

A Study of Frequency and Causes of Neonatal Mortality

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Abstract Therefore in this study, infant mortality rate, and its causes in Bu Ali Hospital, in Sari were investigated. This study is a cross sectional-descriptive-analytical and retrospective one which was done by studying medical records and completed registration form for all infants who were hospitalized during the year 2009 in Bu Ali Hospital. The form of the research consisted of variables such as sex, weight, time of birth, gestational age, cause of death and hospitalization, age at death, maternal age, and type of delivery. Data were analyzed using SPSS software and also Chi-square Test ($\alpha=0.05$). In this study, 60 (4/6%) of 1302 hospitalized infants had died. The most common causes of death included cardiac arrest (36/7%), cardiopulmonary arrest (15%), sepsis (10%), and RDS (16/7%). Among neonates who died, 60% were female and 40% were male and 73/7% of infants were underweight. Prematurity and low birth weight are the most constant and the most important determinant in neonate mortality.

Keywords Neonates, Mortality, Prematurity, Low Birth Weight (LBW)

1. Introduction

Neonatal period (first 28 days after birth) which is the stage of the creation of physiological adaptation to extra uterine life is a vulnerable period and high rates of neonatal mortality comes from the high vulnerability of this period (1).

One important indicator of health condition in any society is infant mortality rate. Despite the great efforts made to reduce infant mortality, neonatal mortality still remains high at about 65% of below one year old deaths (2,3).

Neonatal mortality forms almost two-thirds (1/5 million) of the 8 million annual deaths of children under one and almost 40% of all deaths of children under 5. And 98% of all neonatal deaths occur in developing countries (4). This amount equals half of live births born in Asia and two-thirds of neonatal deaths worldwide (5).

Many studies have been done in this field at home and abroad. In 2008, the infant mortality rate in our country, Afghanistan, Tajikistan, India, China, America, Japan, Sweden, and Singapore, were 36/93, 154/67, 42/31, 32/31, 21/16, 6/3, 2/8, 2/75, and 2/2 respectively (6).

The main causes of infant mortality in the study of Fallahzadeh and et al. were as prematurity, congenital malformations, and RDS respectively (7). In Tark's study, infant mortality rate was 9% and the two leading causes of death were neonatal infections and asphyxia during

childbirth (8). In general, half of the causes of death in the neonatal period were due to low birth weight, prematurity, respiratory problems, congenital abnormalities, and infections (3).

Other important factors that raise the risk of infant mortality include maternal infections during pregnancy, maternal age (less than 16 and more than 35 years), maternal drug addiction, social and economic poverty, unmarried mothers, caesarean and etc. (3,1).

So many factors are involved in the infant mortality rate that identification of these factors can be effective in reducing mortality and also considering ,Almost these studies just indicated prevalence of infant mortality rate and didn't report about cause of this death and details related factors, also no study in this field was done in Bu Ali Hospital which is a paediatric centre, the present study was done to investigate the prevalence of some factors on the mortality of hospitalized infants in Sari Bu Ali Hospital in 2009.

2. Materials and Methods

This study was a cross sectional-descriptive-analytical and retrospective one and the population of the study included all infants hospitalized in Neonatal Unit and NICU of Sari Bu Ali Hospital in 1387. Medical registration form for research project was set and by reviewing the records, information regarding each child was recorded and the form included questions about gender, birth weight, gestational age, cause of death, age at death, cause of hospitalization, maternal age, and type of delivery.

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Data were analyzed using SPSS software and for the analysis of the variables two-way Chi-square test was used and in all phases $p < 0.05$ was considered significant.

3. Results

In this study, of 1302 infants, 434 cases were hospitalized in Neonatal Unit and 868 cases in NICU. A total of 60 infants died in the hospital form which 40% were male and 60% of them were female. 73/7% of them were LBW (weight less than or equal to 2500gr). From among the infants who died, 5% died in less than 25 weeks of gestational age, 65% in 37-25 weeks of gestational age, 28/3% in 41-38 weeks of gestational age, and 1/7% in 42-44 weeks of gestational age. Moreover, the most common cause of death was Cardiac Arrest (36/7%) and a rare cause of death (1/7%) were anomalies, diuresis metabolic, and meconium aspiration (Table 1) and also the most common cause of hospitalization (68/3%) was respiratory distress.

On the other hand, 26/7% of infants died during the first 24 hours after birth, 45% between 1 to 7 days, and 28/3% within 8 to 28 months of their age. Also 71/7% of mothers were above 35 years, 16/7% 18-35 years old, and 11/7% less

than 18 years. So that, 50% of babies were born by normal vaginal delivery and 50% were born by caesarean. Using two-way Chi-square test, it was found that there was a significant relationship between gestational age, cause of death, cause of hospitalization, and maternal age with infant mortality rate but this relationship was not significant between gender, birth weight, maternal age at time of death, and type of delivery with infant mortality rate (Table 2) ($\alpha=0.05$).

4. Discussion

In this study from 1302 hospitalized infants, 60 neonates (4/6%) died that this amount was less than the mortality rate in Pakistan (9%) (8). In a study performed in Canada, this rate was 4% (9) and in Saudi Arabia it was (2/4%) (10), which were probably caused by different levels of health development in these two communities. The most common causes of death in infants were Cardiac Arrest with a frequency of 22 (36/7%) and RDS with a frequency of 10 (16/7%). A study was conducted in Ilam city in which the most common cause of neonatal death was reported hyaline membrane disease (11).

Table 1. the most common cause of death

Frequency Percentage	Frequency	Cause of Death
36.7	22	Cardiac Arrest
15	9	Cardiopulmonary Arrest
10	6	Sepsis
1.7	1	HF
16.7	10	RDS
8.3	5	DIC
3.3	2	CHD
1.7	1	Anomaly
1.7	1	Diuresis Metabolic
3.3	2	Septic Shock
1.7	1	Meconium Aspiration
100	60	Total

Table 2. relationship between gestational age, cause of death, cause of hospitalization, maternal age, gender, birth weight, maternal age at time of death, and type of delivery with infant mortality rate

Test Probability	Critical Chi-Square	Observed Chi-Square	Degrees of Freedom	Amount of Chi-square in Test	Agent
0.1	3.8	2.4	1	Gender	1
0.5	7.8	2.2	3	Birth Weight	2
0.000	7.8	61.3	3	Gestational Age	3
0.000	18.3	75.3	10	Cause of Death	4
0.1	5.9	3.7	2	Age at Death	5
0.000	15.5	206.4	8	Cause of Hospitalization	6
0.000	5.9	39.9	2	Maternal Age	7
1	3.8	0.000	1	Type of Delivery	8

In a study conducted in Norway, the most common cause of neonatal death (21/5%) was congenital heart disease (12). When these studies are compared with the present study, it demonstrates existence of a high incidence of hyaline membrane disease in Iran compared with other countries.

26/7% of the deaths occurred during the first day of birth, 45% during 2-7 days, and 28/3% within 8 to 28 days of birth. This result was compatible with Prelehman's study saying more than half of the mortality is related to the first two days of birth (13), Fvnska's study that 28/6% of the mortality occurred during the first day and 62/4% during the first week of birth (14), and also Fallahzadeh's study (7) and Nayeri's study (15) that concluded 95% and 78% of these deaths happened during the first week of birth respectively.

From among the infants who died, 36 cases (60%) were female and 24 cases (40%) were male. Based on Namakin's study, 57/6% died infants were female and 42/4% were male (16). In this study, like our study, no significant relationship was found between sex and mortality rates. Also in this study, the relationship between type of delivery and infant mortality was not significant which was consistent with the study of Rahimi et al. (17). 46 infants (73/7%) died from LBW. The highest mortality rate was for the weight of less than 1000g with frequency of 19 (13/7%) that was fairly consistent with Zamani's study which demonstrated 15/8% of infant mortality rate was for LBW and the highest mortality rate (5/3%) belonged to less than 1000g infants (18).

In this study, 39(65%) infant deaths occurred at gestational age 37-25 weeks and a study in India revealed that more than 85% of neonatal deaths occurred in preterm infants and LBW (19). Mortality rate for preterm infants in the studies of Estul (1), Tarek (8), and China (20) were (38/6%), (74%), and (45/9%) respectively.

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The statistics indicated a higher incidence of LBW and mortality in our area than most countries and a statistically significant relationship was found between gestational age and mortality. In this study, a statistically significant relationship was found between maternal age and infant mortality rates in a way that 71/7% (43 cases) of mothers of infants who died were over 35-6 years and in terms of the results it was similar to Namakin's study (16).

Considering the significant relationship between age at death and infant mortality rate, the highest mortality was seen in the first 24 hours to 1 week that in the study of Namakin also 35/46% of the deaths occurred during this time and the present study is completely consistent with it. In the study performed by Laven about infant mortality, it was concluded that the main causes of infant deaths included preterm births (28%), severe infection (26%), asphyxia (23%), and in a small proportion of deaths, neonatal tetanus (7%). This study indicated the fact that LBW is an indirect major cause of death in infants (21) which is relatively consistent with the present study.

So it can be said that, with developing maternal prenatal care program and increasing maternal awareness and health rate the prevalence of underweight and premature babies can

be prevented. Moreover, since low-weight premature infants are at more risk of dying in infancy, it is suggested that pregnant mothers should be placed under the required cares to avoid the birth of premature infants as possible.

Preparing appropriate conditions during delivery as well as creating adequate facilities for premature and low weight babies can be effective in reducing infant mortality.

5. Conclusions

The common cause of neonatal death was cardiac and respiratory disease. Almost of this death occurred in premature and LBW babies. We can prevent of born these babies by high quality prenatal care.

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