

**Saving Babies:
A Perinatal Care Survey of South Africa
2000**

Compiled by:
The MRC Unit for Maternal and
Infant Health Care Strategies,
PPIP Users, and the
National Department of Health



**Delegates at the Saving Babies: A Perinatal Care Survey of South Africa Workshop
University of Pretoria Hammanskraal Campus, NW Province
12-14 November 2000**



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links from: www.hst.org.za/info/

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Foreword

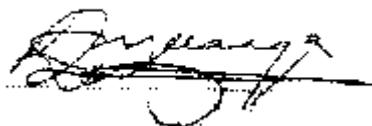
This publication, **Saving Babies: A perinatal care survey of South Africa** represents the work of a unique collaboration between the Department of Health doctors and midwives involved in the care of pregnant women and their babies and the Medical Research Council (Maternal and Infant Health Care Strategies Research Unit at the University of Pretoria). It demonstrates the value of co-operation between the various sectors (academics, administrators and health care workers), and demonstrates what is possible when all pull together.

This publication at last gives South Africans a relatively sound estimate of the magnitude of the problem of perinatal mortality and the major causes of perinatal death. It further demonstrates that although the problem is large, there are many factors that are avoidable or preventable, some at little or no cost.

New ground has been broken for perinatal care in South Africa. This offers us all great hope. We now realise that some of the problems are imminently manageable. There is no reason why (even with the present constraints) the perinatal mortality rate cannot be substantially reduced in South Africa within the next few years.

I hope that all concerned with the care of pregnant women and their babies will read this book, and that they will take its messages seriously and act thereupon.

All people involved in this endeavour deserve the admiration and congratulations of the country. It is hoped this is the first step of many in the steady reduction of the perinatal mortality rate in South Africa and the steady rise in improved care for all pregnant women and their babies.



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SAVING BABIES

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Preface

A workshop was held at the Hammanskraal campus of the University of Pretoria, from the 12-14th November 2000. This workshop brought together the users of the Perinatal Problem Identification Programme (PIIP), the national and provincial Maternal, Child and Women's Health (MCWH) units, the national and provincial Health Information and Epidemiology units, and the Medical Research Council (MRC) Research Unit for Maternal and Infant Health Care Strategies.

The aim of the workshop was to collate data relating to perinatal care from throughout South Africa and to identify major areas of concern regarding the care of women during pregnancy, labour and the newborn period. The delegates came from throughout South Africa and for once the meeting was not dominated by academics or administrators, but by the health workers from the coalface. This workshop was unique in that it combined the grassroots health workers, administrators from the national and provincial health departments and the Medical Research Council.

The basic data was presented from the provincial MCWH units, and the PIIP Users and the MRC unit presented the collated data. Common threads were identified and thereafter workshops were held to discuss the priority areas.

Audit is a systematic review of current practice, and forms an integral part of modern medicine. Audit allows health workers and health administrators to identify problems in the health service. Without identifying these problems they cannot be solved.

Maternal mortality audits are well established, with several developed countries holding confidential enquiries into maternal deaths, and South Africa has recently established its own confidential enquiry. This was a motivation to establish a similar national survey for perinatal care in South Africa. The Confidential Enquiry into Stillbirths and Deaths in Infancy (CESDI) in the United Kingdom is one such successful example. It has identified areas of weakness in the United Kingdom's obstetric and neonatal services and has been responsible for instigating a number of important changes.

However, national perinatal confidential enquiries are more difficult to establish than maternal mortality confidential enquiries, because of the large number of perinatal deaths. It is not possible at this stage for South Africa to have confidential enquiries into all of its perinatal deaths. A solution for South Africa is to have a combination of national basic perinatal data, from every site where babies are born and to have sentinel sites around the country that go further and have confidential enquiries into all the perinatal deaths in their areas. The basic perinatal data would be a minimal data set that includes all births and deaths in their weight categories. The data from the sentinel sites will add descriptive data of causes and avoidable factors to the basic perinatal care indices. This will then give a good reflection of the magnitude of the problem of perinatal care in the country, and will also provide information on why the infants are dying by including details on pathology and health system failure. A combination of both sets of data will give a reliable picture of perinatal care in the country and will direct health workers to areas where the greatest improvements can be made. For the report to be meaningful, the areas of the sentinel sites are crucial and must reflect all segments of the health system.

This report uses this method and not only describes the magnitude of the problem of perinatal deaths in South Africa, but goes further by identifying the causes and the areas where the health system has broken down.

There are a few essential ingredients necessary to effect change¹. The first phase is to identify the magnitude of the problem, and to realise that it is feasible to improve significantly upon the current state of affairs. The second phase is to have the knowledge available to improve the situation, to persuade the health workers to use that knowledge and to make the knowledge and facilities available to the vast majority of the population. For this, a political will must exist to push through the necessary changes.

In South Africa, we are now at a point where we can realistically give a reliable estimate of the perinatal mortality rate in the country. We know the common causes of perinatal death and we know that there are a great number of avoidable factors, missed opportunities and substandard care that exist surrounding these perinatal deaths in South Africa. Most importantly, we now know what these factors are and that they are remediable.

The medical knowledge is available to prevent these deaths and the health system is in place to make that knowledge available to the vast majority of pregnant women. There is a strong political will to improve the care of pregnant women and their infants. Thus all the ingredients are available except that of persuading the health workers to use the knowledge available. That is why this report is being published and widely distributed. All health workers involved in the care of pregnant women should get access to this report and hopefully will take the messages on board. Should that occur, South Africa should see a sudden and major improvement in perinatal care.

All this would not be possible without the hard and often unrewarding work of the PPIP users, the administrators and the researchers. Thank you, but most of all remember that it's the women and their children that will benefit most from your work.

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1. De Brouwere V, Tonglet R, Van Lerberghe W. Strategies for reducing maternal mortality in developing countries: what can we learn from the history of the industrialised West? *Tropical Medicine and International Health* 1998;3:771-782.

Aims of the Perinatal Care Survey of South Africa

Prior to the workshop, a set of aims was drawn up. They were discussed and drawn up by the MCWH unit of the national Department of Health and by the MRC Research Unit for Maternal and Infant Health Care Strategies and agreed to by all delegates at the outset of the workshop. The aims are listed below.

1. Reach consensus on indicators the group will use to describe perinatal care
2. Reach consensus on the minimal data required for perinatal care surveillance and standardisation of the data-collecting tool
3. Collate available data in order to describe perinatal care in terms of relevant indicators (e.g. perinatal mortality rate, neonatal death rate), the common causes of perinatal death, and the common missed opportunities, avoidable factors and substandard care
4. Identify problems with the current data set and decide on methods of improving the data set for the future
5. Prioritise, with respect to resources and current knowledge, major problem areas in perinatal care
6. Plan strategies to deal with these problem areas
7. Produce a report for the Department of Health and all health workers involved in the care of women and children
8. To bring together program managers and health workers involved in perinatal care surveillance in order to promote communication and support.

Point 6 is very ambitious and although the problem areas became very clear to all delegates early on, the planning of strategies to deal with the problems was only started at the workshop. Those suggested in the report should serve as initial suggestions to start a national debate on the possible solutions for the problems identified.

In no way must the report be interpreted as a government policy document.

Saving Babies: A Perinatal Care Survey of South Africa 2000

Executive Summary

Aim

To estimate a national perinatal mortality rate (PNMR) and to identify the major causes of perinatal mortality and related avoidable factors, missed opportunities and substandard care in South Africa.

Setting

All Provinces in South Africa gave input, where possible, into the PNMR in their particular Provinces. Furthermore, 27 state hospitals throughout South Africa representing metropolitan areas, cities and towns, and rural areas were the sentinel sites for the documentation of the causes of perinatal death and the avoidable factors associated with the deaths.

Method

The provincial Health Information Sections and the Maternal, Child and Women's Health units of the provinces presented their available data. Users of the Perinatal Problem Identification Programme (PPIP) amalgamated their data to provide descriptive data on the causes of perinatal death and the avoidable factors, missed opportunities and substandard care in South Africa. The PPIP users were the sentinel sites. The PPIP sentinel sites were grouped into metropolitan, city and town, and rural areas. The metropolitan grouping reflects urban areas and a fully functioning tiered health care system with ready access to tertiary care. The city and town grouping reflects functioning primary and secondary levels of care, with limited access to tertiary care, and the rural grouping reflects primary care, with less accessibility to secondary and tertiary care.

Results

Most of the provinces did not have effectively functioning data collection systems at the time of the workshop and were unable to provide accurate data for their whole province regarding births and perinatal deaths within state institutions. However, accurate data was available for Gauteng and the Western Cape. The PNMR for Gauteng was reported as being 32.1/1000 births and for Western Cape reported as 18.4/1000 births.

The delegates at the workshop agreed to a minimal data set and the perinatal care indices to be used to describe perinatal care. These will be discussed with the National Health Information Systems of South Africa for incorporation into the national minimum data collection set.

At the 27 PPIP sentinel sites a total of 4 155 perinatal deaths with a birth weight of 1000 g or more were reported from 123 508 births. The perinatal mortality rates for the metropolitan, city and town, and rural groupings were 30.0, 39.4 and 30.9/1000 births respectively. The neonatal death rate was highest in the city and town groups (14.8/1000 live births) followed by the rural group (12.1/1000 live births) and metropolitan group (7.6/1000 live births). The low birth weight rate was highest in the metropolitan group (18.4%), followed by the city and town group (17.0%) and the rural group (12.5%).

In all groups the primary obstetric cause of intrauterine death was unexplained in a significant proportion of cases. The most common primary cause of perinatal death in the rural group was intrapartum asphyxia and birth trauma (7.13/1000 births) followed by spontaneous preterm delivery (4.88/1000 births). The most common primary cause of death in the city and town group was spontaneous preterm delivery (6.07/1000 births) followed by intrapartum asphyxia and birth trauma (5.27/1000 births). The metropolitan group's most common primary causes were antepartum haemorrhage (7.08/1000 births) and complications of hypertension in pregnancy (4.31/1000 births). Complications of prematurity and hypoxia were the most common final neonatal causes of death in all groups.

The presence or absence of avoidable factors was documented in 2 733 cases of perinatal death. Patient related avoidable factors were reported to be present in 35.9% of perinatal deaths, followed by health worker related (29.1%) and administrative (7.4%) avoidable factors. There was insufficient information to assess avoidable factors in 5.4% of cases. The most common patient related avoidable factors was no antenatal care, late initiation of antenatal care or infrequent attendance at antenatal clinic (present in 539 cases – 20% of all cases); delays in seeking medical attention during labour (150 occasions – 5% of all cases); and an inappropriate

response by pregnant women to reduced fetal movements (133 occasions – 5% of all cases). The most common health worker related avoidable factors were inappropriate responses by health workers to problems identified during antenatal care (226 occasions – 10% of cases of perinatal deaths whose mothers attended antenatal care); problems of monitoring the fetus during labour (172 occasions – denominator for women in labour with a live baby not available); and delays by health workers in referring patients or calling for assistance (99 occasions – 4% of all cases). Lack of transport was the most common administrative factor recorded specifically in 72 occasions but large proportion of patients' delays in seeking medical help during labour might have been due to transport problems.

Conclusions

The survey demonstrated some deficiencies in the data collection system. To improve the process of achieving a comprehensive perinatal care survey, a minimal data set for each Province needs to be implemented. To improve the quality of data on the causes of perinatal deaths and avoidable factors data more PPIP sentinel sites need to be established.

However, the current data is sufficient to state that the PNMR in South Africa is probably in the order of 40/1000 births, and some readily remedial problems have been identified. These are in the structure of antenatal care, management of labour, resuscitation of the asphyxiated neonate and care of the premature neonate. Focusing attention on these readily remedial priority problems, by ensuring that equipment, protocols and trained health workers are always available and by specifically introducing kangaroo mother care for the care of the premature infants, makes the reduction of perinatal mortality in South Africa feasible and inexpensive.

Recommendations

1. Adopt the proposed minimal data set and tool
2. Establish the process for collection of the minimum data set in each province
3. Establish more PPIP sentinel sites
4. Ensure each site conducting births has the necessary equipment and protocols and that the staff are appropriately trained to manage labour and are especially trained in the use of the partogram
5. Ensure each site conducting births has the necessary equipment and protocols and appropriately trained staff to manage asphyxiated neonates
6. Ensure each site caring for premature infants has the necessary equipment and protocols and that the staff are appropriately trained in kangaroo mother care
7. Ensure each site performing antenatal care has protocols in place for where to and when to refer patients and the staff are appropriately trained therein
8. Move to a system where the time and point at which the woman confirms she is pregnant also becomes the woman's first antenatal visit where she can be classified according to risk and where her further antenatal care is specifically planned

Chapter 1

Introduction, Methods and Definitions of the Survey

Introduction

Historically, where there has been a dramatic reduction in maternal mortality, it has been associated with two technical phases¹. The first phase is a description of the magnitude of the problem (both in local and in comparative terms) and the realisation that it is feasible to do something about it. The second phase is the acquisition of new (scientific) knowledge, the teaching of this new knowledge to health workers, and finally making the knowledge and facilities available to the vast majority of the population. This is coupled with a political will, and pressure from the population to do something about it. In South Africa, the first phase is not yet in place, whereas the ingredients for the second phase are. The scientific knowledge is available, the teaching systems are in place and a health system exists that can provide health care to the vast majority of the population.

Maternal and child health is a priority of the national Department of Health. A confidential enquiry into maternal deaths has already been established. The need for having national data on perinatal care similar to data available on maternal care has been identified as a priority. The MRC Research Unit for Maternal and Infant Health Care Strategies conceived this project together with the Maternal, Child and Women's Health (MCWH) unit of the national Department of Health.

Currently, every province collects basic perinatal data, which usually includes the number of deliveries and perinatal deaths. Some provinces break up the data into weight categories, adding a further dimension to their statistics. However, this data can only describe the magnitude of the problem at various levels, but does not provide information on the medical diseases that led to the perinatal deaths, or areas where the health system has failed. In other words, this data does not give an indication of the manageability of the problems. The Perinatal Problem Identification Programme (PPIP) provides this information.

PPIP was developed in the 1990s by the MRC unit and been extensively field tested since 1996. PPIP is a simple, user friendly computer-based programme that, once simple perinatal data is entered, calculates various perinatal care indices, describes the medical conditions that led to the perinatal death and describes the avoidable factors, missed opportunities and substandard care that led to the deaths. The data from various sites can be collated, thus perinatal care indices, patterns of disease and avoidable factors can be analysed for various groupings of sites, e.g. provincial, or primary, secondary and tertiary levels of care, or metropolitan, city and town, and rural areas. Once this information is available, the priority problems are clearly identified and solutions can be sought. PPIP follows the 'ICA solution' audit system, first described in 1995². This system, although not time consuming or labour intensive, relies on the presence of regular perinatal mortality meetings to discuss the various deaths and the possible shortcomings in care. Thus it takes enthusiasts to run it, and at present cannot be introduced at all sites where births occur.

By collating the two databases (provincial data sets and data from PPIP users), a reliable picture of perinatal care can be obtained as well as clearly identifying where problem areas lie.

Methods

All provincial Maternal, Child and Women's Health units were requested to submit to the national Maternal, Child and Women's Health unit data relating to perinatal care in their provinces. The data included the number of deliveries and deaths per weight category, as well as information relating to the number of caesarean sections, the number of babies born before arrival, and the number of maternal deaths. This was to be effected by requesting the provincial MCWH units to ask all sites in their provinces that deliver babies to fill in a simple form every month and submit it back to them. The provinces were asked to collate the data for the birth sites and send it to the national MCWH unit. The basic form is shown in figure 1.1. The results are discussed in Chapters 2 and 5. The provincial MCWH units were also asked to complete structured abstract forms (appendix 3).

The MRC unit contacted all people currently using PPIP and requested them to send their data to the unit. Specifically, they were requested to send the minimal data set of births and perinatal deaths as requested from each provincial MCWH unit, the primary obstetric and final neonatal causes of death for all births and for those of birth weight 1000 g or more, and the avoidable factors for their institutions. They were also asked to complete an abstract form that asked a number of questions (appendix 4). The MRC unit collated the data. Where the data was not available for one year, the data was extrapolated to extend for one year. This was to ensure uniformity of data presentation. The PPIP sentinel sites were grouped into three categories, those from metropolitan areas (as defined by the new 'mega-cities'), city and town areas, and rural areas. This categorisation was chosen as it grouped the hospitals into naturally comparable units and covered most of the institutional deliveries occurring in those areas and was thought to be more representative of population based data than any other combination. Furthermore, the metropolitan grouping represents a fully functioning tiered health care system, with all patients in the area having relatively easy access to tertiary care if needed. The city and town grouping represents areas where patients usually have easy access to primary and secondary level institutions, but there is some difficulty in accessing tertiary institutions. Finally the rural grouping represents primary care, with the patients having to be referred for secondary and tertiary care. This categorisation was not always easy. It was decided not to combine the data by levels of care across the country because of the very different referral patterns, or by Provinces because of the lack of representation in some Provinces.

Figure 1.1. Example of Gauteng province's minimum data collection tool

MONTHLY SUMMARY STATISTICS					
Name of institution:		Level of care:			
Health district:		Rural/peri-urban/urban			
Health region:					
Month:		Year:			
Weight Category (g)	Stillborn	Neonatal death		Alive on discharge	Total
		Early	Late		
500 – 999					
1000 – 1499					
1500 – 1999					
2000 – 2499					
2500 +					
TOTAL					
Total number of births: _____					
Age less than 20: _____					
Age more than 34: _____					
Syphilis status: Negative _____					
Positive _____					
Unknown _____					
Route of delivery: _____					
Normal vaginal birth: _____					
Assisted birth: _____					
Caesarean section: _____					
Attended antenatal care: _____					
Maternal deaths: _____					
Compiled by: _____			Signature: _____		
Date: _____			Tel/fax: _____		

The weakness of the PPIP sentinel site data set is that it is mainly hospital based and in only a few areas is the data population-based. Thus a comparison was made of the differing patterns of disease and avoidable factors in five areas where there was good population based data. The five sites were the Peninsular Maternity and Neonatal Service, the Pretoria Academic Complex, the Highveld Region, Albany District, and the Jozini Health District. This data is analysed separately in Chapter 4.

Some aspects of the three main branches of perinatal care namely antenatal care, intrapartum care and neonatal care are dealt with in more detail in Chapters 6-8.

Definitions

The definition of the perinatal care indicators and their significance is described below:

1. **Neonatal death rate (NNDR)**
$$\frac{\text{Total number of neonatal deaths} \times 1000}{\text{Total number of live births}}$$

A viable live born baby from birth to 28 days is called a neonate. Neonatal deaths are subdivided into early (first 7 days of life) and late (8 – 28 days) where early neonatal death (ENND) is an indicator of intrapartum care and partly the quality of neonatal facilities.

2. **Stillbirth rate (SBR)**
$$\frac{\text{Total number of stillbirths} \times 1000}{\text{Total number of births}}$$

A viable baby born dead is called a stillbirth. The stillbirth rate is an indicator of the quality of obstetric care in general. Stillbirths can be further subdivided into fresh stillbirths and macerated stillbirths where fresh stillbirths would usually reflect the quality of intrapartum care and macerated stillbirths the quality of antenatal care.

3. **Perinatal mortality rate (PNMR)**
$$\frac{\text{Total number of perinatal deaths} \times 1000}{\text{Total number of births}}$$

The perinatal period starts at the beginning of fetal viability (28 weeks gestation or 1000 g in South Africa) and ends at the end of the 7th day after delivery. A perinatal death is one that occurs during this time period and is the sum of stillbirths plus early neonatal deaths. South Africa still uses the older World Health Organisation (WHO) definition of PNMR. The most recent WHO definition of PNMR is the number of stillbirths and neonatal deaths occurring from 24 weeks gestation or 500 grams to 28 days neonatal life.

The PNMR is the most sensitive indicator of obstetric care. For developed countries the PNMR for babies of 1000 g or more is usually less than 6/1000 births whereas for developing countries PNMR ranges from 30 – 200/1000 births. It is important to note that developed countries calculate their PNMR from 24 weeks gestation or 500 g. For South Africa, the PNMR is estimated to be 40/1000 births with a wide range, and this is for babies of 28 weeks gestation or more or 1000 g or more. The maternal mortality ratio for South Africa was estimated at 150/100 000 in 1998 (DHS, 1998). For every maternal death there are at least 27 perinatal deaths.

4. **Low birth weight rate (LBWR)**
$$\frac{\text{Total number of births} < 2500 \text{ g} \times 100}{\text{Total number of births}}$$

Low birth weight rate is an indicator of the socio-economic status and health of the community in general. If deliveries are categorized by weight, this will give an indication of low birth weight as a cause of perinatal mortality as well as an indication at what weight babies survive. The LBWR for births in developed countries is around 7%, whereas in developing countries it is much higher, around 15%.

For all the indicators mentioned above, 1000 g is used as a cut off and babies weighing 999 g or less are regarded as late abortions. Birth weight is used instead of gestational period as in a significant number of women gestational age is not known. Birth weight of 1000 g equates to

about 28 weeks gestation. There is considerable debate as to whether the PNMR (and other calculations) should be calculated from 500 g, with the Western Cape asking for the inclusion of all babies from 500 g whereas the rest of the country uses 1000 g or more³. In a great many hospitals in the country, small stillbirths are not weighed and are regarded as abortions. Furthermore, in a large number of hospitals, patients considered to be having an abortion do not deliver in the labour ward, but in a female ward or gynaecology ward. A number of babies weighing between 500 g and 1000 g are born in these sites and are not recorded as births. Hence the debate goes around the accuracy of the data and the need for completeness. Another aspect to the debate relates to the common policy in neonatal units of not providing ventilation for neonates born under 1000 g at state institutions.

Clearly the move should be towards recording all births of 500 g or more, however, until the data is shown to be accurately collected, the PNMR should be reported per 500 g and above (where available) and from 1000 g and above. Comparisons in PNMR should be made using 1000 g and above.

5. Stillborn:neonatal death (SB:NND) ratio.

If the data on perinatal deaths is collected by separating stillbirths and neonatal deaths, the SB:NND ratio can be calculated and is another indicator of the perinatal environment. A developed country usually has a SB:NND ratio of around one. In developing countries where there is almost no care the ratio is also around one with as many stillbirths as neonatal deaths. As care improves, i.e. more births take place in institutions and labour, delivery and immediate care of the neonate is supervised, the NNDR declines and the SB:NND ratio increases. Finally as antenatal care improves, the number of stillbirths decline and the ratio decreases again to one.

6. Perinatal Care Index (PCI) Overall PNMR
Percentage low birth weight babies

This was first described by Theron *et al.*⁴ in 1985. It can be used to compare the standard of care of various areas. It takes into account the environmental factors so that the comparison can be more valid. The LBWR of an area is an indication of the socio-economic status of that area. It is not dependent on the care received in the clinic or hospital, but more dependent on environmental factors. Most deaths occur in babies weighing less than 2500 g. If the LBWR is high, it is to be expected that the PNMR will be high. If the PNMR is low in this set of circumstances, then good care is present. However, in areas with a low LBWR that have a high PNMR, then the care must be poor. A low PCI indicates good care whereas a high PCI indicates poor care. A low PCI indicates good care because the PNMR is relatively low in relation to the LBWR. A high PCI indicates poor care because the PNMR is relatively high in relation to the LBWR. It is only appropriate to use this index to compare hospitals with similar circumstances or the same hospital over a period of time.

7. Caesarean section (C/S) rate Number of C/Ss × 100
Total number of births

8. Assisted delivery rate Number of assisted births × 100
total number of births

9. **Booked status rate:** $\frac{\text{Number of booked women (who have given birth)} \times 100}{\text{Total number of births}}$

This is a proportion of women booked for antenatal care and reflects the utilisation of health facilities. A pregnant woman is regarded as booked if she has had a single visit to a general practitioner or the clinic prior to labour or developing a complication. In modern obstetrics, with the availability of on-site testing, a patient can be fully risk classified at the first visit and the antenatal care planned. The term 'booked' is unfortunate. It is derived from a pregnant woman booking a bed for the birth of her baby. That has come to mean someone who attended antenatal care. The term still gives rise to confusion, especially among pregnant women. It would be better to use the term 'attended antenatal care'. This would emphasise the right action.

10. **Maternal mortality ratio (MMR)** $\frac{\text{Total number of maternal deaths} \times 100\,000}{\text{Total number of live births}}$

The MMR is not discussed in this report, but it is useful to record the number of maternal deaths on the same form as perinatal deaths.

The classification system used in PPIP to describe the causes of perinatal death was first used in Aberdeen by Sir Dugald Baird and his colleagues from the 1940s and is clearly defined in *Perinatal Problems: The second report of the 1958 British Perinatal Mortality Survey*⁵. The chief purpose of the classification system was to assist in the prevention of perinatal deaths, and therefore the aim of the Aberdeen classification system is to identify 'the factor which probably initiated the train of events leading to death'. This system clearly points to where prevention can be targeted. The classification system was modified by Whitfield *et al*⁶ in 1986 to bring it into line with modern obstetrics and this forms one of the systems used in CESDI. The Aberdeen classification was adapted again by Pattinson *et al*⁷ in 1989 for use in developing countries and again in 1995² to include the concept of avoidable factors, missed opportunities and substandard care. Appendix 5 gives the definitions of the primary obstetric causes of death and the final causes of neonatal death.

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Chapter 2

Provincial Data Set

Abstract

All provinces were requested to collect and present the perinatal care statistics for their province. Only Gauteng and Western Cape provinces could provide relevant and complete data. Many problems in the data collection systems were identified. Consensus was reached that a minimal data set was required. It was not possible with the data available to calculate a national PNMR. The PNMR for the Western Cape was more than a third less than Gauteng (18.4 versus 32.1/1000 births). Reasons for this need to be identified.

Introduction

Prior to the workshop an attempt was made to collate all available data on perinatal surveillance through the MCWH Coordinators, Directorate: Health Systems Research and Epidemiology and to assess data collecting tools used for data capture. Each province was asked to present the data that they had available from either the Health Information Systems (HIS) units or the MCWH units. A delegate from each of the two units from each province was invited to the workshop.

A summary of the presentations is given below, and only data pertaining to numbers of births, perinatal mortality and other perinatal care indices are detailed here. Problems that were experienced by the provinces are also discussed.

Results

Eastern Cape

The data presented was a combination of the District Health Information Systems 1998-9, EC Annual PHC Facility Survey (1998-9), the Demographic and Health survey (SA-DHS) 1998, EC Hospital Record Review 1999 and Census 1996 (projections for 1999).

No data was available for the whole province on the number of births or perinatal deaths and estimates were made from the data sources listed above. It is estimated that the PNMR was 50.1/1000 births and the NNDR 24.7/1000 live births. Of importance in calculating the data it is estimated that about 34% of births occur at home or in private facilities.

Free State

The Free State has 31 provincial hospitals, 9 private hospitals, 4 private clinics and 281 provincial fixed clinics. The data collection process on perinatal care is based on completion of a standard form used by public and private hospitals, community health centres and primary health care facilities. The form is sent to the provincial office for data capturing, and health care indices are worked out for sub-district, district and provincial levels.

The data collected at that stage was inaccurate because of delays in sending in the statistics, 'cooking' of the statistics, and fragmented statistic collection tools that led to too much duplication of work.

Gauteng

All hospitals in Gauteng conducting births were asked to complete a simple form (see Chapter 1, figure 1.1) and send it to the MCWH unit every month. Data was collected from April 1998 to March 1999. Data included the number of births in weight categories, the number of stillbirths and neonatal deaths, all in weight categories, the number of maternal deaths, the number of caesarean sections and the number of deliveries of women less than 18 years and more than 35 years. Data was analysed per hospital, per region, per level of care, per referral area and for the province as a whole. The PNMR of babies 1000 grams or more, the NNDR, the low birth weight rate (LBWR), the perinatal care index (PCI), the caesarean section rate and the proportion of teenagers and older women were calculated. Data on the total births at community health centres (CHCs) was available and included in the data where applicable.

No data was available for births in private institutions, hence the report related only to perinatal care in public institutions. Data was not available on perinatal deaths or the breakdown of birth weight categories for the CHCs. An assumption was made that all babies delivered at CHCs survived and all babies had a birth weight more than 2500 g. Where possible validation of data was carried out in situations where obvious anomalies occurred, but in some areas it was clear that the data collection was incomplete. It was not possible to determine either the magnitude or the effects of transfers to and from institutions within and from outside Gauteng.

There were 118 495 births (>1000 g) reported in Gauteng during the study period. There were 3798 deaths of babies with a birth weight of 1000 g or more (2 413 stillbirths and 1385 neonatal deaths). The percentage of pregnancies in women less than 18 years of age was 6%, and more than 35 years of age was 8%. The caesarean section rate was 15%.

The PNMR for the Province was 32.1/1000 births and the NNDR was 12.09/1000 live births. The LBWR was 18.4% and the SB:NND ratio was 1.74:1. The PCI was 1.74. The maternal mortality ratio (MMR) was 88.7/100 000 births. All data excludes births and deaths occurring in private hospitals.

Key findings:

- The PNMR of 32.1/1000 births is very high when compared to that of developed countries. When compared with developing countries, it is substantially lower.
- The neonatal death rate for the Province is unacceptably high compared to the Western Cape and is similar to that of developing countries.
- The majority of births occur in level 2 and 3 institutions.
- Mortality rates and some indicators of care are unacceptably high in some institutions.

Recommendations

1. Institutions identified as possibly having problems need further investigation and should answer specific questions that were defined by the report.
2. A detailed analysis of the pattern of disease and avoidable factors should be carried out in sentinel sites throughout Gauteng to pinpoint specific problems in perinatal care. This could lead to a targeted approach to solving the problems throughout the Province.
3. A specific investigation into neonatal care should be conducted and serious attention given to introducing a lodger mother facility in all institutions caring for neonates and to encourage skin-to-skin care (kangaroo mother care).

KwaZulu-Natal

KwaZulu-Natal did not have data to present.

Mpumalanga

There are 3 regions/districts according to the new demarcation comprising 25 public hospitals. The birth statistics include births from 2 CHCs that were hospitals but now function as CHCs. The data also excludes births from Temba Hospital. Information presented was from the provincial Health Information Unit and data collected during the provincial Clinical Skills Capacity Audit (CCA) that took place in March and April.

Total deliveries:	37 863
Stillbirths:	754
Neonatal deaths:	472
C/sections:	4 531
BBA's:	775 (only from 5 hospitals)
Alive on discharge:	36 637
Number of antenatal clinic attenders:	no information available
Number with syphilis status known:	no information available

No perinatal and neonatal mortality rates could be calculated because information was incomplete. Stillbirths and neonatal deaths did not include data from six hospitals. There was also no information on weight categories for PNMR, NNDR etc.

The major problems experienced were the lack of uniform or standard delivery statistics or indicators, and the absence of routine perinatal audit in most hospitals.

North West Province

The province could not report accurate or complete data. The province has 18 health districts grouped into 4 regions. There are 18 district hospitals, 3 provincial hospitals and 52 CHCs.

Northern Cape

The provincial HIS was not collecting the type of data requested at the workshop. However, they estimated a PNMR of 58.2/1000 births, and a NNDR of 21.3/1000 live births. The LBWR was recorded as 17.8% and the PCI as 3.3.

Northern Province

The provincial HIS is not fully in place. Their minimum data set has 32 indicators of which only 3 relate to perinatal health. Furthermore there are several people collecting data with little coordination.

Western Cape

The Western Cape has been collecting statistics on perinatal care for more than a decade, first as the Cape Province Administration and now as the Provincial Administration Western Cape, and has a reasonably effective system. The Western Cape is divided into 4 health regions and 25 health districts. The PNMR and ENND rate are shown in Table 2.1 below.

Table 2.1. Perinatal Care Statistics of the Western Cape Province for 1999

>999g	Region				Province
	Metro	W. Coast/ Winelands	S. Cape/ Karoo	Boland/ Overberg	
Total births	43 316	9 461	8 178	9 732	70 687
Stillbirths	597	127	111	141	976
ENND	174	58	40	53	325
PNMR	17.8	19.6	18.5	19.9	18.4
NNDR	4.1	6.2	5.0	5.5	4.7
LBWR (%)	14.5	19.2	21.9	19.5	16.7
SB:NND ratio	3.43	4.6	2.78	2.66	3.00
PCI	1.22	1.02	0.84	1.02	1.10

This data excludes births in private institutions. Currently negotiations are in progress to get data from these institutions as well

The following problems were highlighted by presentations on provincial data:

1. Perinatal indicators including other reproductive health indicators are not captured by the present health information systems.
2. Provinces are left to collect data they consider useful, therefore there is no uniformity in elements used.
3. Available data are not reliable.
4. Different cut offs are used for certain variables/elements e.g. age 16-17 for Mpumalanga, less than 18 for Northern Cape, 18 for Gauteng, less than 20 for North West Province. This makes comparisons impossible and a national figure cannot be computed.
5. Different formulae were used for computing the same indicators.
6. Wrong computing of indicators with the death rates sometimes reported as percentages, rather than per 1000 births. e.g. PNMR 42.9%, NNDR 0.05%.
7. No links between the PPIP sentinel sites and their provincial MCWH co-ordinators exist, therefore information generated by the PPIP sites was not communicated. This communication is essential for decisions on prioritisation of programmes.
8. Lack of communication between the provincial MCWH co-ordinators and their counterparts in health information directorates.
9. Fragmented collection tools, which led to duplication.
10. Lack of feedback to provincial managers.
11. Health workers were not empowered to utilize the information themselves before forwarding it to the health information directorates.

Most of the data collected by the MCWH co-ordinators was not reliable and was therefore not used in computing the indicators except for data from Gauteng and the Western Cape.

Discussion

It is clear from the above provincial reports that there is currently no functioning system that can supply accurate perinatal statistics for the whole country. There is also a lack of communication between the provincial HIS units and the MCWH units. There is also lack of uniformity of what data should be collected and who should be responsible for collecting the data.

At the November workshop, discussion centred on what could be done and it was decided that there needs to be consensus on a minimal data set, the source of data, the indicators for use and the definitions of those indicators. It was noted that within the national Health Department, the National Health Information System of South Africa (NHISSA) has determined a national minimum data set and has the computer software to manage the data. Every province adopts its own minimum data set, but it must include the national minimum data set. Thus, once a minimum perinatal data set had been agreed upon, discussions would have to be held with NHISSA and at provincial HIS levels.

The PNMR for the Western Cape is more than a third lower than that for Gauteng. The Perinatal Care Index (PCI) is 1.10 for the Western Cape and 1.74 for Gauteng. This would indicate that perinatal care is better in the Western Cape. An investigation should be carried out comparing the functioning of the health systems in both provinces to determine the reason for this difference and to identify what lessons can be learnt from the Western Cape.

Conclusion

It is not known what the total number of births in South Africa was in 2000, what the overall PNMR was or what the other perinatal indicators were, and what geographical regions have the greatest problems. All this information is vital for rational planning to improve perinatal care. There is a clear need to determine a minimum perinatal data set and this is discussed in Chapter 5 and a minimum perinatal data set and tool is proposed.

An investigation into why there is such a large difference between the PNMR and PCI in the Western Cape and Gauteng should be conducted.

Chapter 3

Why babies die

Abstract

Aim: To identify the major causes of perinatal mortality and the avoidable factors, missed opportunities and substandard care regarding perinatal care, in South Africa.

Setting: Twenty-seven state hospitals throughout South Africa representing metropolitan areas, city and town areas, and rural areas.

Method: Users of the Perinatal Problem Identification Programme (PPIP) amalgamated their data to provide descriptive data on the causes of perinatal death and the avoidable factors, missed opportunities and substandard care in South Africa.

Results: A total of 4155 perinatal deaths of 1000 g or more were reported from 123 508 births at the PPIP Users sites. The perinatal mortality rates for the metropolitan, city and town, and rural groupings were 30.0, 39.4 and 30.9/1000 births, respectively. The neonatal death rate was highest in the city and town groups (14.8/1000 live births) followed by the rural group (12.1/1000 live births) and metropolitan group (7.6/1000 live births). The low birth weight rate was highest in the metropolitan group (18.4%), followed by the city and town group (17.0%) and the rural group (12.5%).

Unexplained intrauterine deaths were a common grouping of primary cause of death in all groups. The most common primary cause of perinatal death in the rural group was intrapartum asphyxia and birth trauma (rate 7.13/1000 births) followed by spontaneous preterm delivery (4.88/1000 births). The most common primary cause of death in the city and town group was spontaneous preterm delivery (6.07/1000 births) followed by intrapartum asphyxia and birth trauma (5.27/1000 births). The metropolitan group's most common primary causes were antepartum haemorrhage (7.08/1000 births) and complications of hypertension in pregnancy (4.31/1000 births). Neonatal deaths due to complications of prematurity and hypoxia were the most common final neonatal causes of death in all groups.

Patient related avoidable factors were reported to be present in 35.9% of perinatal deaths, followed by health worker related (29.1%) and administrative (7.4%) factors. Lack of sufficient information to evaluate the case was present in 5.4% of cases. No antenatal care, late initiation of antenatal care or infrequent attendance at antenatal clinic (present in 539 cases) was the most common avoidable factor. This was followed by inappropriate responses by health workers to problems identified during antenatal care (226 occasions); problems of monitoring the fetus during labour (172 occasions); delays in seeking medical attention during labour (150 occasions); an inappropriate response by patients to poor fetal movements (133 occasions); and delays in referring patients or calling for assistance (99 occasions).

Conclusion: Concentration on the remedial priority problems identified (intrapartum care, resuscitation of the asphyxiated neonate, management of the premature neonate using kangaroo mother care, and the structure of antenatal care) make the reduction of perinatal mortality in South Africa feasible and inexpensive.

Introduction

A workshop was held at the Hammanskraal campus of the University of Pretoria, from the 12-14th November 2000. This workshop brought together the users of the Perinatal Problem Identification Programme (PIIP), the national and provincial Maternal, Child and Women's Health (MCWH) units and the Medical Research Council (MRC) Research Unit for Maternal and Infant Health Care Strategies.

One aim of the workshop was to collate data relating to perinatal care from throughout South Africa and to identify major areas of concern regarding the care of women during pregnancy, labour and the newborn period. The delegates came from throughout South Africa and for once the meeting was not dominated by academics or administrators, but by the health workers from the grassroots. This workshop was unique in that it combined these grassroots health workers, administrators from the national and provincial Health Departments and researchers from the MRC.

PIIP was developed in the 1990s by the MRC Research Unit for Maternal and Infant Health Care Strategies and been extensively field tested since 1996. PIIP is a simple, user friendly computer-based programme that, once simple perinatal data is entered, calculates various perinatal care indices, describes the medical conditions that led to the perinatal death and describes the avoidable factors, missed opportunities and substandard care that led to the deaths. The data from various sites can be collated, thus perinatal care indices, patterns of disease and avoidable factors can be analysed for various groupings of sites, e.g. provinces, or primary, secondary and tertiary levels of care, or metropolitan, cities and towns and deep rural areas. Once this information is available, the priority problems are clearly identified and solutions can be sought. PIIP follows the ICA Solution audit system, described by Pattinson et al. in 1995¹. This system, although not time consuming or labour intensive, relies on the presence of regular perinatal mortality meetings to discuss the various deaths and the possible shortcomings in care. Thus it takes enthusiasts to run, and at present cannot be introduced at all sites where births occur.

This chapter gives an overview of the amalgamated data from the PIIP users.

Methods

The PIIP users were grouped into three categories, those from metropolitan areas, (as defined by the new mega-cities), city and towns areas, and rural areas. This was chosen as it grouped the hospitals into natural comparable units and covered most of the institutional deliveries occurring in those areas. It was thought to be more representative of population based data than any other combination. It was decided not to combine the data by levels of care because of the very different referral patterns, or by provinces because of the lack of representation in some provinces. The grouping falls naturally into those areas with easy access to tertiary services (metropolitan group), those with easy access to secondary level care, regional and district hospitals (city and town group) and those where mainly primary level care is available, district and sub-district hospitals (rural group).

The sites that provided data are given below:

Metropolitan: Peninsular Maternity and Neonatal Services (Groote Schuur, Peninsular Maternity and Somerset Hospitals and their Midwife Obstetric Units), Kalafong, Chris Hani Baragwanath, and King Edward VIIIth Hospitals

City & town: Witbank, Rob Ferreira, Frontier, Mafikeng, Middelburg, Potchefstroom, Empangeni, Settlers, Eben Dönges, Kimberley, Goldfields and Klerksdorp Hospitals

Rural: Gelukspan, Lydenburg, Shongwe, Standerton, Port Alfred Hospitals and Jozini Health District (Bethesda, Manguzi, Mosvold and Mseleni Hospitals and their residential clinics)

The data was incomplete in various areas and the data given is only for those areas where there was complete data. The source of the data is specified at each table. Descriptive data is presented as proportions of the total (percentages) and rates per thousand deliveries. The proportional data identifies the priority concerns for that grouping. The rate per thousand figures allows for comparison between the various groups. This enables one to judge the real magnitude of the problem at the various sites. The data is descriptive and only standard statistical methods were used.

Results

Table 1 includes all data from all the hospitals. All data is for a one year period, either directly given by the site extrapolated from the data given. The neonatal death rate per weight category in the city and town group represents data from Rob Ferreira, Frontier, Middelburg, Potchefstroom, Empangeni, Settlers, Eben Dönges, Kimberley and Goldfields Hospitals. (Witbank, Klerksdorp and Mafikeng did not supply a breakdown of the neonatal deaths in weight categories).

The outstanding features of Table 1 are:

1. The high perinatal mortality rate (PNMR) in the city and town group (39.4/1000 deliveries)
2. The high neonatal death rates in the city and town, and rural groups (14.8/1000 live births and 12.1/1000 live births respectively)
3. The very high neonatal death rates in the various birth weight categories in the city and town group which is consistently 3 or more times higher than the metropolitan areas
4. The high low birth weight rate (LBWR) in all groups, but especially in the metropolitan and city and town groups with the rates being 18.4% and 17.0% respectively
5. The Perinatal Care Index (PCI) is lowest in the metropolitan group
6. The high stillbirth neonatal death ratio in the metropolitan area (3.05:1)

Table 2 describes the pattern of disease in the various areas and is expressed as percentages and rates per thousand deliveries. The table includes all data from all hospitals except Kimberley, Goldfields and Standerton Hospitals)

Figures 1-4 illustrate the differences between the various groups with respect to cause of death and area of death.

The significant features of the Table 2 and these figures are as follows:

Table 3.1. Basic data and perinatal care indices

	Metropolitan	City & town	Rural
Total deliveries ≥1000 g	58230	45327	19951
Live deliveries ≥1000 g	56919	44196	19572
SB ≥1000 g	1311	1131	379
NND ≥1000 g	430	654	237
Total deaths ≥1000 g	1741	1785	616
PNMR (≥1000 g) / 1000 del.	30.0	39.4	30.9
NNDR (≥1000 g) / 1000 del.	7.6	14.8	12.1
NNDR 1000-1499 g	105.8	375.5	-
NNDR 1500-1999 g	31.9	171.2	-
NNDR 2000-2499 g	9.9	57.2	-
NNDR 2500+ g	3.4	10.3	-
LBWR	18.4	17.0	12.5
PCI (≥1000 g)	1.63	2.32	2.47
C-section rate	19.7	15.0	-
SB:NND Ratio	3.05:1	1.73:1	1.6:1

Only Gelukspan Hospital gave the breakdown per weight category in the rural group

Table 3.2. Pattern of disease in metropolitan, city and town, and rural areas

	Metropolitan			City & town			Rural		
	No	%	rate/ 1000	No	%	rate/ 1000	No	%	rate/ 1000
Primary causes ≥1000 g			58230			38686			18244**
Unexplained IUD	445	25.6	7.64	357	26.7	9.23	90	16.9	4.93
Spontaneous preterm lab.	141	8.1	2.42	235	17.6	6.07	89	16.8	4.88
Hypertensive disorders	251	14.4	4.31	179	13.4	4.63	29	5.5	1.59
Antepartum haemorrhage	412	23.7	7.08	147	11.0	3.80	49	9.2	2.69
IUGR	61	3.5	1.05	28	2.1	0.72	5	0.9	0.27
Intrapartum asphyxia	172	9.9	2.95	204	15.3	5.27	130	24.5	7.13
Trauma	15	0.9	0.26	19	1.4	0.49	10	1.9	0.55
Infections	59	3.4	1.01	57	4.3	1.47	52	9.8	2.85
Fetal abnormalities	147	8.4	2.50	66	4.9	1.71	29	5.5	1.59
Maternal disease	26	1.5	4.47	17	1.3	0.44	12	2.3	0.66
Other	12	0.7	0.21	26	1.9	0.67	36	6.8	1.97
	1741	100	30.0	1335	100	34.5	531	100	29.1
Final causes ≥1000 g			56919			37676			17912
Prematurity related	114	26.5	2.00	228	41.8	6.05	53	25.0	2.96
Asphyxia & birth trauma	137	31.9	2.41	159	29.1	4.22	88	41.5	4.91
Trauma	4	0.9	0.07	4	0.7	0.11	1	0.5	0.06
Infection	70	16.3	1.23	75	13.7	2.00	30	14.2	1.67
Congenital abnormalities	71	16.5	1.25	39	7.1	1.04	26	12.3	1.45
Other	19	4.4	0.33	30	5.5	0.80	11	5.2	0.61
Unknown	15	3.5	0.26	11	7.0	0.29	3	1.4	0.17
	430	100	7.55	546	100	14.49	212	100	11.84

Excluding Kimberley and Goldfields Hospitals. Excluding Standerton Hospital

Figure 3.1. Patterns of Primary Obstetric Causes of Perinatal Death in the Metropolitan, City and Town and Rural groups

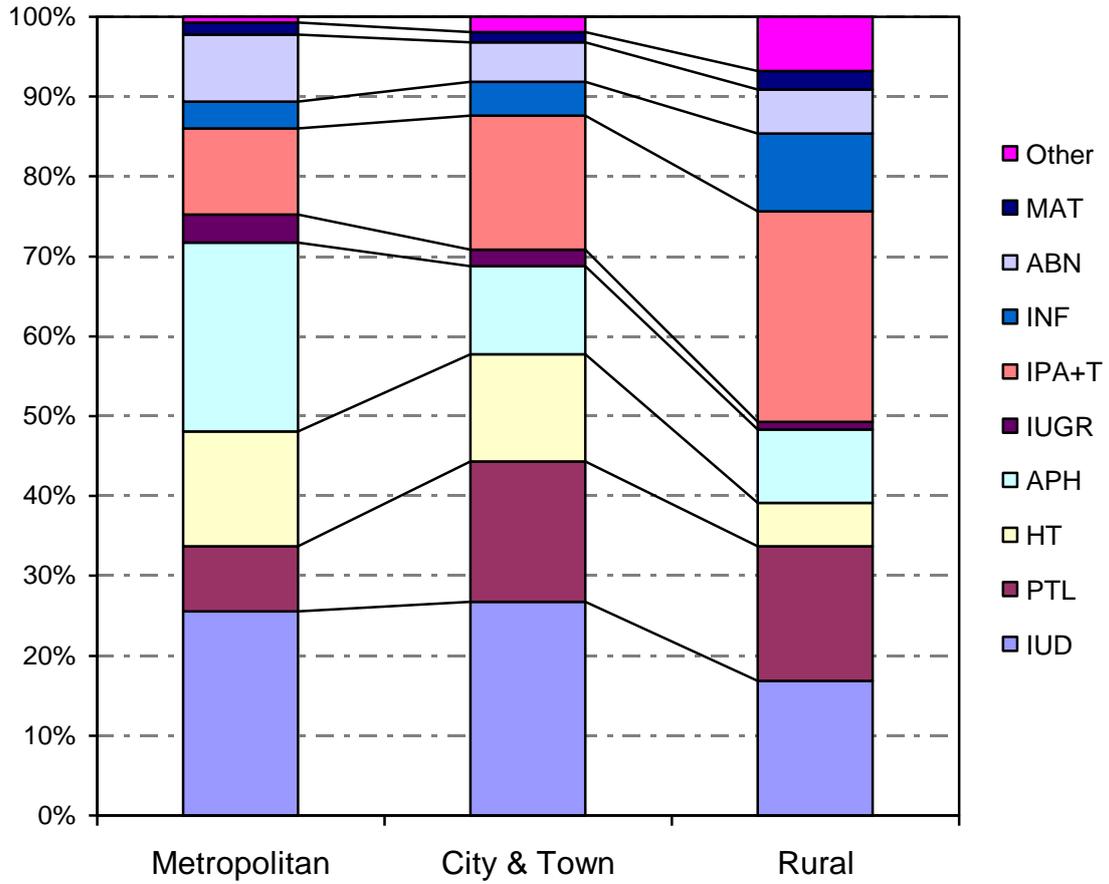


Figure 3.2. Pattern of Final Neonatal Causes of Death in the Metropolitan, City and Town and Rural groups

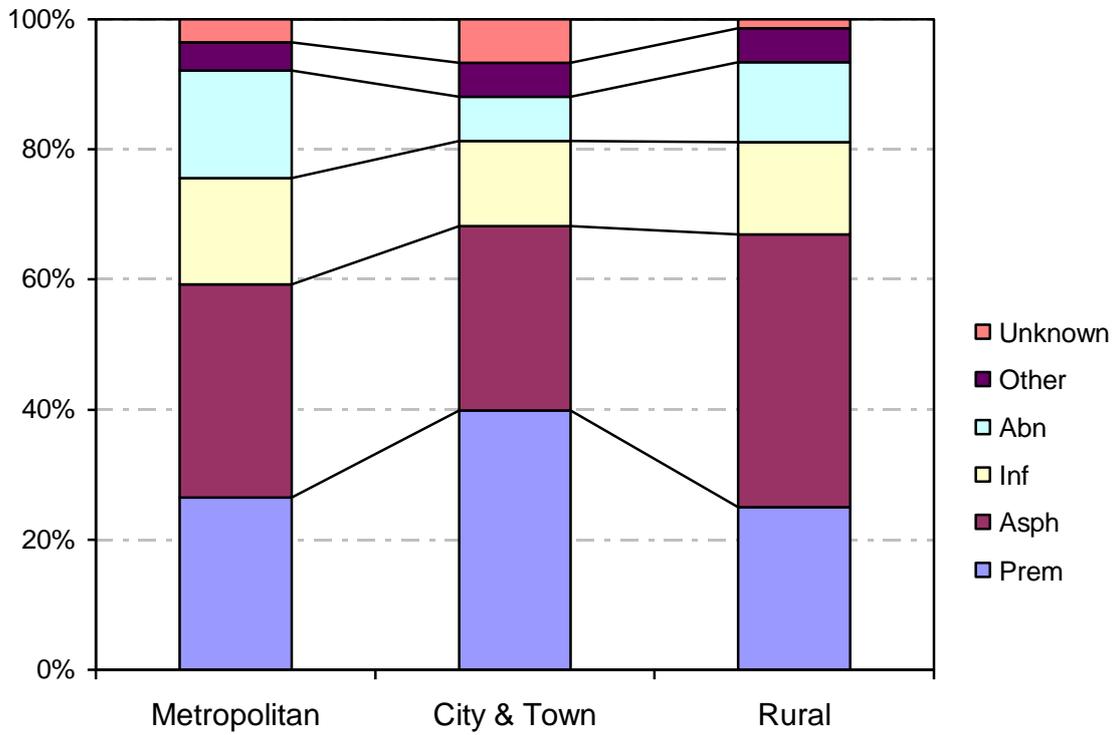


Figure 3.3. Comparison of the rates of primary obstetric causes of perinatal deaths in the Metropolitan, City and Town and Rural groups

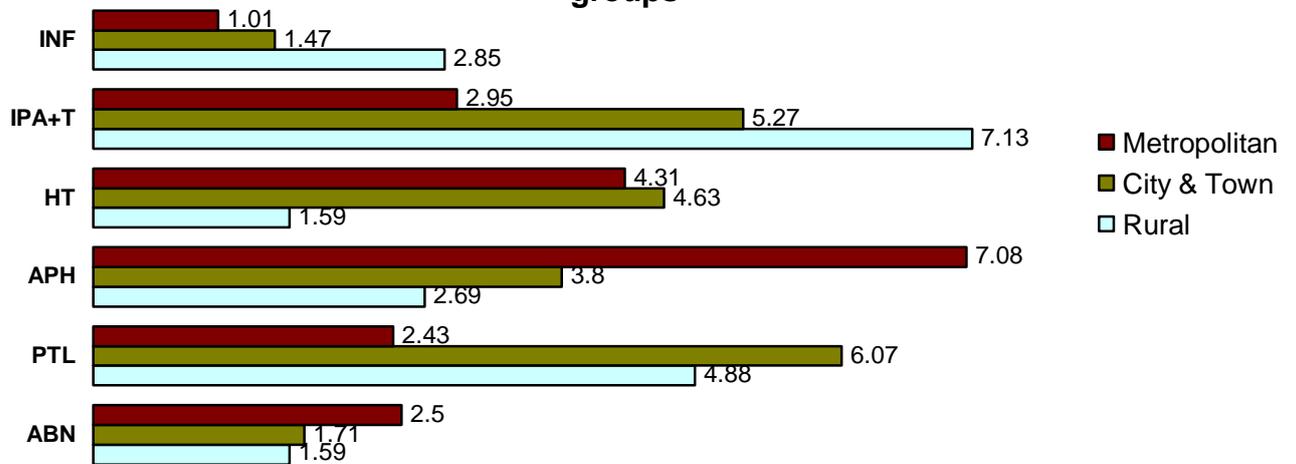
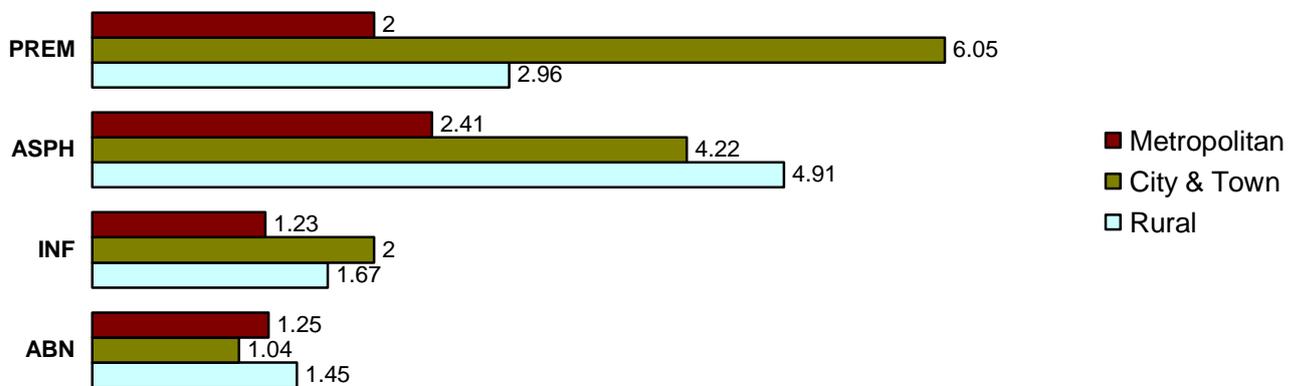


Figure 3.4. Comparison of the rates of final neonatal casues of deaths in the Metropolitan, City and Town and Rural groups



Primary obstetric cause of death

1. Deaths due to intrapartum asphyxia and trauma (IPA+T) are the major causes of death in the rural group (26.4%), and deaths due to these causes were significantly higher in the rural group compared to the metropolitan and city and town groups $P < 10^{-6}$, odds ratio (OR) 2.38, $p < 0.009$, OR 1.33 respectively. Intrapartum asphyxia also occurred significantly more often in the city and town group than the metropolitan group $P < 10^{-6}$, OR 1.79.
2. Death due to antepartum haemorrhage was the most common cause of death in the metropolitan group and occurred significantly more frequently than in the city and town, and rural groups $P < 10^{-6}$, OR 1.86, and $P < 10^{-6}$, OR 2.65 respectively.
3. Spontaneous preterm labour was the most common primary obstetric cause of death in the city and town group and occurred significantly more frequently than in the metropolitan group $P < 10^{-6}$, OR 2.52, but not in the rural group $P = 0.09$.
4. Hypertension in pregnancy was the second most common primary obstetric cause of death in the metropolitan group and third most common in the city and town group. If cases in the sub-category abruptio placentae with hypertension were included in the hypertension in pregnancy group, then death due to hypertension would be the most common primary obstetric cause of death in the metropolitan group. Deaths due to hypertension occurred significantly less frequently in the rural group compared to the metropolitan and city and town groups $P < 10^{-6}$, OR 0.37 and $P < 10^{-6}$, OR 0.34 respectively.
5. Death due to infection was the third most common cause of death in the rural group and occurred significantly more frequently than in the metropolitan and city and town groups, $P < 10^{-6}$, OR 2.82 and $P < 0.0007$, OR 1.94 respectively. However, testing for syphilis in perinatal deaths varied considerably at the various sites and there is clearly under-reporting on syphilis as a cause of death.
6. Unexplained intrauterine deaths were a significant proportion of deaths in each group (metropolitan 25.6%, city and town 26.7%, and rural 16.9%). The majority of these deaths were macerated and there was insufficient information available to allocate specific causes.

Final neonatal causes of death

1. Deaths due to prematurity were the most common neonatal cause of death in the city and town group and had the highest rate of any condition. Deaths due to this cause occurred significantly more frequently than in the metropolitan and rural groups $P < 10^{-6}$, OR 3.03, $P < 10^{-6}$, OR 2.05 respectively.
2. Death due to asphyxia was the most common cause of death in the rural group and second most common in the city and town group. they occurred significantly more frequently than in the metropolitan group $P < 10^{-6}$, OR 2.0, and for city and town not significant. Neonatal deaths due to asphyxia occurred more frequently in the city and town group compared with the metropolitan group $P < 10^{-5}$, OR 1.75.
3. Deaths due to infections occurred more frequently in the city and town group when compared with the metropolitan group ($P = 0.0045$, OR 1.21) but not when compared with the rural group. There was no difference between the rural group and the metropolitan group.
4. There were no differences between the groups with respect to congenital abnormalities.

Tables 3 and 4 show the breakdown of the primary obstetric and final neonatal causes of death into the sub-categories. Details of the sub-categories will be discussed in the chapters on antenatal care, intrapartum care and neonatal care. Table 5 and 6 describe the avoidable

factors, missed opportunities and substandard care. The number of avoidable factors in their respective categories is given for these hospitals combined.

There were 13 hospitals that gave a full breakdown of the causes of perinatal deaths into sub-categories and that could be linked to the avoidable factors. These hospitals were

Metropolitan: Peninsular Maternity and Neonatal Services, Kalafong and Chris Hani

Baragwanath Hospitals

City & town: Witbank, Rob Ferreira, Frontier, Mafikeng, Middelburg, Potchefstroom and Empangeni Hospitals

Rural: Gelukspan, Lydenburg and Shongwe Hospitals

There were 2733 perinatal deaths in these groups with 840 neonatal deaths.

The most common category of avoidable factor was related to the pregnant women's behaviour. This was thought to have contributed to the death of the baby in 35.9% of cases. Omissions or commissions on the part of the health workers were thought to have contributed to 29.1% of the babies' deaths. The significant finding in the avoidable factors, missed opportunities and substandard care tables are as follows:

1. No, infrequent or late attendance at antenatal care occurred on 539 occasions. This occurred in 21% of perinatal deaths and is the single most important avoidable factor noted.
2. The second most frequent avoidable factor was problems of monitoring the fetus during labour and was noted on 172 occasions. This was divided into not monitoring the fetus in labour (72 occasions) and signs of fetal distress being interpreted incorrectly (100 occasions).
3. Delays in seeking medical attention during labour were noted on 150 occasions and transport delays from the patients' home to health institutions occurred on 35 occasions. It is not known what was responsible for the delay in seeking attention, but high on the list must be problems with transport. Thus transport problems are probably under-represented.
4. An inappropriate response to poor fetal movement by the patients was thought to have contributed to the perinatal death in 133 occasions.
5. Inappropriate responses by health workers during antenatal care occurred on 226 occasions of which the most common was no response to hypertension in pregnancy that occurred on 76 occasions.
6. Delays in referring patients or calling for assistance occurred on 99 occasions.
7. Inadequate facilities was noted on 48 occasions, with the most common being lack of neonatal intensive care facilities.

Table 3.3. Breakdown of the categories of Primary obstetric causes

Primary Cause	Number	%
Unexplained IUD	563	100
Macerated	282	50.1
Fresh	41	7.3
Lack of information	79	14.0
Not specified	161	28.6
Spontaneous preterm labour	286	100
Idiopathic	210	73.4
Preterm premature rupture of membranes (PPROM)	30	10.5
PPROM and chorioamnionitis	9	3.1
Preterm labour and chorioamnionitis	3	1.1
Cervical incompetence	16	5.6
Infections	135	100
Syphilis	69	51.1
Amniotic fluid	41	30.4
Other	23	17.0
Antepartum haemorrhage	432	100
Abruptio placentae	230	53.2
Abruptio placentae and hypertension	176	40.7
Placenta praevia	17	3.9
Antepartum haemorrhage of unknown origin	7	1.6
Intrauterine growth restriction	86	100
Idiopathic	75	87.2
Postmaturity	11	12.8
Hypertension	310	100
Chronic hypertension	35	11.3
Proteinuric hypertension	238	76.8
Eclampsia	27	8.7
Fetal abnormality	174	100
Chromosomal abnormalities	20	11.5
Central Nervous System (incl. neural tube defects and hydrocephalus)	62	35.6
Cardiovascular abnormalities	3	1.7
Renal system abnormalities	5	2.9
Nonspecific abnormalities	32	18.4
Multiple systems	33	19.0
Non-immune hydrops fetalis	9	5.2
Unspecified	10	5.8
Trauma	40	100
Mechanical – stuck breech	19	47.5
Mechanical – instrumental deliveries	8	20.0
Ruptured uterus	8	20.0
Assault and motor vehicle accident	5	12.5
Intrapartum asphyxia	366	100
Labour related	260	71.0
Meconium aspiration	28	7.7
Cord prolapse	45	12.3
Cord around the neck	29	7.9
Unspecified	4	1.1
Maternal disease	41	100
Diabetes mellitus	19	46.3
Cardiovascular disease	5	12.2
Other	17	41.5
Other	18	100

Table 3.4. Final Neonatal Causes of Death

Final Cause	Number	%
Prematurity related	290	100
Extreme immaturity	100	34.5
Hyaline membrane disease	124	42.7
Necrotizing enterocolitis	30	10.3
Pulmonary haemorrhage	9	3.1
Intraventricular haemorrhage	16	5.5
Asphyxia and trauma	260	100
Asphyxia	216	83.1
Meconium aspiration	31	11.9
Persistent fetal circulation	8	3.1
Infection	133	100
Septicaemia	90	67.7
Pneumonia	14	10.5
Congenital syphilis	12	9.0
HIV infection	2	1.5
Congenital infection	4	3.0
Group B haemolytic streptococci	7	5.3
Meningitis	2	1.5
Nosocomial	1	0.8
Congenital abnormalities	108	100
Central nervous system	27	25.0
Cardiovascular system	6	5.6
Renal system	6	5.6
Gastrointestinal system	7	6.5
Respiratory system	8	7.4
Chromosomal abnormalities	9	8.3
Biochemical abnormalities	2	1.9
Other	15	13.9
Trauma	9	100
Subaponeurotic haemorrhage	5	
Other	4	
Other	23	100
Unknown	17	100

Table 3.5. Avoidable factors, missed opportunities and substandard care

Avoidable factors	Number	%
Patient related	927	35.9
Administrative factors	192	7.4
Health worker related	752	29.1
Lack of information	148	5.4

Denominator 2733 perinatal deaths

Table 3.6. Specific avoidable factors, missed opportunities and substandard care

Factor	Number
Patient related	
No attendance at antenatal care	373
Late initiation of antenatal care	98
Infrequent attendance at antenatal care	68
Delays in seeking medical attention during labour	150
Inappropriate response to decreased fetal movements	133
Inappropriate response to rupture of membranes	17
Inappropriate response to antepartum haemorrhage	18
Administrative	
Transport delays – Patient to health institution	35
Transport delays – Between health institutions	37
Syphilis serology	26
Insufficient staff	27
Inappropriately trained staff	26
Insufficient neonatal intensive care facilities	29
Inadequate facilities	19
Health worker related	
Antenatal care	
Overestimated fetal size	15
Underestimated fetal size	31
No response to poor past obstetric history	41
No response to glycosuria	7
No response to poor uterine fundal growth	30
No response to hypertension	76
No response to abnormal fetal position	11
No response to apparent post-term pregnancy	15
No response to positive syphilis serology	14
No response to report of poor fetal movements	6
Multiple pregnancy not diagnosed	36
Intrapartum care	
Partogram not used	14
No response to poor progress in labour	28
Fetus not monitored	72
Signs of fetal distress interpreted incorrectly	100
Second stage prolonged without intervention	21
Inappropriate use of forceps/vacuum	14
Neonatal care	
Neonatal resuscitation inadequate	21
Neonatal monitoring inadequate	11
Neonatal management plan inadequate	12
Delays	
Delay referring patient to secondary/tertiary unit	54
Delay in calling for assistance	36
Delay in doctor responding to call	9
Unprofessional conduct	
Doctor did not respond to call	11

Discussion

Reliability of the data

This data is unique because the majority input is from non-academic hospitals. This fact gives a truer reflection of real circumstances concerning perinatal care in South Africa. However there are many gaps, and clearly more sentinel sites are needed. It must be remembered that those hospitals supplying PPIP data are more likely to be better than those not supplying data. Hence the information is biased and probably reflects a more favourable situation than reality. To achieve a true picture of perinatal mortality rates, the minimal data set concerning births in all sites in South Africa is required. (See Chapter 3).

Another weakness of the data is that it is not population based. When the data is compared to population based PPIP data that is available from 5 sites, the patterns are the same, but the mortality rates are slightly lower. (See Chapter 5). Hopefully as more sites come on line, the data will become more population based.

Finally, the data systematically excludes births occurring in private institutions. Inclusion of this data would probably decrease the PNMR and neonatal death rate (NNDR). These limitations must be kept in mind when interpreting the data.

Referral systems

The groupings chosen represent the current health care system in the country. The metropolitan areas all have tertiary hospitals and are associated with academic hospitals. The population from this area has relatively easy access to tertiary care. The tertiary hospitals in the metropolitan areas are supposed to receive referrals from secondary hospitals from their own, but also areas outside of their own areas. The city and town group do not have fully fledged tertiary facilities but often out of necessity provide tertiary care. They have regional and district hospitals and receive patients from the rural areas and refer to the tertiary hospitals in the metropolitan areas. The rural group has a number of primary level hospitals and they are supposed to refer to the secondary level hospitals. The groups of this survey, in general represent the situation in primary (rural group), secondary (city and town) and tertiary (metropolitan group) levels of care. The high PNMR in the city and town group and the rural group in comparison to the metropolitan groups, suggests that the health system is not functioning as effectively as it should. The numbers of cases that should have been referred but were not (54 occasions) demonstrate this problem. Is it because the health workers did not know they should have referred the patient, is it because the hospital to which the patient was being referred refused to accept the patient, or are the tertiary level hospitals too overcrowded that they just do not have space for any referrals? These questions on the actual functioning of the health system need to be answered and the problems addressed.

Perinatal Care Indices

A national PNMR is still elusive, but possibly lies between 35 and 40 per 1000 deliveries. This estimate is made from the assumption that most births occur in the cities and towns, and that they would carry the most weight when calculating a national PMNR. A national NNDR is similarly difficult to estimate, but again will possibly lie between 12 and 15 per 1000 live births.

A high LBWR has been found in all sites. This indicates a developing country where the majority of the population is poor. The LBWR is two to three times higher than in a developed country. A surprising finding that requires further investigation is the reported one

third lower LBWR in rural areas when compared to the other two areas. There are various possible explanations. For example, the mothers with small fetuses are referred to the cities and towns; women who go into labour in rural areas prematurely deliver their babies at home and they are never recorded; and the lifestyle in the rural areas is very different from the urban and peri-urban areas. Any or all of these might explain the difference. It is a priority to establish whether the finding is correct and if so, why.

The stillbirth to neonatal death (SB:NND) ratio is unexpectedly high in the metropolitan areas. This is probably a reflection of good neonatal care. In the rural areas, and cities and towns, the ratio is much lower and the NNDR much higher. Stillbirths reflect antenatal care and neonatal deaths reflect the care during labour and in the nursery. In a developed country, the SB:NND ratio is close to one. Where no care exists, the stillbirth rate and NNDR are both high, and the ratio will also be close to one. Usually care in the institutions providing care during labour improves first before care in the community. Thus labour care and neonatal care improves, the NNDR declines and the ratio rises. Finally, as the provision of antenatal care improves and pregnant women attend the clinics, the ratio will decline. In developing countries there are usually many more stillbirths to neonatal deaths and the ratio is high. Irrespective of this, it is clear that the high number of stillbirths in the metropolitan areas suggest that much effort will need to go into improving the provision of antenatal care in the metropolitan areas. This is not to say the same problems do not exist in the rural areas, and cities and towns, but improving care during labour and in the nursery might be a greater priority in those areas.

The Perinatal Care Index (PCI) is, as expected, lowest in the metropolitan group, then city and town, then rural. The assumption made is that the lower the PCI the better the care. The PCI is the PMNR divided by the LBWR. The LBWR is a factor of the socio-economic circumstances of the community and there is very little that health institutions can do about it on their own. Factors that will decrease the LBWR are improvements in the local economy, increasing education standards, improved living conditions and so on. The majority of perinatal deaths occur in the LBW group of babies and hence, in areas with a high LBWR, one would expect a high PNMR. Should the PNMR be low in that area, one assumes that this is due to the good care provided by the health institutions and the PCI will be low. This is the circumstance in the metropolitan areas. However, in areas where the LBWR is low, one would expect that the PNMR would also be low. Should the PNMR be high, one assumes this is due to poor care in the health institution and the PCI would be high (as is the case in the rural group). The validity of the PCI still needs to be verified. However, a comparison of the PCIs of institutions with similar circumstances will indicate to health administrators which institutions will require their concentrated efforts initially.

Intrapartum care

The high rates of death due to intrapartum asphyxia and trauma at all sites, but especially in cities and towns and rural areas, are a cause for concern. The one area where the health institutions should be able to provide good basic care is during labour. It is the area where standard protocols are available and where the use of the partogram to detect prolonged labour is of value. Both midwives and doctors are trained in managing labour so lack of knowledge should not be a reason for the high death rate. The avoidable factors associated with deaths in labour are misinterpreting the signs of fetal distress, not monitoring the fetus during labour, not using the partogram or using it incorrectly and poor management of the second stage of labour. All these factors should be relatively simple to correct, provided that there are adequate staffing levels.

Perhaps the initial step would be to review the teaching of intrapartum care at nursing and medical schools. It is an assumption that managing labour is taught using current knowledge and concentrating on the use of the partogram. Are midwives (who conduct the majority of births) properly qualified to manage labour? Has the integrated 4-year nursing course removed a level of training that is necessary for midwives to manage labour safely? In the past, nurses had to do an extra year's training to become midwives. Now a nurse is regarded as a midwife on completion of the 4-year course and can be exposed to managing labour unsupervised in primary care settings. Similar comments can be made about doctors who with minimal or no training might be placed in charge of labour wards during their community service, again unsupervised.

Not quantified in the avoidable factors is the number of cases where poor or no neonatal resuscitation compounded the problem of an asphyxiated infant and was a major factor in the ultimate death of the infant. Can all midwives resuscitate an asphyxiated infant? Can all midwives provide effective mask ventilation? Is there equipment available in all sites where births occur?

Answering all these questions might contribute significantly to salvaging asphyxiated infants.

Infections

There is a surprising variation of availability of syphilis serology status of women who have had a perinatal death. One would expect that the group where syphilis testing would be especially thorough would be in those women who have lost a baby. Hence it would be the best reflection of syphilis screening in the population served by the institution. However, in some areas the syphilis serology status of women who have had a perinatal death is not known in more than 80% of cases, and this demonstrates a serious lack of provision of the basic antenatal care in these areas. Simple, inexpensive on-site methods for screening for syphilis are available² and there is really no excuse for the administrators not to ensure that screening is performed throughout. Deaths due to syphilis contributed significantly to the perinatal mortality and the number is clearly under-reported. Syphilis is a condition that can be effectively detected and treated. There can really be no excuse for babies still to die from syphilis.

Preterm labour

Spontaneous preterm labour is the major cause of perinatal deaths in the cities and towns. The reasons for this are not clear. The obstetric management of these cases has not been studied and the proportion of cases receiving corticosteroids is unknown. However, from previous experience at Kalafong Hospital³ the proportion of cases where corticosteroids could

be given is low because in most cases the woman arrives at the institution in advanced labour and the fetus is delivered shortly thereafter. It would seem the area where the major impact could be made is in preventing neonatal deaths by improving the neonatal care of these infants. The rate of preterm labour as opposed to the rate of perinatal deaths due to preterm labour is not known. Perhaps the high proportion of deaths due to spontaneous preterm labour in cities and towns is due to the neonatal care and not an increase in prevalence of the condition. If this were the case, the question would be why is the neonatal death rate so much higher in the cities and towns as already observed? Is it because of lack of facilities, or lack of ability to refer patients or lack of knowledge on how to manage these small babies?

Kangaroo mother care (KMC) has been shown to be an effective, inexpensive and user-friendly method to decrease the neonatal death rate in various settings^{4,5}. It would appear to be an ideal solution for hospitals caring for neonates throughout the country.

Antepartum haemorrhage and hypertension

Perinatal deaths due to antepartum haemorrhage and hypertension occur significantly more often in the metropolitan areas than in other areas and this is a real and not just a proportional difference. Again the reason for this is unknown and one could speculate on the influence of lifestyle, especially smoking, in the women from the metropolitan areas. This aspect will need to be investigated further.

Unexplained stillbirths

There is a disturbing number on unexplained intrauterine deaths recorded in this survey. A number are recorded as such because of lack of information such as the syphilis status of the patients. However, there is still a large group where there is adequate clinical information, but still no cause can be found. Also, the prevalence of these truly unexplained macerated intrauterine deaths appears to be rising (Kalafong Hospital PPIP data: all weight categories 1994 – 11/1000 births, 2000 – 17/1000 births, and for the Atteridgeville community 1994 – 9/1000 births and 2000 14/1000 births). Previously, amniotic fluid infection syndrome (AFIS) has been found to be a common cause. The clinical diagnosis is difficult and is usually only made after the birth of the baby. AFIS is usually a subclinical chorioamnionitis, which occurs in malnourished or immune suppressed patients. Determining the actual cause of the unexplained macerated intrauterine deaths is important and might change the relative importance of the various categories of primary obstetric causes of death. Concurrent with the rise in the unexplained macerated intrauterine deaths has been the rise of the HIV/AIDS epidemic. It is well described that a pregnant woman who is HIV infected has an almost four times greater chance of having a stillbirth and two times risk of preterm labour⁶. Perhaps there is a cause and effect relationship here, and if the cause is due to AFIS, there is place for a randomised trial on the role of prophylactic erythromycin in HIV infected pregnant women. This is a priority for investigation.

Antenatal care

The most common avoidable factor recorded is no, infrequent or late attendance for antenatal care. Ndiweni and Buchmann⁷ have demonstrated that in most cases the unbooked mother that develops a complication has a lower risk than other women who develop complications in pregnancy, and that the vast majority intended to attend antenatal care but the complication occurred before they could attend. At Kalafong Hospital 97% of women make contact with the health services during pregnancy and before the onset of labour. It appears the issue is not encouraging women to attend antenatal care, but encouraging pregnant women to attend early. Here it appears that the agents of the health service put barriers in place to discourage this.

Most women will confirm that they are pregnant either at a general practitioner or a clinic within 3 months of missing a period, but then initiate antenatal care some months later on the instruction of the general practitioner or clinic sister⁸. Hence we have the situation where the average age of confirming pregnancy is 12 weeks and that of starting antenatal care is 22 weeks⁸. Clearly a golden opportunity is being lost to intervene early in the pregnancy. If the paradigm could change such that women receive their first antenatal examination at the point when the pregnancy is confirmed many of the above problems would cease to exist, as demonstrated by Jeffery et al.⁹. The pregnancy plan would be discussed and initiated at that visit. The question is how to initiate this change. Most women confirm their pregnancies at general practitioners, hence part of the solution will be to bring the general practitioners into the circle of health care workers providing antenatal care for indigent women. At the very least, the general practitioners should be supplied with antenatal cards by the health authorities, so that they can issue them to women who make their way initially to them to confirm that they are pregnant. Furthermore, the attitude of the general clinics will need to change such that they welcome women who come early for antenatal care and not tell them to come back when they are 5-6 months pregnant. Innovative ways will need to be sought to change the health service to this paradigm⁹.

Many instances were reported where antenatal problems were not acted upon by the health care workers. It would appear that clear protocols for referrals, and auditing systems to ensure that the policies are followed, are necessary to improve this situation. In circumstances where no referral centre is available, this will need to be established.

Fetal movement charting

Poor reporting of reduced fetal movements is frequently reported as a patient related avoidable factor. Whether this is realistic or a form of victim blaming is uncertain. Neldam¹⁰ showed that formal scoring of fetal movements in a low risk population resulted in a significant reduction in perinatal mortality in Sweden in 1979. The large RCOG trial performed in England later in the 1980s could find no difference between formal recording of fetal movements and no formal recording¹¹. However, in the latter trial a similar number of women reported poor fetal movements in each group. Hence the importance of monitoring fetal movements is unclear. Furthermore, no randomised trial on fetal movements has been conducted in a developing country. There is clearly a need for a well-structured randomised trial to investigate the role of fetal movement recording or awareness and their effect on perinatal outcome.

Other issues

Other issues highlighted by the data are transport problems. These were noted on 72 occasions, but this is almost certainly an underestimation. There were 150 occasions where delay in seeking help in labour was recorded. What was not recorded was the reason why there was this delay. In a number of cases it must have been lack of transport from the patients home to the health institution. An effort will need to be made to more accurately quantify the magnitude of this problem and if is large to bring it to the attention of the relevant authorities.

An area rarely recorded as an avoidable factor is the lack of staff. Is there enough staff or are the health workers so used to chronic shortages that they regard it as normal? Clearly, staffing norms are urgently required and once available the institutions can measure themselves against the norms and will be able to judge just how serious their problem is.

Conclusion

In South Africa we now know the magnitude of the problem of perinatal death, we know the causes and we know that some of the major problems are manageable. By focusing on the remedial priority problems, (intrapartum management, resuscitation of the asphyxiated neonate, care of the premature neonate with kangaroo mother care, and restructuring antenatal care), the PNMR could be substantially reduced. This, coupled with the current medical infrastructure, both regarding the profession and health systems and with clear political support should see dramatic drops in PNMR in South Africa in near future.

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Chapter 4

Population Based Data

Abstract

Objective: *To ascertain whether there are differences in the perinatal care indices and the pattern of disease when population based data is compared with mainly hospital-based data.*

Method: *PPIP data from 5 areas that included all the births of the population from the area are compared to one another and to the data from all PPIP sentinel sites.*

Results: *Perinatal data from the population based metropolitan areas was considerably lower than the hospital based metropolitan data. There were no major differences when the population and hospital based city and town and rural areas were compared. The pattern of disease remained similar.*

Conclusion: *Where possible population based data should be used.*

Introduction

There are five areas where there has been an extensive effort to ensure the data is population based and not hospital based. This data is presented as a comparison to the combined PPIP data shown in chapter 3. The differences are noted and implications discussed.

Methods

The five sites were the Peninsular Maternity and Neonatal Service (PMNS)¹, the Pretoria Academic Complex², the Highveld Region³, Albany District⁴, and the Jozini Health District⁵. The first two are in metropolitan areas (Cape Town and Pretoria) and include academic institutions, the next two include cities, towns and some rural areas (Witbank, Middelburg, Belfast, Machadadorp, Waterval Boven, and Lydenburg in Mpumalanga province, and Grahamstown and Port Alfred in the Eastern Cape. The last one, Jozini Health District in northern KwaZulu-Natal, is entirely rural and includes four rural hospitals (Bethesda, Manguzi, Mosvold and Mseleni) and all their residential clinics.

The PMNS includes the data of 1999. The Pretoria Academic Complex includes data from 1997-1998, the Highveld Region from January 1996 to June 1999, the Albany District from January 1999 to September 2000 and the Jozini Health District from September 1998 to May 1999. The data is presented as percentages of causes and, where possible, rates/1000 births.

Results

The perinatal care indices for the five population based PPIP sites are shown in Table 4.1 and the rates per 1000 births of the primary and final causes of death in Table 4.2. The proportions of primary and final causes of death are shown in Figures 4.1 and 4.2.

The PNMR for the Metropolitan group in Chapter 3 was 30 per 1000 births compared with 20 and 22 per 1000 births for the PMNS and Pretoria Region respectively. The PNMR did not differ when comparing the other groups. The pattern of primary obstetric causes of perinatal

death in the PMNS and the Pretoria Region also differs significantly. The rates/1000 births of deaths due to antepartum haemorrhage were significantly higher in the PMNS when compared to Pretoria whereas the unexplained stillbirth rate was significantly higher in the Pretoria Region. Otherwise the data is consistent with the hospital based PPIP data as shown in Chapter 3.

Table 4.1. Basic data and Perinatal Care Indices from the population based databases

	PM&NS	Pretoria	Highveld	Albany	Jozini
Total births ≥1000g	26974	23886	26844	3095	5728
Live births ≥1000g	26598	23660	26110	3032	5632
SB ≥1000g	376	396	734	63	96
NND ≥1000g	158	136	303	38	71
Total deaths ≥1000g	534	532	1037	101	167
PNMR (≥1000g) / 1000 births	19.8	21.8	38.6	32.6	29.2
NNDR (≥1000g) / 1000 live births	5.9	5.7	11.6	12.5	12.6
LBWR	15.0	15.4	13.9	17.9	8.1
PCI (≥1000g)	1.25	1.41	2.78	1.82	3.6
SB:NND Ratio	3.2:1	2.54:1	2.4:1	1.66:1	1.35:1

Table 4.2. Rate of death per 1000 births per cause of death for the population based data

	PM&NS	Pretoria	Highveld	Albany	Jozini
Primary causes ≥1000g					
Unexplained IUD (IUD)	2.56	7.95	10.32	2.5	6.46
Spontaneous preterm lab. (PTL)	2.52	2.97	5.96	6.46	3.14
Hypertensive Disorders (HT)	2.11	2.55	4.51	3.88	-
Antepartum haemorrhage (APH)	5.00	2.22	3.39	1.94	2.27
IUGR	1.48	0.54	1.01	-	-
Intrapartum asphyxia (IP)	2.00	1.80	5.36	3.88	8.03
Trauma (T)	0.26	0.17	1.42	2.91	-
Infections (INF)	1.37	1.09	3.50	8.72	2.44
Fetal abnormalities (ABN)	1.70	1.47	2.16	4.52	2.09
Maternal disease (MD)	0.37	0.54	0.37	4.20	-
Other	0.26	0.63	0.11	0.65	4.54
Final causes ≥1000g					
Prematurity related (Prem)	1.13	1.86	4.02	6.23	1.95
Asphyxia & birth trauma (Asph)	1.80	1.90	4.17	3.96	6.40
Infection (Inf)	1.50	1.14	1.53	-	1.78
Congenital abnormalities (Abn)	1.20	0.76	1.19	2.30	1.42
Other	0.30	0.08	0.12	1.98	1.16
Unknown	-	-	0.38	0.33	

Figure 1. Pattern of Primary obstetric cause of perinatal death in the various PPIP sites with population based data

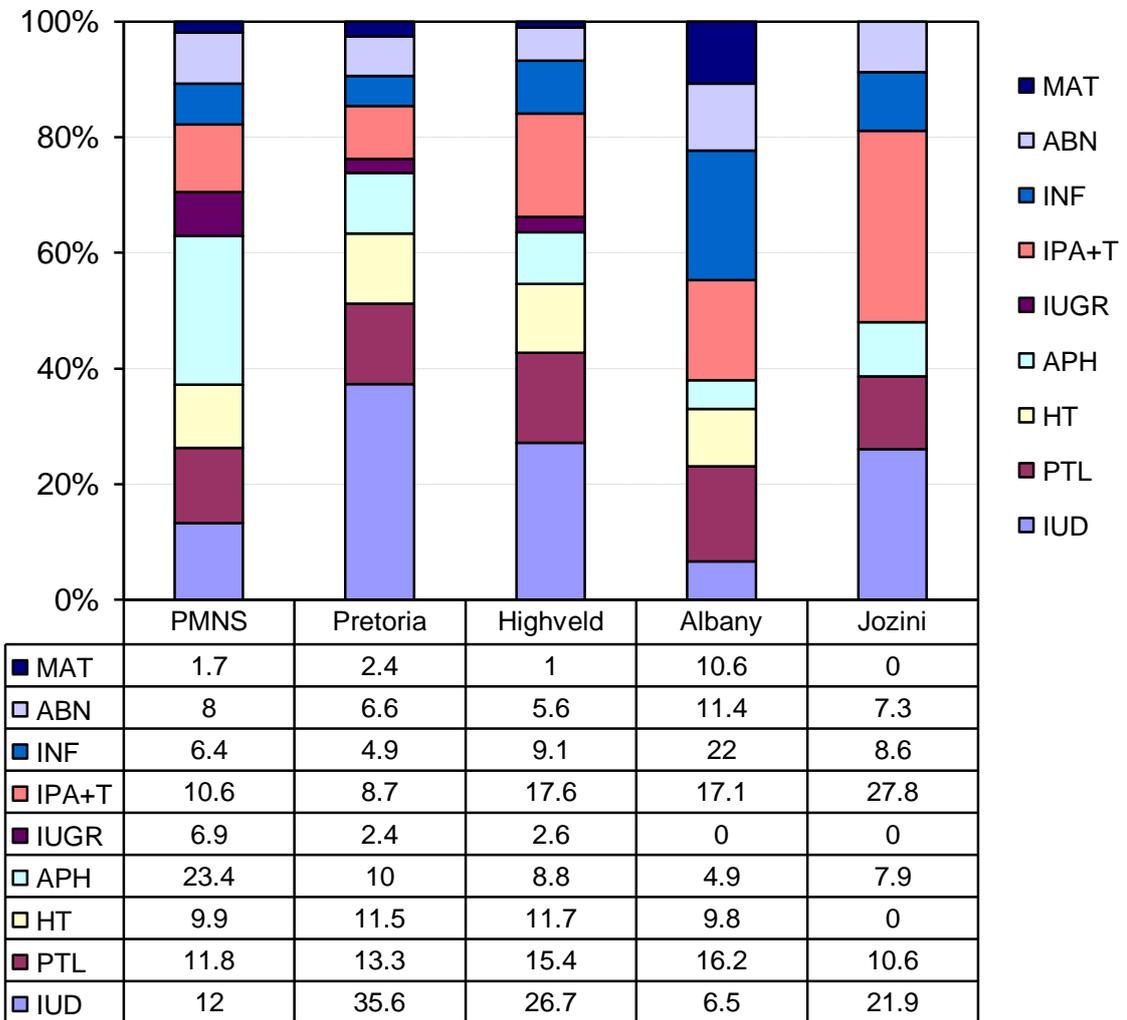
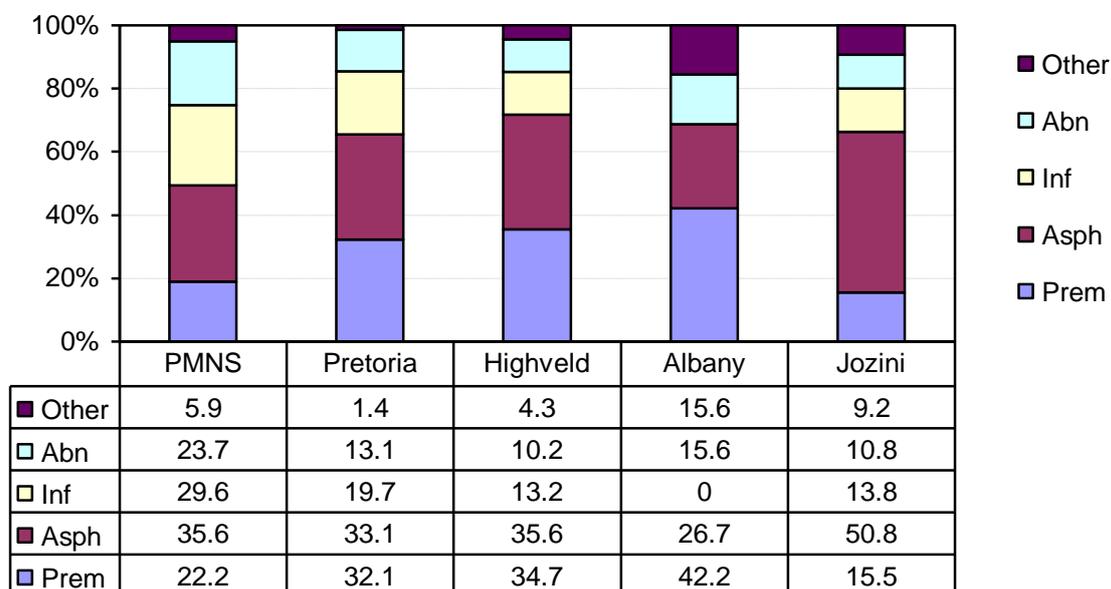


Figure 2. Final causes of neonatal death in the PPIP sites with population based data



Discussion

There are two major findings in this comparison. Firstly, the population based PNMR for the sites in metropolitan areas is significantly lower than the amalgamated data in Chapter 3. The actual PNMRs of between 20 and 22/1000 births for the PMNS and Pretoria Academic Complex is more in line with what would be expected in a fully functioning tiered health care system, with patients having relatively easy access to tertiary level care. It illustrates what is possible in South Africa and the aim should be to provide care to all pregnant women at the same or better standard than in the PMNS and Pretoria Academic Complex. The PNMR for the Western Cape is 18.4/1000 births which is very similar to the PMNS rate of 19.8/1000 births. This is contrasted with the PNMR of 21.8/1000 births for the Pretoria Academic Complex and that of 32.1/1000 births for Gauteng Province. The reasons for this major difference should be investigated.

The second major finding is the difference in pattern of disease between the Cape Town metropolitan area and the Pretoria metropolitan area. The very high rate of deaths due antepartum haemorrhage in Cape Town is clearly a population difference. Lifestyle especially as it relates to smoking needs to be investigated as a possible reason for the large difference. The large number of unexplained intrauterine deaths in the Pretoria metropolitan area compared to the Cape Town metropolitan area is also a surprise finding. The explanation is unknown. One possible explanation is perhaps the influence of HIV infection. The prevalence of HIV infected women has always been consistently higher in the Pretoria metropolitan area than in the Cape Town metropolitan area. As discussed in chapter 3, amniotic fluid infection syndrome occurs more frequently in immune compromised pregnant women and is difficult to diagnose. Thus the unexplained intrauterine deaths might be associated with the rising prevalence of HIV infected pregnant women and mediated by amniotic fluid infection syndrome.

Conclusion

Population based data are less biased and thus more useful than hospital based data. When PPIP sentinel sites are selected, efforts should be made to introduce PPIP to all the sites that conduct births within the district. This would give population based data.

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Chapter 5

Minimum perinatal data set

Abstract

The data collecting on perinatal statistics in South Africa is suboptimal. A minimum data set is proposed which would help provide the relevant information. This data set was taken to NHISSA as a proposal and accepted. However, the data tool for the collection was not accepted and it was left to each province to decide on the tool and method of collection of the data.

Introduction

The magnitude of perinatal mortality in South Africa is not known. This indicator together with other indicators such as neonatal death rate and low birth weight rate are also not currently available. The importance of these indicators is not only to inform on the magnitude of perinatal problems but will also be useful in monitoring progress in implementation of maternal health programmes. The Sub-directorate: Maternal Health has developed the Guidelines for Maternity Care in South Africa as well as a standardised partogram. Indicators are essential in monitoring implementation of these and other programmes that are already in place (e.g. syphilis testing). Other indicators that will be useful in assessing and monitoring maternal and perinatal care include:

1. Proportion of women who have attended antenatal care
2. Caesarean section rate
3. Teenage pregnancy rate
4. Proportion of deliveries to women >34 years old
5. Maternal mortality ratio.

It was not possible to compute a maternal mortality ratio (MMR) in the *Saving Mothers: Report on Confidential Enquiries into Maternal Deaths 1998* since the number of births in South Africa was not known and the accuracy of maternal death reporting was doubtful. There clearly needs to be a system in place that will verify the accuracy of maternal death reporting and allow for calculation of the important health care indices such as the perinatal mortality rate (PNMR) and MMR. Furthermore, rational planning to improve perinatal and maternal care will not be realised without a system to monitor the impact of programmes as well as the utilisation of services. The same indicators are important in setting targets for improvement.

This chapter deals with the minimum data set and indicators for monitoring of maternal and perinatal care.

Method

Prior to the workshop an attempt was made to collate all available data on perinatal surveillance through the MCWH co-ordinators, Directorate: Health systems Research and Epidemiology, and assess data collecting tools used to capture the data. The results of this are discussed in Chapter 2. Following this a simple data-collecting tool used by Gauteng (Chapter 1, figure 1.1) to assess the magnitude of perinatal mortality in Gauteng was circulated to the provinces to assess the possibility of adapting it for a similar purpose countrywide.

A group discussion was held to discuss the Gauteng data-collecting tool and to try and define what data should be included in the minimum data set and what the minimum data tool should look like.

Results

The main issues arising from the discussion group are presented below.

1. The minimum data set used by Gauteng Province should be modified to include also born before arrival (BBA), unbooked mothers, and to separate stillbirths into fresh stillbirths and macerated stillbirths (Figure 5.1)
2. Need to have clarity on cut off for teenage pregnancy
3. National Health Information Systems of South Africa (NHISSA) should be requested to adopt the minimum data tool
4. MCWH Co-ordinators will be responsible for collecting the data and training in collection of data whereas HIS and Epidemiology will be responsible for collation and analysis of data. The need for feedback on data collected was emphasised
5. The first page of PPIP should incorporate the minimum data tool to avoid duplication of data collection and allow for the easy introduction of PPIP later to those sites that want to use PPIP

Even though the minimum data tool (Figure 5.1) looks simple with few elements to be collected, quite a significant number of useful indicators can be computed from these elements and these included the following:

- | | |
|---|--------------------------------------|
| 1. Stillbirth rate | 2. Neonatal death rate |
| 3. Perinatal mortality rate | 4. Low birth weight |
| 5. Perinatal care index | 6. Caesarean section rate |
| 7. Assisted delivery rate | 8. Proportion of teenage pregnancies |
| 9. Prevalence of syphilis | 10. Maternal mortality ratio |
| 11. Proportion of women who attended antenatal clinic | |

An attempt is made to capture as much information as possible from the birth register to provide the perinatal care indicators. The definitions of the various indices are given in Chapter 1.

Other indicators that can be obtained include teenage pregnancy rate, elderly pregnant woman rate, BBA rate and prevalence of syphilis as well as syphilis testing rate. Maternal mortality surveillance is dealt with in detail under the confidential enquiries into maternal deaths. Inclusion of this indicator here is as a validation process for the confidential enquiries.

Discussion

It was decided that it was not possible to include all the variables proposed by WHO for a minimum data set at this stage. This is because the variables such as maternal age, years of study, parity, gestational period, skilled attendant, birth weight and number of severe birth defects (required by the WHO data set - personal communication Moodley, 2000) all require a separate data entry per patient. Currently only numbers in data categories are collected, and these are counted from the birth registers. When the birth registers are computerised in the future, this data will be collected. Some of these variables will however be included in some of the PPIP sentinel sites selected for studying the disease patterns in the different provinces.

The options discussed were adoption of the tool as it was or just the data set. The group realised that it did not have the mandate to adopt the tool without negotiation with the relevant directorates responsible for health information mainly the Directorates: Health System Research and Epidemiology and Health Information. Presentation of the minimum data set to NHISSA was planned and a request was made for adoption of the tool, with the advantage of empowering health workers in the facilities to utilise the information they collected. This presentation was done on 21 November 2000. NHISSA noted that over 70% of the elements were already collected through the Primary Health Care minimum data set and the Hospital data set. This further highlighted lack of communication between Programme Managers and Health Informatics. NHISSA agreed to include the data elements that were not currently covered. There was however reluctance to adopt the proposed tool. It was left up to the provinces to decide on adoption of the tool or not.

The issue of cut off for age had been discussed at length by NHISSA and the consensus was to use of less than 18 years as cut off. This however differs with the definition proposed by the Sub-directorate: Youth and Adolescent Health that has recommended less than 20 years as the cut off.

There still needs to be consensus on several other issues. The cut off weight used for computing perinatal indicators is 500 g for live births in some areas whereas others use 1000 g. Clearly, those who use a cut off weight as 500 grams will report a very high PNMR as survival rates of infants under 1000 g are very low. The cut off for teenage pregnancy also needs to be addressed as discussed above. Uniform definitions are essential for compiling national rates and for comparison of data.

Conclusion

The importance of having a data-collecting tool that can be utilised by health workers on the ground cannot be over-emphasised. This will empower health workers to compute indicators themselves without having to wait for a report that may come out once or twice a year. It will

also facilitate implementation of auditing maternal services, an activity that is strongly recommended for all health workers to engage in. Only through the implementation of formal audit systems can improvements in maternal and perinatal care be realised.

Recommendations

1. More PPIP sentinel sites need to set up in the provinces – to this effect provinces drew a ‘wish’ list on the number of sites. The number of sites provinces hoped to set up were: Northern Cape 1, Northern Province 6, KwaZulu-Natal 4, Free State 5, Eastern Cape 1, North West Province 3, Gauteng 2 and Mpumalanga 5. Participants from established sites volunteered to help set up new sites by assisting with training. Continuing Professional Development (CPD) points should be allocated to doctors involved in auditing.
2. Communication between programme managers, health informatics sections and health workers at the PPIP sites must be improved. Programme managers need the information compiled by both the Health Informatics Section of the Department of Health and the PPIP users for monitoring their programmes, for setting targets as well as for assessing the impact of maternal and perinatal care programmes.
3. A follow up workshop should be held in 2001. The purpose of the workshop would be for continued education on perinatal issues and audit, sharing of experiences and compiling a report from the PPIP sites.

Figure 5.1. Example of the proposed minimal data collection tool. (The areas in bold are the additions/modifications of the Gauteng data collection tool)

MONTHLY SUMMARY STATISTICS						
Name of institution:			Level of care:			
Health district:			Rural/peri-urban/urban			
Health region:						
Month:			Year:			
Weight Category (g)	Stillborn		Neonatal death		Alive on discharge	Total
	Fresh	Macerated	Early	Late		
500 –999						
1000 – 1499						
1500 – 1999						
2000 – 2499						
2500 +						
TOTAL						
Total Number of births: _____						
Women less than 20 years: _____						
Women more than 34 years: _____						
Syphilis status: Negative _____						
Positive _____						
Unknown _____						
Route of delivery:						
Normal vaginal birth: _____						
Assisted birth – Vacuum: _____						
Forceps: _____						
Caesarean section _____						
Born before arrival: _____						
Number attended antenatal care: _____						
Maternal deaths: _____						
Compiled by: _____			Signature: _____			
Date: _____			Tel/fax: _____			

Chapter 6

Antenatal Care

Abstract

Objective: *To describe avoidable factors, missed opportunities and substandard care in the PPIP sentinel sites regarding antenatal care and to identify useful quality assurance markers for antenatal care.*

Method: *Data from 15 PPIP sentinel sites was analysed with respect to avoidable factors in antenatal care.*

Results: *No, infrequent or late attendance at antenatal care, and inadequate response to reduced fetal movements were the most frequently reported patient related avoidable factors. Lack of testing for syphilis was an important administrative avoidable factor related to antenatal care. Delayed or no referral of patients with hypertension, poor obstetric history and poor response to poor or excessive uterine growth were the common health worker related antenatal care avoidable factors.*

Conclusions: *Death due to syphilis and adherence to institutional protocols with respect to referral of patients are potentially good markers for quality assurance in antenatal care. The information is currently collected in PPIP. Initiation of antenatal care at the time of confirmation of the pregnancy could greatly diminish the no or late attendance of antenatal care.*

Introduction

Provision of antenatal care and attendance at antenatal care is regarded as a cornerstone of perinatal care. It is advocated that a pregnant woman should attend an antenatal clinic regularly, and that this would help ensure a successful outcome to the pregnancy. There are four aspects to antenatal care; prevention of problems, screening for problems, treatment of problems and transfer of information to the pregnant woman.

In screening for problems, pregnant women with syphilis, anaemia, Rhesus iso-immunisation, asymptomatic bacteriuria, diabetes mellitus, hypertension, HIV infection, multiple pregnancy, previous pregnancy problems and fetuses with congenital abnormalities can be detected and managed. During follow-up visits poor fetal growth, hypertension, proteinuria, abnormal lie of the fetus, and postterm pregnancy can all be detected and managed. In some cases early signs of preterm labour can be detected and managed, but this is not nearly as successful as for other conditions. As far as the fetus is concerned, perinatal deaths due to syphilis, idiopathic intrauterine growth restriction, diabetes mellitus, postterm pregnancies and abnormal lie can be prevented by antenatal care. This is only the case if pregnant women attend antenatal care, and health workers detect problems and manage the patients appropriately.

Perinatal deaths due to antepartum haemorrhage, complications of hypertension in pregnancy and spontaneous preterm labour can not or can only be partially prevented by antenatal care. However, where the problems are detected, management guidelines have been agreed upon that would help prevent perinatal deaths. Referral of patients with these problems to the appropriate level of care is one of the major elements of these guidelines. Although congenital abnormalities can be detected, this usually does not alter the outcome for these

fetuses or neonates. Obviously perinatal deaths due to intrapartum asphyxia should be managed during labour and antenatal care does not play a large role in their prevention.

The accessibility and quality of antenatal care is not known for South Africa as a whole, although there are suggestions that it could be improved¹. Indirect evidence of quality of antenatal care can be gained by studying primary causes of perinatal deaths and avoidable factors, missed opportunities and substandard care. The conditions that specifically could indicate a poor quality of antenatal care would be perinatal deaths due to syphilis, idiopathic growth restriction, post term pregnancies and perhaps diabetes mellitus. Furthermore, the proportion of cases that should have been referred antenatally and were not is another method of quality assurance in antenatal care.

This chapter examines the data generated from the PPIP sentinel sites around the country and analyses the potential problems in antenatal care and describes possible solutions. It also examines the possibility that by using PPIP the quality of antenatal care provided throughout the country could be assessed.

Methods

Data from 15 PPIP sentinel sites that described the primary causes of perinatal death and the avoidable factors, missed opportunities and substandard care was available for this study. The sites were distributed across South Africa and represent metropolitan, city and town, and rural areas. Doctors and midwives analysed 2733 perinatal deaths in 82 868 births in the data and allocated primary obstetric and final neonatal causes of death and noted whether there were any avoidable factors, missed opportunities or substandard care in each case and if present described their nature.

Results

Table 6.1 gives the categories and sub-categories of the primary obstetric causes of death for the 15 sentinel sites that recorded the avoidable factors.

From Table 6.1 it can be seen that syphilis is responsible for more than half the causes of death due to infection and had a mortality rate of 0.83/1000 births. Intrauterine growth restriction (IUGR) was mainly idiopathic with postmaturity being recorded infrequently. IUGR had a mortality rate of 1.04/1000 births. Diabetes mellitus is a very uncommon primary obstetric cause of death in the general pregnant population and has a mortality rate of 0.23/1000 births. In all these conditions the prevalence in the pregnant population was unknown.

Table 6.2 shows the patient related and antenatal care related avoidable factors for the 15 hospitals. The major patient related factor is the no, late or infrequent attendance for antenatal care, comprising 539 occasions (20%) of perinatal deaths.

Table 6.1. Breakdown of the categories of Primary obstetric causes at the 15 PPIP sentinel sites

Primary Cause	Number	%	Rate/1000 (82 868 births)
Unexplained intrauterine death (IUD)	563	100	6.35
Macerated	282	50.1	3.40
Fresh	41	7.3	0.49
Lack of information	79	14.0	0.95
Not specified	161	28.6	1.94
Spontaneous preterm labour	286	100	3.45
Idiopathic	210	73.4	2.53
Preterm premature rupture of membranes (PPROM)	30	10.5	0.36
PPROM and chorioamnionitis	9	3.1	0.11
Preterm labour and chorioamnionitis	3	1.1	0.00
Cervical incompetence	16	5.6	0.19
Infections	135	100	1.62
Syphilis	69	51.1	0.83
Amniotic fluid	41	30.4	0.49
Other	23	17.0	0.28
Antepartum haemorrhage	432	100	5.21
Abruptio placentae	230	53.2	2.78
Abruptio placentae and hypertension	176	40.7	2.12
Placenta praevia	17	3.9	0.21
Antepartum haemorrhage of unknown origin	7	1.6	0.01
Intrauterine growth restriction	86	100	1.04
Idiopathic	75	87.2	0.91
Postmaturity	11	12.8	0.13
Hypertension	310	100	3.74
Chronic hypertension	35	11.3	0.42
Proteinuric hypertension	238	76.8	2.87
Eclampsia	27	8.7	0.33
Fetal abnormality	174	100	2.10
Chromosomal abnormalities	20	11.5	0.24
Central nervous system (incl. Neural tube defects and hydrocephalus)	62	35.6	0.75
Cardiovascular abnormalities	3	1.7	0.00
Renal system abnormalities	5	2.9	0.01
Nonspecific abnormalities	32	18.4	0.39
Multiple systems	33	19.0	0.40
Non-immune hydrops fetalis	9	5.2	0.11
Unspecified	10	5.8	0.12
Maternal disease	41	100	0.49
Diabetes mellitus	19	46.3	0.23
Cardiovascular disease	5	12.2	0.01
Other	17	41.5	0.21

Inappropriate response to decreased fetal movements, ruptured membranes and antepartum haemorrhage reflect areas where information given at antenatal clinics could be improved. The administrative factor of greatest concern was that syphilis screening was not carried out because testing was not performed by the clinic. This occurred on 26 occasions and was responsible for 38% of deaths due to syphilis. In a further 16 cases (23%) the health worker did not respond to positive syphilis serology. Thus, the health system failed the patient in 61% of deaths due to syphilis.

Another factor of major concern was the large number of occasions (226 occasions) where a problem was detected at antenatal care and there was no response or it was overlooked. The most common missed opportunity in this category was no appropriate response to

hypertension, which occurred on 76 occasions. This is 16% of cases where complications of hypertension (including abruptio placenta) resulted in the death of the baby. In 7 cases there was no response to glycosuria and this was associated with perinatal deaths in 37% of cases due to diabetes mellitus.

Table 6.2. Specific avoidable factors, missed opportunities and substandard care

Factor	Number
Patient related	
No attendance at antenatal care	373
Late initiation of antenatal care	98
Infrequent attendance at antenatal care	68
Delays in seeking medical attention during labour	150
Inappropriate response to decreased fetal movements	133
Inappropriate response to rupture of membranes	17
Inappropriate response to antepartum haemorrhage	18
Administrative	
Transport delays – patient to health institution	35
Transport delays – between health Institutions	37
Syphilis screening not available	26
Insufficient staff	27
Inappropriately trained staff	26
Insufficient neonatal intensive care facilities	29
Inadequate facilities	19
Health Worker Related	
Antenatal care	
Overestimated fetal size	15
Underestimated fetal size	31
No response to poor past obstetric history	41
No response to glycosuria	7
No response to poor uterine fundus growth	30
No response to hypertension	76
No response to abnormal fetal position	11
No response to apparent postterm pregnancy	15
No response to positive syphilis serology	14
No response to report of poor fetal movements	6
Multiple pregnancy not diagnosed	36

Discussion

In antenatal care four major problems were identified:

1. No antenatal care, late initiation of antenatal care or infrequent attendance at antenatal clinic
2. No reporting of reduced fetal movements by pregnant women
3. Inadequate syphilis screening
4. Non-referral of high risk pregnant women by clinic staff

No antenatal care, late initiation of antenatal care or infrequent attendance at antenatal clinic

This was the most common avoidable factor recorded. Caution must be used here as a number of pregnant women have antenatal care performed by their general practitioners and if there is no communication with the public health sector by the general practitioner, for example by providing the woman with a letter or her antenatal card, the woman could easily be classified as not having attended antenatal care. This example is clearly a health system failure and not a patient related factor. Unfortunately, it is unknown in these cases of perinatal death, how many really had no antenatal care.

Ndiweni and Buchmann² have demonstrated that in most cases the ‘unbooked’ mother that develops a complication falls in a lower risk category than other women who develop complications in pregnancy. The vast majority of ‘unbooked’ women intended to attend antenatal care but the complication occurred before they initiated antenatal care. At Kalafong Hospital 97% of women make contact with the health services during pregnancy and before the onset of labour. It appears the issue is not encouraging women to attend antenatal care, but encouraging pregnant women to attend antenatal care early. Here it appears that the agents of the health service put barriers in place to discourage this. Most women will confirm that they are pregnant either at a general practitioner or a clinic within 3 months of missing a menstrual period, but then initiate antenatal care some months later. This behaviour is on the instruction of the general practitioner or clinic sister³. Hence we have the situation where the average age of confirming pregnancy is 12 weeks and that of starting antenatal care is 22 weeks³. Clearly a golden opportunity is being lost to intervene early in the pregnancy. If the paradigm could change so that women receive their first antenatal examination at the point when the pregnancy is confirmed, many of the above problems would cease to exist, as demonstrated by Jeffery et al⁴. The pregnancy plan would be discussed and initiated at that visit. The question is how to initiate this change. Most women confirm their pregnancies at general practitioners. Hence part of the solution will be to bring the general practitioners into the circle of health care workers providing antenatal care for indigent women. At the very least the general practitioners should be supplied with antenatal cards, by the health authorities, so that they can issue them to women who make their way initially to them to confirm that they are pregnant. Furthermore, the attitude of the general clinics will need to change such that they welcome women who come early for antenatal care. The health workers at the clinics should not tell the women to come back when they are 5-6 months pregnant. Innovative ways of introducing this concept are needed to change the health service to this paradigm⁴.

No reporting of reduced fetal movements by pregnant women

Poor reporting of reduced fetal movements was frequently stated as a patient related avoidable factor. Whether this is realistic or a form of victim blaming is uncertain. Neldam⁵ showed that formal scoring of fetal movements in a low risk population resulted in a significant reduction in perinatal mortality in Sweden in 1979. The large RCOG trial performed in England later in the 1980s could find no difference between formal recording of fetal movements and no formal recording⁵. However, in the latter trial a similar number of women reported poor fetal movements in each group. Hence the importance of monitoring fetal movements is unclear. Furthermore, no randomised trial on fetal movements has been conducted in a developing country. There is clearly a need for a well-structured randomised trial to investigate the role of fetal movement recording or awareness and its effect on perinatal outcome.

Inadequate syphilis screening

There is a surprising variation of availability of syphilis serology status of women who have had a perinatal death. Screening is worst in the more rural areas. In some areas the syphilis serology status of women who have had a perinatal death is not known in more than 80% of cases. This demonstrates a serious lack of provision of basic antenatal care in these areas. This is further illustrated by the finding that in 38% of deaths due to syphilis, the clinic did not perform the screening test and in another 16% the health worker did not treat a woman who tested positive for syphilis. Simple, inexpensive on-site methods for screening for syphilis are available⁷ and there is really no excuse for the administrators not to ensure that

screening is performed throughout. Deaths due to syphilis contributed significantly to the perinatal mortality and the number is clearly under-reported. Syphilis is a condition that can be effectively detected and treated. There can be no reason for babies still to die from syphilis once the pregnant woman has entered the health system.

Non-referral of high-risk pregnant women by clinic staff

Many instances were reported where problems detected in antenatal care were not acted upon by the health care workers. The reasons for this are not clear. It may be due to lack of knowledge about the factors that require referral. It may be that there is no appropriate place to which women with high risk factors can be referred. Only an audit of the current situation in the local setting will answer those questions. Where knowledge is lacking, in-service training needs to be provided. The new system of a one-stop service does not allow for specialisation and nurses poorly trained in midwifery could be unaware that they are doing harm. Time will tell whether the one-stop system used in some areas will be an advantage or disadvantage to pregnant women.

It would appear that clear protocols for referrals, and audit systems to ensure that the protocols are followed, are necessary to improve this situation. Guidelines are now available and institutional protocols should be constructed from these for each institution by the hospital to which the clinic refers and the clinic. In circumstances where no referral centre is available, this will need to be established.

The institution to which the patient is referred should carry out audit, and regular feedback to the referring clinics should take place. Special note should be taken of the quality of care in patients where no complication occurred and compare them to patients where complications occurred. It might be that those where nothing occurred were lucky, or the ones where complications occurred were unlucky. The quality of care could be good or poor depending on the proportion of mismanaged patients.

Quality of antenatal care

The prevalence of syphilis has been declining in South Africa over the last decade and is now around 6% of the pregnant population that attends antenatal care⁸. This would indicate about 5000 pregnant women in these PPIP sentinel sites had syphilis. Twenty-seven women whose babies died due to syphilis did not attend antenatal care. The remaining 42 pregnant women had some form of antenatal care. It is now possible to estimate the disease specific PNMR in women with syphilis. In this case the PNMR for pregnant women with syphilis who attended antenatal care was about 8.4/1000 pregnant women with syphilis. This is close to 1% and would seem low. This would indicate that most pregnant women with syphilis were effectively screened and treated. Determining the rate of perinatal deaths due to syphilis of women who attended antenatal care could be used as a marker for the quality of antenatal care provided.

Deaths due to idiopathic intrauterine growth restriction and postmaturity are grouped under the heading IUGR. There were significantly more deaths in the metropolitan group due to this condition than in the rural group (chapter 3). It is unclear whether this is due to the inability to diagnose the condition or due to its relative rarity. The diagnosis of postmaturity relies upon accurate knowledge of gestational age, something that is unknown in more than half of the pregnant women of South Africa. These factors rule out using the number of deaths due to IUGR as a marker of the quality of antenatal care. Diabetes mellitus is an uncommon condition in pregnancy, and the prevalence in the mainly black population in

South Africa is unknown. This also makes using diabetes mellitus as a marker for assessing the quality of antenatal care useless. Hence, perinatal death due to syphilis is the only potentially useful **disease** marker that can be used for the assessment of the quality of care at antenatal clinics.

The number of perinatal deaths that were not appropriately referred antenatally is another potential quality assurance marker that can be considered. This is dependent on having clear protocols at each of the antenatal clinics for the conditions. Noting this deviation as an avoidable factor in cases of perinatal deaths associated with the disease is feasible as demonstrated by PPIP sentinel sites and could be considered a useful quality assurance measure.

Solutions

In other countries where improvements in antenatal care have been achieved, this has been based on specialists working from the top down and has moved away from GP and midwife based antenatal care. In South Africa there are insufficient specialists available and antenatal care will be dependent on midwives and general practitioners for the foreseeable future. This being the case, very clear guidelines for when and where to refer pregnant women is needed. However, to make guidelines work they need to be made into institutional protocols. Guidelines are only a guide to managing the case. Institutional protocols are a much more detailed set of instructions of what to do when certain conditions arise⁹. These are derived from the guidelines and adjusted to meet local conditions. Deriving institutional protocols from guidelines is a negotiation process between the antenatal clinics and the institution to which the patient is to be referred. Fortunately the guidelines are available¹⁰. It is now up to the clinics and institutions to create their protocols. Facilitators might be needed to get the process going. This is the work of the provincial MCWH units.

Conclusions

Introducing the concept of performing the first antenatal care visit at the time of confirmation of the pregnancy is clearly a method of improving antenatal care. The major problem is getting these concepts introduced. This requires changing people's behaviour, a goal that is notoriously difficult to achieve. Introducing the 'Health Workers for Change' programme of the Woman's Health Project¹¹ is one way forward.

Recommendations

1. Provinces and districts need to introduce the concept of pregnancy confirmation clinics and screening for anaemia, syphilis, and rhesus isoimmunisation using on-site testing
2. The first antenatal visit should be performed at the time of confirmation of the pregnancy
3. A standardised antenatal care record that can be used by both public and private sector should be developed
4. General practitioners should be supplied with antenatal cards

5. Regular auditing by the referral institutions and feedback to the referring institutions needs to be in place and strengthened

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Chapter 7

Intrapartum care: Birth asphyxia and trauma

Abstract

Objective: *To describe avoidable factors, missed opportunities and substandard care in the PPIP sentinel sites regarding intrapartum care.*

Method: *Data from the 27 PPIP sentinel sites and from the subset of 15 PPIP sentinel sites that analysed suboptimal care, missed opportunities and avoidable factors were analysed with respect to intrapartum care.*

Results: *The perinatal mortality rates for birth asphyxia and trauma in metropolitan, city and town, and rural hospitals for infants weighing 1000 g or more at birth were 3.2, 5.8 and 7.7 per 1000 births respectively. The contributions of intrapartum asphyxia and trauma to total perinatal mortality were 11%, 17% and 26% respectively. Ninety percent of these deaths resulted from labour-related asphyxia, and were caused by intrapartum hypoxia (72%), cord prolapse (12%), cord around the neck (8%) and meconium aspiration (8%). The 10% of deaths resulting from birth trauma were caused by stuck breech (48%), problems with vacuum or forceps deliveries (20%), ruptured uterus (20%) and maternal injury (13%). Avoidable factors reported were maternal delay in seeking help during labour (37% of deaths), failure to interpret signs of fetal distress correctly (25%), no fetal monitoring (18%), mismanagement of the first stage of labour (10%) and mismanagement of the second stage of labour (8%).*

Conclusions: *The high rates of perinatal death from birth asphyxia and trauma in South Africa are typical of those in underdeveloped countries, with the most serious deficiencies in rural areas. Most of these deaths are avoidable and the reduction of these rates presents an important challenge to providers of perinatal care in this country. Areas worthy of research and action include provision of mothers' waiting facilities in rural regions, improvements in fetal monitoring, partogram based labour management, and the establishment of midwifery staffing norms for South African labour units.*

Introduction

The death of a baby from birth asphyxia or trauma is always tragic and often unnecessary. Doctors, midwives and the parents of the dead infant often feel that something could have been done to prevent the death, and recrimination or litigation may follow. In addition, for every labour-related asphyxial death, there are several survivors of birth trauma or asphyxia who grow up with some degree of brain damage. This has even more serious implications for society, the family, and the doctors and midwives that managed the labour. Perinatal death from birth asphyxia and trauma is therefore worthy of separate and detailed discussion in this report.

Methods

Data from 27 PPIP sentinel sites that described the primary causes of perinatal death and a subset of data from 15 hospitals that also described the avoidable factors, missed opportunities and substandard care were available for this chapter. The sites were distributed across South Africa and represent metropolitan, city and town, and rural areas. Doctors and midwives analysed 2733 perinatal deaths in 82 868 births in the data and allocated primary obstetric and final neonatal causes of death and noted whether there were any avoidable factors, missed opportunities or substandard care in each case and if present described their nature.

Results

The amalgamated results of the PPIP returns from the 27 institutions appear in Tables 3.1 to 3.6 and figures 3.1 to 3.4 (Chapter 3). This chapter extracts relevant data for discussion of deaths due to labour-related asphyxia and birth trauma. All deaths that are presented in these results are of babies weighing 1000 g or more at birth. Table 7.1 shows the contribution of asphyxia and trauma to perinatal mortality, and the absolute perinatal mortality rates due to asphyxia and birth trauma for metropolitan, city and town, and rural areas. The differences in mortality rates between these groups of hospitals are statistically significant, as discussed in chapter 3.

Table 7.1. The contribution of asphyxia and trauma to perinatal mortality and the absolute perinatal mortality rate due to asphyxia and birth trauma for metropolitan, city and town, and rural areas (n=550)

	Birth asphyxia and trauma as a percentage of all perinatal deaths	Perinatal mortality rate for birth asphyxia and trauma per 1000 births
Metropolitan	10.8	3.2
City and town	16.7	5.8
Rural	26.4	7.7

A more detailed description of causes of birth asphyxia and trauma related deaths is shown in Tables 7.2 and 7.3. This is not broken down according to whether the hospital was metropolitan, city and town, or rural. Some detailed data were not available from a number of hospitals, so that the denominator is only 366.

Table 7.2. Causes of deaths from labour-related asphyxia (n=366)

	Number	Per cent
Labour	264	72
Cord prolapse	45	12
Cord around the neck	29	8
Meconium aspiration	28	8

Table 7.3. Causes of deaths from birth trauma (n=40)

	Number	Per cent
Stuck breech	19	48
Vacuum or forceps	8	20
Ruptured uterus	8	20
Maternal injury	5	13

Table 7.4 shows avoidable factors for the 406 perinatal deaths related to labour asphyxia or birth trauma. A breakdown of the different groups of hospitals was not possible.

Table 7.4. Avoidable factors for perinatal deaths related to labour asphyxia or birth trauma (n=406)

	Number	Per cent
Delay in seeking medical attention during labour	150	37
Signs of fetal distress not interpreted correctly	100	25
Fetus not monitored	72	18
No response to poor progress in labour	28	7
Second stage prolonged without intervention	21	5
Partogram not used	14	3
Inappropriate use of forceps or vacuum	14	3

Discussion

Although the data are limited in detail, this collection of information on birth asphyxia and trauma is the largest yet from South Africa and is representative of hospitals throughout the country. As stated in Chapter 3, a limitation is the self-selection of the sentinel sites. The presence of enthusiasts who audit perinatal deaths using PPIP may be associated with a similar enthusiasm for obstetrics and neonatology in those centres. Therefore, the true figure for perinatal asphyxia and trauma related mortality in South Africa may be higher.

Metropolitan, city and town, and rural hospitals

Significantly more asphyxia and trauma related deaths occurred at rural hospitals, where a rate of 7.7 per 1000 indicates an almost 1% chance of an otherwise uncomplicated pregnancy ending with a perinatal death associated with labour. The reason for this is unknown, and worthy of collaborative research between rural and urban institutions. Possible explanations for the difference may include at the rural hospitals a shortage of midwifery or medical staff, absence of specialist advanced midwives or obstetricians, a lack of sophisticated equipment for labour monitoring and neonatal resuscitation, failure to perform caesarean sections in time, transport problems for the women in labour, and the use of herbal medicines by pregnant women going into labour. Concerning metropolitan hospitals, the rate of 3.2 deaths per 1000 births is still more than three times that of hospitals throughout the United Kingdom excluding Scotland (0.89 per 1000 births) according to the CESDI report for 1998¹.

Women who delay in seeking medical attention during labour

It is not known whether the delays are wilful or related to problems with access to hospitals and clinics. It is well known that ambulances are in short supply in South Africa and this is especially so at night and in rural areas. The improvement of transport services and

infrastructure is a problem that goes beyond health care, but must be stated as a goal to help improve perinatal care by improving access to hospitals.

In some rural areas, hospitals provide 'mothers' waiting areas' where pregnant women board from 38 weeks of gestation in or next to the hospital grounds². Food and bedding may or may not be provided by the hospital, but the women have the advantage of being at the hospital when labour pains start. Properly managed, these waiting areas provide a simple means of ensuring a supervised delivery. Mothers' waiting areas should be offered at all rural hospitals and clinics.

Antenatal care must provide pregnant women with a delivery plan and open discussion on how they will get to hospital when labour pains start. Too often, these steps are neglected, and too many women have no idea when, where or how they will give birth.

Fetal monitoring

One hundred deaths resulted from failure to interpret fetal distress correctly. How this assessment was made is not known from the data. In a further 72 cases, death followed a failure to monitor the babies during labour. Fetal monitoring is problematic because of the difficulty of making a decision about fetal well-being using only the heart-rate as a marker. Meconium staining of the liquor may be of help, but its absence does not exclude fetal distress and its presence is not specific. Fetal scalp blood sampling has not, to our knowledge, been a success in any large state-run South African hospital, and is usually used in conjunction with cardiotocography (CTG). The fetal heart rate can be recorded by using a stethoscope (Pinhard or other), hand-held Doppler instrument, or a CTG recorder. The cost of CTG monitoring is so prohibitive that it cannot be considered as a routine method of fetal monitoring in this country. Hand-held Doppler monitoring has shown promise as a more effective method of fetal surveillance than a stethoscope and should be considered for use in all labour units³. It is probably true to say that most babies who die from asphyxia and birth trauma are the product of otherwise low-risk pregnancies. Therefore it is difficult to identify which fetuses are at risk until a risk factor becomes apparent, sometimes only late in labour. Another serious barrier to fetal monitoring is the shortage of midwives in South African public institutions⁴. Too frequently, it is impossible for an understaffed labour unit to provide any fetal monitoring during labour. The establishment of midwifery staffing norms for South African hospitals and midwife obstetric units is long overdue. Once a national standard for staffing levels has been set, it will be possible to identify labour units that require additional midwives.

Research is needed to determine the exact nature of the problem with fetal monitoring as it relates to perinatal death from birth asphyxia in South Africa. The current recommendation, that the fetal heart should be auscultated half-hourly before, during and after contractions, should still be followed⁵.

First stage of labour

Ten percent of asphyxia and birth trauma deaths were related to the failure to manage poor progress in labour, or to use a partogram. Originally introduced in Africa, the partogram has become the worldwide standard for labour monitoring, and was evaluated by the World Health Organisation in South-East Asia where a reduction in intrapartum fetal deaths was associated with partogram use⁶. Labour progress that crosses the action line has been shown to be associated with poor fetal outcome⁷. The partogram must be promoted as the only legitimate record of labour progress, to the extent that failure to use a partogram would be

seen as negligent or indefensible in a medico-legal context. Training of student midwives and medical students, and retraining of midwives and doctors, must emphasise the central position of the partogram in labour management. Every hospital and midwifery clinic in South Africa should have a clear partogram-based labour management protocol, preferably with a display in the labour ward. There is a place for research into barriers to partogram use.

Second stage errors

Prolonged second stage is associated with an increased risk of fetal hypoxia, and subsequent damage or death. At primary care level (midwife obstetric units), clear protocols must be available and displayed so that correct action is taken. The chapter on the second stage of labour in the Perinatal Education Programme provides excellent guidelines on the management of the second stage by midwives⁸.

At referral level (hospitals), there should be personnel with skill in the assessment of a patient with prolonged second stage of labour, to decide on the most suitable mode of delivery. If assisted delivery is chosen, experience and competence with the vacuum extractor, combined with adherence to the rules of vacuum delivery, will ensure that perinatal disasters are prevented. Equipment must be maintained and inspected daily by the labour ward staff using a check-list.

Second stage complications with breech delivery were the most frequent cause of death from birth trauma. It is not known how many of these deaths resulted from delayed presentation by the mothers or from errors in obstetric care. Vaginal breech delivery is now known to be associated with poor fetal outcome when compared with caesarean delivery, and caesarean section should be the delivery method of choice for breech presentation at term⁹.

Perinatal audit meetings

These meetings, also known as morbidity and mortality meetings, provide an opportunity for all staff who work in an obstetric unit to learn about pitfalls in labour care and how these lead to intrapartum related deaths. Audit meetings further provide motivation for regular data collection, opportunities for staff to meet, and for other health problems to be discussed by the group. The implementation of perinatal audit has been shown to be associated with a reduction in the perinatal mortality rate, especially from labour-related asphyxia¹⁰. Provinces should place priority on instituting audit meetings at all delivery units. Midwives in South Africa have shown resistance to involvement in perinatal audit, and research is required to identify barriers to the establishment of perinatal audit meetings in midwifery settings.

Conclusion

Perinatal death from asphyxia and trauma is tragic and preventable. The data in this report will provide useful information for health planners and politicians involved in health care provision. Recommendations for research and action can now be based on a solid body of facts as provided by this survey.

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Chapter 8

Neonatal Care: Asphyxia neonatorum and prematurity

Abstract

Objective: *To quantify the magnitude of neonatal mortality and describe the causes and avoidable factors, missed opportunities and substandard care related to neonatal deaths in South Africa.*

Method: *Data from the 27 PPIP sentinel sites and from the subset of 15 PPIP sentinel sites that analysed suboptimal care, missed opportunities and avoidable factors were analysed with respect to neonatal care.*

Results: *The overall neonatal mortality rate for the PPIP sites was 10.9/1000 live births. However, this varied considerably throughout the country with the metropolitan, city and town, and rural hospitals for neonates weighing 1000 g or more having neonatal mortality rates of 7.6, 14.8 and 12.1 per 1000 live births respectively. The main causes of neonatal mortality were asphyxia and prematurity. Avoidable factors were very poorly reported with only health worker avoidable factors being recorded in 5% of neonatal deaths.*

Conclusions: *The high rates of neonatal death from asphyxia and prematurity in South Africa are typical of those in underdeveloped countries. There is a serious lack of training and exposure of midwives and doctors to neonatal care, which needs to be urgently addressed. Simple interventions such as neonatal resuscitation training and introducing kangaroo mother care should drastically reduce the neonatal mortality rate.*

Introduction

Little nationwide data is available on the magnitude of the problem of neonatal deaths or of their causes. This chapter describes the neonatal death rate (NNDR) for a cross section of South Africa and describes the various final causes of neonatal death. The primary obstetric causes of death have been dealt with in Chapter 3. The avoidable factors, missed opportunities and substandard care were also analysed for the neonatal deaths. Some possible underlying structural problems in the health system are discussed and some solutions presented.

Methods

Data from 27 PPIP sentinel sites that described the final causes of neonatal death and a subset of data from 15 hospitals that also sub-categorised the causes of death and described the avoidable factors, missed opportunities and substandard care were available for this chapter. The sites were distributed across South Africa and represent metropolitan, city and town, and rural areas. (For details see Chapter 3).

Doctors and midwives analysed 840 neonatal deaths in 80 875 live births and allocated final neonatal causes of death and noted whether there were any avoidable factors, missed opportunities or substandard care in each case and if present described their nature. The information available is health facility based and does not include deaths occurring at home. The infants assessed were of birth weight 1000 grams and above.

Results

Tables 8.1, 8.2 and 8.3 give the data from the 27 PPIP sentinel sites and figures 3.2 and 3.4 in chapter 3 graphically illustrate the data.

Table 8.1. Numbers of births and perinatal deaths from the 27 PPIP sentinel sites

	Metropolitan	City & Town	Rural	Total
Total births	58230	45327	19951	123508
Live births	56919	44196	19572	120687
SBs	1311	1131	379	1821
NNDs	430	654	237	1321
Total deaths	1741	1785	616	4142

Table 8.2. Neonatal death rates (NNDR) for the various birth weight categories from the 27 PPIP sentinel sites

	Metropolitan	City & Town	Rural	Total
NNDR/1000 live births	7.6	14.8	12.1	10.9
NNDR (1000 – 1499 g)	105.8	375.5		
NNDR (1500 – 1999 g)	31.9	171.2		
NNDR (2000 – 2499 g)	9.9	57.2		
NNDR (>2499 g)	3.4	10.3		
SB : NND Ratio	3.1 : 1	1.7 : 1	1.6 : 1	2.1 : 1

No data was available for the NNDR in the birth weight categories for the Rural Group.

Table 8.3. Final causes of neonatal death in the 27 PPIP sentinel sites

Cause: (> 999 g)	Metropolitan			City & Town			Rural		
	No	%	Rate	No	%	rate	No	%	rate
Prematurity related	114	26.5	2.0	228	41.8	6.1	53	25.0	3.0
Birth asphyxia	137	31.9	2.4	159	29.1	4.2	88	41.5	4.9
Trauma	4	0.9	0.7	4	0.7	0.1	1	0.5	0.1
Infection	70	16.3	1.2	75	13.7	2.0	30	14.2	1.7
Congenital abnormalities	71	16.5	1.2	39	7.1	1.0	26	12.3	1.5
Other	19	4.4	0.3	30	5.5	0.8	11	5.2	0.6
Unknown	15	3.5	0.3	11	7	0.3	3	1.4	0.2
Total	430	100	7.6	546	100	14.5	212	100.0	11.8

Table 8.4 gives the sub-categories of neonatal death for the 15 hospitals for which this information was available. A total 840 neonatal deaths in 80 875 live births could be assessed. Either asphyxia or prematurity were associated with 65.5% of the deaths.

Table 8.4. Final Neonatal Causes of Death

Final Cause	Number	%	Rate
Prematurity related	290	100	3.58
Extreme immaturity	100	34.5	1.24
Hyaline membrane disease	124	42.7	1.53
Necrotizing enterocolitis	30	10.3	0.37
Pulmonary haemorrhage	9	3.1	0.11
Intraventricular haemorrhage	16	5.5	0.20
Asphyxia	260	100	3.21
Asphyxia	216	83.1	2.67
Meconium aspiration	31	11.9	0.38
Persistent fetal circulation	8	3.1	0.10
Infection	133	100	1.64
Septicaemia	90	67.7	1.11
Pneumonia	14	10.5	0.17
Congenital syphilis	12	9.0	0.15
HIV infection	2	1.5	0.002
Congenital infection	4	3.0	0.004
Group B haemolytic streptococci	7	5.3	0.009
Meningitis	2	1.5	0.002
Nosocomial	1	0.8	0.001
Congenital abnormalities	108	100	1.34
Central nervous system	27	25.0	0.33
Cardiovascular system	6	5.6	0.007
Renal system	6	5.6	0.007
Gastrointestinal system	7	6.5	0.009
Respiratory system	8	7.4	0.01
Chromosomal abnormalities	9	8.3	0.01
Biochemical abnormalities	2	1.9	0.002
Other	15	13.9	0.19
Trauma	9	100	0.01
Subaponeurotic haemorrhage	5	55.6	0.006
Other	4	44.4	0.004
Other	23	100	0.28
Unknown	17	100	0.21

Table 8.5 gives the avoidable factors missed opportunities and substandard care associated with the neonatal deaths. Not all the administrative factors listed below were directly related to neonatal deaths but are part of the global administrative avoidable factors. However, insufficient neonatal intensive care facilities is directly related and occurred on 29 occasions.

Table 8.5. Specific avoidable factors, missed opportunities and substandard care

Factor	Number
Administrative	
Insufficient staff	27
Inappropriately trained staff	26
Insufficient neonatal intensive care facilities	29
Inadequate facilities	19
Neonatal care	
Neonatal resuscitation inadequate	21
Neonatal monitoring inadequate	11
Neonatal management plan inadequate	12

Discussion

For the first time the NNDR from a representative sample of the country is available. The overall NNDR was 10.9/1000 live births for the 27 PPIP sentinel sites. Neonatal mortality rates in developed countries^{1,2} are as low as 1-3/1000 live births, whereas in developing countries for example in Malawi³, the NNDR can be over 30/1000 live births.

In South Africa, the lowest overall NNDR was not surprisingly in the metropolitan areas (7.6/1000 live births), compared with 14.8/1000 live births in the city and town areas, and 12.1/1000 live births in the rural areas. This is probably the reason for the high SB:NND ratio (3.1:1) in the metropolitan areas. The quality of care in the metropolitan areas may be better because both basic care is better (associated with academic institutions) and neonatal intensive care units are available. However, in South Africa it is clear there is considerable room for improvements in neonatal care, particularly as one moves away from the metropolitan areas.

The differences in NNDR in South Africa are probably a reflection of the ability with which staff members are able to deal with babies and of the neonatal care facilities available. Outside of the major centres, there is often uncertainty, and even fear, among health workers, of resuscitating a baby and dealing with a small infant. This is likely to be due to a lack of knowledge, skills and confidence in dealing with these problems. This opinion is the result of the observations of neonatal medical staff working in Cape Town, and in discussion with midwives working in the Midwife Obstetric Units, a primary health care environment. The very small number of avoidable factors allocated to neonatal care (Table 8.5) demonstrates further evidence of this. It is inconceivable that there were health worker related problems in only 43 (5%) instances out of the 840 neonatal deaths, when there are approximately 30% health worker related avoidable factors in the antenatal and intrapartum care. The neonatal mortality rates are far too high to explain the low rates of avoidable factors recorded as being a result of good care. The low recorded avoidable factors probably reflects a real lack of knowledge of neonatal care by the people filling in the PPIP forms and a glossing over of the neonatal care problems. This is a topic that needs further research.

The problem of lack of knowledge and confidence in dealing with neonates possibly originates from what appears to be inadequate preparation and training in midwifery in the basic nursing training and in the training of medical students. From reports from student nurses, it appears that some of their current teaching is not in line with practice in the maternity units. It is a matter of concern that it seems that some tutorial staff in the nursing colleges have lost contact with "on the ground" midwifery practice. This is particularly true for the care of the sick baby.

In the majority of universities, medical students have only a two-week block in neonatology, with relatively little exposure to sick babies. Interns are also often excluded from rotations to neonatal units. This is in the face of the fact that up to 55% of infant mortality in South Africa occurs in the first 28 days of life^{4,5}. If the aim of training medical students is to reduce the mortality rates in South Africa, then theoretically approximately half the time allocated to training medical students in paediatrics should be given to neonatology. It is often only at senior house officer level that doctors are exposed to the management of small and sick babies and very few doctors have this exposure.

Asphyxia neonatorum and prematurity are the two main causes of death in all facilities across all levels of care. Sixty five percent of all neonatal deaths in the sites sampled were due to these two causes.

Asphyxia

The highest mortality is in the rural hospitals (NNDR for asphyxia of 4.9/1000 live births), but it is almost as high in the towns and cities (4.2/1000 live births). The neonatal deaths of babies more than 2 500 grams is three times higher in the city and towns than in the metropolitan areas (Table 8.2). Most of these babies die as a result of asphyxia and this again illustrates the problem of neonatal care in areas outside of the metropolitan areas. In many of these institutions, births are conducted almost exclusively by midwives, and the resuscitation of the babies is often the responsibility, certainly initially, of the midwives. Doctors are often not immediately available, and when they are, are often junior and inexperienced.

Prematurity

Deaths from prematurity are highest in the towns and cities (NNDR for prematurity of 6.1/1000 live births). For the birth weight categories from 1 000 grams to 2 499 grams, the NNDR is consistently more than four times higher in the city and town areas when compared to the metropolitan areas. Unexpectedly the NNDR for the rural centres is lower than the city and town areas (at 3.0/1000 live births). Possible reasons for this are that the patients in preterm labour (or the preterm infants) are transferred out to the larger centres, or that women in preterm labour never get to the rural health centre, and deliver at home, where the infant dies. This aspect also requires further research.

Solutions

Some possible solutions to solve the high NNDR across South Africa are given below.

Asphyxia

The best method of decreasing the number of neonatal death due to asphyxia is by prevention. The correct use and interpretation of the partogram and especially monitoring the fetus in labour are essential skills at all levels of health care. (See Chapter 7).

All health workers need to be competent in basic neonatal resuscitation. There are various courses available in South Africa for the acquisition of skills in neonatal resuscitation. These should be used where possible. The Neonatal Care manual of Perinatal Education Programme gives detailed instruction on neonatal resuscitation. A supplement on basic neonatal care is now available from the PEP Trust. However, *bag and facemask* ventilation is an **essential** basic skill for all health workers involved in delivering babies. Oxygen is not essential for the resuscitation of a newborn baby, although it is usually used when available. Endotracheal intubation is a useful skill but does require good technique, practice and the availability of the necessary equipment.

The premature baby

Neonatal care can be conveniently divided into three important aspects, initial care, ongoing care and establishing and monitoring a care plan.

1. Initial care
 - Warmth
 - Blood sugar
 - Adequate oxygenation

- (The Cape Town group considers examination of an early gastric aspirate, by performing a Gram stain and a Bubbles test essential. They feel the specimen should be taken as soon as the baby has been resuscitated and is stable, and the examination done later. The examination gives valuable information on the possibility on a congenital neonatal infection or hyaline membrane disease).

The initial care should be provided by all midwives and doctors who work with small (and sick) babies. The midwife who performs the delivery and has to manage the baby must provide all of this care. It does not need to be prescribed by a doctor. There appears to be a need to encourage, support and teach midwives, in particular, to be able to perform these simple interventions. Getting these simple things right will improve not only the mortality, but also the morbidity, in low birth weight infants.

2. Ongoing care
- Medication
 - Warmth
 - Blood glucose, this means correct feeding
 - Adequate oxygenation

This ongoing care, is the care that is given once the baby has been stabilised and sent to the nursery for observation or to a special care area. It is important that, where there are nursery facilities where small and sick babies are cared for, the staff are adequately trained and supervised, and that appropriate equipment is available and working.

Kangaroo mother care (KMC) is a simple, natural and inexpensive way to care for small babies. It involves three principles nutrition (breast-feeding), position (skin-to-skin contact on the mothers breast) and early discharge. KMC has been shown to have a stabilising effect on the baby's cardiovascular and respiratory systems, as well as keeping the baby warm more effectively than clothes and blankets. It has been shown that by using KMC a significant reduction in the neonatal mortality and morbidity^{6,7} has been achieved. KMC also has a major impact on the cost of care of the small neonate and is significantly cheaper and requires less nursing staff support than conventional methods of caring for these neonates.

Kangaroo mother care should be the preferred method of care for small and premature infants, rather than incubator care.

There is often a perception that small and premature babies have very little chance of survival and that it is not worth putting time and effort into caring for them. Often this is a perception that is passed down by doctors. The attitude of the doctor is an important predictor of the outcome of these babies. If the baby is labelled as 'not viable', the outcome is bad irrespective of the actual birth weight and the health worker's attitude is the biggest single predictor of neonatal survival⁸. The survival and long term outcome for these babies can be good, if good basic care is provided^{9,10}.

There is no need to give up on any small preterm baby!

3. Care Plan. An appropriate care plan for the baby must be set up, and this must be carefully monitored by good record keeping. Record keeping involves note keeping and observations.

In assessing the records of neonatal deaths it is often difficult to make out what has happened to the baby due to absent or incomplete notes in the patients' records. Observation charts are often absent or haphazardly completed, so that a change in the condition of the baby is not

detected timeously. This leads to substandard care being given. One of the ways of improving the quality of record keeping is to comment on the quality of the records at the perinatal mortality meeting.

Team building

Perinatal care is specialised care and must be recognised as such at all administrative levels (central government to local authority, including hospital administrations).

1. Staff rotation should be stopped, when not absolutely essential, especially in labour ward and the nursery. It takes time for personnel to become acquainted with the protocols in perinatal care. The skills in interpreting the partogram correctly and feeling confident about handling a small or sick baby take time to acquire. Without these skills the care will be sub-optimal and problems only recognised late. In a number of health care institutions the 'turn around' time for staff in the maternity unit is as short as 1 to 2 months, and the whole staff can be changed at one time!
2. 'Core' personnel, at least, should not be moved (especially nursing staff)
3. Doctors and nurses should function as a team – working together for the benefit of the patient
4. Midwives opinions should be respected.
5. Steps must be taken to ensure that the responsible doctor comes when called.
6. A doctor, preferably someone with some experience, should take responsibility for perinatal care, together with the senior midwife. (It may be necessary to have one doctor for the obstetric care and another for paediatric care).

Staff Education

The Perinatal Education Programme should form the basis of perinatal care, and knowledge of the Newborn Care Manual should be essential for all health workers who care for newborn infants. This manual contains the essential knowledge and skills for the resuscitation and care of newborn infants, particularly in hospital. The programme should be introduced to all health care workers at an undergraduate level, and be used as the basis for updating programmes for those in practice. The supplement on basic neonatal care is ideally suited to those working at a primary care level with few special facilities.

The basic training of both doctors and nurses must be relevant to their real needs outside of tertiary units. Teachers must keep up to date with what is happening in the field and should maintain constant contact with the clinical departments, and primary and secondary levels of care. It should be a requirement for all teaching staff that they have clinical responsibilities, or contact, in the clinical areas where their students are likely to be working.

Government (Department of Health) and university partnership in ongoing education and in-service training, especially in outreach to the peripheral hospitals or clinics, is essential.

Audit

The setting up of a minimum data set for perinatal deaths, to be used countrywide is essential set to initiate the process of improving neonatal care, as each institution would then be able to see how well or badly they are doing. (This is discussed in Chapter 5).

An ongoing audit of the neonatal causes of death and identifying any avoidable factors, especially those due to birth asphyxia and prematurity, must be done in order to identify areas of weakness and assess whether or not any interventions are being effective.

The holding of regular perinatal mortality meetings for the discussion of perinatal deaths is essential. The obstetric and paediatric staff, as well as the midwives must attend these. Special care needs to be taken when analysing neonatal care as this is often ignored or glossed over. Deaths need to be looked at carefully and objectively, and the meeting must not become a 'witch hunts'. It is important to look at avoidable factors carefully and objectively, and in a constructive manner, so the patient care can be improved. Where a staff member is making mistakes, or responding inappropriately, it is important for the senior staff to be able to undertake suitable counselling.

Support

No nursery or neonatal intensive care or high care area functions in isolation. Resource people, usually clinical or administrative, need to be able to listen to the problems of the staff 'on the ground', and help to solve them. Help must be given to overcome administrative problems such as ensuring adequate supplies and adequate staffing levels.

Conclusions

Neonatal mortality rates are unacceptably high in South Africa, especially in the cities and towns where ready access to neonatal intensive care is not readily available. Training in neonatal care is lacking in both nursing colleges and medical schools given the burden of disease that neonatal deaths represent. Asphyxia and prematurity are the most common causes of neonatal death.

Recommendations

1. A review of neonatal training should be undertaken in the nursing colleges and medical schools. Where it is under represented, the curriculum should be revised to accommodate more neonatal training.
2. Every health worker involved in the delivery of babies must have adequate knowledge and skills in the resuscitation of a neonate. Most importantly, every health worker must be able to bag and mask ventilate a neonate. Where this is lacking, in service training must be urgently undertaken.
3. Kangaroo mother care must be implemented in all sites where premature babies are cared for.

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Source of medical air
Oxygen / air blenders
Oxycheck
Oxygen saturation monitor

Maintaining blood glucose

Intravenous lines

Neonatelite 200ml bags
Dextrose water 5% 200ml
Administration set 60 drops / ml dropper
Feeding tube FG 5, for umbilical vein catheter
Drip rate controller
Ampoules 50% dextrose water

Tubes

Feeding tubes FG 5 and 6
20 ml syringe, to use as a funnel
Clean containers into which the mother can express her milk
Sterile formula feeds if the mother is unable or unavailable to give
breast milk

Warmth

Kangaroo Mother Care is the first choice
Incubator (or similar “hot box”)

Medication

Theophyllin
Antibiotics Appropriate for the facility
Phenobarbitone
Diazepam
Furosemide
Hydrocortisone
Iron supplement
Multivitamin syrup

Chapter 9

Recommendations and motivations

The recommendations are divided into two sections. The first section describes suggested methods to improve data collection and hence the accuracy and applicability of the report. The second suggests solutions that if implemented would result in a decrease in the perinatal mortality rate and in improved care to pregnant women. These recommendations are aimed at health workers, health administrators, medical schools and nursing colleges. Specific recommendations for the public have not been addressed in this report, but this in no way diminishes their importance. These suggestions have come from the workshop and are not government policy. They serve to initiate the process of discussing ways of decreasing perinatal mortality in South Africa.

To improve the process

1. Adopt the proposed minimal data set and tool

The number of births and perinatal deaths is not known in South Africa (Chapter 2). A set of minimum perinatal care indices was discussed in Chapter 5, and a simple collection tool was proposed. If all provinces could collect this minimum data, district, provincial and national perinatal indices could be calculated and the areas needing immediate attention could be identified.

2. Establish the process for collection of the minimum data set in each province

A decision needs to be made as to which unit will be responsible for collecting the minimum data set, the Health Information Systems units or the Maternal Child and Women's Health units in each province. The provinces have chosen different methods until now (Chapter 2). The unit that takes responsibility must ensure that there is very good communication between it and the other unit. In any event, there must be regular feedback to the institutions sending the data.

3. Establish more PPIP sentinel sites

There were 27 PPIP sites (Chapter 3) in all provinces except the Northern Province. The process was in its infancy in two more, the Free State and Northern Cape. Hence, there are large areas of the country not fully represented. More PPIP sentinel sites are thus required. To achieve this, sites must be identified and health workers trained in the use of PPIP. Ideally, each province should have its own facilitators and PPIP trainers for the system to function efficiently. Once enough sites have been established in each province, workshops can be held and provincial problems specifically identified and strategies developed to solve the problems.

Immediate suggested solutions

1. Ensure each site conducting births has the necessary equipment and protocols and that the staff are appropriately trained to manage labour and are especially trained in the use of the partogram

Perinatal deaths due to intrapartum asphyxia and trauma were the most common avoidable deaths in the country (Chapters 3 and 7). Every woman should have the right to a safe birth. To achieve this all sites conducting births should ensure they have the correct equipment and that it is maintained, the protocols for managing labour are clear, and the

point at which help should be called or the patient referred must be available. The staff must know the protocols and implement them. The protocols should be based on the use of the partogram. Medical schools and nursing colleges should ensure all their students are fully conversant with the use of the partogram before graduation.

2. Ensure each site conducting births has the necessary equipment and protocols and appropriately trained staff manage asphyxiated neonates

Birth hypoxia was the most common cause of neonatal death (Chapters 3 and 8). All sites conducting births should ensure they have the equipment and protocols to manage hypoxic neonates, and ensure the immediate availability of health workers who are fully conversant with resuscitation of a neonate, and can resuscitate a hypoxic neonate.

3. Ensure each site caring for premature infants has the necessary equipment and protocols and that the staff are appropriately trained in kangaroo mother care

Prematurity was the second most common cause of neonatal death and the most common in the city and town institutions (Chapters 3 and 8). Neonatal intensive care units cannot be established at every hospital. Alternative effective methods of caring for these premature neonates are required, either for full care at the institutions or as step down areas to which neonates can be referred. This could allow for more efficient use of the available neonatal intensive care facilities. Kangaroo mother care has been proven to be very effective in these situations and should be implemented throughout the country.

4. Ensure each site providing antenatal care has protocols in place for where to and when to refer patients and the staff are appropriately trained therein

Referral of pregnant women with high-risk antenatal factors to appropriate clinics was not effectively carried out in a large number of cases that ended in perinatal death (Chapters 3 and 6). Each site providing antenatal care must have institutional protocols giving clear instructions as to when and where a pregnant woman who develops antenatal problems should be referred. All health workers in the antenatal clinics should know and implement the protocols.

5. Move to a system where the time and point at which the woman confirms she is pregnant also becomes the woman's first antenatal visit where she can be classified according to risk and where her further antenatal care is specifically planned

No, late or infrequent attendance for antenatal care was the single most common avoidable factor (Chapters 3 and 6). The message of the usefulness of attending for antenatal care has been effectively propagated in South Africa. The major problem now is late attendance for care. Strategies need to be developed whereby pregnant women are encouraged to attend antenatal care as soon as they confirm that they are pregnant. Bringing in the private sector (general practitioners) and providing them with antenatal cards may facilitate this process. Changing the mindset of the health workers in clinics to regard the visit to confirm pregnancy as the first antenatal visit will also improve the situation.

Chapter 10

20 Questions

1. Why is the NNDR so much higher in the cities and towns?
2. What is the NNDR per birth weight category in the rural areas?
3. Is the LBWR in rural areas truly a third less than the other areas?
4. Is the PCI a valid index?
5. What are the real causes of unexplained IUD's?
6. What are the reasons for the high intrapartum asphyxia death rate in cities, towns and rural areas?
7. What is the caesarean section rate in rural areas?
8. Why is syphilis testing still so poorly performed in some areas?
9. Why is APH such a major disease in the metropolitan areas compared to the others?
10. Are perinatal deaths due to complications of hypertension in pregnancy really so low in the rural areas?
11. Why is intrapartum fetal monitoring so poorly performed, and why is the partogram so regularly used incorrectly or not at all?
12. Why are deaths due to prematurity such a problem in cities and towns?
13. What are the referral patterns between rural areas, towns, cities and metropolitan areas and what are the barriers to referral?
14. What are the real neonatal avoidable factors?
15. Why do women delay attending antenatal care?
16. Will paying particular attention to decreased fetal movements decrease the number of perinatal deaths?
17. Why do health workers fail to refer patients with antenatal problems?
18. How does this perinatal mortality data relate to the maternal mortality data?
19. Are the delays in seeking attention during labour related to transport problems?
20. Are staff shortages really a problem or is the poor care due to ignorance or negligence?

APPENDIX 1

Programme

Monday 13th November 2000

Time	Title	Presenter	Chairperson
08h30	Welcome	Ms N Nyathikazi	
08h35	Background and Aims	Prof RC Pattinson/ Dr P Tlebere	
08h45	<u>Provincial Data Presentations</u>		Ms N Nyathikazi
	Eastern Cape	Mr F Maidany	
	Free State	Ms T Rapapali	
	Gauteng	Ms T Chaane	
	KwaZulu Natal		
	Mpumalanga	Dr P Godi	
	North-West	Ms KM Malgas	
	Northern Cape	Ms C Kula	
	Northern Province	Dr A Kambaran	
	Western Cape	Ms E Arends/Dr N Shaikh	
	Explanation of basic data form	Dr P Tlebere	
10h45	Tea		
11h00	<u>PPIP Development and assistance</u>	Dr JD Coetzee	Dr D Greenfield
12h15	Lunch		
13h00	<u>PPIP – Rural Areas</u>		Mrs E Mangate
	Port Alfred Hospital (EC)	Sr JS Snyman	
	Jozini Health District (KZN)	Dr M Gandhi (Pattinson)	
	Lydenburg District (Mpu)	Dr NP Godi	
	Gelukspan Hospital (NW)	Dr AB Njie	
	Standerton Hospital (Mpu)	Dr P Snyman	
	Summary Data	Prof RC Pattinson	
14h30	<u>PPIP – Peri-urban Areas</u>		Prof Loening/ Ms T Chaane
	Frontier Hospital (EC)	Dr M Patrick	
	Settlers Hospital (EC)	Sr JS Snyman	
	Goldfields Regional Hospital (FS)	Sr M Engelbrecht	
	Empangeni Hospital (KZN)	Dr S Raymond	
15h15	Tea		

15h30	<u>PPIP – Peri-urban Areas continued</u> Rob Ferreira Hospital (Mpu) Middelburg Hospital (Mpu) Witbank Hospital (Mpu) Mafikeng Hospital (NW) Klerksdorp Hospital (NW) Potchefstroom Hospital (NW) [Eben Donges Hospital (WC)] Summary Data	Dr A Cumberlege Sr M Muller Dr E Bvuma Dr J Alapatt Dr W Mwebesa Dr S Pretorius [Dr C Oettle] Prof RC Pattinson	
17h00	<u>PPIP – Metropolitan areas</u> Chris Hani Baragwanath Hospital (Gau) Kalafong Hospital (Gau) King Edward Hospital (KZN) Peninsular Maternity Services (EC) Summary Data Workshop Groups & Instructions	Dr E Buchmann Dr E Mitha Dr G Mantel Dr D Greenfield Prof RC Pattinson	Ms N Nyathikazi
18h30	Braai		
20h00	Workshop groups – Priorities and solutions		

Tuesday 14th November 2000

Time	Title	Presenter	Chairperson
08h00	<u>Feedback on Problem Areas & Solutions</u> Antenatal Care Essential data collection tool Intrapartum Care Neonatal Care	Dr E Bvuma Ms T Chaane Sr C Rademeyer Dr E Malek	Dr G Mantel
10h00	Tea		
10h15	<u>Summary of major problems and solutions – Discussion</u>		Dr P Tlebere/ Prof RC Pattinson
11h30	<u>The way forward</u> - New PPIP sites - Writing report - Distribution of report - Next meeting		Dr P Tlebere/ Prof RC Pattinson
12h00	Lunch		

APPENDIX 2

Alphabetical list of delegates at the Saving Babies: A Perinatal Care Survey of South Africa Workshop

Dr J Alapatt, Mafekeng Provincial Hospital, NW Province
Mrs E Arends, PAWC, MCWH, E Cape
Dr L Bamford, Health Systems Trust
Dr E Buchmann, CH Baragwanath Hospital, Gauteng
Dr E Bvuma, Witbank Hospital, Mpumalanga
Ms T Chaane, Gauteng Department of Health
Dr J Coetzee, private practice
Dr A Cumberlege, Rob Ferreira Hospital, Mpumalanga
Dr MA Dhansay, MRC (W Cape)
Mrs MP Engelbrecht, Goldfields Regional Hospital, Free State
Dr NP Godi, Mpumalanga Department of Health
Dr D Greenfield, Peninsula Maternal & Neonatal Service, Western Cape
Dr A Kambaran, Pietersburg-Mankweng Complex, NW Province
Ms O Khumisi, NHIS, N Department of Health
Dr A Krug, Mafikeng Region, NW Province
Ms C Kula, Northern Cape Department of Health
Prof W Loening, National Department of Health
Ms E Mabitsela, Northern Province Department of Health
Ms M Mabusela, Human Genetics, Department of Health
Dr J Makin, O & G, Pretoria Academic Hospital & MRC Unit, University of Pretoria
Dr M Makwela, Witbank Hospital, Mpumalanga
Dr E Malek, Paediatrics, Witbank Hospital, Mpumalanga
Ms KM Malgas, MCWH, North West Department of Health
Ms HL Mangate, National Department of Health
Dr G Mantel, Obstetrics & Gynaecology, University of Natal
Mr S Masilela, Eastern Cape Department of Health
Dr DM Mazibuko, Ga-Rankuwa Hospital/Medunsa, NW Province
M F Maidany, Eastern Cape Department of Health
Dr E Mitha, MRC Unit, University of Pretoria
Ms K Mlambo, North West Department of Health
Dr I Mogileokine, Ukraine
Ms MG Mokoena, Department of Health Mpumalanga
Ms MWA Motlolometsi, Free State Department of Health
Ms M Muller, Middelburg Hospital, Mpumalanga
Dr W Mwebesa, Klerksdorp Hospital, NW Province
Mrs G Nchukana Eastern Cape Department of Health
Dr A Njie, Gelukspan Hospital, NW Province
Mrs D Nyasulu, KwaZulu Natal Department of Health
Mrs N Nyathikazi, National Department of Health
Dr M Patrick, Frontier Hospital, Eastern Cape
Prof RC Pattinson, MRC Unit, University of Pretoria
Dr S Pretorius, Potchefstroom Hospital, NW Province
Mrs RV Prinsloo, MRC Unit, University of Pretoria
Dr RA Quarshie, Mafikeng Provincial Hospital, NW Province
Mr R Rabie, Northern Cape Department of Health
Ms M Rabosiwana, Gauteng Department of Health
Ms C Rademeyer, Addington Hospital, KwaZulu Natal
Mr GI Rapapali, Free State Department of Health
Dr S Raymond, Empangeni Hospital, KwaZulu Natal
Dr M Relling, Potchefstroom Hospital, NW Province
Dr N Shaikh, Western Cape Department of Health

Mrs K Snyman, Albany Health District, Eastern Cape
Dr P Snyman, Witbank Hospital, Mpumalanga
Ms C Stott, Addington Hospital, KwaZulu Natal
Mrs A Swarbreck, KwaZulu Natal Department of Health
Mrs R Taute, Mpumalanga Department of Health
Dr MY Tiamiyu, Shongwe Hospital, NW Province
Dr P Tlebere, National Department of Health

Saving Babies Workshop Delegates

Surname, Initials, Title	Institution
Health Systems Trust	
Bamford, Lesley (Dr)	Health Systems Trust

Institutions presenting data with PPIP users

Alapatt, Jose (Dr)	Mafikeng Provincial Hospital
Buchmann, Eckhart (Dr)	CH Baragwanath Hosp, Gau
Bvuma, Eton T (Dr)	Witbank Hospital, Mpumalanga
Cumberlege, Andrew (Dr)	Rob Ferreira Hospital, Mpu
Engelbrecht, MP (Mrs)	Goldfields Hospital, FS
Greenfield, Dave (Dr)	Peninsula Maternal & Neonatal Service
Mantel, Gerald (Dr)	Dept of Obstetrics & Gynaecology, University of Natal
Muller, Marie (Sr)	Middelburg Hospital
Mwebesa, Winnifride (Dr)	Klerksdorp Hospital, NW
Patrick, Mark E (Dr)	Frontier Hospital, EC
Pretorius, Shirley (Dr)	Potchefstroom Hospital, NW
Rademeyer, Carol (Sr)	Addington Hospital, KZN
Raymond, Steve (Dr)	Empangeni Hospital, KZN
Relling, M (Dr)	Potchestroom Hosp, NW
Snyman, Piet (Dr)	Standerton/Witbank Hospitals
Snyman, Kobie (Mrs)	Albany Health District, EC
Stott, Carmel (Sr)	Addington Hospital, KZN
Taute, Ronelle (Mrs)	DOH, Mpumalanga MRC Unit for Maternal and Infant Health Care Strategies, UP & Kalafong Hospital
Pattinson, RC (Prof)	Hospital
Njie, A (Dr)	Gelukspan Hosp, NW

MRC Unit

Pattinson, RC (Prof)	MRC Unit for Maternal and Infant Health Care Strategies
Makin, Jenny (Dr)	MRC Unit and Dept of Obstetrics and Gynaecology, Pretoria Academic
Coetzee, Johan (Dr)	Private practice - PPIP developer
Prinsloo, RV (Mrs)	MRC Unit for Maternal and Infant Health Care Strategies
Mitha, Essack (Dr)	MRC Unit, Kalafong Hospital & University of Pretoria

National Department of Health

Tlebere, Pulani (Dr)	NDOH
Loening, Walter (Prof)	National DOH
Nyathikazi, Nancy (Mrs)	National DOH
Mangate, HL (Ms)	NDOH
Khumisi, Oumiki (Ms)	NHIS, National DOH

Provincial Department of Health

Arends, Edna L (Mrs)	PAWC, MCWH sub-directorate
Chaane, Thandi (Ms)	Gauteng DOH
Dhansay, M Ali (Dr)	MRC, W Cape
Godi, N Patrick (Dr)	DOH, Mpumalanga
Kambaran, Allen (Dr)	Pietersburg- Mankweng Complex
Krug, Angelika (Dr)	Mafikeng Region, NW Province
Kula, Cavie (Ms)	DOH, NC

Mabitsela, E	DOH, NP
Mabusela, M (Ms)	Human Genetics, DOH
Malgas, KM (Ms)	MCWH, NW Province
Masilela, S (Mr)	Eastern Cape DOH
Meidany, Farshid	DOH EC
Mlambo, K (Ms)	NW DOH
Mokoena, MG (Ms)	IM & R, Mpumalanga Province
Motlolometsi, MWA	MCH & Nutrition Subdirector, FS
Nchukana, Gloria (Mrs)	MCWH, DOH Bisho
Nyasulu, Dolly (Mrs)	MCWH, KZN
Rabie, Ryan S (Mr)	DOH, NC
Rabosiwana, Maureen (Ms)	Gauteng DOH
Rapapali, G Isaac	Information & Research, FS
Shaikh, N (Dr)	WC DOH
Swarbreck, Ann (Mrs)	Health Information, KZN

PIIP Users

Buchmann, Eckhart (Dr)	CH Baragwanath Hosp, Gau
Bvuma, Eton T (Dr)	Witbank Hospital, Mpumalanga
Cumberlege, Andrew (Dr)	Rob Ferreira Hospital, Mpu
Greenfield, Dave (Dr)	Peninsula Maternal & Neonatal Service
Mantel, Gerald (Dr)	Dept of Obstetrics & Gynaecology, University of Natal
Muller, Marie (Sr)	Middelburg Hospital
Mwebesa, Winnifride (Dr)	Klerksdorp Hospital, NW
Patrick, Mark E (Dr)	Frontier Hospital, EC
Pattinson, RC (Prof)	MRC Unit for Maternal and Infant Health Care Strategies, UP & Kalafong Hospital
Prinsloo, RV (Mrs)	MRC Unit for Maternal and Infant Health Care Strategies, UP& Kalafong Hospital
Rademeyer, Carol (Sr)	Addington Hospital, KZN
Raymond, Steve (Dr)	Empangeni Hospital, KZN
Snyman, Piet (Dr)	Standerton/Witbank Hospitals
Stott, Carmel (Sr)	Addington Hospital, KZN
Taute, Ronelle (Mrs)	DOH, Mpumalanga

Other attendees

Makwela, M	Witbank Hospital, Mpumalanga
Malek, Elmarie (Dr)	Dept of Paediatrics, Witbank Hospital
Mazibuko, DM (Dr)	Medunsa/Ga-Rankuwa Hospital
Mogileokine, Iryna (Dr)	Ukraine - Observer
Quarshie, RA (Dr)	Mafikeng Provincial Hospital
Tiamiyu, MY (Dr)	Shongwe Hospital

PRESENTER: KM Malgas PROVINCE: North West Circle where applicable GEOGRAPHICAL AREA: COASTAL TROPICAL MOUNTAINOUS SUB-TROPICAL KAROO-LIKE ESCARPMENT LOWVELD HIGHVELD POPULATION: RURAL PERI-URBAN URBAN
<u>BASIC DATA</u>
TIME PERIOD: January – December 1999 TOTAL NUMBER OF DELIVERIES: 34591 PNMR: 52.5 NNDR: 25.3 PCI: Unknown LBWR: C/s rate: 12.4%
WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH): Infection and congenital abnormalities Asphyxia neonatorum Prematurity Cord around the neck SOLUTIONS TO THESE PROBLEMS (PARAGRAPH): Capacity building of midwives through e.g advanced midwifery, PEP & PPIP etc. Availability and in-service guidelines on maternity care for midwives. Community awareness on importance of ANC. Attendance to decrease BBAs and non-ANC attendance.

PRESENTER: EL Arends INSTITUTION: Western Cape Circle where applicable DESCRIPTION: LEVEL 1 LEVEL 2 LEVEL 3* (*PROPORTION OF REFERRALS: _____) GEOGRAPHICAL AREA: COASTAL TROPICAL MOUNTAINOUS SUB-TROPICAL KAROO-LIKE ESCARPMENT LOWVELD HIGHVELD POPULATION: RURAL PERI-URBAN URBAN
<u>BASIC DATA</u>
TIME PERIOD: 1 January 1999 – 31 December 1999 TOTAL NUMBER OF DELIVERIES: 72193 PNMR: 31.28/1000 NNDR: 8.70/1000 PCI: 0.48 LBWR: 15.1%
WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH): PNMR and NNDR is higher in two of the rural regions. Presently the causes for these are unknown. SOLUTIONS TO THESE PROBLEMS (PARAGRAPH): To investigate reasons for the above and plan interventions accordingly

APPENDIX 4

PPIP USER'S ABSTRACTS

PRESENTER: Sr JS Snyman
 INSTITUTION: Port Alfred Hospital
Circle where applicable
 DESCRIPTION: **LEVEL 1** LEVEL 2 LEVEL 3* (*PROPORTION OF REFERRALS: _____)
 GEOGRAPHICAL AREA: **COASTAL** TROPICAL MOUNTAINOUS SUB-TROPICAL
 KAROO-LIKE ESCARPMENT LOWVELD HIGHVELD
 POPULATION: RURAL **PERI-URBAN** URBAN

BASIC DATA

TIME PERIOD: July 1999 – June 2000
 TOTAL NUMBER OF DELIVERIES: 435
 PNMR: 25/1000 NNDR: 8/1000 PCI: 1.04 LBWR: 24.0%

PATTERN OF DISEASE

TOP 5 PRIMARY CAUSES: 1. Intrapartum asphyxia, 2. Infections, 3. Maternal disease, 4. Spontaneous preterm labour, 5. Antepartum haemorrhage

TOP 5 FINAL CAUSES: 1. Prematurity, 2. Intrauterine death
 (No theatre facility at Port Alfred: early referral of problem cases encouraged)

PROPORTION OF DEATHS WITH AVOIDABLE FACTORS PRESENT:

TOP 3 AVOIDABLE FACTORS:

WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH):

1. Staff knowledge and skills.
2. Shortage of staff.
3. Availability of transport.

SOLUTIONS TO THESE PROBLEMS (PARAGRAPH):

PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PIPI):

1. PPIP seen as an answer to analysing data meaningful.
2. Initially, a few technical problems of our own doing, when learning the program.

PRESENTER: Dr M Gandhi
 INSTITUTION: Bethesda, Manguzi, Mosveld & Mseleni Hospitals, Jozini Health District, KZN
Circle where applicable
 DESCRIPTION: **LEVEL 1** LEVEL 2 LEVEL 3* (*PROPORTION OF REFERRALS: _____)
 GEOGRAPHICAL AREA: **COASTAL** TROPICAL MOUNTAINOUS SUB-TROPICAL
 KAROO-LIKE ESCARPMENT LOWVELD HIGHVELD
 POPULATION: **RURAL** PERI-URBAN URBAN

BASIC DATA

TIME PERIOD: 1/9/98 – 31/5/99
 TOTAL NUMBER OF DELIVERIES: 5728
 PNMR: 29.2 NNDR: 12.8 PCI: 3.6 LBWR: 8.1%

PATTERN OF DISEASE

TOP 5 PRIMARY CAUSES: 1. Asphyxia 28%, 2. Unexplained stillbirth 22%, 3. Preterm labour 11%, 4. Infections 9%, 5. APH 8%

TOP 5 FINAL CAUSES:
 1. Asphyxia and trauma 51%, 2. Prematurity 15%

PROPORTION OF DEATHS WITH AVOIDABLE FACTORS PRESENT:

TOP 3 AVOIDABLE FACTORS:
 1. Medical personnel 45%, 2. Patient oriented 30%
 Intrapartum management, education of population on antenatal care

WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH):
 Intrapartum care

SOLUTIONS TO THESE PROBLEMS (PARAGRAPH):
 Developing Waiting mothers area. Primary rural practice as a separate entity.

PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PIPI):
 Used DOS programme.

<p>PRESENTER: Dr NP Godi INSTITUTION: Data for Lydenburg district (Mpumalanga Province MCWH) Circle where applicable DESCRIPTION: LEVEL 1 LEVEL 2 LEVEL 3* (*PROPORTION OF REFERRALS: _____) GEOGRAPHICAL AREA: COASTAL TROPICAL MOUNTAINOUS SUB-TROPICAL KAROO-LIKE ESCARPMENT LOWVELD HIGHVELD POPULATION: RURAL PERI-URBAN URBAN</p>
<u>BASIC DATA</u>
<p>TIME PERIOD: 1 January 1999 to 31 December 1999 TOTAL NUMBER OF DELIVERIES: 1698 PNMR: 32.4 NNDR: 8.3 PCI: 0.36 LBWR: 11.6</p>
<u>PATTERN OF DISEASE</u>
<p>TOP 5 PRIMARY CAUSES: 1. Intrapartum asphyxia, 2. Intrauterine death, 3. H/t disorders, 4. Spontaneous preterm labour, 5. Infections</p> <p>TOP 5 FINAL CAUSES: 1. Prematurity related, 2. Asphyxia and birth trauma, 3. Unknown</p> <p>PROPORTION OF DEATHS WITH AVOIDABLE FACTORS PRESENT: 44/55</p> <p>TOP 3 AVOIDABLE FACTORS: 1. Medical personnel 45.5%, 2. Patient related 30.9%, 3. Administrative 10.9%, 4. Insufficient information/notes 10.9%</p> <p>WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH):</p> <ul style="list-style-type: none"> • Lack/poor personnel skills and or shortage of personnel at institutions. • Poor infrastructure in most of the district i.e. communications, roads, transport (EMS in a poor state of affairs) and in mostly rural area – contribute to lack of access to medical services at times. Some places are difficult to access by road and clients have to travel far to get to a clinic/health centre. • Lack of data as to weight categories of still births due to the practice of not weighing stillborns. I discovered this during one of my visits to the district PM & M meeting. <p>SOLUTIONS TO THESE PROBLEMS (PARAGRAPH):</p> <ul style="list-style-type: none"> • Encourage PEP and DEPAM courses for staff dealing with pregnant women and neonates. • Maternity and neonatal care refresher/update session/workshops for above staff. • Perinatal audit to be encouraged in other institutions and districts. <p>PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PPIP):</p> <ul style="list-style-type: none"> • A committed/dedicated worker is required to get the PPIP programme going a institutional level. • Lack of HIS skills and unavailability of computers/software at the districts/institutions. • The over burdening of available HIS staff with the collection of irrelevant or just nice to have data in the districts.

<p>PRESENTER: Dr AB Njie INSTITUTION: Gelukspan Hospital Circle where applicable DESCRIPTION: LEVEL 1 LEVEL 2 LEVEL 3* (*PROPORTION OF REFERRALS: _____) GEOGRAPHICAL AREA: COASTAL TROPICAL MOUNTAINOUS SUB-TROPICAL KAROO-LIKE ESCARPMENT LOWVELD HIGHVELD POPULATION: RURAL PERI-URBAN URBAN</p>
<u>BASIC DATA</u>
<p>TIME PERIOD: 1 April 1999 – 31 March 2000 TOTAL NUMBER OF DELIVERIES: 3192 PNMR: 38.3 (WHO) NNDR: 14.9/1000 PCI: 3.6 LBWR: 13.8%</p>
<u>PATTERN OF DISEASE</u>
<p>TOP 5 PRIMARY CAUSES: 1. Preterm labour, 2. Intrapartum asphyxia, 3. Syphilis, 4. APH, 5. Hypertension</p> <p>TOP 5 FINAL CAUSES: 1. Asphyxia, 2. Infections, 3. Prematurity, 4. Congenital abnormalities, 5. Trauma</p> <p>PROPORTION OF DEATHS WITH AVOIDABLE FACTORS PRESENT: 63%</p> <p>TOP 3 AVOIDABLE FACTORS: 1. Unbooked patients, 2. Delay in transferring patients to hospital, 3. Fetal distress not detected intrapartum.</p> <p>WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH): Late booking or no booking by mothers. Substandard intrapartum monitoring and inadequate ambulance services. Communication difficulties between district and hospital.</p> <p>SOLUTIONS TO THESE PROBLEMS (PARAGRAPH):</p> <ul style="list-style-type: none"> • To promote greater use of health facilities by the community. • Continue training and updates for midwives and new doctors. • To maintain labour ward standards and adequate staffing. • Improved ambulance services. • Improve communication logistics. <p>PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PPIP):</p> <ul style="list-style-type: none"> • Y2K • Grade 1 Avoidable factors – discounted. • Inaccurate calculation of PNMR < 1000g category and PC index. • PPIP not yet a priority at district level.

PRESENTER: Dr PF Snyman
 INSTITUTION: Standerton Hospital
Circle where applicable
 DESCRIPTION: **LEVEL 1** LEVEL 2 LEVEL 3* (*PROPORTION OF REFERRALS: _____)
 GEOGRAPHICAL AREA: COASTAL TROPICAL MOUNTAINOUS SUB-TROPICAL
 KAROO-LIKE ESCARPMENT LOWVELD **HIGHVELD**
 POPULATION: **RURAL** PERI-URBAN URBAN

BASIC DATA

TIME PERIOD: 1/9/99 – 31/8/2000
 TOTAL NUMBER OF DELIVERIES: 1707
 PNMR: 36/1000 NNDR: 12.3/1000 PCI: 2.21 LBWR: 163/1000

PATTERN OF DISEASE

TOP 5 PRIMARY CAUSES: Respiratory distress, 2nd degree HMD, Asphyxia neonatorum
 TOP 5 FINAL CAUSES: Respiratory distress, 2nd degree HMD, Asphyxia neonatorum
 PROPORTION OF DEATHS WITH AVOIDABLE FACTORS PRESENT:
 TOP 3 AVOIDABLE FACTORS:
 WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH):
 The majority of deaths were prematurity related with RDS, 2nd degree hyaline membrane disease being the final cause of death.
 SOLUTIONS TO THESE PROBLEMS (PARAGRAPH): Both better obstetrical management of preterm labour and earlier more co-ordinated referral of premature to level 2/3 hospitals.
 PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PPIP):

PRESENTER: Dr ME Patrick
 INSTITUTION: Frontier Hospital, Queenstown, Eastern Cape
Circle where applicable
 DESCRIPTION: **LEVEL 1** LEVEL 2 LEVEL 3* (*PROPORTION OF REFERRALS: _____)
 GEOGRAPHICAL AREA: Savannah/Grassland
 POPULATION: RURAL PERI-URBAN URBAN

BASIC DATA

TIME PERIOD: 1 September 1999 to 31 August 2000
 TOTAL NUMBER OF DELIVERIES: 2604
 PNMR: 34/1000 NNDR: 13/1000 PCI: 2.16 LBWR: 15.7%

PATTERN OF DISEASE

Top 5 Primary causes: 1. Unexplained intrauterine death, 2. Intrapartum asphyxia, 3. Idiopathic preterm labour, 4. Hypertensive disorders, 5. Antepartum haemorrhage.
Top 5 final causes: 1. Immaturity related, 2. Asphyxia and birth trauma, 3. Infection, 4. Unknown cause of death, 5. Congenital abnormalities
Proportion of deaths with avoidable factors present (>999g): Medical personnel: 71.6%, Patient: 17%, Administrative: 7.8%, Insufficient notes: 3.5%
Top 3 avoidable factors: 1. Neonatal resuscitation inadequate, 2. Foetal distress not detected because foetus was not monitored, 3. Delay in referring patient for secondary/ tertiary treatment.
WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE: The major problem, if personnel-related factors are grouped, is mismanagement of patients in labour. The major single problem is inadequate neonatal resuscitation and this probably underestimated in our data because documentation of neonatal resuscitation is virtually non-existent when not performed by paediatric medical officers. Management of labour, as indicated in particular by dead term newborns, is disgraceful, with the basic principles of midwifery and obstetrics being ignored and neglected.
SOLUTIONS TO THESE PROBLEMS: The PPIP process has been going at this hospital since 1995 with monthly meetings started in 1996. Despite the PPIP process, the current data show ongoing avoidable deaths related primarily to medical personnel. At some point, the ongoing avoidable deaths at Frontier Hospital (particularly of **normal term babies**) amount to a significant human rights violation. The deaths at Frontier Hospital despite PPIP imply a need for restructuring of nursing service management at Frontier Hospital. A core midwifery team needs to be established, with each individual being assigned specific responsibilities for the elimination of avoidable deaths. The hospital has no medical superintendent. A superintendent is urgently required to carry out a major responsibility, which is to protect patients against health workers and health systems responsible for avoidable (perinatal) deaths. The superintendent should invite an outside body such as the Human Rights Commission to investigate the management and practice of perinatal care at Frontier Hospital.

PROBLEM EXPERIENCED WITH PPIP: PPIP logo bar at the top of the screen should display the name of the **active unit**, some **terminology** could be improved (eg. Asphyxia vs hypoxia, prematurity vs immaturity), **drop down dates** should show all months of the year, weights should be selectable at “**graphics**” level, **merging** is confusing, and printouts should be **exportable** to other programs (eg. Word-processing and slide presentation programmes).

PRESENTER: Sr JS Snyman
 INSTITUTION: Settlers Hospital
Circle where applicable
 DESCRIPTION: **LEVEL 1** LEVEL 2 LEVEL 3* (*PROPORTION OF REFERRALS: _____)
 GEOGRAPHICAL AREA: **COASTAL** TROPICAL MOUNTAINOUS SUB-TROPICAL
 KAROO-LIKE ESCARPMENT LOWVELD HIGHVELD
 POPULATION: RURAL **PERI-URBAN** URBAN

BASIC DATA

TIME PERIOD: July 1999 – June 2000
 TOTAL NUMBER OF DELIVERIES: 1360
 PNM: 30/1000 NNDR: 15/1000 PCI: 2.01 LBWR: 15.0%

PATTERN OF DISEASE

TOP 5 PRIMARY CAUSES: 1. Spontaneous preterm labour, 2. Fetal abnormality, 3. Infections, 4. Hypertensive disorders, 5. Intrauterine death

TOP 5 FINAL CAUSES: 1. Prematurity related, 2. Asphyxia and birth trauma, 3. Congenital abnormality, 4. Other

PROPORTION OF DEATHS WITH AVOIDABLE FACTORS PRESENT: Data unreliable

TOP 3 AVOIDABLE FACTORS:
 Data unreliable

WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH):
 Gut feeling: Infection with premature neonates and low birth weights.

Not related to patient care: working in isolation.

SOLUTIONS TO THESE PROBLEMS (PARAGRAPH):
 1. Suggest a quarterly meeting with other district and regional hospital to create an opportunity to compare data and share information.

PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PPIP):
 1. PPIP seen as an answer to analysing data meaningful.
 2. Initially, a few technical problems of our own doing, when learning the program.

<p>PRESENTER: Matron M Engelbrecht INSTITUTION: Goldfields Regional Hospital Circle where applicable DESCRIPTION: LEVEL 1 LEVEL 2 LEVEL 3* (*PROPORTION OF REFERRALS: _____) GEOGRAPHICAL AREA: COASTAL TROPICAL MOUNTAINOUS SUB-TROPICAL KAROO-LIKE ESCARPMENT LOWVELD HIGHVELD POPULATION: RURAL PERI-URBAN URBAN</p>
<u>BASIC DATA</u>
<p>TIME PERIOD: 1 January 1999 – 31 December 1999 TOTAL NUMBER OF DELIVERIES: 2572 PNMR: 98.7/1000 NNDR: 39.7/1000 PCI: LBWR:</p>
<u>PATTERN OF DISEASE</u>
<p><u>Obstetrical causes of death:</u> 1. Spontaneous preterm labour, 2. Intrapartum asphyxia, 3. Antepartum haemorrhage, 4. Trauma, 5. Hypertensive disorders, 6. Fetal abnormality.</p> <p><u>Obstetrical causes of death > 1000g:</u> 1. Spontaneous preterm labour, 2. Intrapartum asphyxia, 3. Antepartum haemorrhage, 4. Hypertensive disorders, 5. Trauma, 6. Fetal abnormality</p> <p><u>Final causes of neonatal deaths:</u> 1. Hyaline membrane disease, 2. Asphyxia, 3. Meconium aspiration, 4. Congenital abnormalities.</p> <p><u>Final causes of neonatal deaths > 1000g:</u> 1. Hyaline membrane disease, 2. Asphyxia, 3. Meconium aspiration, 4. Congenital abnormalities.</p> <p><u>Avoidable Factors:</u> 1. Unbooked patients, 2. Management of 2nd stage – prolonged with delay in intervention, 3. Infrequent visits to antenatal clinic, 4. Inappropriate response to rupture of membranes.</p> <p><u>Avoidable Factors > 1000g:</u> 1. Delay in seeking medical attention during pregnancy, 2. Medical personnel should have call for assistance, 3. Medical personnel should have responded when called. 4. Referring hospitals/clinics should have sent patients earlier by proper use of partogram.</p> <p><u>Avoidable Factors identified:</u> 1. Interns and community doctors – inappropriate use of forceps and vacuum, 2. Delay in referring patients to Level 2 facility. 3. Doctors not responding when called for emergency e.g fetal distress.</p>

<p>PRESENTER: Dr S Raymond/Dr M Adanlawo INSTITUTION: Empangeni Hospital Circle where applicable DESCRIPTION: LEVEL 1 LEVEL 2 LEVEL 3* (*PROPORTION OF REFERRALS: _____) GEOGRAPHICAL AREA: COASTAL TROPICAL MOUNTAINOUS SUB-TROPICAL KAROO-LIKE ESCARPMENT LOWVELD HIGHVELD POPULATION: RURAL PERI-URBAN URBAN</p>
<u>BASIC DATA</u>
<p>TIME PERIOD: January 1999 – June 2000 TOTAL NUMBER OF DELIVERIES: 12650 PNMR: 38/1000 NNDR: 13/1000 PCI: 2.35 LBWR: 16.1%</p>
<u>PATTERN OF DISEASE</u>
<p>TOP 5 PRIMARY CAUSES: 1. Spontaneous labour, 2. IUD, 3. Abruptio APH, 4. Hypertension, 5. Intrapartum asphyxia</p> <p>TOP 5 FINAL CAUSES: 1. Prematurity, 2. Asphyxia/Trauma, 3. Infection, 4. Congenital Abnormality, 5. Other 1. Multi-organ immunity, 2. Asphyxia, 3. Hyaline membrane disease, 4. Septicaemia, 5. Intraventricular haemorrhage</p> <p>PROPORTION OF DEATHS WITH AVOIDABLE FACTORS PRESENT: Approximately 36%</p> <p>TOP 3 AVOIDABLE FACTORS: 1. Unbooked patient 2. Late booking 3. Infrequent clinic visits</p> <p>WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH): Lack of antenatal care is a large problem. Less so is medical officers not acting on fetal distress.</p> <p>SOLUTIONS TO THESE PROBLEMS (PARAGRAPH): Education in school and community about the need for antenatal care. Programme of doctor visits to clinics to help the midwives. Intensive education of resident staff.</p> <p>PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PIIP): Insert: Avoidable factors – requires an extra key stroke or mouse click to start insertion. Actual weight grouped delivery numbers have to be derived for SBs and NNDs.</p>

PRESENTER: Dr A Cumberlege
 INSTITUTION: Rob Ferreira Hospital
Circle where applicable
 DESCRIPTION: **LEVEL 1** LEVEL 2 LEVEL 3* (*PROPORTION OF REFERRALS: _____)
 GEOGRAPHICAL AREA: COASTAL TROPICAL MOUNTAINOUS **SUB-TROPICAL**
 KAROO-LIKE ESCARPMENT LOWVELD HIGHVELD
 POPULATION: RURAL **PERI-URBAN** **URBAN**

BASIC DATA

TIME PERIOD: 1 January 2000 – 31 August 2000
 TOTAL NUMBER OF DELIVERIES:
 PNM: 37/1000 NNDR: 7/1000 PCI: 2.96 LBWR: 12.5%

PATTERN OF DISEASE

TOP 5 PRIMARY CAUSES: 1. Intrauterine death, 2. Spontaneous preterm labour, 3. Hypertensive disorders,
 4. Intrapartum asphyxia, 5. Antepartum haemorrhage

TOP 5 FINAL CAUSES: 1. Prematurity related, 2. Asphyxia, 3. Unknown cause of death,
 4. Congenital abnormalities

PROPORTION OF DEATHS WITH AVOIDABLE FACTORS PRESENT: 92% of deaths have avoidable factors, 13% of deaths have probable or identified avoidable factors

TOP 3 AVOIDABLE FACTORS: 1. Insufficient notes to comment, 2. Foetal distress not detected because foetus was not monitored, 3. Foetal distress not detected – signs interpreted incorrectly.

WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH):

1. No ANC cards for evaluation because the labour summary on the ANC card was completed and then sent with the mother to her clinic for her 6-week evaluation.
2. Missing files.
3. No cardiotocographs. Either all broken or a single machine not functioning properly. When CTG's are done, they are not interpreted correctly.
4. Partograms are not always utilised.

SOLUTIONS TO THESE PROBLEMS (PARAGRAPH):

1. A labour summary sheet was printed and is now sent with the mother to her clinic, thereby retaining the ANC card.
2. The issue of missing files has been brought to the attention of the admin. head.
3. We have motivated for 5 CTGs "urgently". A CTG workshop is planned with the next perinatal mortality meeting.
4. The use of partogram and it's implication with asphyxia will be brought to the attention of the nursing staff at the next perinatal mortality meeting.

PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PIIP):

- There should be an item under avoidable factors: 0403 – Missing ANC card.
- What is the obstetric code for a normal delivery?
- The number of "Method of delivery" should be included with the percentages.
- We need a minimum requirement for evaluation of a stillbirth, i.e. how far do we go with these cases?
- What is the value of < 1000g? A patient that delivers a 999g foetus in casualty is not considered in the study because of the definition of viability.
- The number of deliveries per weight category (as requested on the registration pack) and the proportions of deaths with avoidable deaths present should be available on the PIIP program.

<p>PRESENTER: Marie Muller INSTITUTION: Middelburg sub-district DESCRIPTION: LEVEL 1 LEVEL 2 LEVEL 3* (*PROPORTION OF REFERRALS: _____) GEOGRAPHICAL AREA: COASTAL TROPICAL MOUNTAINOUS SUB-TROPICAL KAROO-LIKE ESCARPMENT LOWVELD HIGHVELD POPULATION: RURAL PERI-URBAN URBAN</p>
<p style="text-align: center;"><u>BASIC DATA</u></p> <p>TIME PERIOD: 1 January 2000 – 30 September 2000 TOTAL NUMBER OF DELIVERIES: 1934 PNMR: 31/1000 NNDR: 14/1000 PCI: 3.01 LBWR: 10.2</p>
<p style="text-align: center;"><u>PATTERN OF DISEASE</u></p> <p>TOP 5 PRIMARY CAUSES: 1. Spontaneous preterm labour, 2. Intrapartum asphyxia, 3. Infections, 4. Hypertensive disorders, 5. Antepartum haemorrhage</p> <p>TOP 5 FINAL CAUSES: 1. Prematurity related, 2. Asphyxia and birth trauma, 3. Infection, 4. Congenital abnormalities, 5. Other</p> <p>PROPORTION OF DEATHS WITH AVOIDABLE FACTORS PRESENT:</p> <p>TOP 3 AVOIDABLE FACTORS:</p> <p>Patient:</p> <ul style="list-style-type: none"> • Unbooked patient • Delay in seeking medical attention during labour • Inappropriate response to poor fetal movements <p>Medical personnel:</p> <ul style="list-style-type: none"> • Fetal distress not detected because fetus was not monitored. • Delay in medical personnel calling for expert assistance. • No response to history of stillbirths, abruptio <p>Administrative problems:</p> <ul style="list-style-type: none"> • Insufficient doctors available to manage the patient. • Insufficient nurses on duty to manage the patient. • Inadequate facilities in neonatal unit. <p>WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH): Patients don't attend antenatal clinics, book very late in pregnancy, or attend only once just to obtain an antenatal care. They do not realise the importance of regular monitoring of pregnancy or the need for antenatal care. Some patients visit private practitioners and when admitted, no antenatal records are available. They attend antenatal clinics in other provinces or districts with very poor monitoring of pregnancy and with major problems which are not attended to before delivery in the hospital. Shortage of personnel leads to poor monitoring during pregnancy and labour and lack of information and education of patients. Delay in calling for expert assistance because of wrong interpretation, or incorrect use, or partograms not used at all. A major problem is referring patients because of inadequate neonatal facilities and specialists in referral hospitals.</p>

<p>SOLUTIONS TO THESE PROBLEMS (PARAGRAPH):</p> <ul style="list-style-type: none"> • Standardisation of an antenatal card and to be used by all caregivers involved in antenatal care. • Awareness campaign to stress the importance of antenatal care. • Motivation for more personnel to improve standard of patient care. • Regular in-service training on partograms. • Motivation for adequate neonatal equipment and specialists at referral institutions. <p>PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PIIP):</p> <ul style="list-style-type: none"> • Patients with major problems receive antenatal care in other districts or provinces and deliver a stillborn/neonatal death in Middelburg. • Many stillborns and neonatal deaths occur without a clear cause. HIV is suspected but because it is not screened, the rate is not known. • Not enough codes for avoidable factors e.g.: • patients who refuse medical treatment, • patient who are RPR positive and treated but the partner refuses treatment, • diabetic or hypertensive patients not using the treatment as prescribed.
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PRESENTER: Dr ET Bvuma
 INSTITUTION: Witbank Hospital
Circle where applicable
 DESCRIPTION: LEVEL 1 LEVEL 2 LEVEL 3* (*PROPORTION OF REFERRALS: _____)
 GEOGRAPHICAL AREA: COASTAL TROPICAL MOUNTAINOUS SUB-TROPICAL
 KAROO-LIKE ESCARPMENT LOWVELD HIGHVELD
 POPULATION: RURAL PERI-URBAN URBAN

BASIC DATA

TIME PERIOD: January to July 2000
 TOTAL NUMBER OF DELIVERIES: 1742
 PNMR: NNDR: PCI: LBWR:

PATTERN OF DISEASE

TOP 5 PRIMARY CAUSES: 1. Intrauterine death, 2. Hypertensive disorders, 3. Antepartum haemorrhage, 4. Intrapartum asphyxia, 5. Spontaneous preterm labour

TOP 5 FINAL CAUSES:

PROPORTION OF DEATHS WITH AVOIDABLE FACTORS PRESENT:

TOP 3 AVOIDABLE FACTORS:

1. Late booking/inappropriate response to poor fetal movements.
2. Delay in referring patient for secondary/tertiary treatment.
3. Poor progress in labour but partogram not used correctly.

WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH):

- Lack of staff motivation
- No commitment from top management of the district.
- Poor communication between health care workers and patients.
- Collapse of paediatric input due to staffing problems.

SOLUTIONS TO THESE PROBLEMS (PARAGRAPH):

- Proactive perinatal mortality meetings.
- More involvement by the district managers.
- Better staffing at the clinics and the hospital departments.

PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PPIP):

- Poor filing system at Witbank Hospital – difficulty tracing files once the patient has been discharged; some patients go through the system without getting admission numbers and can therefore not be entered into the data.
- Not all staff members dedicated to the collection of data.

PRESENTER: Dr J Alapatt
 INSTITUTION: Mafikeng Provincial Hospital
Circle where applicable
 DESCRIPTION: LEVEL 1 **LEVEL 2** LEVEL 3* (*PROPORTION OF REFERRALS: ± 30)
 GEOGRAPHICAL AREA: COASTAL TROPICAL MOUNTAINOUS SUB-TROPICAL
 KAROO-LIKE ESCARPMENT LOWVELD **HIGHVELD**
 POPULATION: RURAL PERI-URBAN URBAN

BASIC DATA

TIME PERIOD: August 1999 – June 2000
 TOTAL NUMBER OF DELIVERIES: 3220
 PNMR: 31/1000 NNDR: 15/1000 PCI: 2.22 LBWR: 13.7%

PATTERN OF DISEASE

TOP 5 PRIMARY CAUSES: 1. Hypertensive disorders, 2. Intrapartum asphyxia, 3. Intrauterine death, 4. Spontaneous preterm labour, 5. Infections.

TOP 5 FINAL CAUSES: 1. Hyaline membrane disease, 2. Extreme multiorgan immaturity, 3. Asphyxia, 4. Septicaemia, 5. Congenital abnormalities.

PROPORTION OF DEATHS WITH AVOIDABLE FACTORS PRESENT: ± 30%

TOP 3 AVOIDABLE FACTORS: 1. Insufficient notes, 2. Medical personnel doing, 3. Foetal distress not detected.

WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH): Lack of complete data, poor infrastructure, poor communications, lack of supervision of medical staff.

SOLUTIONS TO THESE PROBLEMS (PARAGRAPH):
 Create better co-operation between the hospital and clinic staff.
 Decrease the rotation of staff allocated to the neonatal ward.
 Full time specialists in both O & G and Paediatrics.
 Motivate the health workers.
 Health education to the public.

PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PPIP):
 Complicated procedures for data imports and/or copying the same to another computer.
 Problems due to lack of experience with the software.
 Difficulty in deleting data.

PRESENTER: Dr WC Mwebesa
 INSTITUTION: Klerksdorp Hopsital
Circle where applicable
 DESCRIPTION: LEVEL 1 LEVEL 2 **LEVEL 3***
 GEOGRAPHICAL AREA: COASTAL TROPICAL MOUNTAINOUS SUB-TROPICAL
KAROO-LIKE ESCARPMENT LOWVELD HIGHVELD
 POPULATION: RURAL **PERI-URBAN** URBAN

BASIC DATA

TIME PERIOD: 1/4/1999 – 31/7/2000
 TOTAL NUMBER OF DELIVERIES: 8427
 PNMR: 37/1000 NNDR: 21/1000 PCI: 2.12 LBWR: 17.6%

PATTERN OF DISEASE

TOP 5 PRIMARY CAUSES:
 Spontaneous preterm labour (38%), Unexplained IUD (23%), Intrapartum asphyxia (14%), Hypertension (12%), Antepartum haemorrhage (7%)

TOP 5 FINAL CAUSES:
 Prematurity related (56%), asphyxia and birth trauma (22%), infection (14%)

PROPORTION OF DEATHS WITH AVOIDABLE FACTORS PRESENT:

TOP 3 AVOIDABLE FACTORS:
 (Not recorded)

WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH):
 (Not recorded)

SOLUTIONS TO THESE PROBLEMS (PARAGRAPH):

PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PIPI):

PRESENTER: Dr S Pretorius/Dr HL van Rensburg
 INSTITUTION: Potchefstroom Hospital
Circle where applicable
 DESCRIPTION: LEVEL 1 **LEVEL 2** LEVEL 3* (*PROPORTION OF REFERRALS: _____)
 GEOGRAPHICAL AREA: COASTAL TROPICAL MOUNTAINOUS SUB-TROPICAL
KAROO-LIKE ESCARPMENT LOWVELD HIGHVELD
 POPULATION: RURAL **PERI-URBAN** URBAN

BASIC DATA

TIME PERIOD: 1/1/99 – 31/12/99
 TOTAL NUMBER OF DELIVERIES: 2709
 PNMR: 43.6/1000 NNDR: 11.1/1000 PCI: 0.35 LBWR: 15.3%

PATTERN OF DISEASE

TOP 5 PRIMARY CAUSES: IUD, Preterm labour, HTS disorders, APH, Fetal abnormality

TOP 5 FINAL CAUSES: Prematurity, asphyxia, infections, congenital abnormalities

TOP 3 AVOIDABLE FACTORS: Unbooked patients, inappropriate response to poor fetal movements, infrequent clinic visits

WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH):
 Information and health education not reaching the pregnant mother regarding basic perinatal care and what the mother can do herself to prevent tragedy and realising the danger signs early.

SOLUTIONS TO THESE PROBLEMS (PARAGRAPH):
 Better health education
 Socio-economic dilemma

PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PIPI):
 PPIP 1 – Rate is given for all deliveries >500. >1000g more realistic for our circumstances.
 Graphics not easily printable.
 PPIP 1 – does not reflect referrals and the fvlows from outside your centre.

PRESENTER: Dr C Oettle
 INSTITUTION: Eben Donges Hospital, Worcester
Circle where applicable
 DESCRIPTION: LEVEL 1 **LEVEL 2** LEVEL 3* (*PROPORTION OF REFERRALS: _____)
 GEOGRAPHICAL AREA: COASTAL TROPICAL MOUNTAINOUS SUB-TROPICAL
KAROO-LIKE ESCARPMENT LOWVELD HIGHVELD
 POPULATION: RURAL **PERI-URBAN** URBAN

BASIC DATA

TIME PERIOD: June 2000 – September 2000
 TOTAL NUMBER OF DELIVERIES: 1033
 PNMR: 24/1000 NNDR: 3/1000 PCI: 0.97 LBWR: 25.2%

PATTERN OF DISEASE

TOP 5 PRIMARY CAUSES:
 1. Antepartum haemorrhage, 2. Intrauterine death, 3. Spontaneous preterm labour, 4. Infections, 5. Hypertensive disorders

TOP 5 FINAL CAUSES:
 1. Prematurity related, 2. Infection

PROPORTION OF DEATHS WITH AVOIDABLE FACTORS PRESENT:

TOP 3 AVOIDABLE FACTORS:
 1. Delay in seeking medical attention during labour, 2. No response to history of stillbirths, abruptio etc., 3. No response to maternal hypertension

WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH):

SOLUTIONS TO THESE PROBLEMS (PARAGRAPH):

PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PIIP):

PRESENTER: Dr E Buchmann
 INSTITUTION: Chris Hani / Baragwanath Hospital
Circle where applicable
 DESCRIPTION: LEVEL 1 LEVEL 2 **LEVEL 3***
 GEOGRAPHICAL AREA: COASTAL TROPICAL MOUNTAINOUS SUB-TROPICAL
KAROO-LIKE ESCARPMENT LOWVELD **HIGHVELD**
 POPULATION: RURAL PERI-URBAN **URBAN**

BASIC DATA

TIME PERIOD: 1/1/2000 – 31/10/2000
 TOTAL NUMBER OF DELIVERIES: 15210
 PNMR: 32/1000 NNDR: 7/1000 PCI: 1.44 LBWR: 22.3%

PATTERN OF DISEASE

TOP 5 PRIMARY CAUSES:
 Unexplained IUD (30%), Hypertensive diseases 22% (if abruptio placentae with hypertension is included then the figure rises to 30%), spontaneous preterm labour (12%), antepartum haemorrhage (12%), intrapartum asphyxia (6%)

TOP 5 FINAL CAUSES: Prematurity, asphyxia, septicaemia, congenital abnormalities

PROPORTION OF DEATHS WITH AVOIDABLE FACTORS PRESENT:

TOP 3 AVOIDABLE FACTORS:
 Unbooked patient (9%), patient booked too late (4%), no response to maternal hypertension (4%), fetus not monitored (4%).

WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH):
 The main problems remain hypertension, abruptio, preterm labour and asphyxia. Syphilis is now unusual as a cause of death.

SOLUTIONS TO THESE PROBLEMS (PARAGRAPH):
 Attention needs to be given to improved antenatal care attendance, management of hypertension and fetal monitoring in labour.

PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PIIP):
 PIIP has been used for perinatal audit at Chris Hani Baragwanath since 1995. It has been useful as the basis for weekly morbidity and mortality meetings and has allowed us to identify certain serious problems such as syphilis as a cause of death in 1995 and the shortage of caesarean section facilities in 1996. The data collection was moved to an Epi-Info package as the original PIIP was found to be too restrictive.

<p>PRESENTER: Dr E Mitha INSTITUTION: Kalafong Hospital Circle where applicable DESCRIPTION: LEVEL 1 LEVEL 2 LEVEL 3* GEOGRAPHICAL AREA: COASTAL TROPICAL MOUNTAINOUS SUB-TROPICAL KAROO-LIKE ESCARPMENT LOWVELD HIGHVELD POPULATION: RURAL PERI-URBAN URBAN</p>
<u>BASIC DATA</u>
<p>TIME PERIOD: 1/10/99 – 30/9/00 TOTAL NUMBER OF DELIVERIES: 5797 PNMR: 30/1000 NNDR: 5/1000 PCI: 1.52 LBWR: 19.5%</p>
<u>PATTERN OF DISEASE</u>
<p>TOP 5 PRIMARY CAUSES: Unexplained IUD (37%), Antepartum haemorrhage (24%), Fetal abnormality (11%) hypertension (9%), (hypertension plus abruptio placentae with hypertension – 14%), intrapartum asphyxia (8%). Spontaneous preterm labour is responsible for 13% (4th most common) of deaths if include babies >500g.</p> <p>TOP 5 FINAL CAUSES: If include <1000g, extreme immaturity is the major cause. If exclude <1000g, then asphyxia, congenital infections, nosocomial infections, hyaline membrane disease, congenital abnormalities</p> <p>PROPORTION OF DEATHS WITH AVOIDABLE FACTORS PRESENT: Patient orientated (69%), Health worker responsibility (19%), Administrative problems (12%)</p> <p>TOP 3 AVOIDABLE FACTORS: Inappropriate response to poor fetal movements, unbooked patients, booked late in pregnancy</p> <p>WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH): Patient education and the health workers poor referral of patients with previous obstetric problems to the appropriate level of care.</p> <p>SOLUTIONS TO THESE PROBLEMS (PARAGRAPH): Community awareness of problems in pregnancy programme and establishing pregnancy confirmation clinics.</p> <p>PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PPIP): Getting the health workers to complete the PPIP forms completely and timeously.</p>

<p>PRESENTER: GD MANTEL INSTITUTION: KING EDWARD HOSPITAL, DURBAN Circle where applicable DESCRIPTION: LEVEL 1 LEVEL 2 LEVEL 3* (*PROPORTION OF REFERRALS: +/-65%) GEOGRAPHICAL AREA: COASTAL TROPICAL MOUNTAINOUS SUB-TROPICAL KAROO-LIKE ESCARPMENT LOWVELD HIGHVELD POPULATION: RURAL PERI-URBAN URBAN</p>
<u>BASIC DATA</u>
<p>TIME PERIOD: 1st July to 31st October, 2000 TOTAL NUMBER OF DELIVERIES: 2653 PNMR: 63/1000 (>1000g) NNDR: 17/1000 (>1000g) PCI: 2.76 LBWR: 22.8%</p>
<u>PATTERN OF DISEASE</u>
<p>TOP 5 PRIMARY CAUSES: Unexplained IUD (28%), Hypertensive disorders (23.7%), Antepartum haemorrhage (22.8%), spontaneous preterm labour (12.1%), Intrapartum asphyxia (5.2%).</p> <p>TOP 5 FINAL CAUSES: Prematurity related (58.9%), asphyxia (23.2%), unknown (8.9%), infection (7.1%), congenital abnormalities (1.8%)</p> <p>PROPORTION OF DEATHS WITH AVOIDABLE FACTORS PRESENT: not adequately assessed</p> <p>TOP 3 AVOIDABLE FACTORS: not adequately assessed</p> <p>WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH): The PPIP programme and a system of adequate data collection needs to be established. This will have to extend beyond King Edward Hospital to involve the whole Ilembe (Greater Durban region) in order to get the correct picture of perinatal disease in the region.</p> <p>SOLUTIONS TO THESE PROBLEMS (PARAGRAPH): Perinatal data collection for the region in a standardised fashion will be implemented next year with King Edward Hospital as the central collection point.</p> <p>PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PPIP): nil</p>

PRESENTER: Dr DH Greenfield
 INSTITUTION: Peninsula Maternal and Neonatal Services, Cape Town
Circle where applicable
 DESCRIPTION: LEVEL 1 LEVEL 2 LEVEL 3* (*PROPORTION OF REFERRALS: _____)
 GEOGRAPHICAL AREA: **COASTAL** TROPICAL MOUNTAINOUS SUB-TROPICAL
 KAROO-LIKE ESCARPMENT LOWVELD HIGHVELD
 POPULATION: RURAL **PERI-URBAN** URBAN

BASIC DATA

TIME PERIOD: 1 January 1999 – 31 December 1999
 TOTAL NUMBER OF DELIVERIES: 27519
 PNMR: 18.7/1000 NNDR: 9.9/1000 PCI: 0.5 LBWR: 16.5%

PATTERN OF DISEASE

TOP 5 PRIMARY CAUSES: 1 Idiopathic preterm labour, 2. Abruptio placentae, 3. Proteinuric hypertension, 4. Unexplained intrauterine death – macerated, 5. Intrauterine growth retardation.

TOP 5 FINAL CAUSES: 1. Extreme multiorgan immaturity, 2. Intrapartum hypoxia, 3. Congenital abnormalities, 4. Hyaline membrane disease, 5. Septicaemia

PROPORTION OF DEATHS WITH AVOIDABLE FACTORS PRESENT: 44.1%

TOP 3 AVOIDABLE FACTORS:

1. Unbooked patient
2. Delay in seeking medical attention during labour.
3. Booked late in pregnancy.

WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH):

1. High incidence of proteinuric hypertension.
2. Patients presenting late in pregnancy, or not booking.
3. Patients presenting late in labour – some of these are related to difficulty in getting transport, particularly at night.
4. Preterm labour is a big problem in the <1000g deaths, with many of these patients arriving late in labour.
5. There are still problems with problems in labour not being picked up, or not acted on.

SOLUTIONS TO THESE PROBLEMS (PARAGRAPH):

1. Not coming to the hospital/clinic in time – a long term effort in patient/community education – no easy “fixes” for this one. It will probably need community upliftment. There is a need to ensure a patient-friendly environment, particularly at a primary health care level. This is not always present.
2. Continuing education in the recognition of problems at both antenatal clinic and labour ward, and to ensure that problems are recognised and patients timeously referred.

PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PIIP):

1. Level 1 programme does not seem to be able to cope with numbers more than 9999.
2. My edition of the programme is not transferring revised codes to the level 1 programmes, and is not transferring the data file accurately to the level 2 programme – hence a lot of hand work and retyping to get this data together.

<p>PRESENTER: Dr DH Greenfield INSTITUTION: Midwife Obstetric Units, Cape Town DESCRIPTION: LEVEL 1 LEVEL 2 LEVEL 3* (*PROPORTION OF REFERRALS: _____) GEOGRAPHICAL AREA: COASTAL TROPICAL MOUNTAINOUS SUB-TROPICAL POPULATION: RURAL PERI-URBAN URBAN</p>
<p style="text-align: center;"><u>BASIC DATA</u></p> <p>TIME PERIOD: 1 January 1994 – 31 December 1999 TOTAL NUMBER OF DELIVERIES: 70659 PNMR: 10.5/1000 NNDR: 5.4/1000 PCI: 0.69 LBWR: 11.0%</p>
<p style="text-align: center;"><u>PATTERN OF DISEASE</u></p> <p>TOP 5 PRIMARY CAUSES: 1. Idiopathic preterm labour, 2. Unexplained intrauterine death - macerated, 3. Labour related intrapartum hypoxia, 4. Intrauterine growth retardation, 5. Syphilis</p> <p>TOP 5 FINAL CAUSES: 1. Extreme multiorgan immaturity, 2. Intrapartum hypoxia, 3. Hyaline membrane disease, 4. Septicemia, 5. Congenital syphilis</p> <p>PROPORTION OF DEATHS WITH AVOIDABLE FACTORS PRESENT: 43.9%</p> <p>TOP 3 AVOIDABLE FACTORS: * Delay in seeking medical attention during labour. * Unbooked patient. * Booked late in pregnancy.</p> <p>WHAT DO YOU PERCEIVE THE MAJOR PROBLEMS TO BE (PARAGRAPH):</p> <ol style="list-style-type: none"> 4. Inadequate antenatal care because the patient was either unbooked or only booked shortly before delivery. 5. Patient arriving late in labour. 6. There are a number of medical staff-related factors, mainly problems not being identified, and not being appropriately reacted to. <p>SOLUTIONS TO THESE PROBLEMS (PARAGRAPH):</p> <ol style="list-style-type: none"> 2. Poor antenatal care – probably this will need community upliftment, community education , and ensuring a patient-friendly environment both at the antenatal clinic and in labour ward. 3. Continuing in-service education, particularly for inexperienced staff. <p>PROBLEMS EXPERIENCED WITH PERINATAL PROBLEM IDENTIFICATION PROGRAMME (PIIP):</p> <ol style="list-style-type: none"> 3. 1. Level 1 programme does not seem to be able to cope with numbers more than 9999. 4. My edition of the programme is not transferring revised codes to the level 1 programmes, and is not transferring the data file accurately to the level 2 programme – hence a lot of hand work and retyping to get this data together.

APPENDIX 5 PERINATAL PROBLEM IDENTIFICATION PROGRAMME

PERINATAL PROBLEM IDENTIFICATION PROGRAMME

PIIP

Simply Software cc, and the
MRC Unit for Maternal and Infant Health Care Strategies
University of Pretoria

ICA Solution Audit System

Identification of maternal and perinatal deaths
Cause of maternal or perinatal death
Avoidable factors



DATA COLLECTION

MONTHLY

Total Deliveries		Data Collection Period		
		Month	Year	
General				
	S/B	NND	Live Discharges	Total
500-999g				
1000-1499g				
1500-1999g				
2000-2499g				
2500g+				
Total				

Multiple pregnancies
(Number of babies born)

OPTIONAL INFORMATION

Miscellaneous 1 Antenatal Care Local clinic Elsewhere None	Delivery methods Normal vaginal Assisted vaginal Vaginal Breach Caesarean section
Miscellaneous 2 Referrals Received Sent	Born before arrival In transit from home Born at home From referral clinic

Teenage deliveries

< 17 years	17-19 years
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EACH DEATH'S

Perinatal Death

General

Identification
Date of delivery
Birth mass (g)

Date of death

Syphilis serology
Positive
Negative
Not done
Not available
Select one

Born alive
SB alive on admission
Fresh SB dead on admission
SB admission status unknown
Macerated SB
Select one

Single pregnancy
Multiple pregnancy
Select one

Cause of death
Primary obstetric cause of perinatal death
Code Description if other

Final cause of death
Code Description if other

Avoidable factors

Code:	Possible cause	Probable cause
Code:	Possible cause	Probable cause
Code:	Possible cause	Probable cause

Available from MRC Unit:

- PPIP Programme
- Perinatal Problem Identification. An introduction to auditing mother and baby health care using the ICA Solution audit system.
- PPIP Simply

I

C

A

RATES
MMR, PNMR,
PCI, SB:NND

DISEASE PATTERN
MATERNAL & PERINATAL
PRIMARY OBST CAUSE OF DEATH
FINAL CAUSE OF DEATH

POSSIBLE HEALTH SYSTEM
MISSED OPPORTUNITIES
AVOIDABLE
FACTORS
PATIENT ORIENTATED
ADMINISTRATIVE

PROBLEM IDENTIFICATION

POSSIBLE SOLUTIONS

APPENDIX 6 CLASSIFICATION OF THE PRIMARY OBSTETRIC CAUSE OF DEATH FOR FETUSES AND NEONATES

1. Spontaneous preterm labour - a baby born at less than 37 completed weeks or weighing less than 2500 g where the gestational age is unknown. (Spontaneous labour means starting labour without any medication or other intervention being used in the pregnant woman to initiate labour)
 - 1.1. Idiopathic preterm labour - labour in a woman within 12 hours of rupture of membranes or with intact membranes, where on examination of the placenta no evidence of infection or abruptio placentae could be found.
 - 1.2. Preterm premature rupture of membranes - membranes ruptured more than 12 hours before the onset of contractions and the baby was preterm.
 - 1.3. Preterm premature rupture of membranes with chorioamnionitis - membranes ruptured more than 12 hours before the onset of contractions and the baby was preterm and some clinical signs of infection were present in the mother (pyrexia, tachycardia, tender uterus, foul smelling vaginal discharge) or baby (fetal tachycardia, foul smelling baby, signs of congenital neonatal infection).
 - 1.4. Cervical incompetence - if a clinical history of cervical incompetence is present, namely rapid painless labour, rupture of membranes shortly before the delivery of the baby, no or small amounts of bleeding, the baby is born alive (although may die shortly after delivery), and the gestational age is less than 28 completed weeks or if the gestational age is unknown, less than 1000 g).
2. Infections
 - 2.1. Syphilis - positive serological tests for syphilis and the presence of clinical and/or radiological signs of congenital syphilis. Clinical signs include an enlarged liver and spleen. Radiological signs include raising of the periosteum. If the RPR or VDRL titre is greater than 1:16 and there is no other obvious cause of death, the cause of death is classified as syphilis.
 - 2.2. Amniotic fluid infection - characterised by one or more of the following: infection clearly evident on placental examination, a foul smelling baby and placenta at delivery, or clinical evidence of infection in the mother (see 1.3.). The membranes must be **intact** at the onset of labour.
3. Antepartum haemorrhage
 - 3.1. Abruptio placentae - more than 15% of the placental surface area has an **adherent** blood clot and there were clinical signs of abruption, namely tenderness of the uterus and vaginal bleeding.
 - 3.2. Abruptio placentae with hypertension - more than 15% of the placental surface area has an **adherent** blood clot and there were clinical signs of abruption, namely tenderness of the uterus and vaginal bleeding and the mother had hypertension on admission.
 - 3.3. Placenta praevia - this is diagnosed before delivery by ultrasound, during labour by palpation of the placenta vaginally, or at caesarean section.
 - 3.4. Antepartum haemorrhage of unknown origin - the woman has bled antepartum but no cause could be determined antenatally or postpartum on examination of the placenta.
4. Intrauterine growth retardation
 - 4.1. Idiopathic intrauterine growth restriction - where the baby was a fresh stillborn or neonatal death and the birth weight was less than the 10th centile for

- gestational age for the growth curves used by the institution, and there no recognised cause of growth restriction (such as hypertension) was present.
- 4.2. Postmaturity – where the baby has the clinical features of growth restriction and is more than 42 weeks gestation
5. Hypertensive disorders
 - 5.1. Chronic hypertension - where the woman was known to be hypertensive but did not have proteinuria.
 - 5.2. Proteinuric hypertension - where the woman was hypertensive and had proteinuria.
 - 5.3. Eclampsia - where the woman had proteinuric hypertension and had a grand mal convulsion.
 6. Fetal abnormality - an anatomical or clinical diagnosis that the abnormality was incompatible with life.
 - 6.1. Fetal chromosomal abnormality
 - 6.2. Neural tube defects / hydrocephalus
 - 6.3. Non-specific fetal abnormality
 - 6.4. Non-immune hydrops fetalis
 7. Trauma - stillbirths and neonatal deaths of normally formed babies **of at least 1500 g** and where mechanical difficulty complicated delivery or where precipitate labour caused fatal cerebral haemorrhage. The birth weight of 1500 g was chosen because under this weight the baby can bruise easily and the primary cause of death was the factor that caused the baby to be born in the first place.
 - 7.1. Mechanical trauma (e.g. breech).
 - 7.2. Precipitate labour.
 - 7.3. Instrumental delivery, forceps.
 - 7.4. Instrumental delivery, vacuum.
 - 7.5. Ruptured uterus
 8. Intrapartum asphyxia - stillbirth or neonatal death of a normally formed baby of at least 1500 g where evidence of peripartum hypoxia existed.
 - 8.1. Labour related intrapartum asphyxia - where labour was prolonged (that is where the action line of the partogram was crossed) and there were clinical signs of hypoxia in the baby such as fetal tachycardia, decelerations in the fetal heart, and low Apgar score on delivery.
 - 8.2. Fetal distress without prolonged labour - where there were clinical signs of hypoxia in the baby such as fetal tachycardia, decelerations in the fetal heart, and low Apgar score on delivery.
 - 8.3. Meconium aspiration - where there was meconium in the amniotic fluid and after delivery, meconium was seen below the vocal cords of the baby.
 - 8.4. Cord prolapse - where the umbilical cord prolapsed through the cervix.
 9. Maternal disease - losses attributed to any medical or surgical condition excluding hypertension.
 - 9.1. Diabetes mellitus
 - 9.2. Maternal heart disease
 10. Other - conditions are rare and can be specifically mentioned.

- 10.1. Rhesus isoimmunisation
- 11. Unexplained intrauterine death - stillbirths and late abortions of normally formed fetuses for which no cause could be found. The fresh stillbirths that are premature (37 weeks or less) or if the gestational age is unknown, less than 2500 g, are classified under the idiopathic preterm labour group.
 - 11.1. Fresh unexplained intrauterine death - where the baby had no signs of maceration.
 - 11.2. Macerated unexplained intrauterine death - where the baby had signs of maceration, i.e. the skin peeling off the fetus.
 - 11.3. Unexplained due to lack of information – where there was no or insufficient information available to fully evaluate the case

Note: Multiple pregnancies can be classified in the same way but it needs to be specified that there was a multiple pregnancy

Appendix 2: Classification of the final cause of death for neonates

- 1. Prematurity related -
 - 1.1. Extreme multi-organ immaturity - this group is restricted to babies who are less than 28 weeks gestation or if the gestation is unknown, less than a birth weight of 1000 g
 - 1.2. Hyaline membrane disease - respiratory distress syndrome - where the neonate died and there was clinical evidence of this syndrome.
 - 1.3. Necrotising enterocolitis-
 - 1.4. Pulmonary haemorrhage
 - 1.5. Intracranial haemorrhage
- 2. Asphyxia and birth trauma -
 - 2.1. Asphyxia
 - 2.2. Meconium aspiration
 - 2.3. Persistent fetal circulation
 - 2.4. Trauma
- 3. Infection
 - 3.1. Septicaemia
 - 3.2. Pneumonia
 - 3.3. Congenital syphilis
 - 3.4. HIV infection
- 4. Congenital abnormalities
- 5. Unknown cause of death

