Future studies will include flow cytometry for analysis of cell cycle progression and quantification of reactive oxygen species, and gamma histone H2A.X (y-H2A.X) foci to visualize DNA damage using confocal microscopy. Consequently, a novel anti-cancer strategy may be studied in vivo and optimized to improve breast cancer management.
Abstract
TRANSMITTED MAJORITY AND MINORITY ANTIRETROVIRAL DRUG-RESISTANCE VARIANTS OF HIV IN THE TSHWANE DISTRICT OF SOUTH AFRICA

Introduction: The effectiveness of antiretroviral (ARV) treatment is determined by susceptibility of HIV strains to drugs used in the ARV regimen and by patient’s adherence to treatment. Transmission of ARV drug-resistant strains compromises response to treatment.

Aim: The aim of this study was to assess transmission of ARV drug-resistant strains of HIV among individuals with early HIV infection.

Methods: Individuals with early HIV infection were identified from five HIV counseling and testing clinics in the Tshwane district of South Africa, and follow-up samples were obtained from them before ARV treatment initiation. In-house nested polymerase chain reaction (PCR) that targets the complete polymerase (POL) gene of HIV was performed on baseline and follow-up samples. Sanger sequencing was only performed on baseline samples, and its sequences were analysed on CLC Main Workbench programme. Illumina MiSeq deep sequencing was performed on baseline and follow-up samples, and its data were analysed using a combination of 3 pipelines; PASeq, HyDRA and DeepChekHIV. Only variants called by all 3 pipelines were reported regardless of the threshold used.

Results: Twenty one participants with early HIV infection were identified, with a median age of 26 years (interquartile range: 23 - 29). POL gene was successfully amplified from 17 participants, 13 of whom had follow-up samples. Sanger detected transmitted resistance mutations in 11.7% (2/17) of participants. Using a ≥1% threshold for detection of variants, the Illumina MiSeq deep sequencing detected transmitted resistance in 41.2% (7/17) of participants, and this increased to 52.9% (9/17) when a ≥0.5% threshold was used. A trend of increase of minority variants, ranging from 2 to 123 fold increase, was observed in some sample pairs from baseline to follow-up.

Conclusions: Illumina deep sequencing detected a higher rate of transmitted ARV drug-resistance. The minority variants were all mutations that are known to reduce the replication capacity of HIV, hence they existed at lower proportion of the virus population. A trend of increase of these minority variants in some sample pairs, without ARV drug pressure, highlights their possible clinical relevance.
Abstract Detail
SYNERGISTIC ANTICANCER EFFECTS OF A POTENT ANTIMITOGEN AND AN IN SILICO DESIGNED BROMODOMAIN INHIBITOR ON BREAST CANCER CELLS

Background: This aim of the study is to contribute towards understanding the mechanistic behaviors of a potent antimitotic compound (STX1972) in combination with a newly in silico-designed Bromodomain 4 (BRD4) inhibitor (W41). The effects of these compounds was investigated on three different cell lines: MCF-7 and MDA-MB-231 (breast cancer cell lines) and a human endothelial-like Ea.hy926 cell line.

Methods: A crystal violet assay was used to screen the effect of anticancer compounds on cell growth in order to determine the effective concentration of the compounds alone and in combination. The project mechanistically assessed the in vitro antineoplastic activity of the compounds and combination by means of flow cytometric analysis of cell cycle progression, apoptosis detection and Bcl-2 protein expression. Confocal microscopy was used to morphologically observe the effect of the compounds on the cytoskeletal microtubule architecture.

Results: IC50 results show that STX is the more potent compound exhibiting nanomolar activity. The BRD4 inhibitor proved to be more potent in reducing cell growth in MDA-MB-231 cells when compared to MCF-7 cells. A combination ratio of 0.55 * STX1972 IC50 + 0.3 * W41 IC50 (combination index =0.85) was identified as the most synergistic combination. Confocal microscopy analysis of tubulin structure revealed abrogated spindle formation in STX1972-and combination-treated MDA-MB-231 cells. Cell cycle progression at 8 h exposure to STX1972 revealed a G2M block in all cell lines. At 48 h the sub G1 fraction increased in STX1972 exposed cells. W41- and the combination-treated MCF-7 and MDA-MB-231 cells resulted in a more pronounced G1-block after 48 h exposure in comparison to the Ea.hy926 cells. The combination-treated cells showed an increase in cell death in MCF-7 and MDA-MB-231 cells and to a lesser extent in the Ea.hy926. Analysis of Bcl-2 and Ser70 phosphorylated Bcl-2 content revealed that combination treatment resulted in decreased total Bcl-2 content but a small increase in Ser70 phosphorylated Bcl-2 content.

Discussion and conclusion: Results from the study demonstrate that the combined incorporation of an antimitotic agent as well as an epigenetic regulator holds promise to induce synergistic effects due to simultaneous targeting of multiple cancer hallmarks.
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Abstract Detail
COMMUNITY KNOWLEDGE, PERCEPTIONS AND ACCEPTABILITY OF MICROBIAL LARVICIDING FOR MALARIA CONTROL IN SELECTED RURAL AREAS OF BOTSWANA AND ZIMBABWE.

Background: Indoor residual spraying with pyrethroids and long-lasting insecticidal nets are the main malaria vector control interventions in Botswana and Zimbabwe. Increasing resistance of mosquitoes to pyrethroids is threatening successful malaria control leading to increasing demand for additional interventions such as larviciding. While larviciding field trials have shown promising results, success at program level requires community participation and support. In this paper, we report on community knowledge, perceptions and acceptability of bio-larviciding in selected rural areas of Botswana and Zimbabwe.

Methods: Thirty-two heads of households were interviewed using an interview guide with both closed and open-ended questions. Participants came from two villages and two wards in Botswana and Zimbabwe, respectively. The villages and wards were study arms of an ongoing larviciding experiment in the two countries.

Results: Bio-larviciding was known to 81% and 31% of the respondents in Botswana and Zimbabwe respectively. All the participants, from both countries, knew about indoor residual spraying and long-lasting insecticidal nets. Interviewed community members felt that larviciding was acceptable and were willing to support it because it could effectively supplement IRS and LLINs. They also had a desire to be protected from mosquito bites, and they perceived that larviciding was able to kill mosquitoes early, and that it was safe and easy to implement. Community members perceived that the weaknesses of larviciding included the inability to control all mosquitoes, that larvicides were not always available and that finding all the breeding sites would be difficult.

Conclusion: Community members, from Botswana and Zimbabwe, felt that larviciding using microbial larvicides is acceptable. National mosquito control initiatives should take advantage of the communities’ willingness to support and include larviciding into an integrated vector management (IVM) package for selected rural areas where breeding habitats are few, fixed and findable.
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Abstract Detail

ASSESSMENT OF PHYSIOLOGICAL VARIABLES AMONG HIGH SCHOOL RUGBY PLAYERS DURING TRAINING SESSIONS AND COMPETITIVE MATCHES

Background: Rugby is a competitive sport that is watched by millions of people around the world. In order for rugby teams to remain competitive; training status, fitness and performance levels of rugby players must be prioritized. The aim of this study was two-fold, firstly to assess cardiac autonomic function among high school rugby players by looking at heart rate variability (HRV) and heart rate recovery (HRR) as indicators of training status; and secondly to assess the position-specific physiological traits and impact exposure during competitive matches versus fitness training scenarios throughout a rugby season.

Methods: In a cross-sectional study, nine healthy high school rugby players (randomly selected) were assessed during contact fitness training sessions as well as competitive matches. The Zephyr BioHarness™, a U.S. FDA-approved wireless, ambulatory physiological monitoring device that consists of a 50 mm wide, adjustable fabric chest strap, attached transmitter unit (the sensor) and will be used to measure cardiac autonomic function parameters and portable Global Positioning System (GPS) devices were used to obtain accelerometry and impact data.

Results: HRV is analysed by firstly quantifying the time differences between successive heart beats, also known as R-R intervals (RRI). The RRIs are analysed through time- and frequency-domain methods. RRI data is imported into the Kubios software platform (University of Finland), and artefacts are removed using the built-in artefact correction tools, where after HRV will be calculated. HRR is measured as the absolute decrease in heart rate during the first minute following discontinuance of exercise (ΔHR1min). HR reduction of approximately 36bpm 3-minutes directly after exercise is a good statistical determinant of autonomic function. Peak accelerations (g) are derived from the composite acceleration of the 3 primary directions (x, y, or z) and are used to assess impact. Any peak accelerations above 2g is considered as a significant impact and such impacts are qualified and analysed using the OmniSense software and its additional impact processor plug-ins.

Discussion and conclusion: Results from the study contribute to the improved monitoring, assessment and understanding of the various physiological factors at play during competitive matches versus fitness training scenarios throughout a rugby season.
Abstract Detail
IDENTIFICATION OF POTENTIAL PLASMODIUM FALCIPARUM DIHYDROFOLATE REDUCTASE-THYMIDYLATE SYNTHASE INHIBITORS USING PHARMACOINFORMATICS APPROACH

Background: Malaria is a devastating infectious disease mainly caused by parasite Plasmodium falciparum and characterized by intermittent high fevers and, in the case of cerebral malaria, neurological complications such as brain injury and coma. According to World Health Organization about 212 million cases were found and an estimated 429 000 malaria deaths in 2015. Antimalarial drugs, target to the dihydrofolate reductase enzyme (PfDHFR-TS) of the parasite shown drug resistance properties that leads necessitates of development new drugs for the malaria. The current study aims to use pharmacoinformatics approach for the discovery of novel inhibitors of PfDHFR-TS to treat resistant falciparum malaria.

Method: Pharmacophore based virtual screening followed by molecular docking and molecular dynamics simulation were adopted to identify the potential lead molecules for the malaria. In this purpose a set of PfDHFR-TS inhibitors were collected from BindingDB with biological activity. The whole dataset was divided into training and test sets for the generation of pharmacophore models and validation of generated model respectively. The final validated model was used to screen the Asinex database. Furthermore the final screened promising compounds were considered for molecular docking and molecular dynamics simulation studies.

Results: The best pharmacophore model explained that one hydrogen bond (HB) acceptor and two HB donors along with one hydrophobic region are crucial for inhibition to the PfDHFR-TS. The initial molecules identified were sorted out using a number of criteria and finally three molecules emerged as promising PfDHFR-TS inhibitors for therapeutic application in malaria. The molecular docking study confirmed the binding interactions between final screened molecules with the catalytic amino residues of PfDHFR-TS. The RMSD, RMSF, and radius of gyration in 30ns molecular dynamics study of protein-ligand complexes revealed that the proposed molecules are capable of retaining stability inside the receptor cavity of PfDHFR-TS.

Conclusion and Discussion: The experimental procedure identified three molecules capable of inhibiting the PfDHFR-TS enzyme. The molecules were validated by molecular dynamics simulation. The study suggested that the proposed compounds might be promising PfDHFR-TS inhibitors for the treatment of malaria affected community subjected to experimental confirmation.
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Abstract Detail
BARRIERS TO THE IMPLEMENTATION OF PREOPERATIVE ERAS FASTING GUIDELINES IN AN ACADEMIC HOSPITAL IN GAUTENG

Background: Enhanced Recovery After Surgery (ERAS) protocols consist of a holistic multidisciplinary approach to improve recovery during the hospitalisation of surgery patients. It decreases risks of complications, lessens hospital stay and lowers morbidity rates. Nutrition, specifically the latest preoperative fasting guidelines, is an essential component of ERAS and was found not to be implemented in an Academic Government Hospital. Aim: Determine the barriers to pre-operative ERAS fasting guidelines implementation by the multidisciplinary team in an Academic Government Hospital in Gauteng.

Methods: An observational study in the quantitative domain was conducted using a self-administered questionnaire among nursing staff, dietitians and anaesthetists involved in adult surgery. The questions were categorised into staff-related, practice-related and resource-related factors. Data was analyzed using descriptive statistics.

Results: A total of 116 participants (nine dietitians, 87 nurses and 22 anaesthetists) were included in the sample. Staff-related factors were found to be the predominant barriers with only 20% of the sample being aware of ERAS and only 7% of the nursing staff being aware. Half of the sample (50%) knew the latest preoperative fasting guidelines. Only 28% of the sample indicated that they received training on ERAS with the majority of these participants (72%) indicating that the training was adequate. Communication, as a practice-related factor, was found to be a barrier as only 38% of participants indicated they are instructed to implement the latest preoperative guidelines, 36% agreed that the guidelines are discussed in the ward and 41% confirmed the availability of a protocol in the hospital. Resource-related barriers included time, personnel and carbohydrate-rich drinks availability in the wards. Of the sample, 46% thought there was adequate personnel available whilst only 40% reported that carbohydrate-rich drinks are readily available. Sixty-seven percent (67%) of the sample was of opinion that they had enough time to implement ERAS.

Conclusion: All participants had a positive attitude towards the implementation of ERAS preoperative guidelines. The most evident barrier to the implementation of the latest pre-operative fasting guidelines is a lack of knowledge as well as a lack of training in ERAS. Addressing these barriers can result in improved patient outcomes.
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Abstract Detail
FLOW CYTOMETRIC ANALYSIS OF PLATELETS IN SUBJECTS ON A LOW-CARBOHYDRATE HIGH-FAT DIET

Background: Emerging evidence has shown that platelets not only play a significant role in the atherogenic process but also in the initiation and progression of the plaque and their subsequent thrombotic complications.

Aim: The aim of the study is to assess platelet function of individuals on a low-carbohydrate high fat (LCHF) diet using flow cytometry.

Methods: Upon ethical approval, 28 subjects on a LCHF and 32 controls were recruited to participate. Once informed consent forms were completed, citrated blood was taken from all participants in order to analyse the expression of platelet surface receptors. Platelet parameters used for the study were platelet identifier (CD41) and platelet activation markers (CD62 and CD63). For each blood sample taken 2 tubes were prepared; each tube containing 1 ml sheath fluid from Beckmann and Coulter and 20 μl of blood. The other tube was stained with 5 μl of CD41-FITC (fluorescein isothiocyanate) CD62P-APC (P-selectin) Allophycocyanin (APC) and CD63-PE (Phycoerythrin). These were examined using an FC500 Beckman Coulter flow cytometer.

Results: Results show that compared to healthy controls LCHF group showed a significant difference in both platelet identifiers (CD41) and markers indicating platelet activation (CD62 and CD63). Statistical differences were obtained with the following when comparing LCHF subjects to controls: CD41 counts were higher (p=0.01); all gated platelets [A] CD63CD62 counts (p=0.041) & % gated (p=0.049); platelets gated alone [I] CD41CD62 counts (p=0.039) & % gated (p=0.032) and platelets gated alone [I] CD63CD62 counts (p=0.035) & % gated (p=0.050) all were higher in the LCHF individuals.

Conclusion: When compared to controls subjects on a LCHF had significantly elevated activated platelets as measured with CD62 and CD63 markers. Increased platelet activation have been documented in coronary artery disease and type 2 diabetics. Further studies will need to be done to confirm is this poses an increased risk for thrombosis in LCHF individuals.
Abstract Detail

LARYNGEAL AMYLOIDOMA IN AN HIV-POSITIVE PATIENT SECONDARY TO A PLASMA CELL NEOPLASM

Background: Patients with HIV/AIDS are predisposed to the development of several well documented malignancies termed neoplasms “strongly-associated with HIV” or “AIDS-defining”. Furthermore, these patients also develop non-AIDS defining malignancies at a higher rate than the general population. The introduction of effective antiretroviral therapy has resulted in a greater life expectancy in this patient group resulting in an even greater risk for morbidity due to infectious and neoplastic disease. Amyloidosis represents the extracellular deposition of abnormal proteins within tissues in association with a clonal plasma cell population or more rarely due to genetic, inflammatory or idiopathic factors. Laryngeal amyloidosis is an unusual pathological process infrequently documented secondary to plasma cell neoplasms occurring in the context of HIV/AIDS. Two successive biopsy specimens submitted for histopathological assessment from a retro viral-disease positive patient who had presented with upper airway obstruction showed a high-grade plasma cell neoplasm with abundant amyloid deposition which was accompanied by a florid giant cell reaction.

Methods: The biopsy specimens were extensively reviewed and immunohistochemical staining for LCA, CD20, CD38, Mum-1, Ki-67, CD56, CD31, kappa and lambda light chains as well as Congo Red special staining and immunofluorescence for Thioflavin-T was performed. EBV in-situ hybridization was also requested.

Results: The immunohistochemical profile confirmed the presence of a plasma cell neoplasm with kappa light chain restriction. The extracellular proteinaceous deposits stained salmon pink and exhibited an apple-green birefringence with polarized light in sections stained with Congo Red confirming the presence of AL (kappa) amyloid deposition.

Discussion: South Africa remains the country with the most people living with HIV/AIDS. The longevity of these patients has dramatically improved with antiretroviral therapy, however, the multitude of HIV-associated diseases has placed ever increasing financial demands on our health care system whilst decreasing the ability of patients to remain economically active members of society.

Conclusion: This case report highlights two infrequent pathologically related entities in the larynx of an HIV-positive patient in order to raise clinical awareness of HIV-associated malignancies and their complications with the hopes of expediting appropriate management.
Abstract Detail

A SURVEY OF SURGEON SATISFACTION WITH THE ANAESTHETIC SERVICES AT A TERTIARY HOSPITAL IN GAUTENG, SOUTH AFRICA.

**Background:** The anaesthetist has two clients, namely the patient and the surgeon. This is the first study that assesses the surgeon satisfaction with the anaesthetic services at Steve Biko Academic Hospital (SBAH).

**Methods:** The survey was conducted using a modified version of the Surgeon Satisfaction with Anaesthesia Services scale (SSAS scale). This scale was used in a Canadian study in 2000. Two areas of satisfaction were evaluated namely the clinical skill of the anaesthetists and the attitude/behaviour of the anaesthetists. The questionnaires were completed anonymously and a total of 104 completed questionnaires were returned, giving a response rate of 57.78%

**Results summary:** The mean satisfaction score of the anaesthetists clinical skills was 66.39%. The surgeons were most satisfied (>80%) with the anaesthetists ability to keep the patients hemodynamically stable, that the anaesthetists act effectively during a medical emergency and that the anaesthetists keep their knowledge and skills up to date. The mean satisfaction score of the anaesthetist behaviour and attitude was 68.25%. The surgeons were most satisfied (>80%) with anaesthetists ability to remain calm under pressure, that the anesthetists remain sufficiently present in theatre to monitor patients and that the anesthetists consider the surgeons professional opinion. There were statistically significant satisfaction differences between surgeons with different levels of experience (F = 2.75; p = 0.047). Age, sex and surgical speciality of surgeon did not have a significant influence on satisfaction scores. The Cronbach alpha score of 0.84 indicated good reliability of the questionnaire.

**Conclusion:** The survey of surgeon satisfaction with the anaesthesia services at SBAH identified areas of > 80% satisfaction, 60-80% satisfaction and < 60% satisfaction. The results showed similarities with a Canadian study and suggests that there are common factors leading to satisfaction or dissatisfaction with anaesthetic services in the context of state sponsored healthcare. The anaesthetic department at SBAH will use the information obtained as part of the process of continuous quality improvement (CQI) of the anaesthetic service.
Abstract
SEASONAL PSEUDOHYPERKALAEMIA IN A TEMPERATE CLIMATE SOUTH AFRICA

**Background:** The phenomenon of seasonal pseudohyperkalaemia where falsely high levels of potassium are observed during the cold winter months has been described in the United Kingdom. In South Africa, which has a more temperate climate, it has not been described. This may be related to prior cold storage of blood samples or transportation in colder ambient temperatures. It is hypothesized that the lower temperature inhibits the red cell Na-K ATPase allowing the efflux of potassium and higher measured levels.

**Aim:** Our study aimed to investigate whether there is a relationship between ambient seasonal temperatures and serum potassium levels in a South African climate.

**Methods:** A retrospective study reviewing serum potassium results from January to June 2017 was conducted at Steve Biko hospital. The study included patients from surrounding clinics and satellite hospitals in Pretoria, South Africa. Average temperature ranges were obtained from the South African weather service from the period (January-May 2017).

**Results:** 10002 serum potassium levels were analyzed in January 2017, 8000 in February, 9205 in March, 7800 in April and 11005 in May respectively. Analysis of these results showed a statistically significant difference between January (summer) and May (winter) serum potassium levels (p<0.0001). In January temperatures ranged from 17-29 degrees Celsius and in May from 7-22 degrees Celsius. There was also significant difference in data between February and May 2017 (p<0.0001). The above results show that significantly higher potassium results occur in the winter months in South Africa.

**Conclusions:** This study shows that seasonal hyperkalaemia may be more prevalent than realized and can occur in more temperate climates and is not only a feature of high latitude northern hemisphere countries where greater extremes of temperature are seen. Laboratory users need to be more aware of this potential phenomenon and should take the appropriate actions when transporting samples from phlebotomy sites to a centralized laboratory.
Abstract Detail
ANTIPHOSPHOLIPID SYNDROME COMPLICATED BY OVARIAN VEIN THROMBOSIS- A RARITY

**Background:** Ovarian vein thrombosis (OVT) is a rare condition that commonly occurs during the post partum period but has also been documented with pelvic inflammatory disease, pelvic malignancies and following pelvic surgical procedures. There are few reported cases of OVT in the antiphospholipid syndrome.

**Case:** We report a case of a 32-year-old female patient who was diagnosed with OVT by computed tomography (CT) scan after she underwent a Cesarean section and while undergoing investigation for a spontaneous intracranial hemorrhage. The ovarian vein thrombosis was asymptomatic. Investigations revealed undiagnosed antiphospholipid syndrome. The patient is currently on anticoagulation therapy and a follow up CT scan revealed almost complete resolution of the OVT. OVT may develop in the absence of pelvic clinical manifestations, therefore, a high index of suspicion is required for the diagnosis to be made. If left untreated, complications of ovarian vein thrombosis can cause significant morbidity, including sepsis, pulmonary embolism and death. The diagnosis can be confidently made using cross sectional imaging.
Abstract Detail
DEALING WITH CHALLENGES DURING IMPLEMENTATION OF FAMILY-CENTRED CARE QUALITY IMPROVEMENT INITIATIVES IN NEONATAL INTENSIVE CARE UNITS

Background: Bonding and attachment between babies and parents are crucial for optimal long term outcomes of the babies and their families. Separation between them is a common occurrence between premature or sick babies and their families. Separation tends to hamper the process of bonding and attachment, with potential outcomes like developmental delays, neglect or even abuse or abandonment. Family-centered care in the NICU can reduce separation and create opportunities for bonding and attachment, but there was limited evidence thereof in the respective NICUs. Quality improvement champions were identified and supported through leadership development to initiate projects independently in three separate NICUs to improve family-centred care. The implementation though occurred with several challenges.

Aim: To describe how quality improvement champions dealt with challenges during the implementation of initiatives to improve family-centered care in neonatal intensive care units (NICUs).

Method: A qualitative descriptive approach was used. Champions were requested to write naïve sketches about the challenges they experienced and how they dealt with them. Qualitative content analysis was done to identify themes and sub-themes.

Results: The challenges were related to logistics (time and resources) and the stakeholders (especially staff and patients). The champions were of the opinion that the most important was to focus on leadership skills and change management. The outcomes of the initiatives then led to more involved and less stressed parents, and improved bonding and attachment.

Discussion and lessons learned: Leadership skills and the ability to work with people (patients and staff) are of utmost importance for the success of a quality improvement initiative. It is furthermore important to have the necessary resources and managerial support for any quality improvement initiative to succeed.
Abstract Detail
DIFFERENCE IN BRAIN PROFILES OF HIGH PERFORMING ATHLETES

Background: One's ability to perform regardless of different situations and distractions requires a person to shift between attention, arousal, as well as calm states efficiently. Mental flexibility allows one to shift between these states. Mental fitness is key in achieving high performance in all athletes. One can achieve and develop mental fitness through many Neurofeedback training regimes. Neurofeedback is a technique that aims to teach a subject to regulate a brain parameter measured by a technical interface to modulate his/her related brain and cognitive activities such as Quantitative electroencephalography (qEEG). qEEG will allow for a deeper understanding of the different brainwaves and their influence found in different athletes.

Aim: This study will aim to support previous studies in that there is a general brain profile trend seen in high performing athletes that helps them perform above average, thus making potential top athletes aware of the groundbreaking possibilities of Neurofeedback training in enabling them to reach peak performance. In this study we will be focusing on alpha and beta waves as they are the main waves active in the awake state, by using qEEG.

Method: The brain profile of 40 athletes was determined trough qEEG. The qEEG was connected to each athlete following the International 10 twenty system. Athletes were required to open and close their eyes for 5 minutes. The Brain Avatar Software was used to obtain and compute the brain waves in Hz. Artefacts was excluded and cut from the data, such as eye blinks, muscle movement or any interference by the Brain master software. The finalised data was presented as a Brain Map.

Conclusion: Neuro feedback is an abnormal analysis with excessive activation and deactivation and compromised network relations. Brainwave homeostasis will allow for peak performance in athletes.

Recommendations: Neurofeedback training to improve concentration and focus. Alpha coherence training to help with concentration and focus. HRV and Neurofeedback training to improve sleep hygiene and help decrease and manage anxiety. ISF neurofeedback training to improve regulatory system of the brain.
Abstract Detail
OUTCOMES OF CRITICALLY ILL HIV-POSITIVE PATIENTS, ADMITTED TO THE MEDICAL INTENSIVE CARE UNIT OF A SOUTH AFRICAN ACADEMIC HOSPITAL

Aim: The aim of this study was to determine the predictors of outcome in critically ill HIV-infected patients admitted to a medical ICU unit.

Design: This was a retrospective cohort study.

Methods: The records of all patients admitted to the medical intensive care unit between 1 January 2015 and 31 December 2016 were reviewed. Adult patients who were HIV positive, as per 2 positive ELISA tests or a positive viral load, were included in the study. Data collected included demographic details, admission diagnosis, HIV viral load, CD4 count, SAPS II score on admission to the ICU, life-supporting interventions, presence or absence of antiretroviral therapy, duration of stay, ICU mortality and in-hospital mortality.

Results: One hundred and fourteen patients were included in the study. The most common admission diagnosis was pneumonia. Mortality prediction scores were high, as was the death rate at 58.7%, in the population studied. Predictors of mortality were the absence of antiretroviral therapy (p<0.001), diagnosis of pneumonia (p=0.040) and the use of inotropic support (p=0.045). After logistic regression only the presence of antiretroviral therapy (before ICU admission or initiated during the ICU stay) were found to be significant.

Conclusion: The mortality rates of patients admitted to the medical ICU during the study period was high, reflecting late presentation. The presence of HAART on admission, as well as initiation during the admission, had a significant effect on mortality. Further studies are needed to delineate the ideal timing and effect of HAART initiation in the intensive care unit.
Abstract Detail
INVESTIGATING THE ULTRASTRUCTURAL AND VISCOELASTIC PROPERTIES OF WHOLE BLOOD, WITH SPECIFIC FOCUS ON ERYTHROCYTES, IN POORLY CONTROLLED TYPE 2 DIABETES

Introduction: Type 2 Diabetes Mellitus (T2DM) is a metabolic disease associated with three main glycaemic disorders: Chronic hyperglycaemia, glycaemic variability and iatrogenic hypoglycaemia. Some comorbidities that often accompany T2DM are dyslipidemia and hypertension. There is no one cause of T2DM, but rather a series of risk factors that play a role in developing the disease. The most common risk factors include obesity, high blood pressure and a sedentary lifestyle however, there are many other factors that may contribute to the development of the disease. Normally when someone is diagnosed with T2DM, they make necessary changes to their lifestyle to prevent their condition from worsening however, some people choose not to do anything. These people can be classified as poorly controlled type 2 diabetics. It has been published that diabetes is associated with chronic low-grade systemic inflammation, meaning that while not as severe as acute-phase inflammation, it has an effect on the cardiovascular system. One of the signs of low-grade systemic inflammation is hypercoagulability of the blood. Hypercoagulability and the change in viscoelastic properties of the haemostatic system was the focus point of this study, looking specifically at the level where diabetes is poorly controlled.

Methods and results: Two groups, a healthy control group and poorly controlled T2DM group were compared in this study. Erythrocyte sedimentation rate was used to measure hypercoagulability and showed a significant increase in poorly controlled T2DM. Viscoelastic properties were measured with thromboelastography and displayed a decrease in clot formation time with poorly controlled T2DM as opposed to the control group. Additionally, clot lysis time in T2DM was increased. SEM analysis of whole blood presented with an increase of fibrin formation as well as eryptotic cells in the poorly controlled T2DM group as opposed to the control group. An increase of platelet presence was also observed.

Discussion: Results from this study showed a distinct difference between the two groups, indicating a significant change in the viscoelastic properties of individuals with T2DM but also an increase in eryptotic cells. Future studies will likely aim towards quantifying eryptotic cells in the T2DM group as opposed to the control group.
IN VITRO EFFECTS OF A NEWLY SYNTHESIZED BROMODomain INHIBITOR ON METASTATIC BREAST CANCER CELLS

Background: Breast cancer is one of the major concerns with regards to mortality rates. Many treatment types have been, and continue to be developed and refined to reduce concerns related to efficacy, bioavailability and toxicity of chemotherapeutics. One of the focus areas in cancer drug discovery is the field of epigenetics. Seeing that epigenetic changes are reversible, compounds that can repair the epigenetic balance represent potential therapeutic targets for cancer. This study investigated the effects of CC6, a novel in silico‐designed analogue of the bromodomain inhibitor (BRDi) JQ1, on the MDA-MB-231 cell line.

Methods: Cytotoxic effects of CC6 (12 µM, 48 hours) were evaluated spectrophotometrically using a crystal violet staining assay in the MDA-MB-231 cell line. Morphological changes were investigated using light microscopy, as well as polarization-optical transmitted light differential interference contrast (PlasDIC) microscopy.

Results: The GI50 after 48 hours exposure for CC6 was determined to be 12 µM. Data from microscopy techniques showed compromised cell density and characteristics of apoptosis in the morphology of CC6-treated cells.

Discussion and Conclusions: This in vitro study provides evidence that CC6 has potential antiproliferative effects and induces apoptosis in the metastatic MDA-MB-231 breast cell line. Further in vitro studies into the biochemical mechanism(s) of this potential anticancer compound will be conducted to contribute to the understanding of the efficacy of CC6 in inhibiting the proliferation of breast cancer cells, as well as its mechanism of action in these cells.
Abstract Detail
APPRECIATION OF MAGNETIC RESONANCE IMAGING IN NEOPLASM OF ADIPOSE TISSUE: LIPOMA OF THE RIGHT FOOT

Introduction: Case report: A 24 year old female patient presented at a tertiary hospital in the Tshwane District in October 2017. The patient’s history was a none painful, soft, mobile and slow growing swelling of fifteen years duration on the dorsal aspect of the right foot. The swelling increases in size accompanied by splaying of the 4th and 5th toes as the patient grow older. It has become very uncomfortable and painful wearing closed shoes with inability to stand for a long time. The patient was referred at radiology department for a magnetic resonance imaging (MRI) for soft tissue differentiation of the tumour to plan surgical intervention.

Radiographic imaging: A none contrast enhanced MRI with T1 weighted (T1W), T2 weighted (T2W) and fat suppression (FatSat) sequences was performed for better analysis and visualization of the lesion to assist in planning the approach for surgical excision.

MRI findings: MRI showed capsulated isointense lesion without involvement of the tendon or bony elements. The lesion appeared hyperintense on T1W images and hypointensity on T2W images. There was low signal on the FatSat images in line with benign fatty tumour, lipoma. Lipoma is a rare slow growing benign neoplasm of fatty tissue origin occurring in almost 2% of the general population. It can occur in any organ in the body but the most common site of occurrence is the ankle and foot. Lipoma can be aggressive in nature and may even transform into malignant neoplasm if left untreated. Risk factors of lipoma include blunt trauma to the subcutaneous tissue, sporadic or familial.

Conclusion: The FatSat protocol in MRI is an important imaging technique in musculoskeletal imaging to enhance pathological characterisation of the tumour. FatSat offers high spatial and contrast resolution for better analysis of pathological lesions which would otherwise be obscured by adipose tissue in computerised tomography (CT scan) and ultrasound (U/S) imaging. This case has highlighted the need for community engagement and health promotion by the radiography workforce to contribute positively towards better health and wellbeing of the population.
Abstract Detail
COMMUNICATION BETWEEN SEXUAL PARTNERS ON HIV AND AIDS PREVENTION IN AN SEMI-FORMAL AREA IN TSHWANE

Background: Communication among sexual partners on prevention of HIV and AIDS is central to curtail new infections and re-infections. Coitus is responsible for the highest incidences of HIV and AIDS infections however there is still silence regarding safer sex practices among sexual partners. Even though the risk of infection is observed by sexual partners communication is in most instances not initiated. The purpose of the study was to explore and describe communication between sexual partners’ on HIV and AIDS prevention in an semi-formal area in Tshwane.

Method: A qualitative design and focus group interview method was used. A total of 32 female participants voluntarily participated. Tesch’s data analysis was used and trustworthiness was ensured. Ethical principles were adhered to.

Results: The findings emerged with three themes. Gender emerged as a barrier to initiation of communication by either male or female sexual partner. Risks behavior regarding the infection and transmission of HIV to a sexual partner were identifiable.

Discussions: Barriers to initiation of communication existed that indicated that support to initiate partners to communicate on HIV prevention be developed. The protracted silence among married or cohabiting sexual partners is one of the factors for the HIV infection incidence rate. Sexual partners are in need of gender specific interventions to facilitate communication and HIV prevention.
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Abstract Detail
SULCAL PATTERN VARIATION IN EXTANT HUMAN ENDOCASTS

Introduction: Our knowledge of human brain evolution primarily relies on interpretation of paleoneurological evidence. In this context, the endocast (i.e., replica of the internal table of the bony brain case) constitutes a proxy for reconstructing a timeline and mode of cerebral changes in human evolution. The identification of cerebral imprints, with specific focus on cortical sulci, is critical for assessing the topographic extension and structural organization of cortical areas. However, the description of these crucial landmarks in fossil endocasts is challenging. The recent introduction of high-resolution imaging techniques in (paleo)neurology offers new opportunities for tracking detailed endocranial neural characteristics.

Aim: This study aims at providing an atlas documenting the variation in the extant human endocranial sulcal pattern for subsequent use as a comparative platform for the study of the fossil record.

Methods: A total of 20 extant human crania were selected from the Pretoria Bone Collection (University of Pretoria, South Africa) and detailed by X-ray microtomography at a spatial resolution ranging from 94 to 123 µm. Freely available software was used for extraction and analysis of cortical imprints in the endocast. In our analysis, sulci are nearly consistently identifiable on the frontal (i.e., superior, intermediate and inferior sulci) and temporal (i.e., superior and inferior sulci) lobes. Interestingly, sulci bordering critical functional areas (e.g., Broca’s cap) could be labelled as well. The construction of an atlas is a prerequisite for developing protocols involving automatic sulci recognition in endocasts.

Conclusion: In this regard, our study introduces a promising perspective for discussing long-standing questions in paleoneurology.
AN INVESTIGATION INTO THE EFFECTS OF HYPERCOAGULATION ON THE COAGULATION SYSTEM IN BREAST CANCER PATIENTS

Background: It is well documented that breast cancer results in a hypercoagulable state in vascular system of affected patients. This is a result of the increased inflammation responding to the presence of cancer or arising from the cancer itself. The system most affected by this state is the circulatory system. It is not unexpected then to note that breast cancer patients are at an increased risk for thrombotic events during or after treatment.

Aim: This study aims to characterize the effects of hypercoagulation on circulatory components to gain a better understanding of the increased thrombotic risk in this patient group.

Methods: Blood samples of 15 treatment-naïve breast cancer patients were analysed. Scanning electron microscopy was performed to identify ultrastructural changes to whole blood and clot structure, according to standard laboratory processing procedure. Thromboelastography® (TEG®) was performed to evaluate the viscoelastic properties of the blood during clot formation. Erythrocyte sedimentation rate was used to confirm inflammatory status and a Haemanalyzer was used to obtain a complete blood count.

Results: Ultrastructural analysis revealed an increase in eryptotic red blood cells, spontaneous fibrin formation and platelet activation in several of the patients when compared to controls. Of the viscoelastic properties measured, the rate of clot formation, maximum clot strength, maximum speed of clot formation and final clot strength were all significantly increased while the time taken to achieve a given clot strength was significantly decreased.

Discussion and Conclusion: These results confirm that a hypercoagulable state exists in breast cancer patients and that this state has a direct effect on components of the circulation system. Ultrastructural and TEG® results concurred in that the rigidity and strength of clots was stronger in patients than controls. These observations concur with the clinical observation of increased incidences of thrombotic events in breast cancer patients and provide motivation for further investigation into the biological mechanisms which can be targeted in order to alleviate this risk.
Abstract Detail
THE BURDEN OF CARE EXPERIENCED BY FAMILIES WITH TEENAGE MOTHERS IN A SELECTED TOWNSHIP IN MPUMALANGA

Introduction: In South Africa, 30 per cent of teenagers admit to “ever falling” pregnant. Most teenage mothers live with family members, are unemployed and still attending school. Various forms of care provided include emotional care, financial care and physical health care including access to resources. Family members provide teenage mothers with care throughout antenatal and postnatal period. Families find themselves challenged with the burden to provide care for the teenage mother and baby, as pregnancy is unplanned.

Aim: The aim of the study is to explore and describe the burden of care experienced by families with teenage mothers in a selected township in Mpumalanga.

Research design and methods: Qualitative design, this method was used to explore and describe experiences of families with teenage mothers with regard to the burden of care in a selected township in Mpumalanga. A total number of seven families who care for teenage mother were included. Semi-structured interviews were conducted until data saturation was achieved. Data analysis was done using the eight steps of Tesch’s data analysis method, and in doing so ethical consideration and trustworthiness were ensured. It emerged that families are burdened with provision of care to the teenage mother: socially, psychological and financially including meeting the physical health needs of teenage mother and baby. Recommendations in the study included the involvement of health experts to assist families on handling issues that emerged after teenage pregnancy. A need to formulate specific policies regarding the support of families with teenage mothers by relevant departments is eminent.

Conclusion: The conclusion made is that families need diverse support to provide care to teenage mother and baby.
Abstract Detail
TARGETING ACTIN DYNAMICS WITH A NOVEL LIM KINASE INHIBITOR RESULTS IN RADIOSENSITIZATION OF TRIPLE NEGATIVE BREAST CANCER CELLS AND RADIATION-INDUCED PRO-APOPTOTIC BYSTANDER EFFECTS

Background: Primary and metastatic carcinomas may display resistance to radiation treatment, which contributes significantly to the morbidity and mortality of these patients. The actin skeleton is fundamental to cell division, migration and invasion, making it a key regulator in the local and distant spread of neoplastic cells. Actin dynamics are regulated by the cyclic phosphorylation/dephosphorylation of cofilin, an actin filament severing protein. LIM kinase phosphorylates and inactivates cofilin whereas slingshot phosphatase dephosphorylates cofilin. The aim of this study was to evaluate the pro-apoptotic and radiosensitizing ability of a novel LIM kinase inhibitor, namely 9-benzoyloxy-5,11-dimethyl-2H,6H-pyrido[4,3-b]carbazol-1-one (Pyr1).

Methods and Results: BT-20 cells exposed to low doses of Pyr1 24-hours prior to 8 Gy radiation revealed a significant increase in apoptotic cell death compared to the individual treatments, as quantified by the flow cytometric detection of Annexin V. Cell cycle progression analysed by the same method revealed a significant increase in cells in the sub-G1 phase. Reactive oxygen species (ROS) generation increased and the mitochondrial membrane integrity was compromised when assessed by the flow cytometric quantification of hydroethidine and the Mitocapture™ kit respectively. Light microscopy showed increased apoptotic body formation and decreased cell density. Additionally, the radiation-induced bystander effect was analysed on unirradiated cells to determine the pro-apoptotic intercellular signals released from cells exposed to the combination therapy. Medium transferred from the treated cells induced pro-apoptotic effects on confluent BT-20 cells, as demonstrated by increased ROS formation and loss of mitochondrial membrane potentials.

Discussion and Conclusion: Pre-exposure of BT-20 cells with a low dose Pyr1 24-hours prior to radiation increased the induction of programmed cell death compared to the individual treatments. A relationship between irradiated- and unirradiated cells was demonstrated by the radiation induced bystander effect. Cells propagated in conditioned media obtained from cells exposed to radiation displayed a significant increase in apoptotic signalling. The presence of these apoptotic signals were amplified with the addition of Pyr1. Future studies will evaluate the effect of this combination therapy on DNA repair mechanisms, and examine the role of these inhibitors more closely in vivo.
Abstract Detail

CONE BEAM COMPUTED TOMOGRAPHIC AND HISTOPATHOLOGICAL FEATURES OF A GIANT AMELOBLASTOMA

**Background:** Ameloblastoma is a benign odontogenic neoplasm which causes local destruction and can reach alarming sizes in a short space of time. The results of delayed diagnostic and surgical intervention severely impact the quality of life of the patient in such cases. Early diagnosis by means of combined radiological and pathological correlation as well as surgical management may reduce the social stigmatization and necessity for more complex reconstruction whilst preventing possible malignant transformation for this lesion. The disfiguring consequences of late presentation and treatment impede social and psychological functionality of these patients. This case report highlights the radiological and histopathological features of an ameloblastoma in a 42-year old male patient who presented to the Oral and Dental Hospital after a 15-year history of a gigantic jaw lesion after repeated unsuccessful attempts to manage it by means of traditional herbal remedies.

**Methods:** The radiological and histopathological features of a large ameloblastoma are presented here with the intention of highlighting early intervention in a benign yet incapacitating neoplasm. CBCT is indicated for the diagnosis and surgical planning and reconstruction in such cases. A large multilocular lesion with cortical expansion and localized bone destruction was identified within the left mandible extending from tooth 34 posteriorly. The histopathological findings on incisional biopsy confirmed the presence of a benign cystic odontogenic neoplasm which fulfilled the Vickers and Gorlin criteria for the diagnosis of an ameloblastoma. The patient underwent a hemimandibulectomy with total temporomandibular joint replacement.

**Discussion:** Early presentation, diagnosis and surgical management of this benign neoplasm results in the best psychological, aesthetic and functional results in patients whilst minimizing the alarming disfigurement and complications which may ensue.

**Conclusion:** Ameloblastomas may not always be surgically prioritized and require radiological and pathological diagnostic confirmation. This case report highlights the profound effects of a benign neoplasm in a patient presenting late for medical intervention in order to create awareness of the benefits of expeditious therapeutic management.
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Abstract Detail
COIL EMBOLIZATION OF THE INTERNAL CAROTID ARTERY IN A PATIENT WITH A RETAINED TRANSCRANIAL KNIFE

Background: Transcranial stab injuries are common in the South African population when compared to the West. A higher incidence of vascular injury is seen in patients with a retained knife compared to patients in whom the knife has already been extracted.

Case: We present the case of a 21 year old male patient who sustained a stab to the left temporal skull and presented with a retained knife blade. On presentation, he was haemodynamically stable and neurologically intact. CT angiography followed by Digital Subtraction Angiography (DSA) revealed narrowing of the lacerum segment of the left internal carotid artery by the tip of the knife blade with adequate collateral flow across the Circle of Willis. Coil embolization and occlusion of the internal carotid artery proximal and distal to the knife tip was performed following which the knife was extracted. Repeat left internal carotid artery angiogram showed no displacement of the coils with no extravasation of contrast. The patient remained neurologically intact post operatively.
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DESIGN DETAIL
DESIGN AND VALIDATION OF QUESTIONNAIRES INVESTIGATING ACCESS AND UTILIZATION OF CERVICAL CANCER TREATMENT AND PALLIATIVE CARE.

BACKGROUND: Standardized tools to evaluate access and utilization of cervical cancer treatment and care remain scarce in developing countries despite huge disease burden and limited treatment services. The objective of this study was to validate questionnaires that could be used to investigate access and uptake of treatment and palliative care services amongst women.

METHODS: We designed and validated two questionnaires for patient and community and health worker surveys to determine the main constructs of each of the draft questionnaires before using them for a bigger study. Pilot data was collected randomly amongst 50 patient and community participants and 14 health workers respectively in Chitungwiza, Zimbabwe. Content and face validity were assessed qualitatively from expert evaluations. Construct validity, reliability and internal consistency testing were conducted using exploratory factor analysis and Cronbach’s alpha correlation coefficient respectively. Both questionnaires were sub-divided into mini-questionnaires to avoid Heywood case and ease of analyses due to the complexities of the variables involved. Analyses were conducted using STATA version 14 to generate evidence for the study.

RESULTS: At least 12 experienced researchers reviewed the questionnaires and validated their draft constructs based on experience and literature. Each of the questionnaires was sub-divided into 4 separate mini-questionnaires respectively. All the eight mini-questionnaires were analyzed independently and Kaiser-Meyer-Olkin coefficients ranged from 0.5-0.9 and Bartlett’s sphericity tests were all significant, p<0.001, showing promising to very good constructs. After dropping some items based on magnitude of factor loadings and communalities; patient and community questionnaire had 15 meaningful constructs while the health worker questionnaire had 13. Cronbach’s alpha (α) coefficients for internal consistency reliability testing of all the final constructs were greater than the minimum acceptable threshold of 0.70.

CONCLUSION: This analysis revealed the validity and the reliability of questionnaires that can be used to evaluate access and utilization of cervical cancer treatment and palliative care in developing country contexts. While various methods have been developed and used in validating questionnaires in different fields of research, this present study presents a systematic and simplified approach that can be adopted by researchers.
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Abstract Detail

Introduction: Unidentified human remains (UHRs), despite not being an officially recorded or statistically attended entity in South Africa (SA), are deemed a major problem both nationally and globally. The problem of human remains being buried or cremated whilst unidentified has far reaching effects, ranging from the psychological trauma and financial burden of next-of-kin, to the administrative and financial burdens imposed on the state and indirectly, to the imposition on the tax payers and insurance companies of SA.

Aim: The aim of this study was to retrospectively profile all unidentified decedents admitted to the Pretoria Medico-Legal Laboratory for the period 2010 – 2015.

Methods: A total of 2 372 cases were identified for inclusion within the scope of this study, out of a total of 11 795 cases admitted to the PMLL for this period (20.1 % of total annual caseload). Illegally dumped abortuses or still births constituted 25.5 % (606 of 2 372 cases) of the total inclusion group. In 58.78 % (1 038 of 1 766 cases) of the remaining cases (i.e. excluding the cases involving concealed birth), initially unknown decedents were eventually identified by next-of-kin, whilst 23.5 % of the 1 766 cases were disposed of with a presumed identity or, despite various means to identify the decedents, were eventually buried or cremated as paupers (15.1 %).

Discussion: This study suggests that, despite the various means of identification currently available in SA, unidentified and unclaimed decedents remain a problem that requires intervention on both a national and international level.
Abstract Detail
HYPERCOAGULABILITY USING BIOPHYSICAL PARAMETERS IN HIV POSITIVE VERSUS HIV NEGATIVE PATIENTS WITH DEEP VEIN THROMBOSIS

Background: Patients infected with the Human immunodeficiency virus (HIV) are more prone to developing a hypercoagulable state, which may be attributable to an upregulated inflammatory system resulting in a different coagulation profile compared to HIV negative patients.

Hypothesis: HIV positive patients have a different coagulation profile compared to HIV negative patients which results in hypercoagulability and DVT.

Objectives: To compare: inflammatory markers; haematological markers; viscoelastic properties of whole blood (WB) and platelet poor plasma (PPP); light microscopy smears; ultrastructure of platelets and red blood cells.

Methods: A descriptive comparative prospective study recruiting symptomatic confirmed DVT adult patients with HIV status. The objectives were achieved by comparing:
1. Serum inflammatory markers.
2. Haematological results.
3. Viscoelastic properties, using a thromboelastogram (TEG).
4. Light microscopy smears.
5. Surface morphology of platelets and red blood cells with Scanning Electron Microscope (SEM).
6. SEM using WB with thrombin, to the viscoelastic results to assess the interaction of fibrin strands with the red blood cells.
7. SEM, using PPP with thrombin, to the viscoelastic results to assess the fibrin strand ultrastructure and diameter.

Results: Fifty DVT patients were recruited, 35 HIV negative and 15 HIV positive. DVT patients have anaemia, raised inflammatory markers and iron deficiency. HIV positive patients have raised C-reactive protein and ferritin concentrations; and a microcytic hypochromic anaemia. DVT patients have a hypercoagulable profile on the TEG but no significant difference between HIV positive and HIV negative groups. Light microscopy changes were more pronounced on the SEM of HIV positive patient’s red blood cells. There were also activated platelet changes, although not correlating with the TEG results, together with increase fibrin fibre diameter, dense matted deposits and the dense compact fibrin network.

Conclusion: Patients with DVT are in a state of inflammation. Whether HIV is the cause of the DVT or the DVT is the cause of the inflammatory changes is not certain. However, HIV infection is linked to inflammation and inflammation is linked with a hypercoagulable state. HIV positive patients do have a different coagulation profile compared to HIV negative patients which can result in hypercoagulability and DVT.
CORRELATION BETWEEN THYROID ULTRASOUND FINDINGS AND FINAL HISTOLOGY IN PATIENTS WITH INDETERMINATE FINE NEEDLE ASPIRATION CYTOLOGY RESULTS

Background: Thyroid nodules are common. Diagnostic investigations are performed mainly to exclude malignancy. Most patients with indeterminate fine needle aspiration are subjected to thyroidectomy for fear of malignancy, however only 20-30% of these are found to be malignant. Therefore 70-80% of patients are subjected to unnecessary operations which puts them at needless risk of complications of thyroid surgery.

Aim: To determine the value of thyroid ultrasound in diagnosing malignancy in patients with indeterminate fine needle aspiration cytology results.

Method: A retrospective review of patient records was done from 2001 to 2015 in all patients above 18 years old who presented at Kalafong Tertiary and Steve Biko Academic hospital with a nodular thyroid goiter, and had an ultrasound, FNAC and thyroidectomy or lobectomy was performed.

Result: Records of 104 patients were retrospectively evaluated. Patients were predominantly female (93.3%). Final histology was available in 101 of the patient’s records. Malignancy was identified in 23 (22.8%). The overall sensitivity and specificity of thyroid image reporting and data system (TIRADS) score in this study were 69.5% and 61.5% respectively. The TIRADS score had high sensitivity amongst the indeterminate 26 patients with sensitivity and specificity of 85.7% and 52.6 respectively, however this was not statistically significant with a p-value of 0.28.

Conclusion: For patients presenting with a thyroid nodular goitre in which the FNAC has an indeterminate result (Bethesda III and/or Bethesda IV), there was no significant correlation between the TIRADS score and malignancy or between the TIRADS score and the final histology. The ultrasound could therefore not diagnose cancer in these patients.
Abstract Detail
OUTCOMES FOLLOWING THERAPEUTIC HYPOTHERMIA IN SOUTH AFRICAN AND GLOBAL CLINICAL TRIAL HYPOXIC ISCHEMIC ENCEPHALOPATHY PATIENTS

Background: On a cellular level, sustained oxygen deprivation is known to induce inflammation and metabolic stress. If persistent, cell death occurs. Neonatal encephalopathy with suspected hypoxic ischemic encephalopathy (NESHIE) results from sustained oxygen deprivation in neonates and can lead to permanent brain injury reflected in motor and/or cognitive dysfunction, neurodevelopmental delay, or in severe cases, death. NESHIE occurs at a rate that is 3-5 times higher in South Africa than the global incidence of 1:1000 births. Since it is known to decrease the likelihood of severely negative outcomes, therapeutic hypothermia (TH) has been implemented as part of standard practice in several public hospitals in South Africa. The purpose of this study was to investigate documented differences in cooling practices and outcomes in South Africa compared to TH protocols developed through globally conducted clinical trials.

Methods: Data relating to definitions of outcomes, TH methods, and patient outcomes, as described in five large international clinical trials published between 2005 and 2011, were compared to the same categories published for public hospitals in South Africa where TH is practiced as part of standard care.

Results: Although cooling practices are comparable between South Africa and these global clinical trials, differences in outcome definitions were observed. Short-term outcomes between South African and clinical trial patients were comparable for sepsis and death. However, coagulopathy was observed at a higher rate, while hypotension and hypoglycaemia were observed at a lower frequency in South African patients. Long-term outcomes, which included death and mild to severe disability were comparable between South African and clinical trial patients. In all studies, relatively low sample sizes were observed which limits the utility and complicates the interpretation of this data.

Discussion & Conclusion: Large-scale research studies should be considered across multiple cooling centres in South Africa in order to investigate the full range of outcomes observed in local NESHIE cases, as well as to identify confounding factors and trends that may contribute towards the observed differences in short-term outcomes.
Abstract

A REVIEW OF THE PROVISION OF MENTAL HEALTHCARE SERVICES FOR ELDERLY PATIENTS IN TSHWANE DISTRICT, GAUTENG PROVINCE.

Background: According to the WHO, an elderly individual is defined as anyone who is 60 years of age or older. The global elderly population is projected to almost double its size by 2050. Compared to other African countries, South Africa has relatively well-resourced mental health services. However, most patients with a mental illness – including the elderly - do not get the required healthcare. Healthcare facilities in Tshwane District, Gauteng province that provide a mental healthcare service for elderly patients are scarce and insufficient information exists on their quality. The aim of this study is to describe the provision of mental healthcare services for elderly patients in Tshwane District.

Method: An observational cross-sectional study design was used. The study setting included all public sector hospitals, clinics, community health centres (CHC) and non-governmental organizations (NGO) that provide these services. A validated checklist of 39 items assessed their quality, generating a score. Key informants were interviewed using semi-structured questions. Interviews were audiotaped and all results captured into Microsoft Excel. Thematic analysis was conducted.

Results: 64 facilities were invited to participate. Of these facilities, 27 (42.2%) were assessed. CHCs had the highest mean score for service provision due to recent renovations while NGOs had the lowest scores. The main shortcomings were: inadequate infrastructure, poor lighting and lack of adequate wheelchair access. There was also a shortage of health professionals for this population. Key informants verified these difficulties with amongst others, the lack of medications on the essential drug list and inadequate implementation of the Mental Healthcare and Older Person’s Acts.

Discussion and conclusion: There is currently a shortage of specialized, quality services available to address the needs of this vulnerable growing population. To avoid future tragedies where patients with mental health illnesses have died in the ongoing "Life Esidimeni" saga, increased surveillance of all facilities tasked with providing such services is mandatory. Other recommendations include the need for a culture shift regarding elderly persons as well as information about these facilities that are in the public domain.
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Abstract Detail
COMPARATIVE VALIDITY AND REPRODUCIBILITY OF A QUANTITATIVE FOOD FREQUENCY QUESTIONNAIRE FOR MEN IN THE VHEMBE REGION, LIMPOPO PROVINCE

Introduction: Valid and reproducible dietary data are essential for drawing accurate conclusions about the intakes of a study population.

Objective: To determine the comparative validity and reproducibility of a culturally sensitive quantitative food frequency questionnaire (QFFQ) for men in the Vhembe region.

Methods: The sample comprised men (18 – 35 years) enrolled in an environmental health study. Comparative validity was tested against four 24-hour recalls (24HR) administered at two-day intervals. Reproducibility was determined by repeating the QFFQ after one week. Trained local interviewers conducted interviews using a validated food portion photograph book and local household measures to aid portion size estimation. Nutrient content was analysed by the Medical Research Council’s SAFOODS database. After testing for normality, statistical analyses for energy, macronutrient and fortified micronutrient (iron, zinc, vitamin A, thiamin, riboflavin, niacin, folate, vitamin B6) intakes were: Wilcoxon rank sum test, Spearman rank (r) and intraclass correlation (ICC) coefficients, weighted Kappa statistics (Kw) and Bland-Altman (BA) plots.

Results: For validity (n=73), all median intakes were higher for the QFFQ (p<0.05), Spearman r ranged from 0.22 (p=0.57) to 0.5 (p<0.0001) and, excluding vitamin A and riboflavin, ICCs were significant (0.3 to 0.6; p<0.05). Kw indicated fair agreement (p<0.05) for seven of the 12 nutrients tested. For reproducibility (n=65), median intakes were significantly lower for the repeat QFFQ for energy, carbohydrate and five of the fortified micronutrients (p<0.05). Spearman r and ICCs were acceptable to good (0.4 to 0.6; p<0.05) and Kw was fair (0.3 to 0.5; p<0.05) for all nutrients tested. Validity and reproducibility BA plots showed wide limits of agreement and magnitude bias to varying extents.

Conclusion: Both validity and reproducibility showed acceptable to good correlation and fair agreement. Despite the differences between intakes of the QFFQ and 24HR and administrations of the QFFQ, the QFFQ was considered acceptable for use in the target population.
Abstract Detail
EFFECT OF EXPANSION AND CRYOPRESERVATION ON THE IN VITRO ADIPOGENIC DIFFERENTIATION POTENTIAL OF ADIPOSE-DERIVED STROMAL CELLS

Introduction: Adipose tissue is a rich source of mesenchymal stromal/stem cells referred to as adipose derived stromal/stem cells (ASCs). ASCs are multipotent and have the ability to differentiate into various cell types, including adipocytes. The ability of ASCs to differentiate into adipocytes serves as a useful model to study adipogenesis using cells of human origin. In vitro culturing of ASCs often requires several rounds of expansion (passages) in order to achieve sufficient cell numbers for downstream experiments. Cryopreservation is also regularly used in laboratories to store cells for future use. In order to assist in the translation from the laboratory to the clinic, it is important to understand how these procedures (passaging and cryopreservation) impact the functional ability of ASCs. In this study, we investigated the effect of passaging and cryopreservation on the ability of ASCs to undergo adipocyte differentiation.

Methods: ASCs were isolated from lipo-aspirate collections after informed consent was obtained. The isolated ASCs were expanded for five passages. At each passage, cells were induced to differentiate into adipocytes over 21 days. Cells were also cryopreserved at each passage. After storing the cells for approximately 6 months, ASCs stored at passage 0 (P0) were thawed and expanded to P5 after which the cells were induced to undergo adipogenesis. The adipogenic differentiation potential of the previously cryopreserved ASCs was compared to the degree of differentiation observed for freshly isolated cells (P5). Adipogenic potential was assessed using flow cytometry and fluorescence microscopy.

Results: The adipogenic potential of ASCs decreased significantly with extended passaging, while no statistically significant differences were observed in adipogenic capacity between freshly isolated and cryopreserved ASCs.

Conclusion: Our results suggest that expansion of cells for an extended period affects the adipogenic differentiation potential of the ASCs, while cryopreservation does not appear to affect the cells in this regard.