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A Study the Factors Affecting under the Age of 5 Years Child Mortality

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Abstract In this descriptive-analytical and retrospective study, all below 5 years children who were admitted to Bu Ali and died there during 2009 were studied. Data were collected through questionnaire and studying records of children under the age of 5 and then were analyzed. Among 3737 under 5 hospitalized children, 1302 people were infants and the rest were one month to 5 years old. 40% of the infants who died were male and 60% of them were female. 73/7% of infants were less than or equal to 2500g, 5% of mothers had gestational age of less than 25 weeks, 65% of them had gestational age 37-25 weeks, and the most common cause of death (38/46%) was cardiac arrest. There was a significant relationship between cause of death, the number of twins, maternal age at childbirth, and pregnancy care frequency with deaths of children under 5 but this relationship was not significant with other variables. Due to the high mortality rate and of children under 5 years old with a history of low birth weight and preterm delivery, by providing necessary methods of prevention and therapy this index can dramatically be reduced.

Keywords Under 5 Year-old , Children , Mortality, Risk Factors

1. Introduction

To be aware of the causes of mortality and their affecting factors in identifying health status and common diseases in the society for planning health issues, education, and the creation of new hospital posts can have an effective role. This identification has gained particular importance especially about the causes of below 5 years old child mortality. Because below 5-year-old child mortality is one of the most important health problems in developing countries, still about 30% of all deaths occur in this age group[1].

Annually, about 10/5 million and daily, over 26 thousand children under 5 die from mostly preventable disease from which about 40 percent occur in the first months of life[2]. This statistical index not only shows the quantity and the number of deaths, but also reflects the quality of life. According to available statistics, from the total annual birthrate in the world, more than 14 million people die in the first year of their lives and approximately 60% of all deaths in the first year of life are neonatal ones[3]. In recent years, the health network in our country has provided suitable ground for providing services and mortality of children under 5 declined in recent decade. However, death frequency of children under 5 in our country is much higher than the one in developed countries. Based on the vital horoscope of live births, our country's infant mortality rate in 1384 was 21 out of one thousand live births[4]. However, according to an annual rate, infant mortality declined from 20 million in 1960 to 9/7 million in 2006. In 2006, more than 80% of deaths of children under the age of 5 were in sub-Saharan Africa and South Asia. In order to achieve the Millennium Development Goal for below 5-year-old children's survival, this rate should be reduced to half by 2015 that this amount in 2006 was 72 children from 1000 which in 2015, it should reach to 31 children in 1000. In China, the rate of 45 deaths per one thousand live births in 1990 reduced to 24 deaths in 2006 and this decline in India was 34% and in the whole world it was 23% (during this period time)[1].

According to World Health Organization, major causes of below 5-year-old child morality in Iran and in the world include: infants diseases (37%, 62/9%), AIDS (3%, 1%), diarrheal diseases (17%, 5/5%), measles (3%, 1%), malaria (8%, 2%), pneumonia (19%, 6/4%), surgery (3%, 12/8%), and other causes (11% , 12/1%) respectively.

The infant mortality rate in 2004 in Iran and the world were respectively 19 and 28 per one thousand live births and the death rate of children under 5 in Iran and the world were 36 and 74 live births out of one thousand respectively[1].

The highest mortality rate of children below 5 years old in developing countries is in Sierra Leone (270 deaths per 1000 live births) having the first place and the lowest rate is in Cuba (7 deaths per 1000 live births) which is placed in 157th position[1].

Since every society has its own economic, social, cultural, health, political, and geographical condition which can

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directly or indirectly have an effect on the causes of death in that society, particularly on below 5-year-old child mortality, and due to the sensitivity of this period and the different causes of death in this age group with the other age groups, and to obtain a measure of health status in the region, it is necessary to study this issue in several areas. Because Bu Ali Children's Hospital in Sari city is the only pediatric medical and training center that generally provides medical services for children in urban and rural region, and any one didn't performe similar study in this area , thus the aim of this study was to determine the frequency and causes of death in below 5-year-old children in Bu Ali Hospital in Sari during 2009.

2. Methods

This study is a descriptive-analytical and retrospective study in which the community of the study consisted of 3737 children under 5 (of course after the neonatal period) who were admitted in 1387 at Bu Ali hospital. The study was performed in retrospective method and the information was collected based on data available in medical records of children who died. Variables included: gender, age, cause of death, birth rank of the dead baby, status of infants who died which included: age, birth weight, birth date, and place of birth; age difference of the dead child with previous child, a history of previous child's death in mother (including miscarriage, stillbirth, or death after birth) or (risk during mother's pregnancy), maternal age at pregnancy and the number of birth control in pregnancy.

The data collection tool was a questionnaire that its validity and reliability were measured based on content validity and calculating alpha coefficient of 0/6 respectively. Also in this study, the cause of death was determined based on the classification and diagnosis of diseases mentioned in the final discharge summary sheet that was matched with death certificate, which were classified in 7 groups. Data analysis was performed using SPSS software and Chi-square test was used to determine the relationship between these variables and mortality rates. The level of statistical significance in this study was 0/05.

3. Results

Among the 3737 children (1320 infants and 2417 were over one month) hospitalized in Bu Ali hospital in Sari in 1387, 78 deaths were seen, from which 60% (76/93) were infants and 18% (23/07) were in after the neonatal period. In this study, of 1302 infants, 434 cases were in NICU and 868 cases were hospitalized in neonatal unit. A total of 60 infants died in the hospital that 24 people (40%) were male and 60% of them were female. 46 subjects (73/7%) had LBW (less than or equal to 2500g). Among the infants who died, 3 people (5%) were with gestational age of less than 25 weeks, 39 cases (65%) with gestational age of 37-25 weeks, 17 cases (28 /3%) with gestational age of 41-38 weeks, and 1 person (1/7%) with gestational age of 42 to 44 weeks. The most common cause of death was cardiac arrest (36/7%) and a rare cause of deaths (1/7%) contained anomalies, diuresis metabolic, and meconium aspiration. On the other hand, 16 people (26/7%) of infants died during the first 24 hours after birth, 27 patients (45%) between 1 to 7 days, and 17 (28/3%) within 8 to 28 months of their age. Also, 43 mothers (71/7%) were over 35 years, 10 mothers (16/7%) were 18-35 years old, and 7 mothers (11/7%) were less than 18 years old. So that 50% of infants were born by normal vaginal delivery and the other 50% were born by caesarean. Moreover, the most common cause of hospitalization was respiratory distress 41 (68/3%). By using the two way Chi-square test, a significant relationship between gestational age, cause of death, cause of hospitalization, and maternal age with infant mortality rate was seen but this relationship was not significant between gender, birth weight, age at death, and type of delivery with infant mortality rate (Table 1).

Among children over 1 month, 7 cases (38/9%) were 6-2 months, 6 cases (33/3%) were 6 to 12 months, and 5 cases (28/8%) were 2-5 years old. Among 18 died children 7 cases (38/9%) were 6-2 months, 6 cases (33/3%) were 6 to 12 months and 5 cases (28/8%) were 2-5 years old. The total 18 persons who died with different causes: 8 (44/4%) with cardiac arrest, 1 (5/6%) due to cardiopulmonary arrest, 4 persons (22/2%) with disseminated intravascular coagulation due to (DIE), 2 persons (11/1%) with respiratory distress, 1 (5/6%) with meningitis, and 1 (5/6%) with myocardial hypertrophy, and 1 (5/6%) due to hydrocephalus.

Of these, 6 (33/3%) were first child, 7 (38/9%) were 2nd to 4th child and 5 persons (27/8%) were fifth or more than it. The age difference of dead child with previous child in 8 cases (44/4%) were less than 18 months, in 5 cases (27/8%) 35-18 months, and in 4 cases (22/2%) mothers with a history of child death including abortion, stillbirth and postnatal death were reported. All children were born in hospital and among the dead children above one month, 7 persons (38/9%) were the result of term delivery, and 6 persons (33/3%) were the result of preterm delivery. Six cases (33/3%) of the dead children had birth weights of less than 2 kg, 4 cases (22/2%) 3-2 kg and the rest (44/4%) more than 3kg. Among them, two cases (11/1%) were twins and the remaining pregnancies were singleton. Seven mothers (38/9%) had a history of high risk pregnancies and 1 mother (6/5%) was under 18, 10 cases (55/6%) were 35-18 years old, and 2 cases (11/1%) were over 35 years. Number of birth control in 12 cases (66/7%) was less than 8 times and for the rest of the cases (44/3%) it was more than 8 times. Also, based on the Chi-square test, there is a significant relationsh ip between cause of death, the number of twins, maternal age at childbirth, and pregnancy care frequency with the morality rate of below 5-year-old children but this relationship was not significant with other variables (Table 2).

Table 1. Investigating Significant Relationship between Some Variables with Infant Mortality

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

Table 2. Frequency distribution of some variables in one month to 5 years children

Percent	Number	Variable	
33.3%	6	First Child	Dead Child Was Result of:
38.9%	7	2^{nd} - 4^{th} Child	
27.8%	5	5^{th} Child and Higher	
44.4%	8	Less than 18 Month	The Age Interval Between Dead Child with Previous Child
27.8%	5	18-35	
22.2%	4	Mother with a History of Child Death	
38.9%	7	Term Pregnancy	Dead Child Was Result of :
33.3%	6	Preterm Delivery	
33.3%	6	Less than 2kg	Weight of Died Baby
22.2%	4	3-2Kg	
44.4%	8	More than and Equal to 3kg	
11.1%	2	Child Resulting from Twin Pregnancy	
38.9%	7	Maternal High-Risk Pregnancy	
5.6%	1	Under 18	Maternal Age
55.6%	10	18-35 Years	
11.1%	2	Above 35 Years	
66.7%	12	Less than 8 Times	Frequency of Prenatal Care
44.3%	6	More than 8 Times	

4. Discussion

The findings of this study show that morality rate in boys is more than girls. This is in accordance with the international findings[1], probably due to the cultural issues (baby girl less referred) and boys' vulnerability. The highest mortality was seen in children below one year (2 months to 12 months) old and this finding is consistent with all the literature and studies[6, 3, 7 and 8]. In this study, the most common causes of mortality were cardiac (44/4%), DIC (22/2%), and respiratory distress (11/1%). In a survey conducted by Hajian, the most common causes of mortality were infectious diseases (35/8%), respiratory (21/5%), and cardiovascular (10/3%) which was approximately consistent with the present study[9] whereas studies in Bangladesh[10], America[11, 12], Niamey[13], Thailand[14], India[15], and the World Health Organization report[16] have reported Acute respiratory infections, diarrhea, malnutrition, measles, and prematurity as the main causes of less than 5 years old children's morality. Although Health Organization in 2008 reported that in developing countries, diarrhea (19%), acute respiratory infections (13%), measles (10%), and prematurity (10%) were considered as the causes of less than 5 years old children's deaths[16], in this study, heart and cardiovascular problems and respiratory were the most common causes of death.

In this study, 44/4% of dead children above one month had a previous birth interval of less than 18 months. However, based on studies and literature, the shorter is the interval of one child from previous child, the more is the risk of babies' not staying alive[17, 18, and 19]. Also based on Namakin and et al.' theory, the death risk of infants who had more than 36 months interval was estimated that this indicates the importance of family planning services and compliance with the recommended interval (at least three years) between the two deliveries[20]. In this study, 66/66% of children who died had less than 2 kg birth weight and were premature. These factors in literature and studies have been determined as risk factors for child death[6, 12, 21, and 22]. Considering that the low birth weight (LBW) is associated with low socioeconomic status, as maternal diseases such as anemia, malnutrition, inadequate care during pregnancy, and birth

complications increase the rate of LBW, it seems that promotion of maternal health and live in the area has an important role in reducing LBW and also in the case of LBW, infants morality be prevented by providing early adequate health services and appropriate training recommendations. Also risk of death in infants whose mothers were identified high risk during pregnancy, as well as mothers who had a history of abortion and stillbirths were more than other mothers that this emphasizes the importance of special attention to high risk mothers. In similar studies, children whose mothers were high risk have always been in higher risk of death[6, 12, 15, 16 and 22]. In addition in this study, 66/7% of mothers whose children died had inadequate prenatal care. Many women who receive inadequate prenatal care are at risk of complications during birth. There are some barriers to prenatal care which includes: poor economic status, lack of insurance, lack of free care services, and inadequate training about the importance of prenatal care[6]. This study was consistent with that of Namakin and et al.[2].

Finally, considering the large number of factors shown significantly associated with infant mortality rates have significant are changeable. With increasing awareness of families, improving the quality of life, optimizing prenatal care, strengthening family planning programs, training about the identification of mothers requiring maternal care and giving appropriate services to them, paying particular attention to low-weight and premature infants, and providing more facilities to provide certain hospital services to this children many deaths during this critical period can be avoided. Due to the high incidence of mortality in children below 5 years, the necessity of comprehensive studies of cognitive health plan to prevent diseases and create facilities and services is essential in reducing their mortality.

5. Conclusions

According the result of this paper and detection the risk factor of under 5 years old mortality ,we can suggest that , carefull prenatal care and consultation before pregnancy can reduce these mortality.

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