Post Neonatal Mortality in Children Welfare Teaching Hospital for the Period 2007-2009

Muhi Kadhem Al-Janabi* ,Nadia Aziz Nasir,Kawes Omer Zangana***, Asaad Fakhri Hasan******

ABSTRACT:

BACKGROUND:

Post neonatal mortality refers to deaths between 28 days and 1 year of life. It represents about one third of infant death. Post neonatal death rates vary according to causative factors in each area of the world.

OBJECTIVE:

To study the post neonatal mortality and its major causes in Children Welfare Teaching Hospital (CWTH) - Medical City /Baghdad.

METHODS:

The medical records of 782 post neonatal deaths who were admitted to CWTH from 1st jan.2007 - 31st Dec. 2009 were studied, especially for the causes of death as registered in the files.

RESULTS:

The overall post neonatal death rate in the study period was 71.4 per 1000 of post neonatal admissions. Out of 782 total post neonatal deaths, males were 465 (59.5 %) and females were 317(40.5 %). Major causes of death were; pneumonia (24.8 %), gastro intestinal (22.8 %), infection (18.4 %) ,cardiovascular (10.3 %), central nervous system (9.8 %),surgical (4.9 %), renal problems (4.9 %), malignant causes(2.7 %),congenital anomalies (0.7 %),inborn error of metabolism(0.7 %) of total post neonatal deaths.

The results of this study indicate that post neonatal death rates are still high in a tertiary referral pediatric teaching hospital in Baghdad.

KEYWORDS: post neonatal, mortality, CWTH.

INTRODUCTION:

Infant mortality includes Neonatal &Post neonatal mortality. Neonatal mortality only includes deaths in the first 28 days of life. Post neonatal mortality only includes deaths after 28 days but before one year of age. Historically, infant mortality claimed a considerable percentage of children born, but rates have significantly declined in the West in modern times. This has been mainly due to improvements in basic health care, though high-technology medical advances have also helped. Infant mortality rate is commonly included as a part of standard of living evaluations in economics. [1]

For the world, and for both Less Developed Countries (LDCs) and More Developed Countries (MDCs), IMR declined significantly between 1960 and 2001. However, IMR was, and remains, higher in LDCs.[2] Historically, these infant deaths were due to causes outside the neonatal period, such as SIDS, infections (respiratory, enteric), and trauma. In the majority of countries, the most robust predictor of infant mortality is a poor level of maternal education. Other maternal risk characteristics, such as unmarried status, adolescence, and high parity, correlate with increased risk of post neonatal mortality and morbidity and low birth weight.[3] Population-based studies of post neonatal mortality, generally using vital statistics data, have extensively explored socio demographic determinants and mortality trends over time but have lacked the detailed clinical data necessary to examine medical risk factors and clinical pathways to death. [4]Post neonatal mortality is related primarily to social & environmental conditions, as opposed to medical care. [5] Hence, further improvements in medical care may not tackle the underlying risks that affect post neonatal mortality. [6]Post neonatal mortality remains nearly twice as high for babies registered solely by their mothers compared to babies registered by both parents. [7]Post neonatal deaths remain higher

* Department of Pediatrics, College of Medicine, University of Baghdad.

**Department of Community Medicine, College of Medicine, University of Baghdad.

***Children Welfare Teaching Hospital, Medical City, Baghdad.

****Children Welfare Teaching Hospital, Medical City, Baghdad.

in the most deprived communities and in the more disadvantaged social classes. [8]There was a significantly increased risk of post neonatal deaths in the more disadvantaged social classes in all time periods. [9]Post neonatal mortality is most often caused by infectious diseases, such as pneumonia, tetanus, and malaria. An important factor in reducing post-neonatal mortality is adequate nutrition, particularly breast milk, which provides babies with both the nourishment and the antibodies to fight infectious diseases. [10]

AIMS OF STUDY:

To evaluate the causes of post neonatal deaths in Children Welfare Teaching Hospital & to compare the major causes with other studies in Iraq & other developing & developed countries.

PATIENTS AND METHODS:

The medical records of 782 post neonatal deaths (PND) for the period from 1st jan.2007 -31st Dec.2009 admitted to CWTH were studied, especially for the causes of death as registered in the files. Data were collected from the medical records, included name, gender, age, residency, ward (medical, surgical, emergency, oncology& RCU), feeding, previous hospitalization, referral of patients and the cause of death as registered in the medical files.

RESULTS:

The total number of post neonates admitted to CWTH during the study period was (10949) representing medical, emergency, oncology, surgical wards and RCU in CWTH . The total post neonatal deaths in CWTH in the study period were 782 patients. The post neonatal death rates in 2009 was 67.3/1000 lower than 2008 &2007 (73.54/1000 & 74.39/1000) respectively. The overall post neonatal mortality rate (PNMR) among admitted post neonates in CWTH for the study period was (71.74 per 1000). Males deaths were 465 (59.5 %) & females were 317 (40.5%). Male to female ratio = 1.4:1. 479 (61.2%) PND were at &below 6 months while 303(38.8%) were above 6 months of age . Pneumonia was the first cause of death formed 194 (24.8 %) from the total post neonatal death followed by gastrointestinal diseases 179 (22.8 %), infections 144 (18.4 %), cardiovascular diseases 81 (10.3 %), central nervous system diseases 77 (9.8 %), surgical diseases 38 (4.9 %), renal diseases 38 (4.9 %),malignant diseases 21 (2.7 %), multiple congenital anomalies 5 (0.7 %), inborn error of metabolism 5 (0.7%) .For infectious causes of death ; septicemia 119 (15.2 %)from the total post neonatal deaths , Kala azar 19 (2.4 %) & measles 6 (0.8 %). Gastrointestinal causes of post neonatal deaths included acute gastroenteritis 144 (18.4 %), liver failure 35 (4.4 %) . The cardiovascular causes were; VSD 35 (4.5%)from total post neonatal death,TGA 13 (1.7 %), myocarditis 10 (1.3 %),TOF 8 (1 %), PDA 8 (1%), dilated cardiomyopathy 7 (0.8 %) .Central nervous system causes were; meningitis 76 (9.71 %) &Werdnig –Hoffman disease one (0.09 %) . Surgical causes were; Intestinal obstruction 13 (1.7 %), Intussusception 7 (0.9 %), Diaphragmatic hernia 6 (0.8 %) , TEF 5 (0.7 %), Hirschsbrung disease 3 (0. 3 %),Obstructed inguinal hernia 2(0. 3 %), Biliary atresia one (0. 1%) & Perforated viscus one (0. 1%) from total post neonatal death. Renal causes were; 35 (4.47%) from total post neonatal death & congenital nephrotic syndrome 3 (0.38 %) .
Malignant causes were; Leukemia 13 (1.66 %) from total post neonatal death, Neuroblastoma 4 (0.52 %),Wilms tumor 3 (0.38 %), Rhabdomyosarcoma one (0.12 %). Post neonatal deaths in the wards of hospital were ; medical wards 471 (60.2 4%) from total post neonatal deaths, Emergency ward 240 (30.69 %), Surgical ward 38 (4.86 %), Oncology ward 21 (2.68 %)& RCU 12 only in 2007(1.53 %) . The number of patients who died &had history of recurrent admission 652 (83.4 %) & those who died in the first admission 130 (16.6 %).The information about type of feeding available for only 542 patients from total. They were; bottle feeding 280 (51.6 %), Mixed feeding 149 (27.5 %) & Breast feeding 113 (20.9 %. Regarding the residency of patients, from Baghdad 529 (67.3 %), outside Baghdad 253 (32.3%). Those who were referred from other hospitals (from Baghdad &other governorates) were 529 (67.7 % from total post neonatal deaths), private clinics 164 (20.9 %) & without referral 89 (11.4 %).

Table 1 : **Distribution of total admission ,post neonatal admission & post neonatal deaths.**

years	2007	2008	2009
Total admission	12499	17138	18687
Postneonatal admission	2769	4079	4101
Postneonatal deaths	206	300	276
Postneonatal death rate for admitted postneonates	74.39/ 1000	73.54 / 1000	67.30 /1000

Table 2 : Distribution of post neonatal deaths according to causes.

years	2007		2008		2009	
Causes of death	No	%	No	%	No	%
RESPIRATORY:	54	26.21 %	79	26.33 %	61	22.10 %
INFECTIONS	39	18.93 %	44	14.67 %	61	22.10 %
GIT	53	25.73 %	68	22.67 %	58	21.01 %
CVS	8	3.88 %	40	13.33 %	33	11.96 %
CNS	25	12.13 %	28	9.33 %	24	8.69 %
RENAL	6	2.92 %	19	6.34 %	13	4.71 %
MALIGNANCY	4	1.94 %	5	1.67 %	12	4.35 %
SURGICAL	15	7.28 %	15	5 %	8	2.90 %
CONGENITAL ANOMALIES	1	0.49 %	1	0.33 %	3	1.09 %
INBORN ERROR OF METABOLISM	1	0.49 %	1	0.33 %	3	1.09 %
Total	206	100 %	300	100 %	276	100 %

Table 3: Distribution of post neonatal deaths according to infections.

years	2007		2008		2009	
Infection causes	No	% from PND	No	% from PND	No	% from PND
Septicemia	31	15.05 %	40	13.33 %	48	17.39 %
Kala azar	8	3.88 %	4	1.34 %	7	2.54 %
Measles	-	-	-	-	6	2.17 %
Total	39	18.93 %	44	14.67 %	61	22.10 %

Table 4: Distribution of surgical causes of post neonatal deaths.

years	2007		2008		2009	
Surgical causes	No	%from PND	No	% from PND	No	% from PND
Intestinal obstruction	5	2.42 %	5	1.66%	3	1.08 %
Intussusception	2	0.98 %	3	1 %	2	0.73 %
Diaphragmatic hernia	2	0.98%	2	0.67 %	2	0.73 %
Trachea-esophageal fistula	2	0.98%	2	0.67%	1	0.36 %
Hirschbrung disease	1	0.48%	2	0.67%	-	
Obstructed inguinal hernia	1	0.48%	1	0.33 %	-	
Biliary atresia	1	0.48%			-	
Perforated viscus	1	0.48%			-	
Total	15	7.28%	15	5 %	8	2.90%

Table 5: Distribution of malignant causes of post neonatal deaths.

years	2007	2008	2009			
Malignant causes	No	% from PND	No	% from PND	No	% from PND
Leukemia	3	1.46 %	3	1 %	7	2.53 %
Neuroblastoma	-	-	2	0.67 %	2	0.73 %
Rhabdomyosarcoma	-	-	-	-	1	0.36 %
Wilms tumor	1	0.48 %	-	-	2	0.73 %
total	4	1.94 %	5	1.67 %	12	4.35 %

Table 6: Distribution of post neonatal deaths according to the wards.

year	2007		2008		2009	
Ward	No	%	No	%	No	%
Medical ward	117	56.80 %	188	62.66 %	166	60.14%
Emergency ward	58	28.16 %	92	30.67 %	90	32.61%
Surgical ward	15	7.28 %	15	5.00 %	8	2.90%
Oncology ward	4	1.94 %	5	1.67 %	12	4.35 %

Table 7: Frequency of post neonatal deaths according to the type of feeding.

year	2007		2008		2009	
Type of feeding	No	%	No	%	No	%
Bottle	87	58.78 %	103	49.52 %	90	48.4 %
Breast	38	25.68 %	35	16.83 %	40	21.5 %
Mixed	23	15.54 %	70	33.65 %	56	30.1 %
Total	148	100 %	208	100 %	186	100 %

Table 8: Distribution of post neonatal deaths according to the referral.

years	2007		2008		2009	
Referral from:	No	%	No	%	No	%
Hospital	147	71.36 %	200	66.67 %	182	65.94 %
Private clinic	34	16.50 %	63	21.00 %	67	24.28 %
Without referral	25	12.14 %	37	12.33 %	27	9.78 %
Total	206	100 %	300	100 %	276	100 %

DISCUSSION:

The overall post neonatal mortality rate (PNMR) among admitted post neonates in CWTH for the study period was (71.74 per 1000) which was lower than PNMR in Iraqi from (1995-1998) when it was (101 per 1000) (18).It was higher than in other countries like Egypt PNMR in (1996-2000) was(44/1000),Jordan PNMR (1998-2002 was (22 /1000). [11] This might be attributed to increasing admissions in CWTH & referral of complicated cases because it is a tertiary hospital. In USA for the years 2004 & 2005 PNMR was (2.25 /1000& 2.32/1000). [12]The difference in the post neonatal death rate between this study &other studies in other countries was because this study done in CWTH which is considered a tertiary hospital & receive complicated cases from other hospitals in Baghdad & other governorates & also may be due to delayed seeking medical help by the families & low socio economic states, delayed referral & may be due to lack of many advanced techniques & equipments . During the years 2008 and 2009 increased rates of admission were noted than during 2007, this might be due to security circumstances improvement.

The male to female ratio of 1.4:1 was similar to another study in India in 2003 with male to female ratio of 1.3:1. [13] Age of death in this study (61.2 %) at &below 6 months of age was similar to other study in India in 2003 which showed that most of post neonatal deaths occurred in the first 6 months (82 %). [13] Causes of death; in this study pneumonia formed the major cause of post neonatal deaths (24.8 %) which was different from other MOH study in Iraq (1994-1998) which showed that diarrhea was the leading cause of post neonatal deaths (51.1 %) followed by pneumonia (25.2 %). [14]This result is different from another Indian study in 2003 which showed that diarrhea was the most common cause of post neonatal deaths (43 %) followed by pneumonia (21 %). [15]This study unlike other study in USA in 2005 in which the major cause of death was sudden infant death syndrome (21 %) of post neonatal deaths & pneumonia formed (2.7 %) of total post neonatal deaths which is considered much lower than the result in this study. [16] Gastroenteritis was the second cause of post neonatal death (18.4 %) . Septicemia formed (15.2 %) of total post

neonatal death which unlike other study in USA in 2005 showed that septicemia formed (3.1 %) of total post neonatal deaths. [17] Cardiovascular diseases constitute (10.3 %) of total post neonatal deaths which was higher than other study in USA in 2005 which showed cardiovascular diseases constitute (4.5 %) of total post neonatal deaths. [17] Malignant diseases constitute (2.7 %) of total post neonatal deaths which was much higher than MOH study in Iraq which showed malignant diseases constitute (0.1 %) of total post neonatal deaths. [14]Congenital anomalies constitute (0.7 %) of total post neonatal deaths which was lower than other MOH study in Iraq which showed congenital anomalies constitute (2.3 %) of total post neonatal deaths,(17) and different from another study in USA in 2005 which showed congenital anomalies constitute(17.2 %) of total post neonatal deaths. [17] This difference might be attributed to recording of mortalities in the systems involved rather than recording the congenital anomalies and syndromes that leaded to deaths (recording problem). Most deaths in post-neonatal group were in bottle-fed infants (51.6 %) from the total post neonatal deaths followed by mixed feeding (27.5 %)& breast feeding (20.9%), this is similar to other studies in Senegal &WHO studies showed most deaths reported in bottle feed. [18,19] The risk of death increases with the increase in the number of hospitalizations , most of the post neonatal deaths occur in patients who had history of recurrent admissions (83.4 %) from the total post neonatal deaths& patients died in the first admission (16.6 %); Senegal and WHO studies showed the risk of death also increased with the increase frequency of hospitalization. [20,21]

CONCLUSION:

Post neonatal death rate in CWTH still higher than that in developing countries and more developed countries. Male to female post neonatal death's ratio was 1.4:1. Most of the post neonatal death occurs at 6 months of age &below. The most common causes of death in post neonate was pneumonia followed by acute gastroenteritis ,septicemia , cardiovascular diseases, meningitis and postoperative complications of surgical diseases.VSD was the most common cardiovascular cause of post neonatal deaths. Leukemia was the most common malignant cause of post neonatal deaths. Acute renal failure was the most common renal cause of post neonatal deaths. Post-operative complications of Intestinal obstruction were the most common surgical cause of post neonatal deaths. Most of post neonatal deaths occur in the medical ward. Most of post neonatal deaths occur in patients with recurrent admission .Most of post neonatal deaths occur in bottle-fed .Most deaths occur in patients referred from other hospitals. The medical files and case sheets were not fully informative.

Recommendations

Social awareness and education for the early signs of pneumonia &benefit of ORS in the treatment of diarrhea. General education about the benefit of breast feeding in reducing infections and deaths. More efforts to overcome Shortage in many medications and investigations is an important contributor to post neonatal mortality. Better recording system is needed especially reception notes, discharge and death summaries for more accurate studies in future. Detailed studies and researches need to be done to identify the factors behind high death rates from infection.

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