WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.074
Volume 7, Issue 17, 58-66. Research Article ISSN 2277– 7105

NEONATAL DEATH: EXPLOTARY STUDY IN THE NEONATAL CARE UNIT OF ALKARKH MATERNITY HOSPITAL/ALKARKH/ BAGHDAD OVER YEAR 2015

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Article Received on
23 July 2018,

Revised on 13 August 2018,
Accepted on 03 Sept. 2018

DOI: 10.20959/wjpr201817-13347

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ABSTRACT

Background: Globally, 2.6 million children died in the first month of life in 2016 – approximately 7,000 newborn deaths every day – most of which occurred in the first week. In Iraq, the neonatal mortality rate is 18 per 1000 livebirths in 2016. **Objective**: This study aimed to explorate the death rates and major causes of neonatal death in the neonatal care unit (NCU) of Alkarkh maternity hospital /Alkarkh /Baghdad over the year 2015. **Patients & Methods:** A descriptive study of 152 neonatal deaths in the neonatal care unit (NCU) from 1st of January 2015 to 31st of December 2015 in the neonatal care unit (NCU) of Alkarkh maternity hospital /Alkarkh /Baghdad was carried out, and the causes of death as in the neonatal NCU medical records were studied. **Results:** Neonatal death rate in relation to admission was (15.2%). The Neonatal death rates for gender were, males were 102 deaths (67.1%) out of 152 & females were 50 (32.9%) with male to female ratio was 2.04:1. The preterm were (76.32%), and the term were (23.68%) and (59.2%) were low birth weight (< 2.5 kg). The main causes of neonatal deaths, respiratory distress syndrome (42.1%), congenital anomalies were the second(17.8%), septicemia & birth asphyxia (3.3%)for each, meconium aspiration (1.3%) and other causes of death (32.2%). **Conclusion:** The main causes of neonatal death were respiratory distress syndrome, congenital anomalies, septicemia, birth asphyxia and meconium aspiration.

KEYWORDS: Neonatal Deaths, Neonatal Care Unit, Neonatal mortality, respiratory distress syndrome.

INTRODUCTION

Aim of the study

This study aimed to explorate the death rates and major causes of neonatal death in the neonatal care unit (NCU) of Alkarkh maternity hospital /Alkarkh /Baghdad over the year 2015.

Neonatal death

The first 28 days of life – the neonatal period –are the most vulnerable time for a child's survival. Children face the highest risk of dying in their first month of life, at a global rate of 19 deaths per 1,000 live births. By way of comparison, the probability of dying after the first month but before reaching age 1 is 12, and after age1 but before turning age 5 is 11. Globally, 2.6 million children died in the first month of life in 2016 – approximately 7,000 newborn deaths every day – most of which occurred in the first week, with about 1 million dying on the first day and close to 1 million dying within the next six days.[1]

The neonatal period is the transitional time from intrauterine to independent existence[2], and defined by medical dictionary as the interval from birth to 28 days of age.[3]

The neonatal deaths account for two-third of all deaths in the first year of life, and 40% of under five mortality.[4] Neonatal mortality rate is defined as the number of neonatal deaths/ 1000 live births.[5] Neonatal mortalities continue to occur at high levels in Iraq and neonatal mortality rate remained as high as 62 per 1000 live births in 2006 then decreased to 23 in 2010 and 18 in 2016 in comparison to 10 in Iran and 13 in Egypt and 3 in Kuwait in 2016.[6]

According to the World Health Organization (WHO), preterm birth accounts for 30% of global neonatal deaths, sepsis or pneumonia for 27%, birth asphyxia for 23%, congenital abnormality for 6%, neonatal tetanus for 4%, diarrhoea for 3%, and other causes for 7% of all neonatal deaths.[7,8,9]

Deaths in neonatal period account for more than half of under-five children deaths, highlighting urgent need to introduce health interventions to improve essential neonatal care and effective treatment for neonatal conditions.[10] Deaths of newborns within 28 days of birth are a major barrier to improving the survival of children aged less than five years (under-five children) in developing countries.[11]

RESULTS

All the neonates admitted to NCU of Alkarkh maternity hospital over the year 2015 were 999 and divided into, 589(58.9%) males and 410(41%) females, 152 neonates out of 999 died for different causes, the death rate in the unit(NCU) is 15.2%. Table- 1.

For calculation of neonatal mortality rate(NMR), we need the total number of live births in the geographical area(target population) served by the hospital which is unavailable in the hospital, so we calculate neonatal death rate in the unit.

Males were forming 102 deaths (67.1%) out of 152 & females were 50 (32.9%), male to female ratio was 2.04:1. Table- 2.

According to the age of neonate(age of death), those equal or below 1 day were 82(53,9%), those 2 -7 days were 57 (37.5%), and those 8-28 days were 13 (8.6%). Table -3.

In relation to gestational age, of the 152 died, those delivered at age of (below or equal < or =27) weeks were 38(25.0%), those delivered at (28-36) weeks were 78(51.3%), and those delivered at (above or equal = or >37) weeks were 36(23.68%), so of all neonatal deaths, the preterm were 116(76.32%), and the term were 36(23.68%). Table-5.

According to body weight, those low birth weight or below (<2.5 kg) were 90(59.2%) and those not considered low birth weight or above or equal (> or =2.5kg) were 62(40.8%). Table-6.

For the main causes of neonatal deaths in this study, respiratory distress syndrome (RDS) was the main cause of death of 64(42.1%) of neonates under study, congenital anomalies were the second cause of death of 27(17.8%), septicemia 5(3.3%), birth asphyxia 5 (3.3%), meconium aspiration 2(1.3%) and other causes of death 49(32.2%), other causes include all other diagnoses given by physician on duty at time of death as the main cause of death (prematurity, low weight, respiratory & heart failure, incomplete growth in the uterus, amniotic fluid aspiration, asphyxia because of milk aspiration) and the researcher put them in one group because the deaths investigating committe in the hospital did not consider these causes as the direct causes of death (the main or real cause of death) and advised physicians to put the direct cause of death according to the international classification of diseases by the world health organisation (ICD-10-WHO). Table- 7.

According to type of delivery, normal vaginal delivery or caesarean section, Normal vaginal deliveries(NVD) were, 67(44.1%) of total neonatal deaths and those delivered by caesarean section(C/S) were 85(55.9%). Table-4.

Table 1: Number & percentage of admitted & died neonates.

Gender(sex)	No. & % admitted	no. & % died
male	589(58.9%)	102 (67.1%)
female	410(41%)	50(32.9%)
total	999(100%)	152(100%)

Table 2: Gender(sex) of the neonate.

Gender (sex)	No.	Percent (%)
male	102	67.1
female	50	32.9
Total	152	100.0

Table 3: Age of death of neonate.

Age of neonate	No.	Percent(%)
equal or below 1 day	82	53.9
2 -7 day	57	37.5
8-28 day	13	8.6
Total	152	100.0

Table 4: Type of delivery.

Type of delivery	No.	Percent (%)
Normal vaginal delivery(NVD)	67	44.1
Caesarean section(C/S)	85	55.9
Total	152	100.0

Table 5: Gestational age.

Gestational age in weeks	No.	Percent (%)
Below or equal(<=27) weeks	38	25.0
28-36 weeks	78	51.3
Above or equal(=>37) weeks	36	23.7
Total	152	100.0

Table 6: Birth weight.

Body weight of neonate in kg	No.	Percent(%)
Below (<) 2500 kg	90	59.2
Above or equal (>=) 2500 kg	62	40.8
Total	152	100.0

Table 7: Causes of death.

Causes of death	No.	Percent(%)
RDS (respiratory distress syndrome)	64	42.1
Congenital anomalies	27	17.8
Septicemia	5	3.3
Birth asphyxia	5	3.3
Meconium aspiration	2	1.3
Other causes of death	49	32.2
Total	152	100.0

DISCUSSION

The current study showed that the neonatal death rate of (15.2%) is lower than Numan N. Hameed study in Iraq (18.5%)[12] & higher than his study (10.7%)[13] and near to bushra study in Baghdad 2015 (16%)[14], and higher than Hanady study in Mosul/ Iraq (1.46%)[15] and lower than Rashid et al study in Bangladesh 2010 (15.5%)[16] and higher than Adeolu AA et al study in Nigeria 2010(10.8%).[17] And lower than a study done in the NICU in Abha, Saudi Arabia 2002-2003 (22.4%)[18] and lower than a study done in Tanzania tertiary care referral hospital 2003 (19%)[19], and higher than a study done in three rural African villages in 1997 (15%)[20], and it was lower than a study done among out born neonates at 10 tertiary care institutions in India during the year 2000 (16.4%)[21] But it is higher than Hagen study done in Oslo, Norway when the neonatal mortality rate relative to admissions decrease significantly from 1987-1988 to 1997-1998 (6.9% vs. 3.4%).[22] Neonatal death rate is calculated (in the NCU only) by dividing the number of neonates died in the unit in one year on the number of all neonates admitted in the same year multiplied by 100(%), while neonatal mortality rate (NMR) is calculated by 1000 live births. The high male to female ratio of (2.04:1) is higher than Numan(1.4:1)[12], & Adeolu AA et al study in Nigeria 2010(1.5:1)[17], this may be due to the fact that male neonates have approximately two folds higher incidence of sepsis and respiratory distress syndrome than females.[23,24] Regarding body weight, (59.2%) of death were in neonates less than 2.5kg, which is lower than(79%) in Numan study in Iraq[12], & lower than Foram H study in Ireland 2002 (88%),[25] & Rashid study in 2010(67.12%)[16], and higher than Jehan I et al study in Pakistan 2009 (54%).[26] In the current study, (55.9%) were delivered by C/S, which is higher than(44.7%) in Numan study[12] & Rashid study in Bangladesh 2010 (35%).[16] In the current study, respiratory distress syndrome (RDS) was the most common cause of neonatal deaths of (42.1%) which agrees with bushra study(43%)[14] and Hanady study in mosul city(42%)[15] which is lower than Numan study (48.8%)[12] & respiratory problems were the most common cause of neonatal deaths (62.8% of total deaths),

in Numan study [12], which differs from Rashid study in 2010 in which immaturity – related and birth asphyxia were the most common cause of neonatal death (26%)[16] for each and differ from Adeolu AA et al study in Nigeria 2010 in which infection was the most common cause of neonatal death (26.1%).[17] The high incidence of RDS in current study may be explained by poor use of Betamethasone before delivery in suspected premature delivery, or it could be due to high percentage of CS which is a risk factor for RDS occurrence agrees with one research found that pregnant ladies choosing repeated cesarean deliveries are up to two times more likely to have a baby with serious complications including respiratory distress resulting in NICU admission.[27] For gestational age in relation to neonatal death, the preterm deaths were (76.32%), which is nearer to (80%) of deaths in Numan study[12], and higher than his study (10.3%)[13] and than Rashid study in Bangladesh 2010 (59.59%).[16] and more than Frankul study (15.5%).[23], preterm birth rate was reported as (5.5%) in New South Wales (Australia) and (9.7%) in USA, (3%), in Jordan, (15.2%) in Zimbabwe, (20.3%).[28] Death from congenital anomalies formed (17.8%), it agrees with Numan study(17%)[12] and lower than (41.8%) in another Numan study[13], it disagrees with Hagen study where the congenital malformations was the leading cause of death(54%)[22], and disagree with Frankul study 2003 (27.6%)[23] and Awqati study (10.3%)[30], & higher than Jehan I et al study in Pakistan 2009 (8%).[26] and bushra study (12%)[14] and hanady study (14%)[15] and in Awqati N study Congenital malformations contribute to (10.3%) of neonatal deaths in a large study done in Iraq between 1994-1999 which is less than our rate.[30] Wong et al. (2008) found congenital malformations (29.6%) was the commonest cause for neonatal deaths despite of thorough antenatal and early termination of pregnancy in presence of major congenital malformations.[29] Neonatal septicemia (sepsis or infection) as a cause of neonatal death was (3.3%), near to hanady study (3%)[15] and to bushra study Septicemic deaths (4%)[14] and lower than infections (sepsis) (11.2%) of total deaths in Numan study,[12] and his other study (33.4%)[13] and Frankul study (32.5%)[23], and Rashid study in Bangladesh (28.77%)[16] And Adeolu A A et al study in Nigeria 2010, (26.1%)[17], and In Al-Zwaini study (2002), mortality was (28%),[31] Neonatal septicemia may be due to poor hygienic practice in cases of premature rupture of membrane and in the NCU.[14] The low number in Alkarkh maternity hospital may be related to the sterilized NCU unit and the admission of only neonates delivered inside the hospital and the use of high hygienic methods. Birth asphyxia caused (3.3%) of total neonatal deaths, which is lower than (9%) in Numan study[12], and bushra study (8.2%)[14] and Jehan I et al study in Pakistan 2009 (26%)[26], this may be due to that the study was done in a maternity hospital. Meconium aspiration always carries high mortality

rate, in the current study, it was (1.3%), in bushra study it was (1%).[14] Other causes of death, were (32.2%) in the current study, and in bushra study (10%).[14] This group included all causes of death which the death investigating committe in the hospital considered them not the direct or real cause of death either because the doctor did not reach exact diagnoses or because the real cause of death was not clear specially in preterm neonates with very low birth weight and the complications of prematurity and low birth weight. The committee advised the physicians to use diagnoses according to the international classification of diseases(ICD-10) of WHO. These differences in pattern of neonatal mortality may be due to marked differences between different countries concerning availability of equipment as neonatal mechanical ventilation and routine use of surfactant in respiratory distress syndrome and management of other causes of death and training of medical and nursing staff.

CONCLUSION

The most common causes of neonatal death were RDS and congenital malformations. Male neonate admissions to NCU and death rate were higher than female. About 85% of the admitted neonates were discharged well and only 15.2% died. It is recommended to establish better antenatal care services starting from the primary health centers as a neonatal care for pregnant woman is the key for safe neonatal life. It is better to have a good interaction between obstetricians and pediatricians. Initiation of death conferences in maternity hospitals of each case of neonatal death is recommended to raise NCU staff awareness of causes and take appropriate actions. This study recommended that a need for great efforts to determine and reduce risk factors associated with neonatal mortality, and to adequately evaluate the medical and nursing care provided in neonate intensive care units. This study demonstrates the need for more studies investigating the causes of neonatal death on more large sample size and cover more years.

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