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# CAUSES OF STILLBIRTHS AT KGAPANE HOSPITAL, LIMPOPO PROVINCE

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## INTRODUCTION

Stillbirths are a global public health challenge predominantly affecting low- and middle-income countries[1]. Globally, about 2.0 million stillbirths occur each year, and most of these (55%) are from sub-Saharan Africa[2,3,4]. In 2019 stillbirth rates around the world ranged from 1.4 to 32.2 stillbirths per 1,000 total births, with the highest stillbirth rate in Sub-Saharan Africa. In South Africa, about two-thirds of perinatal deaths are stillbirths, and approximately 7500 occur every year[5,6]. Of these, the majority of the pregnancies were regarded as healthy at the time of the foetal demise and had not been referred for advanced care[3]. In the last two decades, the world reduced the number of stillbirths by almost a third, but Sub-Saharan Africa did not show this declining trend.

Common causes of stillbirth include intrapartum complications, antepartum haemorrhage (including placental abruptio), infections and maternal conditions such as hypertensive disorders of pregnancy, with foetal growth restriction as a common underlying pathway[8]. Many of these causes can be avoided through better nutrition, antenatal care, foetal growth monitoring, and access to safe and quality labour care[3,4,9,10].

Unfortunately, the causes of many stillbirths remain unknown and account for about 25-30% of perinatal deaths[3,5,7]. The inability to establish a cause is a source of great distress for families and hampers the grieving process.[7] Improving reporting of foetal deaths and perinatal audits could improve cause of death data quality and availability[1,2,4].

Considering the above, it was of interest to describe the audit findings from Kgapane Hospital, a medium-sized district hospital in the Mopani District of Limpopo Province, South Africa. The study explored perinatal clinical audit data collected from 2018 – 2021 with a focus on identifying the causes attributed to stillbirths and modifiable factors.

## METHODS

Kgapane hospital serves a population of 230 000 people and has 21 clinics in its catchment area. Around 5000 babies are delivered here annually. Monthly there are 16 full-time midwives allocated to the maternity section, including the labour ward, ante- and postnatal wards, which amounts to a midwife-to-birth ratio of 3,5.[11]

A retrospective observational study was conducted using information from audit documents of individual file audits of all perinatal deaths occurring at Kgapane Hospital and its catchment area during the period February 2018 to October 2021. Stillbirths where the maternal case records were not available for audit, were excluded.

Data was extracted from the audits with a tool based on the Perinatal Problem Identification Programme (PPIP) data collection sheet which is a standardized tool in South Africa[6] 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) and Kgapane Hospital management. A waiver of consent was obtained as secondary data was used for the study with no implications for the patients. Only patient identification codes were used when capturing the data to ensure confidentiality.

## RESULTS

A total of 392 stillbirths 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, resulting in a stillborn rate of 19.06/1000 births. Of the 392 stillbirths recorded, audits were done on 354 of the maternal case records. The remaining 38 (9,7%) case records were missing and thus not audited.

Most women who had stillbirths were between 30 and 40 years of age (40%) with a mean age of 27,6 years. Women who never had a viable pregnancy formed the largest subgroup with 34%.

Most women (86,4%) delivered their stillbirths in the hospital with 7,6% at clinics, 4% at home and 2% in transit. Multiple pregnancies constituted 7,6% of the stillbirths, 15,5% were documented as having had previous miscarriages, and only 1% had had previous stillbirths. A total 89,8% of the women attended basic antenatal care at least once, and 35,6% of them also attended the high-risk clinic at the hospital. See figures 1-5

Macerated stillbirths (MSB) constituted 67,2% of the total and fresh stillbirths (FSB) 32,8%.

**Table 1:** Demographic data of women who had stillbirths (N=354)

| Age | Parity | Gravidity |
|---|---|---|
| Unknown | Unknown | Unknown |
| 66 (18,6%) | 6 (1,7%) | 6 (1,7%) |
| <20yrs | P0 | G1 |
| 42 (11,9%) | 120 (34%) | 94 (26,6%) |
| 20-30yrs | P1 | G2 |
| 138 (40%) | 83 (23,4%) | 98 (27,7%) |
| 30-40yrs | P2 | G3 |
| 93 (26,2%) | 81 (22,9%) | 75 (21,2%) |
| >40yrs | P3 | G4 |
| 15 (4,2%) | 44 (12,4%) | 51 (14,4%) |
| Mean | P4 | G5 |
| 27,6 | 16 (4,5%) | 20 (5,6%) |
| Median | P5 | >6 |
| 27 | 4 (1,1%) | 10 (2,8%) |

**Table 2:** Birth weight of stillbirths

| Birth weight | All stillbirths N=354 | MSB N= 238 (67,2%) | FSB N=116 (32,8%) |
|---|---|---|---|
| 500-999g | 87 (24,6%) | 62 (26,1%) | 25 (25,6%) |
| 1000-1999g | 125 (35%) | 91 (38,2%) | 33 (28,4%) |
| 2000-2999g | 82 (23,2%) | 54 (22,7%) | 28 (24,1%) |
| 3000-3999g | 48 (13,6%) | 26 (10,9%) | 22 (19%) |
| >4000g | 7 (2%) | 2 (0,8%) | 5 (4,3%) |
| Unknown | 6 (1,7%) | 3 (1,3%) | 3 (2,6%) |

**Table 3:** Modifiable factors

| Modifiable factors | Guidelines most frequently not followed |
|---|---|
| Inadequate intrapartum foetal monitoring | Management of hypertensive disorders in pregnancy |
| Inadequate implementation of management guidelines | Plotting and interpretation of symphysis fundal height measurement |
| Patient-related factors | Early identification and management of intrauterine growth restriction |
| Delay in referral to specialized care | Management of HIV during pregnancy |

Figure 1: Antenatal care attendance

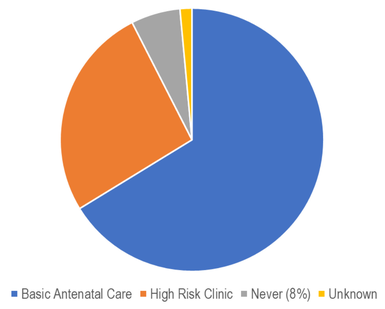



Figure 2: Place of delivery

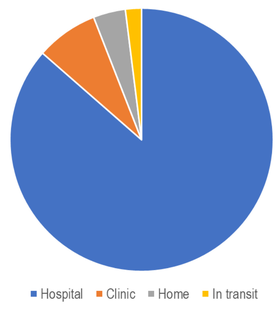



Figure 3: Previous miscarriages

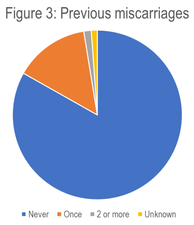



Figure 4: Multiple pregnancies

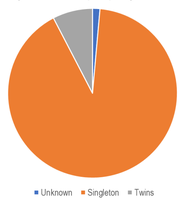



**Figure 5:** HIV data for women with stillbirths

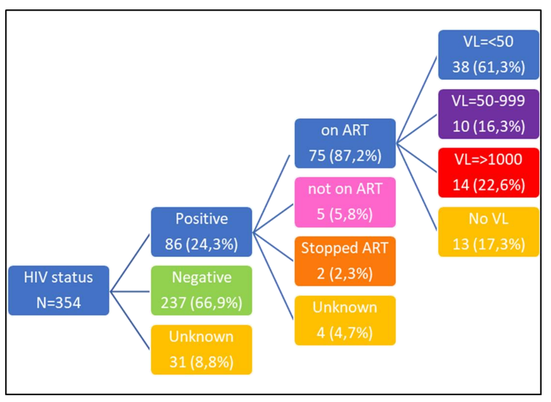



**Figure 7:** Causes of MSB and FSB

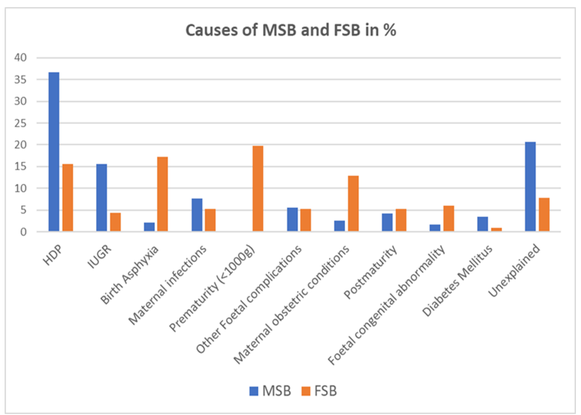
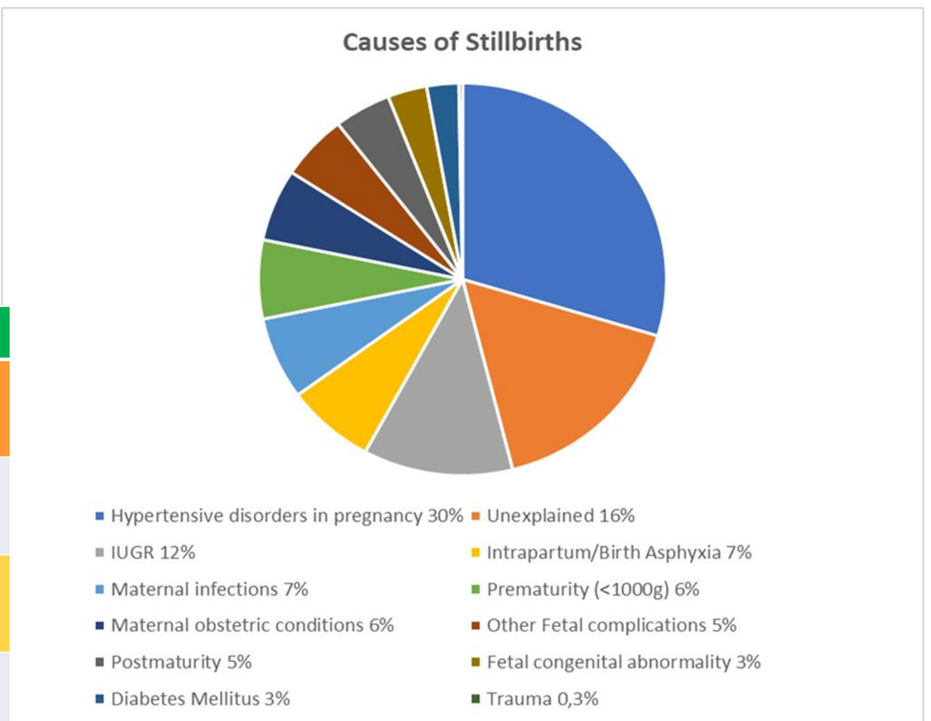



**Figure 6:** Causes of stillbirths including MSB and FSB




## CONCLUSION

Our study found the five leading causes of stillbirths to be hypertensive disease in pregnancy, intrauterine growth restriction, intrapartum asphyxia, maternal infections, and prematurity. For 16,8% of stillbirths no possible cause was found. The modifiable factors identified in this study seem to correspond with the causes of stillbirths and can form the basis of improvement strategies such as training, timeous referral, and improved resources and staffing.

## RECOMMENDATIONS

Care can be improved with focussed training and implementation of key guidelines, upscaling resources for intrapartum monitoring, timeous referrals, and by encouraging better health-seeking behaviour amongst patients.
Audit tools to monitor this will go a long way to strengthen the implementation of these guidelines[20]. There is a need for further research into staffing norms and its effects on perinatal health outcomes in South Africa.

## DISCUSSION

In our study, the five most frequent causes of stillbirth were: hypertensive disorders in pregnancy (HDP) (29,7%); intrauterine growth restriction (without HDP) (11,9%); birth asphyxia (7,1%); maternal infections (6,8%), which were mostly HIV with unsuppressed VL; and premature labour (<1000g) (6,5%). We were unable to find a cause for stillbirth in 16,4% of cases. In MSBs, unexplained stillbirth accounted for 20,6%, while amongst FSBs, there were 7,8% without a cause identified. Given the fact that HIV remains a significant cause of stillbirths in sub-Saharan Africa[1,2,3,6.], our findings that the maternal HIV viral load suppression rate was only 61,3% is concerning.

The causes of stillbirths identified in our study are very similar to the literature[3, 8, 9,10,12,13,14]. Madhi *et al.* conducted placental macroscopic and histopathological examination, as well as blood cultures on stillborn foetuses, and they showed that 19% of stillbirths were caused by infections and another 19% by pathological placental conditions[14]. The PURPOSe study in Southeast Asia found the confluence of maternal hypertensive conditions and placental malperfusion lead to growth restriction and asphyxia as the major causes of stillbirths.[8] Birth weight <3rd percentile was associated with antepartum stillbirth with the greatest risk in babies not suspected to be growth-restricted during antenatal care[13].

The modifiable factors we identified, including inadequate intrapartum foetal monitoring, poor implementation of a few key treatment guidelines, patient-related factors, and non-referral to specialized levels of care, are echoed in multiple other studies[2,5,6,7,8,9,10,12,13,14,16]. Furthermore, the causes contributing to stillbirths correlate well with these commonly identified modifiable factors.

One of the modifiable factors identified, namely inadequate intrapartum monitoring could be attributed to inadequate staffing and resources. The recommended ratio in low resource settings by the international federation for gynaecologists and obstetricians (FIGO) is 1.71 births per midwife, and the FIGO ideal ratio is 1.52.[11] In the maternity section where the present study was conducted the midwife:birth ratio was 3.5

## 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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