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Perinatal mortality rate, fetal causes and associated maternal factors in Hail Maternity and Children Hospital

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ABSTRACT

Background: According to the WHO, three million babies are estimated to die in the early neonatal period, while 2.6 million are still born annually worldwide. Due to the lack of such information regarding the perinatal mortality rate in Saudi hospitals, we aimed in our study to identify the perinatal mortality rate in Hail Maternity and Children Hospital and to find the underlying causes and risk factors. *Methods*: We conducted a hospital-based retrospective analytic study which includes the whole perinatal deaths in Hail Maternity and Children Hospital, from 1st of January to 31st of December 2019. *Results*: Perinatal deaths were 164 (64 still births and 100 early neonatal deaths). Perinatal mortality rate was 24.9/1000 (SBR: 9.72/1000, END rate: 15.18/1000). The most identifiable cause of perinatal mortality in our study was IUGR (26.83%) followed by unexplained death. *Conclusion*: The perinatal mortality rate at Hail Maternity and Children Hospital was 24.9/1000 by 2019 in which IUGR was the most distinguishable cause, followed by unexplained death. Due to the lack of such a study in this hospital, we couldn't find if our results considered as an improvement or deterioration of PMR comparing with past years.

Keywords: Perinatal mortality, stillbirths, early neonatal deaths, IUGR, Saudi Arabia

1. INTRODUCTION

Perinatal mortality remains a globally high and unacceptable major public health issue. According to the World Health Organization (WHO), three million babies are estimated to die in the early neonatal period; while 2.6 million are stillborn annually worldwide in which one of three deaths occurring during delivery can be largely prevented (Dwa and Bhandari, 2019). The perinatal mortality rate (PMR) is defined as the number of stillbirths and early neonatal deaths for every 1,000 live births. Stillbirth is a baby born dead after the 24th week of gestation (Santosh et al., 2013), whereas early neonatal death is death between zero and seven completed days of birth (Pathirana et al., 2016). PMR is therefore used as an established epidemiological indicator of perinatal care and health status in the health care system/region (Rahman et al., 2020). It is affected by multiple factors like late detection of pregnancy date and also, depends on the quality of health care given to pregnant women and their babies (Bayou and Berhan, 2012). Studies showed that adverse pregnancy outcomes are strongly linked to suboptimal antenatal, intrapartum, and postnatal health care services (Yirgu et al., 2016). Risk factors affecting PMR include maternal age (less than 20 and over 35 years), parity, birth interval, progress, course, and outcome of the current pregnancy. In addition to maternal health, nutrition, availability, and utilization of health services (Al-Ani et al., 2009). Other leading causes for increase PMR are congenital malformations, preterm birth, intrauterine growth restriction (IUGR), low birth weight, birth injuries, anoxia, and neonatal infections (Yirgu et al., 2016; Al-Ani et al., 2009). In Saudi Arabia, despite death certificates collected and retained, the perinatal mortality rate is not routinely recorded. However, causes and risk factors of perinatal mortality are not available either as regularly published data or from specialized studies (Milaat and Florey, 1992). Thus, due to the lack of such information regarding the perinatal mortality rate in Saudi hospitals, we aimed in our study to identify the perinatal mortality rate in Hail Maternity and Children Hospital and to estimate the underlying causes and risk factors.

2. MATERIALS AND METHODS

We conducted a retrospective analytic study which includes the whole perinatal deaths in Hail Maternity and Children Hospital in 2019. Hail Maternity and Children Hospital is the main tertiary care hospital for maternity and neonatal care in Hail City. It is a hospital-based study that includes 6584 born between 24 weeks or more of gestation and up to the first week of life in a year period (1st of January to 31st of December 2019).

Data were collected and analyzed using Google form, Google sheet, and the Statistical Package for Social Sciences version 16 for Windows (SPSS). It includes information about pregnancy, childbirth, and NICU admission of the child within one week after birth. Data for mothers include parity, gravidity, mode of delivery (normal vaginal delivery, elective cesarean section, emergency cesarean section, and instrumental delivery), their medical complications, and their obstetrical history. Data of stillbirths and early neonatal deaths include gestational age, birth weight (500-1000g, 1001-1500g, 1501-2500g, >2500g). In addition to causes of death which include (IUGR, unexplained intrauterine death, congenital anomaly, ruptured membrane, prematurity complications, antepartum hemorrhage, pre-eclampsia, multiple pregnancy complications, hematological disorders, diabetes, hypertension, placental causes, umbilical cord accident, antiphospholipid syndrome, infections, labour mechanical complications, and other maternal disorders). The research was approved by the College Ethical Research Committee, College of Medicine, University of Hail.

3. RESULTS

The total number of births in Hail Maternity and Children Hospital was 6584 in 2019 (6420 live births and 164 perinatal deaths). Perinatal deaths were 164 (64 stillbirths and 100 early neonatal deaths (END). Perinatal mortality rate PMR was 24.9/1000 (stillbirth rate: 9.72/1000, early neonatal mortality rate: 15.18/1000). The most identifiable cause of perinatal mortality was IUGR (26.83%), 20.12% were early neonatal death and 6.71% were stillbirths. Followed by unexplained death (18.90%), 9.76% were early neonatal death, and 9.15% were stillbirths (Table 1 and Figure 1).

Table 1 Obstetric and fetal causes of death in stillbirth and early neonatal death

Cause of death	Early neonatal deaths	Stillbirths	Total
	n (%)	n (%)	
Unexplained death	16 (9.76%)	15 (9.15%)	31 (18.90%)
Antepartum hemorrhage	7 (4.27%)	4 (2.44%)	11 (6.71%)
Antiphospholipid syndrome	1 (0.61%)	0 (0%)	1 (0.61%)
Congenital anomaly	7 (4.27%)	5 (3.05%)	12 (7.32%)
Diabetes complications	2 (1.22%)	2 (1.22%)	4 (2.44%)
Hematological disorders complications	2 (1.22%)	3 (1.83%)	5 (3.05%)
Hypertension complications	2 (1.22%)	1 (0.61%)	3 (1.83%)

IUGR	33 (20.12%)	11 (6.71%)	44 (26.83%)
Labor complications (mechanical)	0 (0%)	1 (0.61%)	1 (0.61%)
Non-pregnancy related infections	0 (0%)	1 (0.61%)	1 (0.61%)
Other maternal disorders	3 (1.83%)	4 (2.44%)	7 (4.27%)
Pre-eclampsia	6 (3.66%)	2 (1.22%)	8 (4.88%)
Rupture of membrane complications	3 (1.83%)	9 (5.49%)	12 (7.32%)
Umbilical cord accident	2 (1.22%)	1 (0.61%)	3 (1.83%)
Multiple pregnancy complications	3 (1.83%)	3 (1.83%)	6 (3.66%)
Placental complications	1 (0.61%)	2 (1.22%)	3 (1.83%)
Prematurity complications	12 (7.32%)	0 (0%)	12 (7.32%)

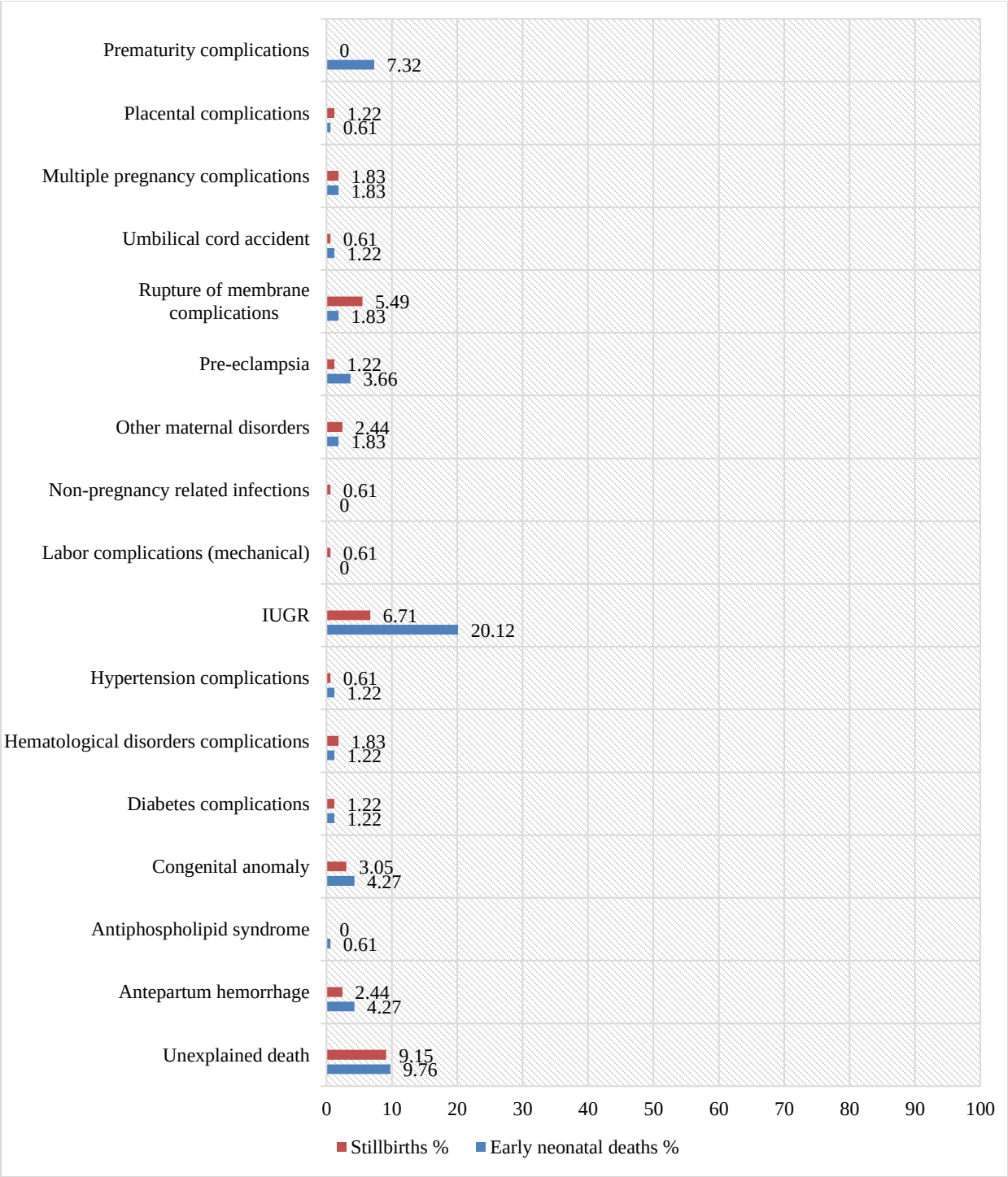

Figure 1 Obstetric and fetal causes of death in stillbirth and early neonatal death

In early neonatal death, 45% occurred in women with gravidity of 2 to 4, and in 28% of the cases the parity was 1, the weight of the baby was 500-1000g in 35% of the cases, 68% of the cases had a vaginal delivery, and 53% of the fetal death occurred at the gestational age 24-> 34 weeks (Table 2). While in stillbirths 45.3% of the women had gravidity of 2 to 4, and in 26.6% of the cases the parity was 1. The baby weight was 1501-2500g in 34.4% of the cases, 59.4% of cases had a vaginal delivery, and the gestational age at fetal death 37 or more weeks in 45.30% of the cases (Table 2).

Table 2 The risk factors for perinatal mortality

	Early neonatal deaths	Stillbirths	
	n (%)	n (%)	
Gravidity			
1	21 (21%)	17 (26.6%)	p-value 0.62
2 - 4	45 (45%)	29 (45.3%)	
5 or more	34 (34%)	18 (28.1%)	
Total	100 (100%)	64 (100%)	
Weight			
500 – 1000g	35 (35%)	19 (29.7%)	p-value 0.62
1001 – 1500g	22 (22%)	11 (17.2%)	
1501 – 2500g	26 (26%)	22 (34.4%)	
> 2500 g	17 (17%)	12 (18.8%)	
Total	100 (100%)	64 (100%)	
Parity			
0	22 (22%)	16 (25%)	p-value 0.09
1	28 (28%)	17 (26.6%)	
2	22 (22%)	7 (10.9%)	
3	7 (7%)	12 (18.8%)	
4	6 (6%)	2 (3.1%)	
5	8 (8%)	3 (4.7%)	
6	1 (1%)	4 (6.2%)	
7 or more	6 (6%)	3 (4.7%)	
Total	100 (100%)	64 (100%)	
Mode of delivery			
CS Elective	11 (11%)	5 (7.8%)	p-value 0.25
CS Emergency	20 (20%)	18 (28.1%)	
Vaginal	68 (68%)	38 (59.4%)	
Instrumental	1 (1%)	3 (4.7%)	
Total	100 (100%)	64 (100%)	
Gestational Age at fetal death			
24 - < 34	53 (53%)	32.80%	p-value 0.02
34 - < 36	22 (22%)	21.90%	
37 or more	25 (25%)	45.30%	
Total	100 (100%)	100.00%	

4. DISCUSSION

It is possible to improve the survival of the newborns and reduce the number of stillbirths by promoting better antenatal care, labor care, and postnatal care for the mother and baby. In this study we found that the perinatal deaths in Hail Maternity and Children Hospital were 164, stillbirths were 64 and early neonatal deaths were 100. Compared to other hospitals in Saudi Arabia such as Sulaiman Al Habib Medical Group in Riyadh and Qassim (private facility) the perinatal deaths were 80 (50 stillbirths and 30 END) which appears less than the numbers in Hail Maternity and Children Hospital with the consideration of many different factors such

as the number of patients (population) in each facility, the duration of each study, the better healthcare services in some private hospitals, the socioeconomic status of the patients, the quality of education and practice for health care providers, and others (Rahman et al., 2020). The number of intrauterine growth restriction (IUGR) in our data was surprising and represents the most frequent cause of perinatal deaths which shows a total of 44 (26.83%) divided into 11 (6.71%) stillbirths and 33 (20.12%) END.

Most cases of IUGR in Hail Maternity and Children Hospital were combined with other risk factors like multiple pregnancies, hypertension, history of miscarriage, and history of perinatal mortality. Following IUGR, the second most frequent cause is the unexplained death, which represents 31 (18.90%). In addition to the variables discussed the least causes of perinatal deaths were antiphospholipid syndrome only one (0.61%), labor complications (mechanical) only one (0.61%), and non-pregnancy related infections only one (0.61%). In our study, we noticed a lower incidence of prematurity complications and congenital anomalies as a cause of perinatal deaths compared to Sulaiman Al Habib Medical Group as they were the two major causes of perinatal deaths in their study, also in Southeast Nigeria, Tertiary Care Hospital of Nepal and South Africa (Dwa and Bhandari, 2019; Rahman et al., 2020; Allanson et al., 2015; Iyoke et al., 2014). Of all documented stillbirths in our study, (34.4%) weighted 1.5 to 2.5 kg compared to 54.5% in the Nepal study and they also reported that (10%) of Stillbirths weighted less than 1 kg, while in our study (29.7%) weighed less than 1 kg (Dwa and Bhandari, 2019). Improving perinatal care, prompt management of chronic diseases, and health education for patients are considered high priority points to reduce perinatal mortality in Hail Maternity and Children Hospital. Knowing that our study was conducted only in Hail Maternity and Children Hospital, and this limits our data to evaluate the healthcare system regarding perinatal mortality. Further studies must include other maternity hospitals in Hail City for a more comprehensive comparison of mortality rate and all other causative factors.

5. CONCLUSION

The perinatal mortality rate at Hail Maternity and Children Hospital was 24.9/1000 by 2019 in which IUGR was the most distinguishable cause, followed by unexplained death. Due to the lack of such a study in this hospital, we couldn't find if our results considered as an improvement or deterioration of PMR comparing with past years. As well, we had some limitations in collecting data because there was incomplete information in some files regarding the mother's medical history. On the other side, we faced some difficulties in contrasting our results with other published studies because of the inconsistency of the population and duration especially Saudi papers, there weren't any recent study can support what we found in our results.

We encourage other local and international hospitals to pay more attention to perinatal mortality studies for more accurate and logical comparison. The outcomes of this study highlight the need for more attentiveness to prevent common preventable fetal and maternal risk factors, particularly for high-risk pregnancies. Our goal is to focus on significant factors that play a major role to reduce stillbirths and early neonatal deaths which include early detection of accurate pregnancy date, careful and frequent antenatal care for continuous monitoring of fetal growth, screening, and discovering growth restriction with early interventions. Furthermore, the prevention of preterm births, intensive care of low-birth-weight babies, improving neonatal services, and proper intrapartum care through timely and appropriate interference.

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Author Contributions

All the authors listed above have participated equally in collecting the data, analyzing the data, writing the manuscript, and reviewing the article.

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Conflict of Interest

The authors declare that there are no conflicts of interests.

Informed consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

Ethical approval

The study was approved by the Research Ethics Committee at the University of Hail, Hail, Saudi Arabia (Ethical Approval Code: Nr. 9472/5/42).

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No conflict of interest.

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Written & oral informed consent was obtained from the participant included in the study.

Data and materials availability

All data associated with this study are present in the paper.

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