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Neonatal Mortality in Misan Hospital for Child and Maternity in Iraq in 2018 and 2019

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ABSTRACT

Background and Objective: The first month of life is a significant period for child survival. The highest rate of death was reported in the neonatal period in the world. This study was conducted to estimate the mortality rate in neonates and to determine the main causes and their demographic characteristics in Misan Hospital for Child and Maternity in Iraq.

Methods: This cross-sectional study was performed in Misan Hospital for Child and Maternity. The required data were collected from the files in the neonatal and obstetrical units for two consecutive years (2018 and 2019). Any neonatal death in time period from 0 to 28 days was enrolled in this study whether preterm or term. Causes and time of neonatal death were studied based on demographic characteristics (gender, gestational age, type of delivery, and type of pregnancy). The neonatal mortality rate was calculated according to the recommendation of the World Health Organization and expressed per 1000 live births in each year.

Findings: The total live birth was 11343 and 11063 in 2018 and 2019, respectively. The mortality rate among neonates was 14.8 and 12.8 deaths per 1000 live births in 2018 and 2019, respectively. The major cause of neonatal mortality was respiratory distress syndrome with approximately similar rates in both years (65.5% vs 63.4%). The subsequent causes were birth asphyxia, congenital anomalies, meconium aspiration, and sepsis. The mean gestational age was 32.33±4.065 weeks in 2018 and it was 32.40±4.339 weeks in 2019.

Conclusion: The results of the study showed that the mortality rate in babies of Misan hospital is high. Premature birth and its complications had led to the highest rate of death among neonates. Therefore, focusing on prenatal care is still a big challenge.

Keywords: *Mortality, Neonates, Maternity, Misan.*

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Introduction

The first month of life is the most important period for child survival. The risk of death is the highest in the neonatal period at an average rate of 18 deaths per 1000 live births in the world. Neonatal death accounts for 47% of causes of death in children under 5 years as reported by World Health Organization (WHO) and UNICEF in 2017 (1). However, the mortality rates among neonates differ widely. The highest numbers were recorded in west and central Africa, and South Asia, whereas, the lowest rates were recorded in western Europe (1). More than half of the world's countries would need rapid progress to decrease their neonatal mortality rates. Efforts towards improvement in the survival chances of newborns are still an urgent need to launch the third Sustainable Development Goal (aiming to provide healthy lives and enhance well-being for everyone in all age groups) (1, 2).

Furthermore, the neonatal deaths in Iraq account for a large proportion (55.8%) of death in children under 5 years (3). The neonatal mortality rate in Iraq was 13.6 deaths per 1000 live births in 2017 as recorded by the annual statistical report (4). Iraq is located in the Middle East which is considered as one of the regions associated with a high mortality rate among neonates (1). Neonatal mortality is still a good indicator that reflects the health system. Progress in neonatal care, respiratory support, as well as, categorization level has notably increased the survival rate in the neonates (5-8).

So far, there has been no recognized development in the neonatal field especially in the middle and southern areas of Iraq including Misan. Different neonatal mortality rates were recorded in different governments in Iraq in 2017. The highest rates were seen in the governments located in the Central areas such as Baghdad (reaching 17 deaths per 1000 live births) followed by Southern areas including Misan and the least rates were reported in the Northern areas (ranging between 5 and 6 deaths per 1000 live births) (4). On the other hand, in the last decade, a great improvement was noted in the Northern area regarding the health services and system explaining the lower rates of neonatal mortality.

This difference in the mortality rates can be attributed to the great differences in the development of neonatal care in Iraq. In spite of the availability of Continuous Positive Airway Pressure (CPAP), and mechanical ventilation in Baghdad (the Capital) and Misan, they are still incompatible with the admission capacity. Supportive neonatal care and trained medical staff were lagging behind as mentioned by different studies (9, 10). Categorization of neonatal care levels is still lacking in Misan hospital in spite of being a new one established in 2017. For this reason, this study was conducted in this new hospital to estimate the mortality rate in neonates and to determine its causes and their demographic characteristics.

Methods

A retrospective cross-sectional (descriptive) study was conducted based on the guidelines of the Declaration of Helsinki and approved by the ethical committee of the College of Medicine, University of Misan with the reference number 21/1. Description of hospital and neonatal care unit: This study was done in Misan Hospital for Child and Maternity. The hospital was established in 2017 in Misan (South East area of Iraq). The Neonatal Care Unit has 20 incubators which are distributed in two significant wards containing one mechanical ventilator and four CPAP. Additionally, there is an observation room that contains six resuscitators.

Inclusion criteria: Any neonatal death was enrolled in this study whether preterm or term. The time period of neonatal death is from 0 to 28 days old. A preterm baby was considered with a gestational age less than 37 weeks while term baby between 38-42 weeks.

Exclusion criteria: any death after the age of 28 days old and still births.

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Data collection: The data were obtained from the file records in the neonatal care and obstetrical units for two successive years (2018 and 2019). The number of neonatal deaths and the total live births in each year were reported. The neonatal mortality rate was calculated following the recommendation of WHO (11) by applying this equation; Total number of neonatal deaths/ Total number of live births [per 1000]. So, the net result of neonatal mortality rate was expressed per 1000 live births in each year. Causes of death were reported as respiratory distress syndrome (RDS), birth asphyxia, congenital anomalies, meconium aspiration, and sepsis. These causes usually were determined by specialist and consultant doctors depending on a clinical history, examination and laboratory investigations with the radiographic studies whenever needed. Demographic characteristics of dead neonates for the first two major causes of death were studied, including: (gender, gestational age, type of delivery, and type of pregnancy). The time of neonatal death was divided into four periods: less than 24 hours, 1-3 days, 4-7 days, and 8-28 days.

Statistical analysis: The data were studied and analyzed using the statistical packages for social science (SPSS software version 22). Data were arranged in tables and figures of number and percentage.

Results

In 2018, the total live birth was 11343, number of still births was 141, and the number of neonatal deaths was 168. So, the mortality rate among neonates was 14.8/1000 live births. In 2019, the total live birth was 11063, number of still births was 108, and the number of neonatal deaths was 142. So, the mortality rate among neonates was 12.8/1000 live births.

The annual percentage of cesarean delivery in Misan hospital was approximately 34% of total deliveries (34.06% and 34.19% in 2018 and 2019, respectively). The mean gestational age (week) was 32.33±4.065 in 2018 while it was 32.40±4.339 in 2019.

In studying the causes of neonatal death, RDS was the primary cause in both years causing about (65.5% in 2018) and (63.4% in 2019) of total death. Birth asphyxia was the second cause with approximately the same results (18.4% and 18.3% in 2018 and 2019, respectively) followed by congenital anomalies (9.5% and 12% in 2018 and 2019, respectively) (Figure 1).

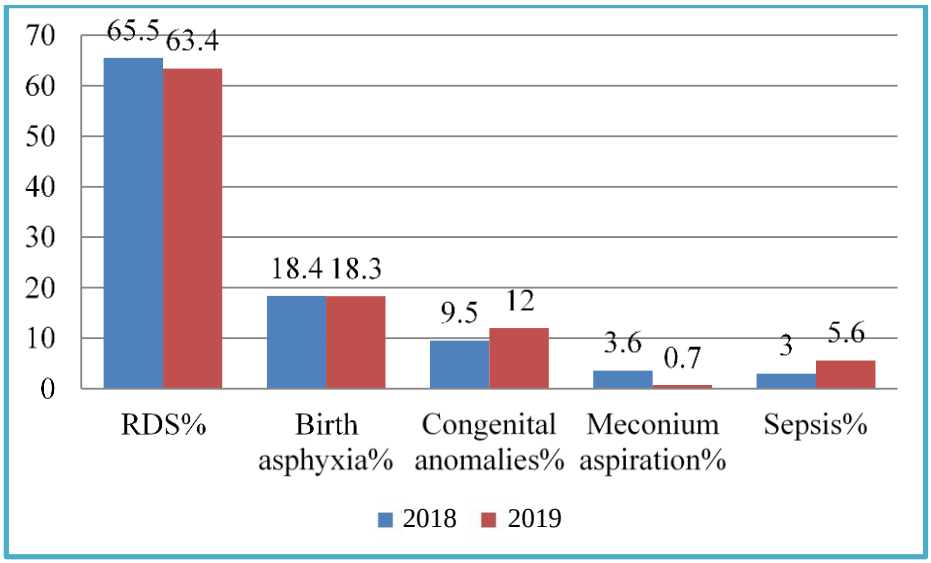


Figure 1. Causes of death among neonates in both years (2018 and 2019)

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Regarding the time of neonatal death, the majority of death occurred in the first 24 hours of life. (47%) and (33.8%) neonatal death occurred at less than 24 hours in 2018 and 2019, respectively. The period of 8-28 days was associated with the least neonatal death (11.3% and 14.1% neonatal death in 2018 and 2019, respectively) (Figure 2).

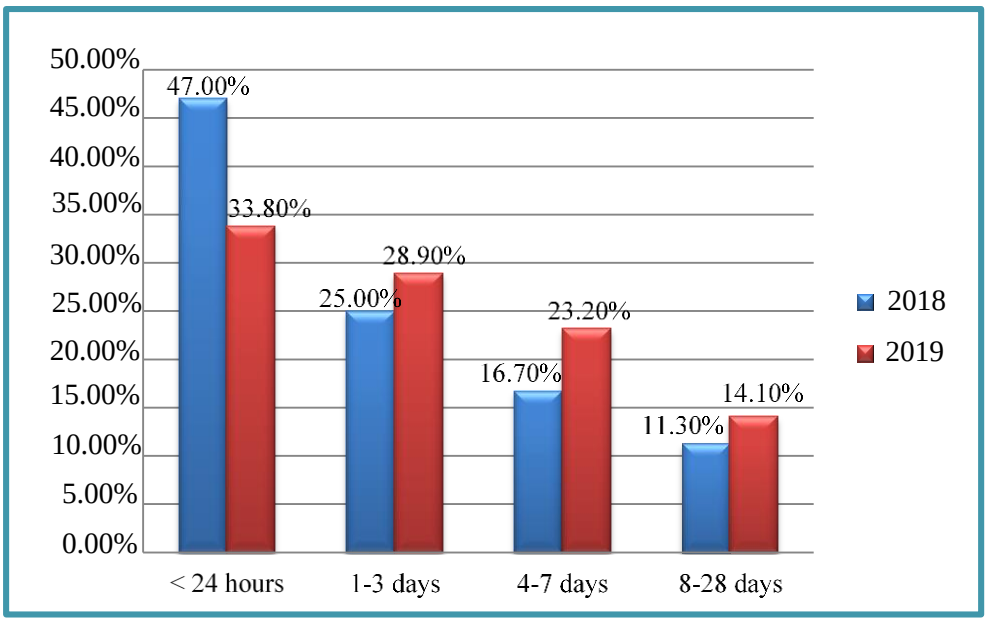


Figure 2. Time of death among neonates in both years (2018 and 2019)

In studying the distribution of demographic characteristics in the first two major causes of neonatal death, it was found that there was a predominance of male gender in RDS (54.5% in 2018), as well as, birth asphyxia (77.4% in 2018). Preterm distribution was seen more with RDS (96.4%) while term occurrence was more frequent with birth asphyxia (87.1%). Vaginal delivery was more frequent in RDS (59.1%) while cesarean section was more with birth asphyxia causing about 64.5% (Table 1).

Table 1. Demographic characteristics in the first two major causes of neonatal death in 2018

Characteristics	RDS (total 110) Number(%)	Birth Asphyxia (total 31) Number(%)
Gender		
Male	60(54.5)	24(77.4)
Female	50(45.5)	7(22.6)
Gestational age		
Preterm	106(96.4)	4(12.9)
Term	4(3.6)	27(87.1)
Type of delivery		
Vaginal	65(59.1)	11(35.5)
Cesarean section	45(40.9)	20(64.5)
Type of pregnancy		
Single	97(88.2)	29(93.5)
Multiple	13(11.8)	2(6.5)

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In 2019, there was a predominance of male gender in RDS (66.7%) and birth asphyxia (69.2%). The majority of neonatal deaths caused by RDS were preterm (95.6%) while the total neonatal deaths caused by birth asphyxia were term (100%). In RDS, vaginal delivery was more frequent than cesarean section (75.6%) while in birth asphyxia, cesarean section was more common (57.7%). Finally, delivery of a single baby was more common in both RDS and birth asphyxia (Table 2).

Table 2. Demographic characteristics in the first two major causes of neonatal death in 2019

Characteristics	RDS (total 90) Number(%)	Birth Asphyxia (total 26) Number(%)
Gender		
Male	60(66.7)	18(69.2)
Female	30(33.3)	8(30.8)
Gestational age		
Preterm	86(95.6)	00(0.0)
Term	4(4.4)	26(100)
Type of delivery		
Vaginal	68(75.6)	11(42.3)
Cesarean section	22(24.4)	15(57.7)
Type of pregnancy		
Single	70(77.8)	26(100)
Multiple	20(22.2)	00(0.0)

Discussion

Death among neonates in the neonatal care unit of Misan Hospital for Child and Maternity was high reaching 14.8 and 12.8 per 1000 live births in two successive years which were nearly the same results reported in Ethiopia and Jordan (14.4, 14.1 deaths per 1000 live births, respectively) (12, 13), and also compatible with another large-scale study in Jordan which reported a mortality rate of 12 deaths per 1000 live births (14). In comparison with another hospital in Misan province (Al-Sadder Teaching Hospital), the current rates were approximately the same or slightly less than Al-Sadder (12, 13, and 16 deaths per 1000 live births in 2011, 2012, and 2014, respectively) (10). Moreover, it was less than Algeria (16 deaths per 1000 live births) (15).

Mortality rate among neonates was much less than in Eritrea (about 65 per 1000 live births) (16). It was slightly higher than Iran (11.4 deaths per 1000 live births) (17), and was much higher than the rates reported in eastern China (2.3 deaths per 1000 live births) (18). These diverse data in different countries is associated with different levels of development of health system and mainly the neonatal fields which have a major effect on the neonatal mortality rates. This is reflecting the need for more focus on the development of neonatal care units in order to decrease mortality rates in Misan.

In studying the causes of neonatal death, RDS was the primary cause in both years forming about 65% of total death. This was attributed to the predominance of preterm babies. In the present study, approximately, 96.4% and 95.6% of RDS neonates were preterm in 2018 and 2019, respectively. These data were concordant with another study in Misan Hospital for Child and Maternity in 2018 which revealed that the total percent of preterm admission in the neonatal care unit was high reaching 36.6% of all neonatal admissions and RDS was the major cause of death (19).

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The present study showed a predominance of preterm and development of RDS with higher risk of mortality which confirms the finding of earlier researches (10, 16-18, 20). In addition, there is a significant and converse relationship between gestational age and mortality as reported in many studies in Jordan (13, 14), Iran (17, 21), Oman (22), Ethiopia (23, 24), Mauritania (25), and Brazil (26). The preterm babies are at higher risk for developing complications during and after delivery, leading to more morbidity and mortality. Two studies in Iran revealed that prematurity was the second cause of neonatal death and concluded that controlling preterm deliveries would be effective in controlling neonatal mortality rates (27, 28). In addition, statistical data in Iraq in 2017 reported an infant mortality of 18.6/1000 live birth. Prematurity was the fourth sequence in the causes of infant mortality. Approximately 5.4% of them were related to prematurity (4). It is worth noting that prematurity and its complication can be prevented by better plans in prenatal and antenatal care to decrease the risk of preterm delivery and by applying the appropriate and advanced facilities in the neonatal intensive care unit. In fact, it is reflecting the teamwork plan in order to increase the survival rate with the least complications.

The present study showed that the majority of neonatal deaths occurred in the first 3 days after birth. About one third to one half of neonatal death occurred in the first 24 hours of life. It was approximately similar to the findings of a study in southern Ethiopia (23). This is related to the development of neonatal respiratory distress which is responsible for greater risk of morbidity and mortality especially in the first few days of life such as RDS and birth asphyxia (19, 31).

The current study revealed an obvious predominance of male gender in neonates with RDS or birth asphyxia. Multiple studies reported predominance of male in RDS (29, 30), and a higher risk of mortality was reported in males than females (20-22, 24, 25, 31). A study in southern Ethiopia showed a significant relationship between male and higher neonatal mortality rate (23) but no significance in other studies (10, 13, 16, 19).

In this study, there was more predominance of full-term neonates who were delivered by cesarean section and birth asphyxia with subsequent death. There was significantly higher risk of death among neonates who were delivered by cesarean section than those who were delivered vaginally as reported in Ethiopia (12) and Jordan (13, 14). Meanwhile, understanding the main causes of neonatal death could play a role in changing the mortality rate in Misan province, and in the whole country. Consequently, this makes Sustainable Development Goal 3 more achievable by 2030 (2).

Based on the findings of the present study, we concluded that the mortality rate among neonates of Misan hospital was high. Preterm babies and their complications were forming the majority of neonatal death. Still, more work and effort are needed in the neonatal field in Misan. In addition, concentration on prenatal care is still challenging.

Regarding the limitation of this study, multiple and different factors (prenatal, natal, and postnatal) associated with neonatal mortality were not studied in this research, hence, further prospective studies are needed in the future to determine their roles in the neonatal outcomes.

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