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THE NEONATAL MORTALITY IN TERTIARY HOSPITAL (BAGHDAD TEACHING HOSPITAL): RISK FACTORS

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ABSTRACT

Background: The neonatal period (first 28 days of life) is the most critical time for a child's survival. Neonatal mortality risk factors are complex, relatively improved slowly, but remains a major concern in developing countries. In developing countries where there is no satisfying registration and as most complicated cases referred to medical city complex, trying to determine the causes of neonatal mortality let to put strategies' that will help in reducing it. **Objective:** To evaluate the neonatal mortality potential risk factors. **Methods** We reviewed all medical records of neonates that hospitalized in the neonatal intensive care unit (NICU) at Baghdad teaching hospital from 1st December 2016 and 31st January 2017. Analyzed variables were sex, birth weight, gestational age, maternal age, place of delivery, mode of delivery, and sepsis. Subjects were enrolled; that is 208 cases 91died. **Results:** The total births during this period of study 2071 births, 1259 deliveries through caesarian section still birth 21 while normal vaginal deliveries 812, 42 dead births. NICU admission 208 with neonatal mortality rate 43.8%. Prematurity was the major cause of death 61.5%. multiple pregnancies with unplanned operation increased prematurity incidence, shortage of resuscitation equipment and limited training of nurses and doctors working in obstetric and neonatal care ward may attributed to increase mortality. **Conclusions** Neonatal mortality is high; the Majority of the deaths were males in early neonatal period. The neonatal mortality risk factors in the NICU are preterm, labour complication, congenital anomaly and sepsis, in order to reduce morality we have to establish more trained centers with well qualified person.

KEYWORDS: Neonatal mortality, risk factors, tertiary hospital, neonatal intensive care unit (NICU), resuscitation.

INTRODUCTION

The mortality risk for fetuses and neonates is very high around the time of birth. The perinatal period is the most often defined as the period from the 28th weeks of gestation through the 7th day after birth. The neonatal period is defined as the 1st 28 days after birth and may be further subdivided into very early (birth to < 24 hr.), early (birth to < 7 days), and late neonatal periods (7 days to <28 days).[1] Mortality data indicate numbers of deaths by place, time and cause (WHO). (In developing countries the majority of newborn deaths happened as result of low health access. Majority of these deaths occurs at home, without facilities and skilled care that could increase survival chance greatly).[2]

During pregnancy, childbirth and in the immediate postnatal period (perinatal period) skilled health care prevents complications for mother and newborn, and allows for early detection and management of problems.[2]

Ranking of countries in the Eastern Mediterranean Region by total under-five deaths, Iraq ranked 8th from 41 countries.[3]

The main causes of neonatal mortality are prematurity, low-birth-weight, neonatal asphyxia, infections, and birth trauma. These causes are responsible for about 80% of deaths in neonatal period.[2]

In the first month of life about 2.7 million Babies die every year and a similar number are stillborn. Up to half of all these deaths occur within the first 24 hours of life, and in the first week about 75% therefore the most critical period for newborn survival is the first 48 hours immediately following birth.[5]

There is limited information on pregnancy events and complications and period before delivery, made strategies planned to decrease these complications less effective.

World Health Organization (WHO) defines neonatal mortality as death from the birth till 28th day of life.[1] Neonatal mortality is taken as one of the most important determinants of children health status. The causes of neonatal mortality are complex and improvement of this health indicator is relatively gradual. According to WHO estimations, 130 million infants are born each year worldwide, from them about 4 million die in the first 28 days of life.[1] During the first week about three-quarters of neonatal deaths occur, and most of them(one-quarter) occur in the first 24 hours.[2,3] More than one million babies in Africa die in the first week of their life, half of them at the first day of life. It was reported that the most unseen and uncounted deaths occur at home. Under the age of 5 years, neonatal deaths account for 40% of deaths worldwide. The neonatal mortality which occurs during the first four weeks after birth is subdivided into early neonatal death which occurs in the first week of life and late neonatal death which occurs during the period between 7 and 28 days of life. Estimations from the WHO showed that although under-five mortality has fallen globally from 12.2 million deaths in 1990 to 7.6 million deaths in 2010, the fall in neonatal mortality is considerably less than that in the post-neonatal period.[5,6]

Consequently, the proportion of deaths in the neonatal period rose from 38% (4 million) of total deaths in 2000 to about 41% (3.3 million) in 2009.7 This may be attributable to the high emphasis on child survival programs such as nutrition, vaccination and health promotion interventions relative to hospital-related investments necessary for neonatal mortality reduction particularly in rural areas.[6,7]

MATERIALS AND METHODS

This retrospective study was conducted from December 2016 to February 2017; the data were extracted from mothers and neonates files stored in maternity and neonatology units of Baghdad teaching Hospital medical city complex, with the aim of exploring maternal and newborn risk factors associated with neonatal mortality. The dependent variable was neonatal mortality, while independent variables were sex, birth weight, maternal and gestational ages, place and mode of delivery. Low birth weight was defined as birth weight <2500 grams; normal birth weight was considered to be >2500 grams. Maternal age was categorized as <35 years or >35 years. Gestational age was categorized as preterm for <37 weeks or full term for>37 weeks. Enrolled in this study were not all newborns admitted in the NNU of this hospital only whom develop complications or looks ill. Newborns admitted in this unit and discharged alive after management were the controls. Excluded from the study were neonates admitted during the study period but who died or were discharged alive after 28 days of life, or referred to other hospital or other department as pediatric surgery and also files with insufficient data.

RESULTS

The total births in Baghdad Teaching Hospital obstetrical ward during the period of study were (2071) births, (898) males and (1017) are females, (156)were not identified in case sheet(table 1), mostly deliveries done by caesarian section (1259) births, from these(21) dead births while normal vaginal deliveries(812), (42) dead births. Parity less than 3 (53%) and only (19.8%) of patients received steroid as they prepare for emergency labor. Admission to the NICU (208) with neonatal mortality rate (43.8%), mortality per 1000 live births (43.9) most of them during early period (2-7 days) after birth (63.7%). The causes of death varies between prematurity, birth asphyxia, congenital abnormality and infection, but the main cause was prematurity (61.5%) (Table 2). Most of deaths were males (56%) with birth weight <2500 g (70.3%). Mode of delivery for these death neonates, was caesarian section account for (61) only (24) cases were delivered by emergencies and (19.8%) of all deliveries received steroid during pregnancy (table 3).

Table 1: Neonatal, perinatal and stillbirth mortality rates, (sex and in total), in a retrospective study.

Births and mortality rates	Births/deaths	Males No. (%)	Females No. (%)	Non-identified No. (%)	Total
All births n (%)	2071	898(43.5)	1017(49)	156(7.5)	2071(100)
Still birth	63(3)	34(54)	18(28.6)	11(17.4)	63(100)
Perinatal mortality rate, rate per 1000 live births	144(7)(59.5)	83(57.6)	50(34.7)	11(7.7)	144(100)
NICU admission	208(21.8)	96(46.2)	112(53.8)	0	208(100)
Neonatal mortality, rate per 1000 live births	91(43.8)(43.9)	51(56)(24.6)	40(44)(19.3)	0	91(100)
Very early neonatal mortality	23(25.3)	13(14.3)	10(11)	0	25.3(100)
Early neonatal mortality, (per 1000 live births)	58(63.7)(28)	36(39.6)(17.4)	22(10.6)(10.6)	0	63.7(100)
Late neonatal mortality, (per 1000 live births)	10(11)(4.8)	4(4.4)(1.9)	6(6.6)(2.9)	0	11(100)

Table 2: The final causes of neonatal deaths that occurred in retrospective study in Baghdad teaching hospital, according to the death time and cause recorded.

Cause of death	Death			
	≥ 48 hours No.	3–7 days No.	8–28 days No.	All No. (%)
Prematurity	11	45	0	56 (61.5)
Congenital abnormality	5	0	4	9 (9.9)
Birth asphyxia or hypoxia	7	13		20 (22)
Infection (involving sepsis, pneumonia or meningitis	0	0	6	6 (6.6)
Total	23	58	10	91

Table 3: Clinical and delivery variables for infants who died and survived in retrospective study of neonatal mortality in NICU of Baghdad teaching hospital.

Variables		Neonatal death ≥28 days No. (%)	Infant Surviving No. (%)a
Number of Admission in NICU		91(100)	117
Gestational age at birth	< 37 weeks	77(84.6)	
	≥ 37weeks	14(15.4)	
Birth weight	Unidentified	9 (9.9%)	
	< 2500 g	64 (70.3%)	
	≥ 2500	18 (19.8%)	
Gender (n = 91)	Male	51 (56%)	
	Female	40 (44%)	
Mode of delivery (n = 91) Vaginal (reference) Caesarean section		NVD 30 CS 61 Em.24 Elect. 37	
Vaginal bleeding (n = 1019)		10(11%)	
Previous scar		17 (18.7%)	
Congenital anomaly		19 (20.9%)	
Medical disease		20 (22%)	
Multiple fetus		4 (4.4%)	
Non identified		21 (23%)	
Steroid administration during pregnancy		18(19.8%)	
parity			
<G3		53	
>3		38	

DISCUSSION

The survival rate of low birth weight infants has been increasing in developed countries due to the technological advancements employed in healthcare services and to the careful monitoring of pregnant women and of delivery.[11] Medical city complex is tertiary hospital that patients delivered from various district of Baghdad, (Baghdad citizen around 8 -10 million) and from other governorates of Iraq, most cases are complicated and require special care that explain the high rate of deliveries per month (1035) deliveries.

Perinatal mortality rate is the number of still births and the death in the first week per thousand total births. It is considered the most sensitive index of maternal and neonatal care. 98% of perinatal deaths occur in developing countries.[5]

Among perinatal death 70% were still births. 15.5% in 24 hours of birth and rest of deaths occurred between 2-7 days after birth. Pregnancy & delivery related causes were responsible for 21% of perinatal death.[12] In our study the perinatal mortality rate per 1000 59.5(7%) were still births 3% which is less 82.66 in India.[12] Initially, it may be due to an improvement of mother-to-child health in recent years: the improvement that concentrated on maternal and delivery care services has highly increased, the improvement in intervention-related indicators associated with neonatal mortality delivery by health professionals, delivery in a health facility, provider of ANC services, and encourage the early initiation of breastfeeding.[15]

The UN recommends for optimal decrease neonatal and maternal mortality rates a Caesarean section rate of 5–15%[16], In our study found that, the mode of delivery mostly done by caesarian section 67% only 19.8% received steroid during pregnancy as preparation to early delivery which may contributed to increased death of prematurity (as complication of RDS) increasing the rate of neonatal mortality as prematurity is the main cause of neonatal death, this fact elicit when know that only 24 cases out of 61 delivered by emergency and 30 case through NVD. NICU which newly developed contain 30

incubators, 7 ventilators and 14 CPAP so when compare the no. of delivery to incubators no. there is severe shortage in devices when compare to no. of deliveries especially they are complicated and may require special care. Over the period of this study, which lasting 2 months we estimated the neonatal mortality rate which is 43.9 per 1000 live births. This rate was higher than the worldwide neonatal mortality rate (30/1,000), and lower than 53% in Pakistan[9], and higher than Iran 14.1%.[10] the higher neonatal death during early period 63.7% than very early 25.3% than late 11% despite availability of rather good antenatal care, a high birth rate in a health facility with professional skilled birth attendants, and a "high" Caesarean section rate. we proposed that happen due to poor infectious control and poor facilities for early detection of infection and shortage of devices and equipment deal with complication of prematurity whom immunocompromised, Although mortality falls with increasing gestational age, even infants born only a few weeks early have a substantially increased risk of death when compared with term infants[18], neonatal mortality rates were highly increased with low birth weight (less than 2,500 grams) infants (55.38 per 1,000) than those infants with birth weights of 2,500 grams[18] where most of death are premature(84.6%)and low birth weight <2500 gm was 70.3%.

The most common causes of neonatal mortality are prematurity 61.5% than birth asphyxia 22% as second cause this results correspond with study done in tertiary hospital in Nigeria where prematurity 31.9% and asphyxia was 24.1%[19], this results may be attributed to fact that most of cases are complicated and referred from other governorate, and the confidence of hospital make the site of prefer for patient (2071 deliveries per two months). Multiple pregnancies or grand multi gravida are also associated with a substantially higher risk of neonatal death from high risk of prematurity and malformation. Early identification of multiple pregnancies, careful planning of IVF pregnancies, referral for appropriate delivery care centre, and close monitoring during the neonatal period can prevent most of these deaths.[16]

The prevalence of sepsis in developing countries is generally higher than in developed countries[14] in our study found 6.6% mostly in late death may be due to late resource of early detection and most cases died in early period. Neonatal resuscitation is critical, training is essential and reported to reduce deaths in babies with intrapartum asphyxia and early neonatal deaths. The need for resuscitation or assistance at birth is not always predictable, so all nurses and doctors involved in obstetric and neonatal care should be trained in at least immediate care of the newborn and basic neonatal resuscitation.

Resuscitation equipments are essential and should be provided as training on its own will not be adequate, therefore all labour wards, delivery rooms and neonatal/paediatric wards should be provided with appropriate equipment to resuscitate newborns with intrapartum asphyxia.[17] There must be plans to replace resuscitation equipment or parts of these equipments that are found not working properly or lost.[14]

CONCLUSION

Neonatal mortality is high, despite the effort to deal with it. Prematurity, complications of labour, congenital anomaly are the major risk factors of neonatal mortality. The rate of caesarian sections are high. Measures that should be applied to decrease the neonatal mortality are exercised well skilled attendance at birth and established of more good equipped centers with trained persons. Measures should be applied to improve antenatal care for early detection and appropriate management of high-risk pregnancies could help reduce neonatal mortality. Provision of resuscitation equipment and continuous training of all nurse and doctors working in obstetric and neonatal care ward are essential to improve services and decrease mortality.

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