Hammersmith Neonatal Neurological Examination of Healthy Term Infants at Ages 6 and 10 Weeks in Tshwane District, South Africa

Marna Nel[1,2], Ute Feucht[1,2,4], Helen Mulol[1,2,4], Carina Eksteen[3]

[1]Research Centre for Maternal, Foetal, Newborn and Child Health Care Strategies, University of Pretoria, Pretoria, South Africa

[2]Maternal and Infant Health Care Strategies Research Unit, South African Medical Research Unit, Pretoria, South Africa

[3]Department of Physiotherapy, Sefako Makgatho Health Science University, Ga-Rankuwa, South Africa

[4]Department of Paediatrics, University of Pretoria, Pretoria, South Africa

BACKGROUND

- The neurodevelopmental progress of infants below three months is globally not well described.
- The 6 weeks postnatal age is an important milestone for observing characteristic changes occurring in the domains of ***posture, muscle tone, and visual orientation***[(1)]**.**
- Neurodevelopmental characteristics of infants at 6 and 10 weeks are omitted from the South African (SA) Road to Health Booklet (Fig.1) [(2)]; the status and progress at these ages are routinely not monitored, and the data not documented.
- Research lacks quantitative data and values for optimal neurodevelopmental status and characteristic changes in healthy infants at and between 6- and 10-weeks postnatal age.

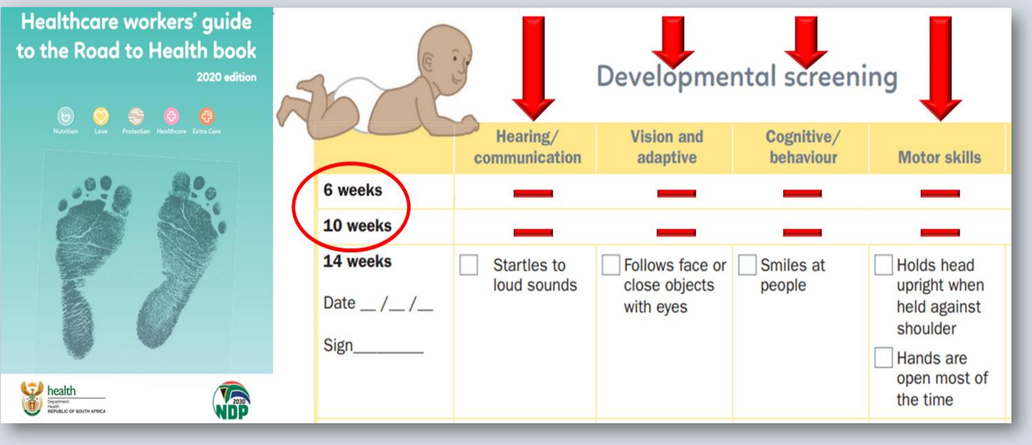

Figure 1: Road to Health Book, Developmental screening at 6 and 10 weeks (p23).

AIMS OF THE STUDY

1. To assess and attribute raw scores (RSs) to the distribution of neuro-behavioural characteristics in healthy 6- and 10-week term infants born from mothers with low-risk pregnancies in the Tshwane District in SA.
2. To establish an optimal frequency distribution by applying an optimality scoring system to the RSs obtained by this cohort of 6- and 10-week infants in the domains of ***posture, tone, reflexes, movements, orientation and behaviour.***

METHOD

- A prospective longitudinal study was performed on 35 healthy term-born, infants from low-risk pregnancies at 6- and 10 weeks' postnatal age in the Tshwane District.
- The status of infants' ***posture, tone, reflexes, movements, orientation and behaviour*** were recorded using the Hammersmith Neonatal Neurological Examination (HNNE)[(3)] (Fig.2).
- **Optimality score ranges** were derived from the raw scores of the 34-item proforma, using the 5th and 10th centiles as cut-off points according to the HNNE optimality scoring system[(4)].

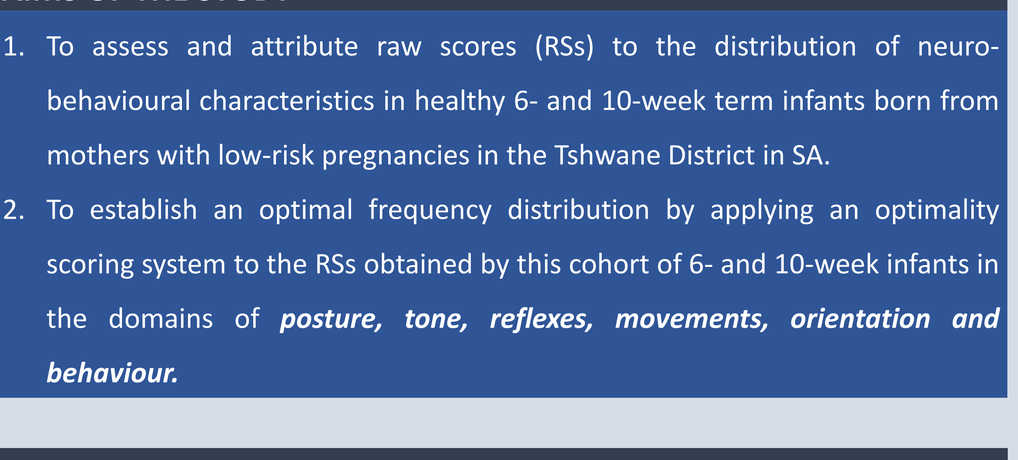

Figure 2: The HNNE proforma evaluation form with 34 scorable items in six domains. Columns resembling or describing the infants' performance were ascribed a raw score according to the number of the column 1 - 5.

RESULTS

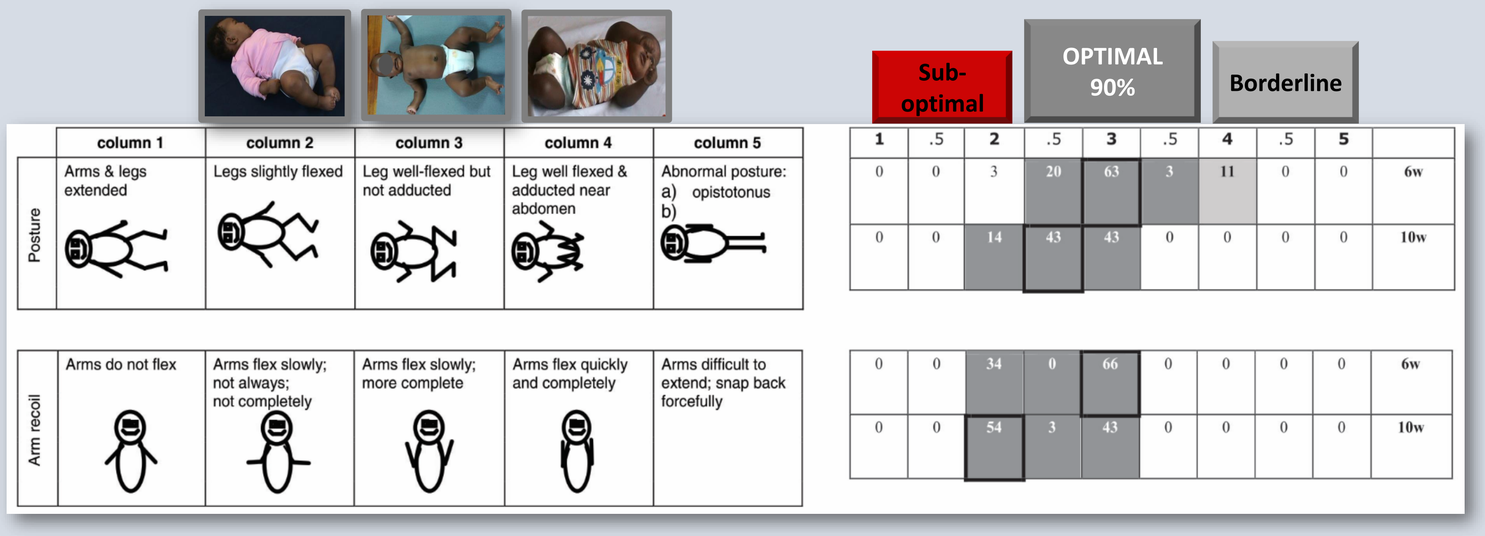

Figure 3: The 'optimality scoring system' converted the **frequency distribution of RSs** of the 34 items to **optimality score ranges** using the 5th and 10th centiles as cut-off points. The highlighted blocks represent the **median** score for each item.

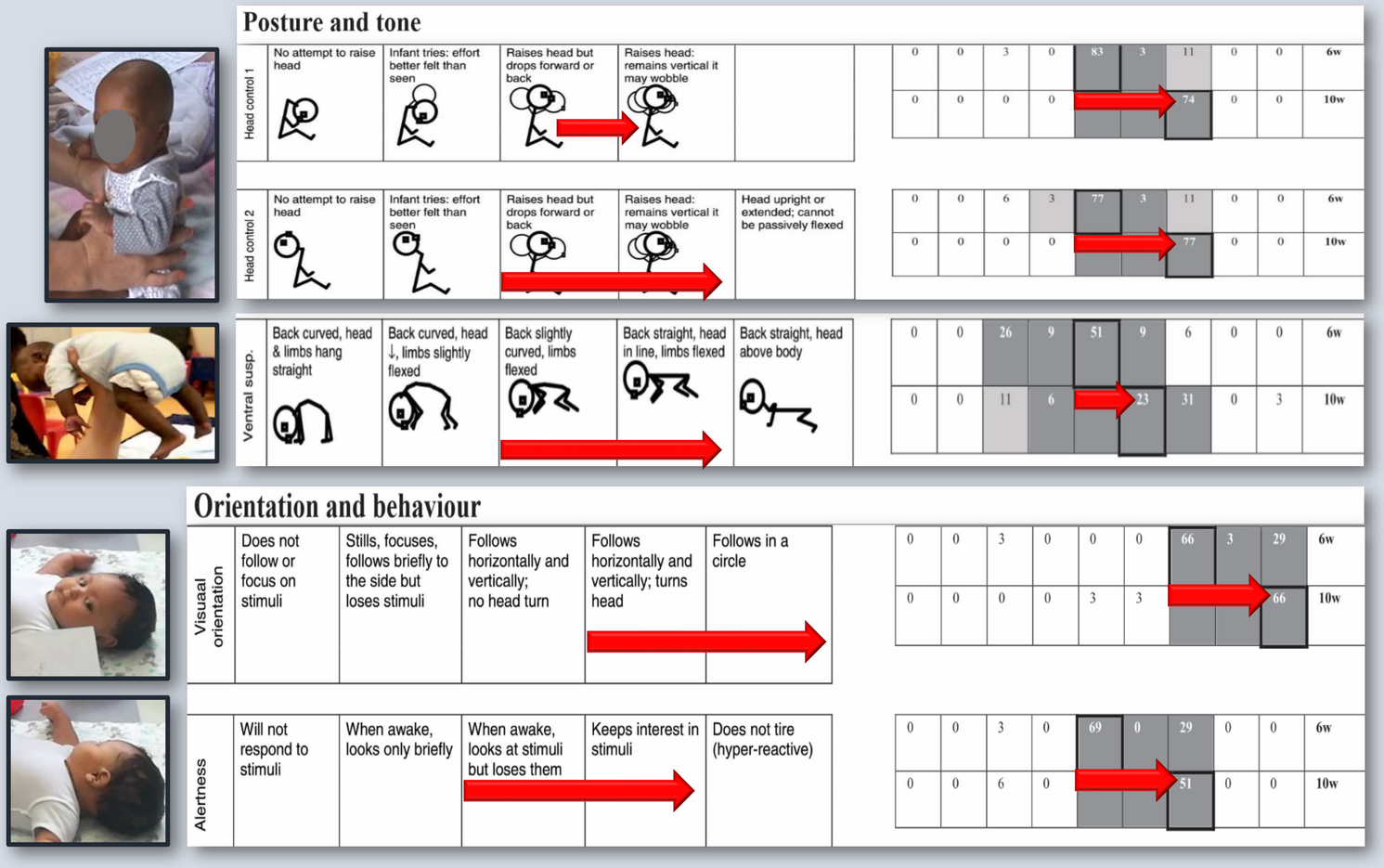

Figure 4: The direction of changes in upper and lower limb tone, active head control in horizontal and vertical positions, and advanced visual orientation and alertness were illustrated and projected by **median score shifts** in this cohort infants between 6 and 10 weeks.

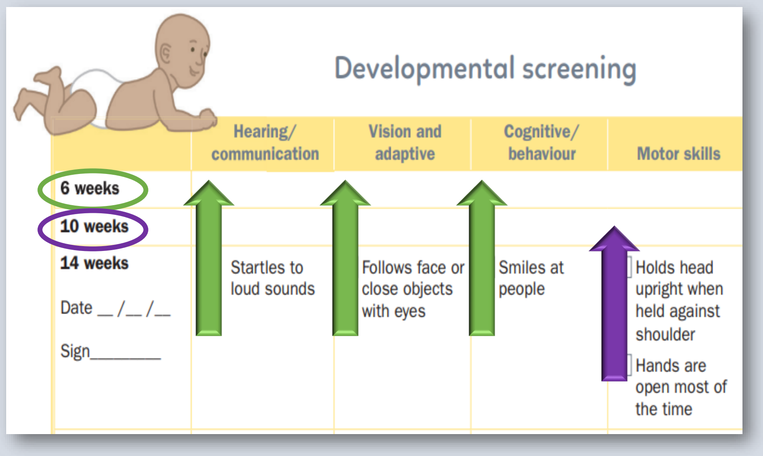

Figure 5: Milestone characteristics at 14 weeks according to Road to Health Book are already visible in healthy infants at 6- and 10-weeks post term age.

CONCLUSION

This study presents the first results of ongoing research and evolving data for identifying a developmental trajectory of neurodevelopmental characteristics of healthy term-born infants at 6- and 10 weeks in a developing country. Studying bigger cohorts in SA may result in data collection that can lead to a greater understanding, continuous monitoring, and effective management of infants and as such contribute to Sustainable Development Goals in SA.

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