

CAUSES OF NEONATAL DEATHS AT KGAPANE HOSPITAL, LIMPOPO PROVINCE

Authors: G Marincowitz, UL; C Marincowitz, US

INTRODUCTION

Neonatal deaths are a global public health challenge predominantly affecting low- and middle-income countries¹. In high-income countries, the early neonatal mortality rate is about 3/1000 live births for infants weighing 500g or more². Comparatively, in sub-Saharan Africa, the early neonatal mortality rate is about 27/1000 live births for infants weighing 500g or more¹. The first month of life is the most vulnerable period for child survival, with 2.4 million newborns dying in 2021. For this year, nearly half (47%) of all under-5 deaths occurred in the newborn period, an increase from 1990 (40%). This is due to the global level of under-5 mortality declining faster than that of neonatal mortality^{1,3,4}.

Internationally, preterm birth, intrapartum-related complications (birth asphyxia), congenital abnormalities and infections are the leading causes of neonatal deaths^{5,6,7,8,9,10,11,12,13}. According to the Saving Babies report (2014-2016) the common identifiable primary causes of neonatal death in South Africa are: Spontaneous preterm labour (48,1%), intrapartum hypoxia (24,2%), neonatal infections (11,2%), and foetal abnormalities (9,1%).

Considering that most of the causes of neonatal mortality described in the literature are preventable, it is of interest to describe the audit findings from Kgapane Hospital in Limpopo, South Africa.

METHODOLOGY

Kgapane Hospital is a medium sized district hospital in the Mopani District of Limpopo Province. It serves a population of 230 000 people and has 21 clinics in its catchment area. The hospital has a busy maternity section delivering around 5000 babies annually with 250 or more deliveries done at the 21 clinics.

Monthly there are 16 full-time midwives allocated to the maternity section, including labour ward, ante- and postnatal wards resulting in a midwife to birth ratio of 3,5¹⁴.

Individual file audits were done on all the perinatal deaths between February 2018 and October 2021. All deaths of neonates delivered at Kgapane Hospital and its catchment area were included in the study. Cases where the records were not available for audit, were excluded from the study.

The data extraction tool used was based on the Perinatal Problem Identification Programme (PIPI) data collection sheet which is a standardised and tested tool in South Africa⁴. Data was extracted from the audit reports and captured by the researcher on a password protected Excel[®] spreadsheet.

Ethical clearance for the research was obtained from the Research and Ethics Committee of the University of Limpopo (TREC/61/2023: IR), and permission acquired from the Limpopo Provincial Department of Health (LP 2023-03-012) as well as Kgapane Hospital management.

RESULTS

A total of 254 neonatal deaths occurred during the period 1 February 2018 to 31 October 2021 at Kgapane Hospital and its surrounding clinics. The total number of births for this period was 20562. This resulted in an early neonatal mortality rate of 12,6/1000 live births.

Of the 254 recorded neonatal deaths in the period, audits were done on 236 of the records. The remaining 18 case records were missing. Data from all the available neonatal death records were included in the study analysis.

The demographic information of women who had neonatal deaths are presented in detail in the pie graphs. The mean age was 27,25 years. Of the mothers, 45 had experienced one or more previous miscarriages, 4 had previous stillbirths, 3 had previous neonatal deaths, and 11 had previously lost a child after the neonatal period.

DISCUSSION

In our study 90% of the deaths can be attributed to four causes namely prematurity (44%); intrapartum complications (19%) including asphyxia, meconium aspiration and breech deliveries; neonatal infections (16%) of which HIV positivity was the most prevalent; and foetal congenital abnormalities (11%). It is concerning that only 18 (34%) of the women on antiretroviral treatment who had neonatal deaths had suppressed viral loads of below 50, as this is far below the target of 95% viral load suppression rate.¹⁵

The four major causes of neonatal death we identified have been echoed by multiple other studies^{6,7,8,9,10,11,12,13}. Additionally, most studies based on PIPI data also identified very similar proportions for these four causes^{3,4,5,7,12,13}. Of note is that a few studies identified considerably higher rates of infections, these were mostly conducted in Nepal, Pakistan and India.^{8,9,11} This could be due to differences in interpretation of the cause of death. Several deaths amongst premature neonates are most likely caused by undetected infections, even premature labour itself is frequently precipitated by infections.^{1,11}

The modifiable factors we found are echoed by several authors^{2,3,4,5,6,8,10,13}. Rhoda et al¹² identified the most important management strategies to reduce neonatal deaths as administering antenatal corticosteroids for preterm labour, labour and delivery management, prevention of mother-to-child transmission of HIV, the use of oral rehydrating solution for babies with diarrhoea, handwashing with soap, and case management of severe neonatal infection.

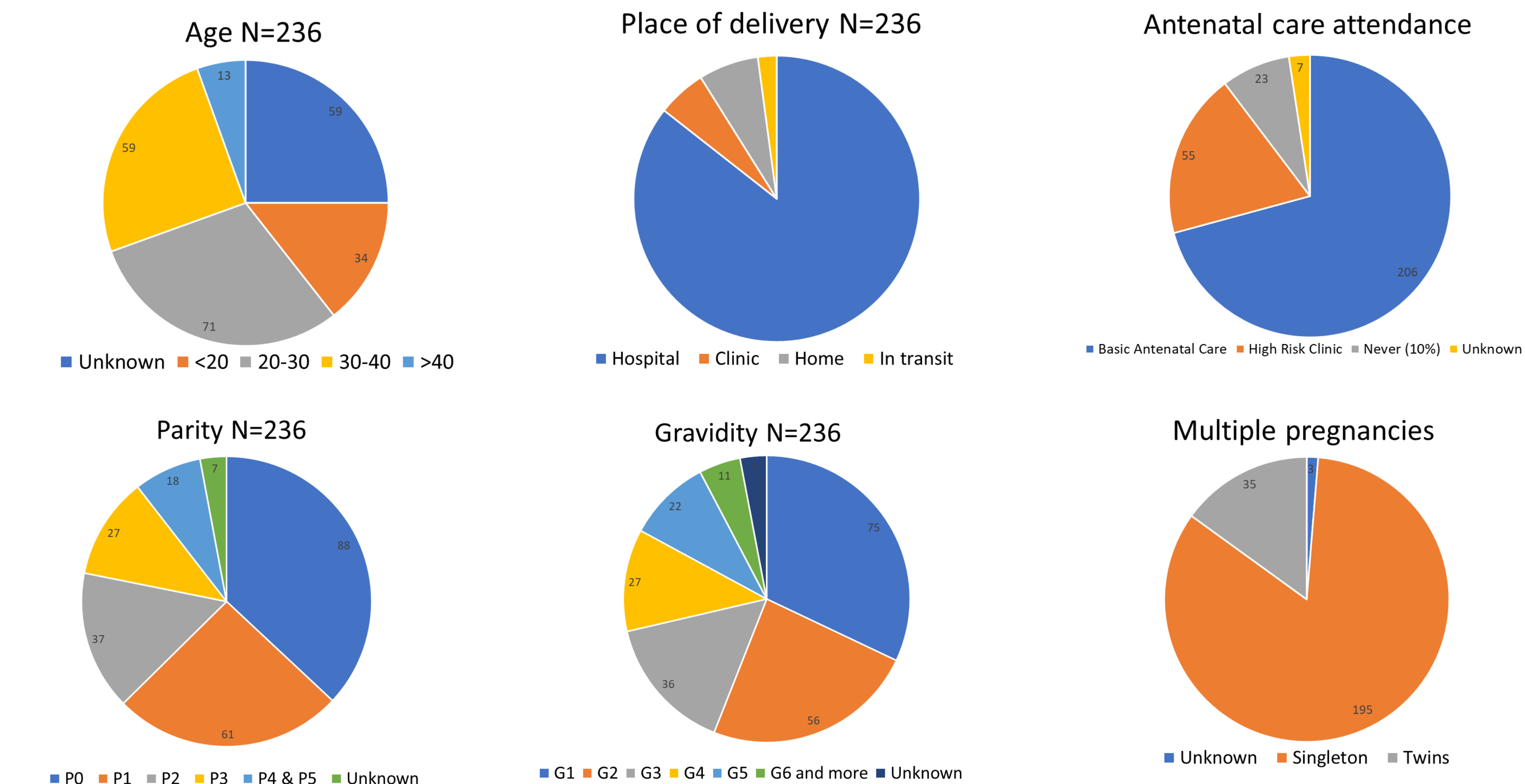
The reported inadequate intrapartum monitoring could be attributed to inadequate staffing and resources including equipment such as cardiotocographs. The recommended midwife:birth ratio in low resource settings by the international federation for Gynaecologists and Obstetricians (FIGO) is 1.71 births per midwife, while the FIGO ideal ratio is 1.52.¹⁴ In the maternity section where our study was conducted the midwife:birth ratio was 3,5.

CONCLUSION

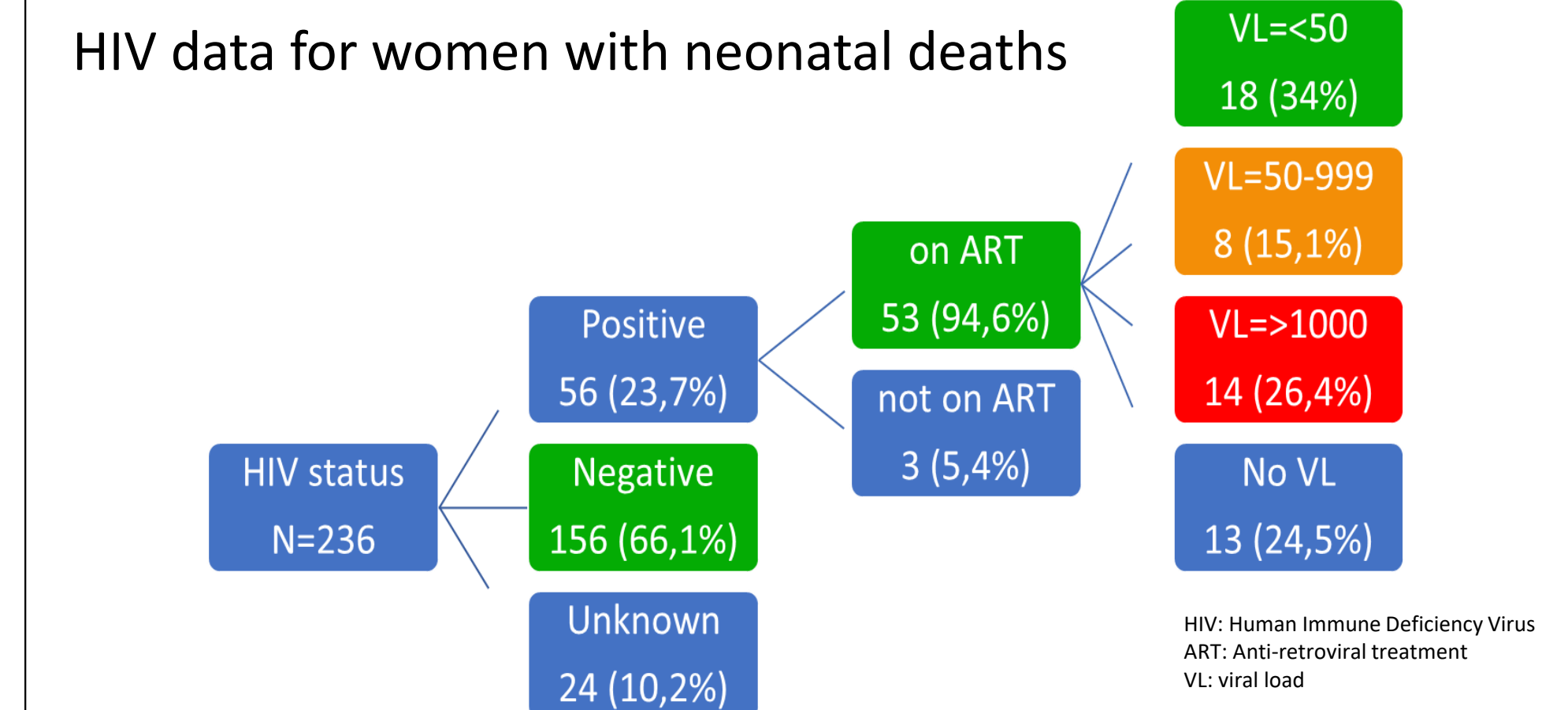
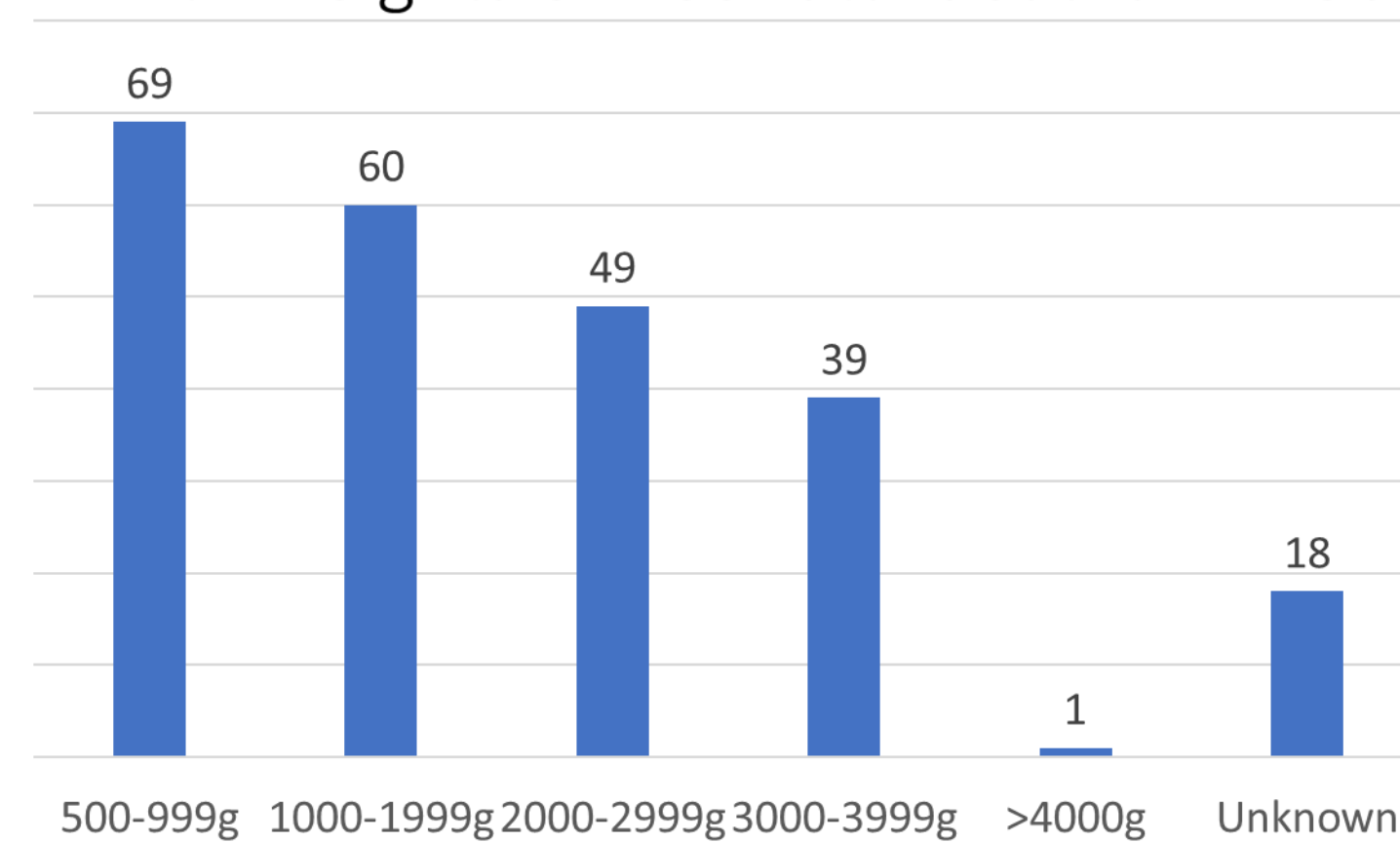
Our study identified four main causes of neonatal deaths at a rural, level-one hospital. These included prematurity, intrapartum asphyxia, neonatal infections, and foetal congenital abnormalities. These can largely be attributed to inadequate management of premature labour, poor intrapartum monitoring, delays in management interventions and referral to specialized care. It is widely accepted that knowing the causes of neonatal mortality leads to the identification of preventable factors, and herein lies the importance of perinatal audits¹⁷.

RECOMMENDATIONS

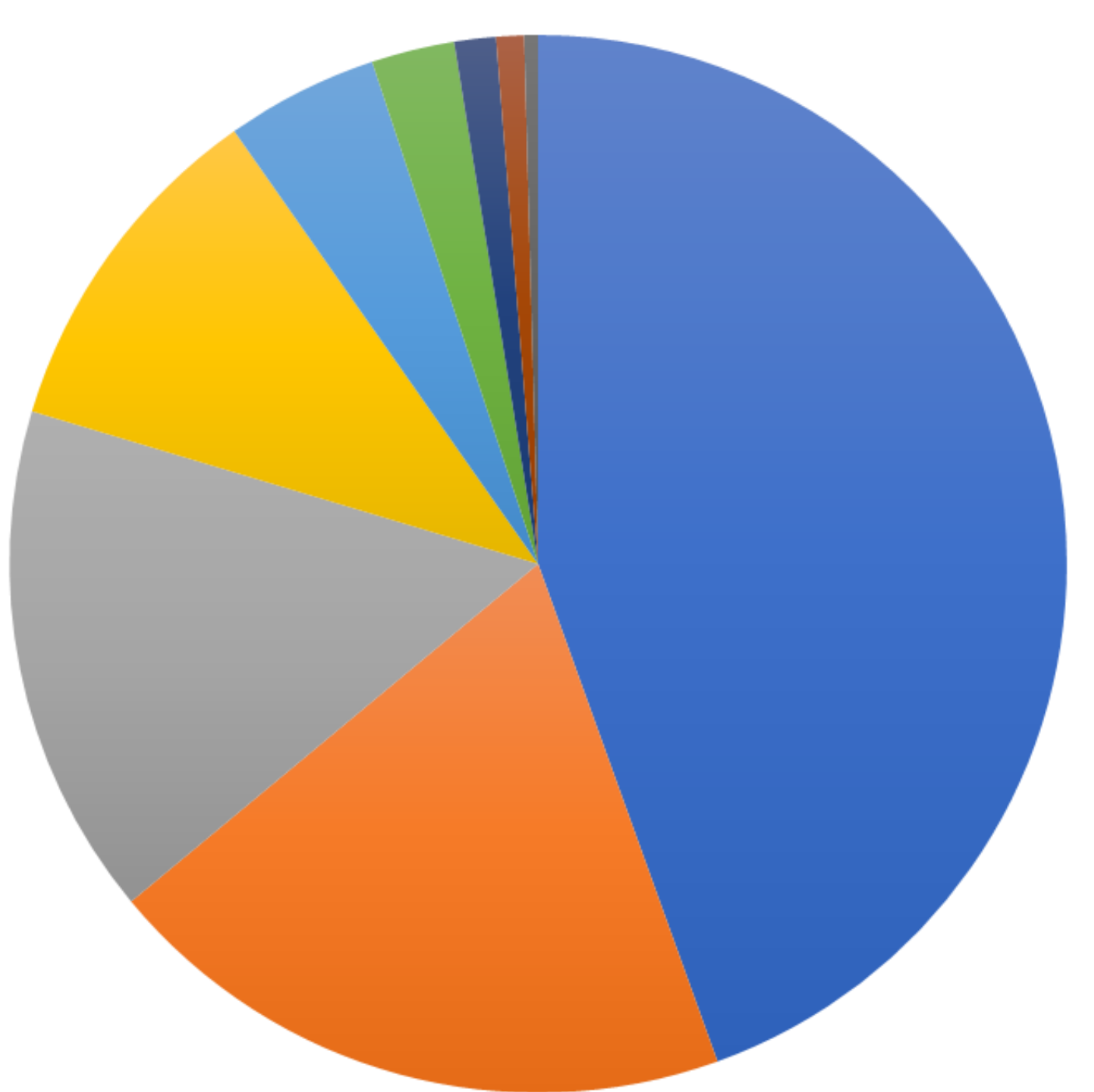
Care can be improved with better training and implementation of key guidelines^{18,19}, as well as improving the practice of intrapartum monitoring, timeous referrals of patients who require specialised care, and responding promptly to signs and symptoms which might indicate risk factors – especially premature labour. Furthermore, maternity ward staffing norms should be standardized¹⁴, adequate resources are essential to improve effective intrapartum monitoring.¹⁶ There is a need to audit the capacity for appropriate intrapartum monitoring and management of premature neonates including space, equipment and staffing norms and training. Tools for the audit process are readily available¹⁸ and more emphasis should be placed on the most important part of the audit process: continuing the audit cycle through ongoing assessment and re-evaluation of improvements as recommended from the initial audit¹⁷.



Birth weights of neonatal deaths N=236



Causes of Neonatal Deaths



MODIFIABLE FACTORS
1. Management protocols not followed
2. Inadequate intrapartum foetal monitoring
3. Delays in management interventions
4. No attempts to refer patients for specialized care
5. No beds available at the next level of care
6. Patient-related factors

- Prematurity 44,5%
- Intrapartum complications 19,5%
- Neonatal Infections 15,7%
- Fetal congenital abnormality 10,6%
- IUGR 4,7%
- Unexplained (including 2 possible SIDS) 2,5%
- Haemorrhagic Disease of the newborn 1,3%
- Dehydration/Diarrhoea 0,8%
- Trauma 0,4%

PROTOCOLS COMMONLY NOT FOLLOWED
1. Management of premature labour
2. Respiratory distress in a premature baby
3. Management of HIV in pregnant women

LIMITATIONS

Limitations include the fact that retrospective data was used and that frequently recordkeeping is not at the expected standard. Since the file audits were done by the researcher who also worked in the ward at that time, it could have compromised objectivity and introduced bias. Another limitation is that some files were not traced and therefore not audited.

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