The outcome of newborn admitted in neonatal care unit, center teaching hospital of pediatric , Baghdad Al-krakh, 2015

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ABSTRACT

Background: Neonatal period is a very vulnerable period of life due to many problems, In spite of advances in perinatal and neonatal care still, the mortality rate of neonate high especially in developing country The World Health Organization estimates that globally four million neonatal deaths per year, Developing countries account for around 99% of the neonatal mortality in the world, In Iraq. Neonatal mortality rate about 19 per 1000 live births which represent 56% of child death below 5 years age in 2012. The hospital in the study represents the larger pediatric hospital in Iraq. It contains 400 children's beds and 24 neonatal incubators.

Aims of the study: are to determine the institutional new-born case fatality rate and the cause of death in the neonatal care unit.

Method; The study is cross-section study of the population sample of neonatal care unit of central teaching hospital of pediatric in Baghdad Al-krakh health directorate

Result: Study appear total neonate admission during 2015 was 1977 neonates mortality rate 9% Four main causes of death were Respiratory related condition, Bacterial sepsis, Disorder related to short gestational and low birth weight not relayed to elsewhere classification and congenital malformation 37.5%, 33.3%, 7.1% and 7.1% respectively while the main primary cause of morbidity were Neonatal jaundice, Respiratory related condition, Bacterial sepsis and 37.5%, 35.2%. 14.1% respectively **Conclusions:** The majority of morbidity and mortality can prevent by appropriate intervention

Key wards: Mortality, Morbidity, Neonate

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INTRODUCTION

Neonatal period (0 to 28 days of life) is the most critical period of life because of various problems/diseases, which a neonate faces [(1)].Also in this period, many physiological modification processes necessary for extra uterine life are formed, Thus, the neonate is very vulnerable with high rates of mortality and morbidity. Neonatal mortality rate is often used as a standard for the development of health care systems as well as achieving optimal educational and social conditions [(2,3)].Neonatal mortality rate is directly as-sociated with high risk pregnancy and therefore the major reasons for neonatal death can be revealed in relation to complications of risky pregnancy including prematurity, intrauterine growth retardation, congenital abnormalities and other disabilities [(3)].also delivery –related complications (birth injury ,birth asphyxia)are direct effect in neonate survival and on fatality and morbidity[(3).]

Therefore woman's health, maternal and child health play substantial role in determine the neonatal fatality and morbidity.

Despite a marked lowering in the U5MR in the past few years following substantial interventions like immunization, diarrhea control programs and integration management of child illness program, the neonatal death in resource poor countries is still alarmingly high. It accounts for over 40% of all deaths of children under fiveyear's age. It is estimated that 34 of every 1000 babies born in developing countries die in the first month of life [(4-6)].

However, the decline in neonatal death in 1990–2015 has been slower than that of post-neonatal, under-five mortality (1-59 months): 47 percent, compared with 58 percent globally. This manner applies to most low- and middle-income countries [(4-6)].

Around two-third of infant deaths occur in the neonatal period, of which almost two-thirds die during the first week and of these two thirds die during the first 24 hours Nearly all cases of deaths occur in low-income or middle-income countries [(6)]. This happens primarily because of most child survival strategies being designed passing the new born.

Globally, the major reasons of neonatal deaths were preterm birth complications (35 per cent), intrapartum related complications (24 per cent), and sepsis (15 per cent)[(7)].

In developing countries death in neonatal period accounted 50-70% of infant mortality

[8]. The main direct cause of death is 27% preterm birth 26% infection, 23% asphyxia, 7% congenital anomalies, 7% other, 7% tetanus, 3% diarrhea[9].

Most deaths of children under five years age are caused by diseases that are easily preventable or treatable with proven, cost-effective interventions [6].

In the year 2000 United Nations Millennium Summit the international community committed to reducing the child, neonate and maternal mortality as part of the Millennium Development Goals (MDGs). The fourth goal (MDG4) sets to reduce deaths of children under five years age by 66% by 2015[10].

Millennium Development Goal 4 has encouraged efforts to reduce child mortality. Fundamental decreases in deaths in children younger than 5 years old have been due to reductions in post neonatal mortality. No similar progress has been made in the lowering of neonatal mortality[11, 12].

Neonatal outcome is substantial index of obstetrics and health care. It is estimated that effective implementation and high coverage of interventions could prevent up to 70% of neonatal deaths globally [12].

Neonatal mortality is broadly preventable and has been considerably reduced in developed countries using proper techniques and convenient preventive approaches [13, 14].

However, improved neonatal care, particularly the wide spread use of surfactant replacement and antenatal steroids, has almost halved neonatal mortality in many parts of the world[15].

In Iraq UNICEF estimated fallowing vital statistics [16]U5MR 53 and 34 per 1000 live births in 1990 &2012 respectively, infant mortality rate 42&28/1000live births in 1990 &2012 respectively and neonatal mortality rate 27&19/1000live births in 1990 &2012 respectively.The ministry's annual report said that total number of neonatal incubators 1682 represents 2.7 incubators per 10 children's hospital beds[17].

In Baghdad there are 4 hospital for pediatric specialty and 2 hospital Obstetric and pediatrics specialty [21].

Central teaching hospital of pediatric in alkrakh health directorate (The hospital in our study) represents the largest pediatric hospital in Iraq. It contains 400 children's beds and 24 neonatal incubators.

Aim of study:

To determine the institutional newborn case fatality rate and the cause of death in neonatal care unit.

Objectives: To calculate the case fatality rate

To study cause of death ratio and Relation between deaths as an outcome by selected explanatory variables

Rank the causes of admission.

METHODS

Study design was cross section of descriptive study.

Study site;

Central Teaching Hospital of Pediatric in Baghdad Al-krakh directorate.(convenient sampling),

Study sample

All neonates admitted in neonatal care unit in The Hospital among 2015.

Data collection:

Data have been collected from hospital recording for admitted pediatric in neonatal care unit from 1/Jan./2015 to 31/Dec./2015 by using application form which has been prepared by the Statistical Department of Planning and Resource Development directorate, MOH

Data type and Organized in categories:

Gender categorized into male and female.

Age of newborn categorized into :At birth (one day), First week of life, 2nd to 4th week of life& ->28 days.

Multiple pregnancywas categorized into single and twins.

Type of delivery categorized into; Normal vaginal delivery, Caesarean section &Assisted vaginal delivery (instrumental).

Age of mother years categorized into; <20, 20-29 &30- 39.

Neonate weight (gm)-categorized into; Extremely low neonate weight (<1500), Low neonate weight (1500-2499), Acceptable (2500-4000) &Macrosomia (>4000).

Duration of hospital stay categorized into; Discharged on the same day, 1 – 5 days, 6-10 days &>11 days.**Cause of admission we used the diagnosis recorded in hospital table which had send to MOH then we categorized according to ICD10.**

Outcome of newborn in analysis.

The outcome we categorized into well and death, with exclusions newborns whose referral to other hospital and newborns discharge on her or his parent responsibility.

Cause of death use same method in categorizing the cause of admission.
We excluded gestational time because of recorded unreliable gestational time.

Data analysis

Computerize data which were collected by IBM ver. 21 SPSS programs then analyzed the data.

RESULTS

The result presented in this study based on analysis of a total 1977 neonates admitted to hospital during the year 2015

(Table- 1): Frequency distribution of the study sample by socio-demographic variables.

Gender	N	%
Male	1179	59.6
Female	798	40.4
Total	1977	100

Multiple pregnancy	N	%
Single	1942	98.2
Twins	35	1.8
Total	1977	100

Type of delivery	N	%
Normal vaginal delivery	902	45.6
Caesarean section	1071	54.2
Assisted vaginal delivery (instrumental)	4	0.2
Total	1977	100

Age of mother years-categories		
	N	%
<20	23	1.2
20-29	1548	78.3
30-39	406	20.5
Total	1977	100

Neonate weight (gm)-categories		
	N	%
Extremely low weight (<1500)	15	0.8
Low weight (1500-2499)	1476	74.7
Acceptable (2500-4000)	481	24.3
Macrosomia (>4000)	5	0.3
Total	1977	100

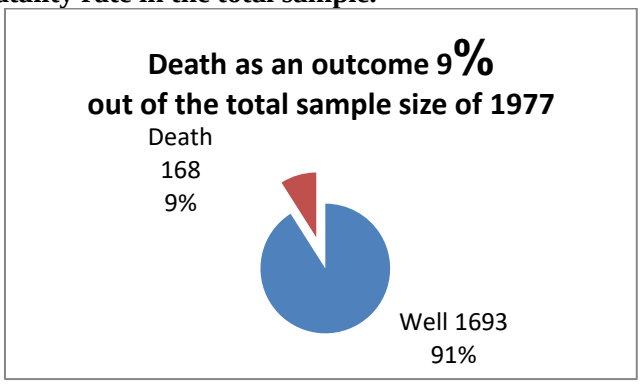
Duration of hospital stay		
	N	%
Discharged on the same day	219	11.1
1-5 days	1214	61.4
6-10 days	359	18.2
11+ days	185	9.4
Total	1977	100

Newborn's age at admission (categories)		
	N	%
At birth	341	17.2
First week of life	855	43.2
2nd to 4th week of life	757	38.3
>28 days	24	1.2
Total	1977	100

(Table-2): Relative frequency for selected categories of cause of admission.

N=1977	N	%
Neonatal jaundice (P59)	742	37.5
Respiratory conditions (P21, P22, P23)	695	35.2
Infection/sepsis (P36)	278	14.1
Disorders related to short stature and low birth weight not elsewhere classified (P07)	45	2.3
Blood and bleeding problems (D64, P61.9, P53)	41	2.1
Congenital malformations/chromosomal abnormalities (P91, Q00-Q99)	40	2
Renal conditions (UTI, renal failure) (P96, P39)	37	1.9
GIT problems/symptoms (A09, P76, P92.0)	38	1.9
Others (miscellaneous) (P71, R69, M00)	19	1
CNS conditions/symptoms (convulsion-meningitis) (G40, P90, A87.8, P91.6)	11	0.6
Endocrine diseases/symptoms (P72)	8	0.4
Symptomatic labels (E64, P28.2, L20.9, P74.1)	8	0.4
PUO (P81.9)	6	0.3
Cardiovascular conditions (P29)	5	0.3
Trauma (P15)	4	0.2

(Table- 3): The case fatality rate in the total sample.



(Table - 4): Cause of death ratio

Cause of death	N	%
Respiratory conditions (P21 ,P22 .P23)	63	37.5
Infection/sepsis (P36)	56	33.3
Congenital malformations/chromosomal abnormalities (Q00-99)	12	7.1
Disorders related to short stature and low birth weight not elsewhere classified (P07)	12	7.1
Renal conditions (UTI, renal failure) (P96, P39)	8	4.8
Neonatal jaundice (P59)	8	4.8
Cardiovascular conditions (P29)	4	2.4
GIT problems/symptoms (A09, P76, P92.0)	2	1.2
Blood and bleeding problems (D64, P61.9, P53)	2	1.2
Others (miscellaneous) (P71, R69, M00)	1	0.6
Total	168	100

Table 6: The case fatality rate by selected explanatory variables

	Death as an outcome						P (Chi-square)
	Well		Death		Total		
	N	%	N	%	N	%	
Age of mother years-categories							0.299 [NS]
<20	19	90.5	2	9.5	21	100	
20-29	1336	91.5	124	8.5	1460	100	
30-39	338	88.9	42	11.1	380	100	
neonatal weight (gm)-categories							0.028
Extremely low neonatal weight (<1500)	12	92.3	1	7.7	13	100	
Low neonatal . weight (1500-2499)	1264	90	141	10	1405	100	
Acceptable/macrosomia (2500+)	417	94.1	26	5.9	443	100	
Duration of hospital stay							<0.001
Discharged on the same day	147	77.8	42	22.2	189	100	
1-5 days	1062	92.2	90	7.8	1152	100	
6-10 days	318	93	24	7	342	100	
11+ days	166	93.3	12	6.7	178	100	
Newborn's age at admission (categories)							0.009
At birth	279	87.7	39	12.3	318	100	
First week of life	741	92.9	57	7.1	798	100	
2nd to 4th week of life	654	90.7	67	9.3	721	100	
>28 days	19	79.2	5	20.8	24	100	
Multiple pregnancy(state of pregnancy)							0.542[NS]
Single	1663	91.0	164	9.0	1827	100.0	
Twins	30	88.2	4	11.8	34	100.0	
Type of delivery							0.165[NS]
Normal vaginal delivery	762	90.0	85	10.0	847	100.0	
Caesarean section/assissted delivery	931	91.8	83	8.2	1014	100.0	
Gender.							0.295[a]
Male	1014	91.3	97	8.7	1111	100	
Female	679	90.5	71	9.5	750	100	

DISCUSSION

Corrected data on the morbidity and mortality are helpful for many reasons. It is important for the providers of primary and secondary health care, investigators, local and national health administrators, and for decision makers to design interventions for prevention and treatment and to implement and evaluate health care programs.

Studying neonatal morbidity and mortality is of parameter important at the level of strategic health planning For example prematurity was the second leading cause of hospital admission for neonates in 2004 [18] , Ten years later this problem moved down the top the top 4 cases of admission. Targeting specific important causes of neonatal morbidity allowed other less important causes to climb up the list.

The purpose of this study was to assess neonatal morbidity and mortality for hospital in mates. The pediatric teaching hospital in Baghdad .is very busy all over the year. It has 24 neonatal incubators which allow for a large population size of 1977 during year 2015. The current study sampled all the population of that year.

Study sample by socio-demographic variables.

The admissions of male babies (59.6%) were more than those of females This may be related to the predilection for the male child in the society and the biological vulnerability of the males to infection. The male overbalance for admissions has been documented in previous studies [19, 20].Our study showed that 98.2% of the sample was singleton delivery. It was recorded in USA that one twin was born for every 30 single infants born 2009.[19, 21]. The current study found that neonate delivered by caesarean section admission to hospital (54.2%) more than normal vaginal delivery. This is similar to a study in USA at 2007, which showed that about two thirds of admitted neonates were caesarean section [22]

As large as 78.3% of admitted baby had mothers aged 20 -29 years, women at this age are more fertile This agrees with a study by Asma A Aljawadi in 2003 in Mosul Iraq which showed that more than half (55.6%) of pregnant women had presented at age of twenties[36]. Most admitted neonates (74.7%) were of low weight; this is similar to many studies which considered the weight of neonate as a risk factor for many diseases. Low neonatal weight may be related to low socio-economic status and poor, maternal health condition. It is often used as indicator of quality for the maternal care facilities [23,24]. The relation between age of neonate and the morbidity showed that neonate admission at birth (first day) and at first week of life is more than other ages (17.2% and 43.2% respectively). This is because neonate at this age is biologically vulnerable. Many studies in different times and places agree with the previous argument ([23, 24].Pakistan showed that 44% of neonates admitted at first day of age [25].

Study cause of admission in the hospital; The first three primary causes of admission were Neonatal jaundice, Respiratory condition, Infection /Sepsis 37.5%, 35.2% and 14.1% respectively. These represent more than 86% of admissions. Study in India in year 2014 reported respiratory condition ,sepsis, encephalitis, neonatal jaundice (arranged from high to low)[18].Another study in Pakistan offered other causes of neonatal admission including prematurity, sepsis ,respiratory condition ,neonatal jaundice (form higher percentages).These two studies share in common respiratory conditions and sepsis as leading causes of neonatal admission similar to our study This difference observed reflected the neonatal care , maternal education and antenatal care in community [25,27], In present study the admissions related to respiratory condition were divided in to three causes respiratory distress, pneumonia , birth asphyxia which represent 20% , 10% and 2% respectively. Each one of these has specific risk factors.

Respiratory distress syndrome was considered the first cause of admission in many hospital, research done by C.Dani and The Italian Group of Neonatal Pneumology as well found the risk factor like birth weight, maternal age, gestational age, emergence caesarean section and male gender [28].

In case of bacterial sepsis which occupied the first or second cause of admission in numerous hospital [18, 29] the risk factors related to delivery complication and socio economic factor [3;29].

The case fatality rate in the total sample; Population studies showed that NMR in Iraq declined as estimated by WHO from 27.1 neonatal death per 1000 birth in 1990 to 18.4 neonatal death per 1000 birth 2015[30]In comparison the NMR with neighboring countries such as Saudi Arabia, Jordan, Egypt and Syria showed that Iraq had highest NMR for 2015. Despite the fact that some of these countries have economic income less than Iraq, especially Egypt .If we compared with developed countries such as UK and the USA showed a big difference, is observed.

There is a great variation in neonatal fatality statistics between Neonatal care units from different parts of the world. This variation probably reflects the difference in the level of civilization in population, antenatal care, admission criteria, specific exclusion & inclusion criteria and level of neonatal care.

Using mortality statistics for the hospital admission neonate's one can see that

The case fatality rate for hospitalized neonatal in current study was 9% from total neonatal admission, this figure was higher than hospital fatality rate reported in Canada, Pakistan & Brazil in 2015 ,(4% ,7 % & 6% respectively) [31,32])on other hand this figure was much lower than study in neonatal care unit in Baghdad teaching pediatric hospital ,medical city ,(15% in 2007 and 19.2% in 2009 [33]

Cause of death ratio in the total sample. The current study showed that respiratory condition ,infection sepsis, congenital malformation, disorders related to short stature and low birth weight were the leading causes of death,(37.5% , 33.3% , 7.1% and 7.1%) respectively which represent 85% of all death ,This was in concordance with national death [17]reported by Iraq MOH annually report , Except for sepsis that occupied the second reason instate of third in general population . The current study showed results similar to a study in 2010 in Baghdad pediatric teaching hospital ,medical city, that reveled the cause of death among 2007, 2008 and 2009 were respiratory condition, congenital malformation , sepsis, 62%, 17% ,22.2% respectively [34].Infection (sepsis). It represented the second cause of death in current study (33.3%). This

agrees with WHO estimation that more than 1/3 of estimated 4 million neonatal deaths each year around world are caused by severe infection. The present study Showed that disorders related to short gestation and low birth weight not elsewhere classified as primary cause of death constituted 7.1% of all death in hospital This figure is lower than globally estimated (28% [9]), It is also lower than study in India (41%) of death [35] This study showed that neonatal death due to Congenital malformations& deformations and chromosomal abnormalities constituted 7.1% all death in hospital, which is lower than study in 2010 by Numan N. Hameed Baraa N.[33] which reported proportioned mortality ratio of 18.4%,14. 2%, 19.5%, at years 2007, 2008,2009 respectively ,It was also lower than that reported by study in India 12% [35], but it was similar to global estimated that recorded 7% in 2004[2].specific case fatality rate by cause of admission

In current study showed the highest case fatality rate was associated cardiovascular neonatal 80% from all cardiac neonatal admitted, This fatality was significantly higher than that recorded for the overall cases admitted neonate of 9%, This reflects the capability of hospital to deal such difficult condition this agrees with a study by Wren C[36] which showed that 10 - 20% of all neonates with cardiac malformations, corresponding to 1-2 per 1000 newborns, have a cardiac defect that if undetected may cause circulatory collapse and death during the neonatal period and 30% of cases were not diagnosed before death

The case fatality rate attributed to congenital malformation is equal to 37.5% which was significantly higher than the average case fatality rate for an admitted neonate of 9%, It was lower in a study in Northern Tanzania, 2010 that recorded a case fatality rate of 44.1% [37]. This difference may be related in type of congenital malformation which includes wide variety of diseases. The case fatality of sepsis was 21.5% which was significantly higher than the average case fatality rate for an admitted neonate of 9%.This agree with WHO which suggested that the chances of survival are weak for newborns with a serious infection, Controlling on neonatal infection can serve as a powerful tool to reduce neonatal mortality since sepsis is both preventable and treatable Our study revealed that disorders related to short stature and low birth weight not elsewhere classified was associated with a case fatality rate 27.9% which was significantly higher than the average case fatality rate for an admitted neonate of 9%, This finding was similar to that a study by Northern Tanzania in 2010 that recorded a case fatality rate of 22.4% [37].

Relation between death as an outcome by selected explanatory variables (case fatality rate) which act as risk factors.Regarding death with neonatal weight as risk factor in our study it was shown that 7.7% and 10% of extremely low neonatal weight and low neonatal weight respectively ended in death as an outcome, This agree by study presented by Nayeri F Risk factors for neonatal mortality among very low weight neonate indicated that each 250 g weight increase up had protective effect, and reduced mortality rate. And survival rate was calculated to be 80.4% for neonates weighing more than 1000 g [38]. In current study the case fatality rate at the youngest age of one day was highest 12.3% compared to other ages (9.3% at the fourth week of life) This agree by many studies showed early age neonatal death more than late age neonatal death [38].

CONCLUSION

1- The case fatality rate in total admitted neonates during 2015was 9% .

2- The main causes of admission were Neonatal jaundice, Respiratory condition and Infection /Sepsis which composed more than 86% of total study sample.

3- The two most important causes of death were Respiratory condition and Infection / Sepsis that form about three quarter of all deaths.

4- The low weight of neonates, discharging the neonates on same days (which represent the severity) and age of neonates less than week.

They were more likely to die than others

5- Neonates admitted because cardiac condition and congenital malformation had higher case fatality rate.

6- The majority of morbidities and subsequently the mortalities can be prevented by improving antenatal care, maternal health, timely intervention, referring at appropriate time to tertiary care centers for high risk cases, preventing preterm deliveries, and care of neonates at centers with facility.

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