

A Clinical Audit of Mortality and its Major Causes in Children from Birth to 24 Months of Age in the Gowal Mandi Area Lahore – Pakistan

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Abstract

Background: Perinatal mortality is the index of the available obstetric and perinatal services in a community concerned. There is limited available data regarding perinatal mortality in Pakistan. A study was conducted to assess mortality patterns according to age and its major causes in children from birth to 24 months of age.

Methods: This community based descriptive case series study was conducted in Gowal Mandi area Lahore, from Jan 1997 to Jan 2007. Pregnant women were registered and their offsprings were followed for two years by fourteen visits at specific time points. If any death occurred in the intervening period, verbal

autopsy was used to diagnose the main cause of death.

Results: A total of 934 mothers were registered, out of which 10 had still births. The mortality rate in first two years is 49.9 / 1000 live births. Maximum deaths (33%) occurred in first three days and 60% in 28 days. The number of deaths per 1000 live births from birth to 24 months of age is 49.9 per 1000 live births. The major causes of death were Asphyxia Neonatorum (20%), Birth trauma (13%) and Aspiration (11%).

Conclusion: This study shows a high mortality rate in the earliest age, 33% deaths occurred in first three days of life and 80% deaths were observed in first three months. The major causes of deaths were Asphyxia neonatorum (20%), birth trauma (13%) and aspiration (11%).

Key Words: Age Specific child Mortality, Asphyxia Neonatorum, Causes of child Mortality. A Clinical audit of mortality and its major causes in children from birth to 24 months of age in the Gowal Mandi area Lahore Pakistan.

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Introduction

Infant and child mortality rates are sensitive indicators of the social and economic levels of any country. High mortality rates reflect the existence of socioeconomic and health care problems. Health planning requires reliable information about the rates, ages, and causes of mortality. Unfortunately, precise and reliable information of this nature is lacking in most developing countries.

The general picture of child health in Pakistan could become critical as a result of rapid expansion of the population. Pakistan has experienced steady but modest declines in rates of mortality at all ages. The

latest in 2008; infant mortality rate of Pakistan is 78 per 1000 live births.¹ The infant mortality rate was very high in Pakistan until the early 1990s, at 100 deaths per 1000 live births.² According to the Millennium development goals (MDG's), Pakistan has to attain one – third reduction in 1990's IMR by the year 2015.³

There are many causes which have a large contribution in child mortality the major contributors to the neonatal mortality were birth asphyxia, sepsis and prematurity.⁴ In another study it was investigated that the main causes of early neonatal mortality are prematurity and related complications (35%), congenital malformations (23%), sepsis (19%), and birth anoxia (16%).⁵

In India, about 2.1 million child deaths occur every year, which is the highest number within a single country worldwide. The national under – 5 mortality rate is around 87 per 1000 live births but there is a wide variation between states, the main causes are diarrhea, pneumonia, and for the deaths among the neonates asphyxia, preterm delivery, sepsis and tetanus. The major underlying cause of death is under nutrition.⁶

According to the state of world children UNICEF 2007, in the analysis of global infant mortality, Singapore has the lowest infant mortality rate, 1.0 per 1,000 and many countries tie for second place with 2 per 1,000 live births. The highest rates globally were in Africa and South Asia.⁷

The purpose of this study is to describe mortality rates, main causes of deaths, age at death and age spe-

cific death rates in the children from birth to 24 months of age.

Material and Methods

The basis of the project is a follow up study of the outcome of pregnancies registered in the GowalMandi, which is an urban area of Lahore. The study was conducted by the department of Social and Preventive Paediatrics King Edward Medical University Lahore.

The study period was from Jan, 1997 to Jan, 2007. In this study the pregnant women, identified by surveying the study area and were registered from Jan, 1995 to Jan 2005. These registered mothers were followed throughout the pregnancy by antenatal visits and after the delivery; the newborns were followed up to two years by fourteen different visits at specific time points. The first visit was made as early as possible preferably within 72 hours of births. The second visit on 3rd day, third on 7th day and the fourth visit was made on 28th day. After this the baby was followed by monthly visit up to six months of age. The tenth visit on the 9 month of age, 11th visit at the age of 12 months. In the second year of life the baby was monitored at the age of 15 month, 18 month and at 24th month of age.

At each visit baby was measured for height, weight and examined for any illness. History was taken from mothers about any illness in the period intervening between two visits. If any death occurred in the intervening period, verbal autopsy method was used to diagnose the main cause of death; a well structured verbal autopsy form was used for this purpose.

Table 1: Age Specific Death Rates.

¥ Age interval = age intervals from birth to 24 months of age

☼ Deaths = child deaths observed in each age interval

* Mid year population = population at the mid of each interval

§ Age specific death rates = Deaths in each interval / mid year population

¶ Cumulative death rate = cumulated deaths up till each interval

Age Intervals ¥	Deaths ☼	Mid Year Population *	Age Specific Death Rates §	Cumulative Death Rates ¶	Deaths Per 1000
0 – 3 days	15	916.5	0.0164	0.0164	16.40
3 – 7 days	5	906.5	0.0055	0.0219	21.90
7 – 28 days	7	900.5	0.0078	0.0297	29.70
1 – 3 months	9	892.5	0.0101	0.0398	39.80
3 – 6 months	4	886.0	0.0045	0.0443	44.30
6 – 12 months	4	882.0	0.0045	0.0488	48.80
12 – 24 months	1	879.5	0.0011	0.0499	49.90
Total	45				

Results

A group of 924 children was followed up to 24 months of age from which 45 (4.9%) died and 49 (5.3%) moved from the study. There were 450 (48.7%) male and 468 (50.6%) female babies in this group. The information of sex for 6 babies was missing in the data.

Fig. 1 shows the age intervals and deaths in those intervals. It shows that the maximum deaths (33%) occur in first three days of life. In this study 60% of total deaths occurred in 28 days and 80% deaths occurred before the age of 3 months. The number of deaths per 1000 live births from birth to 24 months of age is given in the table 1, the over all child mortality rate is 49.9 per 1000 live births. Table 2 shows that Asphyxia Neonatorum is a cause for 20% of the total deaths. Birth trauma accounts for 13% and aspiration is a cause for 11% deaths. The other main causes of death were respiratory infections (9%), prematurity (7%), septicaemia (7%), chronic diarrhea (4%), and congenital malformations (4%). The parents of four children moved from the area of study after the death of child, and two parents refused for verbal autopsy. There were 30 / 450 (6%) deaths in male babies and 14/468 (2.9%) deaths in the female babies (Fig. 2).

Discussion

Infant mortality rate reflects a population's health status, which depends on several factors, such as diseases, environment, child development, and other population characteristics.⁸ This article deals with the relevance of child age on the probability of death in the different age groups throughout the first two years of life, taking into account the illnesses causing death.

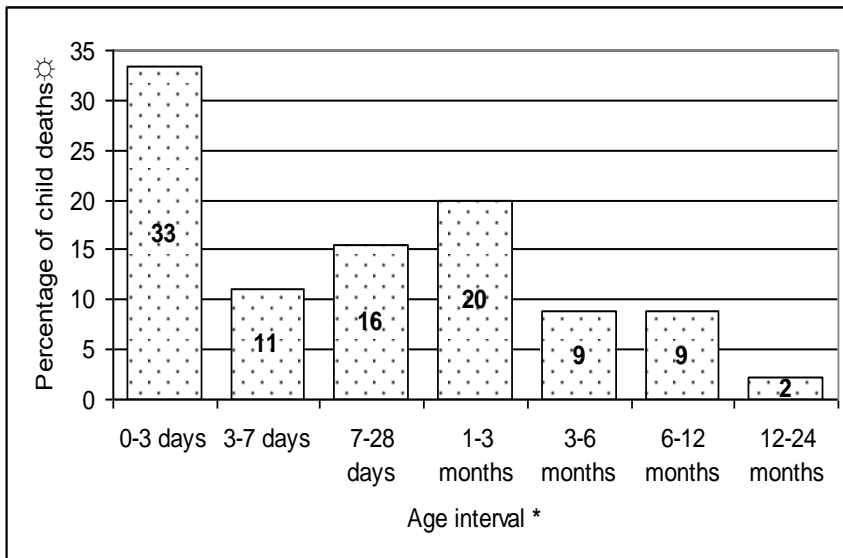
This study shows that the infant mortality rate during the period (Jan, 1997 to Jan, 2007) is 49.9 per 1000 live births in the urban area of GawalMandi, Lahore. This is less than the current official figure of 78 deaths per 1000 live births.¹ The strength of the data lies in the fact that the mothers were closely followed right from the 5th month of pregnancy. Even if it was not possible to examine some of the newborns within 72 hours of birth, fatal events were reported immediately. The monthly follow up of the whole group made it possible to detect any deaths occurring later. The same holds true for the age at death of the individual child. The causes of death were in most cases known due to the longitudinal follow up and careful clinical history taken. The verbal autopsy made in all deaths to identify the cause of death.

Table 2: Major Causes of Death.

Major Cases of Death ¶	Frequency	Percentage (%)
Asphyxia Neonatorum	9	20%
Birth Trauma	6	13%
Aspiration	5	11%
Respiratory Infections	4	9%
Prematurity	3	7%
Septicaemia	3	7%
Chronic Diarrhoea	2	4%
Congenital Malformations	2	4%
Neonatal pneumonia	2	4%
Renal Failure	1	2%
Acute Diarrhoea	1	2%
Hypothermia	1	2%
Parents moved after child death	4	9%
Refuse	2	4%
Total	45	100%

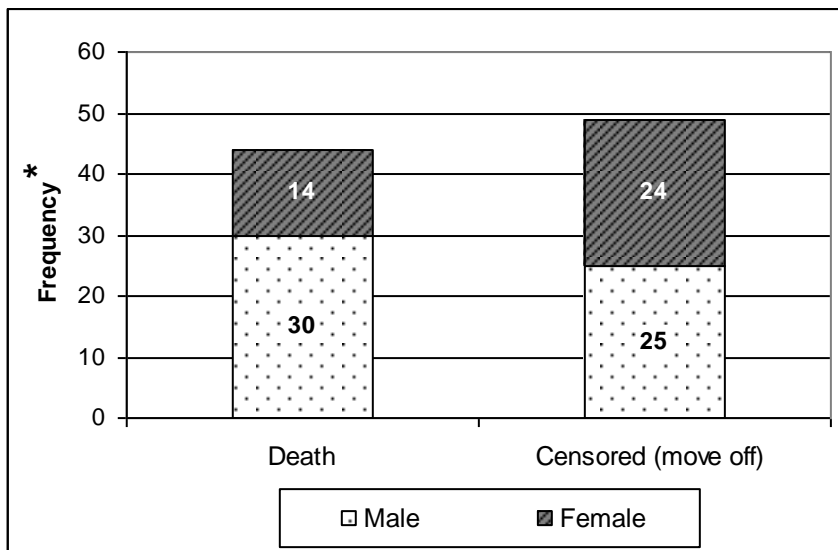
¶ Major causes of child deaths investigated through verbal autopsy

Fig. 1: Deaths with respect to age intervals.



* Age interval = age intervals from birth to 24 months of age
 ☼ Percentage of child deaths observed in each age interval

Fig. 2: Comparison of death in male and female babies.



*Frequency = Number of children in each category
 Censored (moved off) = Children moved from the study area

The area under study represents an urban slum of Lahore. Pakistan consists on 32.5% urban population and 67.5% of rural population.⁸ This area under study is most likely represent the major population found in other urban areas of the country, especially regarding the socioeconomic and educational characteristics and the access or usage of the health facilities.

Mortality has been declining steadily for a long time in the highly urbanized countries. But this decline has not been a uniform trend nor has it benefited all sections of the society equally. Perinatal mortality rate (PNMR) not only serves as a quantitative measure of maternity care but it also reflects the economic, social and educational standards of the community. Accord-

ing to a hospitalized study in Nawabshah 15.3% children of all ages died; 71% were underweight, septic meningitis, marasmus, persistent diarrhea / dysentery, severe pneumonia, viral encephalitis, cerebral malaria, measles and post measles state, septicemia, childhood tetanus, acute diarrhea and tuberculosis in descending order were found to be the main causes of death.⁹ Similarly in the present study Asphyxia Neonatorum is a cause for 20% of the total deaths. Birth trauma accounts for 13% and aspiration is a cause for 11% deaths. The other main causes of death were respiratory infections (9%), prematurity (7%), septicaemia (7%), chronic diarrhea (4%), and congenital malformations (4%).

In a hospitalized study in Lahore it was reported that about 56.66% of the expired neonates were low birth weight. Neonatal sepsis was the commonest cause of death (44%), second commonest cause of neonatal death was birth asphyxia (22%) and the third commonest cause was prematurity (19%) with its complications.¹⁰

Perinatal deaths are largely the result of poor maternal health, low socioeconomic status, lack of health awareness and inadequate care during antepartum, intrapartum and postpartum period. In a study at the Jinnah Postgraduate Medical Centre Karachi, it was found that perinatal mortality rate (PNMR) was 97.2 / 1000 total births and still birth rate 73.4 / 1000 total births. The leading cause of stillbirth was hypertensive disease of mother in 24%, this included Pregnancy Induced Hypertension 14% and eclampsia 10%. The next common cause was mechanical, accounted for 21.4%. Antepartum haemorrhage was responsible for 20% perinatal deaths and low birth weight (LBW) was identified in 14.4%. Congenital malformation caused deaths in 6.2%, maternal medical disorders as jaundice, anaemia and diabetes in 3.2% and neonatal infections as Respiratory Distress Syndrome, probable pneumonia, bleeding disorders and septicaemia caused deaths in 4.8%.¹¹

Several studies show a significant difference in death rates of male and female babies in the first two years of life male babies have a greater risk of mortality in the first year of life.^{9,12} The present study also shows significantly high mortality (68%) in male babies (Fig. 2).

A large percentage of these deaths are preventable, by improving the educational, Socio cultural and economic status of mothers. Planning of maternity services and maintenance of perinatal statistics and clinical audit at all levels is mandatory to improve the results. In a study it was seen that there was a significant reduction in mortality in LBW babies after training of medical and nursing staff. Reduction in overall PMR and NMR was also due to decrease in mortality in LBW babies.⁵

Conclusion

This study shows a high mortality rate in the earliest age, 20% deaths occurred in first three days of life. In the neonatal period (≤ 28 days) 60% deaths occurred

and in the age of first three months 80% deaths were observed. The major causes of deaths are Asphyxia neonatorum (20%), birth trauma (13%) and aspiration (11%).

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