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Survival Behavior of Children from Birth to 24 Months of Age in Gowal Mandi Area, Lahore

Objective: To estimate the survival time, survival analysis of the deaths and to compare survival distributions with respect to gender, birth weight and birth length in children from birth to 24 months of age.
Materials and Methods: This community based prospective cohort study was conducted in Gowal Mandi area Lahore, from Jan 1995 to Jan 2006. A cohort of 934 pregnant women was registered by surveying the study area, and their off springs were followed from birth to 24 months of age by fourteen visits at specific times in two years. The cause and age at death was determined by conducting verbal autopsy. The Kaplan Meier survival estimates were obtained for babies with respect to gender, birth weight and length.
Results: From this cohort 10 were still births and 45 children died before the age of 24 months. There were 450 (49.0%) male children and 468 (51.0%) female children. The overall mean survival time for the babies is 304.49 (247.16 to 361.01) days. Comparison of survival distributions shows that female babies (p<0.05), babies with normal birth weight (p<0.05) and length (p<0.05) have significantly more survival time as compared with male babies, low birth weight and length babies respectively.
Conclusion: The overall mean survival time for the babies in first two years is 304.49 days. This study also shows that male babies, low birth weight babies and the babies born with less than standard height are at more risk to die.
Key Words: Survival Analysis, Low birth weight and length babies, Survivor function, Verbal autopsy

Introduction

Perinatal mortality rate is a sensitive indicator of quality of care provided to women during pregnancy, at and after child birth and to the newborns in the first week of life. Regular perinatal audit would help in identifying all the factors that play a role in causing perinatal deaths and thus help in appropriate interventions to reduce avoidable perinatal deaths.1 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.2
In Pakistan, over 5 million children are born each year. Close to 9% do not survive until the end of the first year of life; of the approximately 0.45 million that die each year within the first year of life, nearly half of these deaths occur in the first month.3 There has been a decline in IMR from 82 per thousand live births in 2001-02 to 70 per thousand live births in 2005-06. The infant mortality rate for urban areas is 41 where as it is 82 in rural areas. This indicates that there is improvement in health care system more particularly in urban area.4
About 2.1 million Indian children under 5 years of age die each year. In spite of reduction in child mortality rate over the past two decades, the rate remains high at 87 per 1000 live births.5 The sex ratio at birth was 869 females per 1000 males. The mean infant mortality was 1.3 times higher in females than in males.6

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Results

In the twelve years of study a cohort of 934 women were registered from the study area. There were ten still births and 924 live births from these registered mothers. In which 453 (49 %) were male and 470 (51 %) were female babies and one baby was born with ambiguous genitalia. In this cohort 45 (4.9%) children died during the study and 49, (5.3%) moved from the study. Using the Kaplan Meier survival method the over all survival time (in days) for the children from birth to 24 months of age is computed as follows Table.1 Kaplan Meier Survival table (Life table)

Time (Days)	Status	Cumulative Survival	Standard Error	Cumulative Events (deaths)	Number Remaining
0	death	0.9043	0.0303	9	85
1	death	0.8601	0.036	13	78
2	death	0.8491	0.0372	14	77
3	death	0.8381	0.0383	15	76
5	death	0.8271	0.0394	16	75
6	death	0.783	0.043	20	71
8	death	0.7719	0.0438	21	70
9	death	0.7609	0.0445	22	69

Bangladesh is currently one of the very few countries in the world, which is on target for achieving the Millennium Development Goal (MDG) 4 relating to child mortality. There have been very rapid reductions in mortality, especially in recent years and among children aged over one month. However, this rate of reduction may be difficult to sustain and may impede the achievement of MDG 4. Neonatal deaths now contribute substantially (57%) to overall mortality of children aged less than five years, and reductions in neonatal mortality are difficult to achieve and have been slow in Bangladesh.7

The male infant is known throughout the world to be much more at risk of mortality than the female infant. In the US from 1979 to 1998 there were 420328 male infant deaths and 322077 female infant deaths from all causes which show a 5% excess in male birth rate and 24.3% male excess death rate. However, there is no known and accepted cause for this male excess of infant death.8

In the analysis of global infant mortality, according to the state of world's children UNICEF 2007, Iceland has the lowest infant mortality rate of 2.0 per 1,000 live births and many countries tie for the second position with IMR of 3/1000 live births.9
In this study, we describe the survival pattern of a cohort of newborns from birth to 24 months of age in the Gowal Mandi area Lahore. This study also shows the relationship of child survival with respect to gender, birth weight and birth length along with the comparison of survival distributions on the basis of these aspects.

Materials and Methods

In this prospective cohort study the outcome will be seen from the pregnancies registered from Jan 1995 to Jan 2006 in the Gowal Mandi, which is an urban area of Lahore. The study was conducted by the department of Social and Preventive Paediatrics King Edward Medical University Lahore.
In this study the pregnant women, identified by surveying the study area, were registered. The newborns were examined at birth within 72 hours and were followed up to two years by fourteen different visits at specific time intervals.

On each visit weight and length was taken using standardized instruments by trained lady health workers. History and present examination was taken regarding any illness in the intervening period. 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 4th visit was made on 28th day (early neonatal period). 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 15th, 18th and at 24th months of age.

Standardized study forms were used to collect the data regarding any illness, weight, and length at each visit. If any death occurred in the intervening period, verbal autopsy method was used to diagnose the main causes of death; a well structured verbal autopsy form was used for this purpose.

Survival analysis of the data including Kaplan Meier survival curves were constructed and log rank test was used for the comparison of survival curves using SPSS (version 11.5) statistical software. Survival functions (i.e. probability of surviving at least to time T) were estimated.

10	death	0.7499	0.0452	23	68
16	death	0.7388	0.0459	24	67
20	death	0.7278	0.0465	25	66
22	death	0.7168	0.0471	26	65
24	death	0.7058	0.0476	27	64
31	death	0.6944	0.0482	28	61
35	death	0.6712	0.0493	30	58
37	death	0.6597	0.0498	31	57
65	death	0.6474	0.0503	32	53
75	death	0.6352	0.0509	33	52
82	death	0.623	0.0513	34	51
92	death	0.6108	0.0518	35	50
115	death	0.5981	0.0522	36	47
129	death	0.5848	0.0527	37	44
156	death	0.5582	0.0536	39	42
158	death	0.5439	0.0541	40	38
223	death	0.5064	0.0565	42	27
317	death	0.4834	0.0584	43	21
358*	death	0.4579	0.0606	44	18
544	death	0.3663	0.0952	45	4

(* Event showing the probability of life after 1 year) Number of Cases: 94   Censored: 49 (52.13%) Events (deaths): 45