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ASSOCIATION OF NEONATAL MORTALITY WITH BIRTH WEIGHT

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Abstract:

730 low birth weight (LBW) newborns and 1460 control subjects were selected from 6250 newborns born and compared for mortality in the first seven and up to 28 days of life (early neonatal period). In this study, all low birth weight neonates are divided into four birth weight subgroups, and mortality within the first seven (early neonatal mortality) and up to twenty-eight days of life (neonatal mortality) is examined in both groups. Part of the results is as follows:

1. Pre-term babies account for 5.6% of all newborns,

2. 14.3% of LBW newborns die within the first seven days of life,

3. 75% of newborns who weigh very much (less than 1500 g) die within the first seven days of life,

4. Newborns with a low birth weight have a mortality twenty-four times higher than children with a normal birth weight in the first and fourth week of life,

5. Infant mortality in this study was 18 per thousand.

Keywords: *early neonatal mortality, newborns, low birth weight*

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INTRODUCTION:

The infant mortality rate (IMR), one of the most important health indicators, has fallen and continues to decline in developed countries, reaching 7-25 per thousand newborns, in line with the health status achieved by these countries. In developing countries, because of the huge differences in the socio-economic status of these countries, IMR are represented by very different numbers. According to W.H.O, this indicator is 26-200 (for 1000 live born) infants. In Pakistan, the IMR rate is generally declining, and a recent study conducted on 1% of the total Pakistani population in 1988 shows that this figure is 45. With such a decrease in IMR. The following questions become relevant:

1. What percentage of LBW babies is included in this rate? or what is the impact of LBW on infant mortality?
2. Was the decrease in neonatal mortality parallel to IMR?
3. What are the differences between LBW mortality and normal infants?
4. What further measures can be included in the planning and implementation of programs to improve this problem?

To examine the above questions, a survey was designed and conducted to examine various variables; the results of this study will be published gradually.

This article presents the results of the first data analysis, which includes the number of LBW infants and their mortality during the first and twenty-eight days of life.

MATERIALS AND METHODS:

This Cross sectional study was held in the Pediatrics department of Mayo Hospital Lahore for 32 years duration from March 2017 to March 2019. All women were interviewed for delivery and a multi-variable questionnaire was completed. For all infants who weighed less than 2500 g after birth, another questionnaire was completed and registered, which contained more detailed information about the mother and her newborns.

At this stage, two LBW babies were randomly selected for control, and for each of them the same detailed questionnaire was completed and recorded. The following methods were used to monitor and further information on the survival or death of these infants in the first seven to twenty-eight days of life:

1. During the hospitalization period, these infants were looked after by highly trained nurses, and all events related to that period were recorded by these trained personnel.
2. On the day of discharge, the mothers received two forms and two envelopes with stamps to be filled in by parents, one containing the relevant details of the first week of life of the newborn and the other to be completed by the end of the twenty-eighth day of life of the newborn and asked to send the completed forms. Infant deaths have also been reported. When the mothers began to answer and send the completed forms, this information was recorded in the original special questionnaire.
3. Mothers who did not respond within the required time, were sent another set of forms or contacted by phone (for those who provided a phone number) and were asked to inform us about the condition of the infant.
4. 4 who still did not answer were visited at the home at the address given. Although many of these addresses were not easily identifiable, every effort was made to locate these mothers and visit the home.

Although every effort was made to continue, by the end of the study, 8% of newborns for the first eight days of life and 14% who had reached 28 days could not be located, mainly due to migration, wrong address or change of address and therefore could not be included in this study.

RESULTS:

Of the 6250 newborns, 730 or 6% are infants with LBW. 1457 normal birth weight infants were selected for control by random sampling, and the mothers of both groups were interviewed while in hospital. A special questionnaire was completed and completed by a trained interviewer.

LBW infants are divided into 4 subgroups (Table I). About 10% of infants with LBW have very low birth weight (VLBW, less than 1500 g), and 90% are between 1500-2499 g, moderate LBW. Data for developed countries indicate that 1% of all newborns fall into the LBW category, which corresponds to our figures in this study, which shows that VLBW in this study accounts for less than 1% of all births.

Table I. Frequency distribution and percentage of LBW newborns according to birth weight

Frequency/Weight(g)	No.	%
<1000 gm	18	2.5
1000-1499	52	7.1
1500-1999	130	17.8
2000-2499	530	72.6
Total	730	100

Table II. Comparison of neonatal mortality of case and control newborns.

Outcome/Weight	>2500			>2500		
	No.	%	Cumulative	No.	%	Cumulative
Death first day	2.0	0.1	0.1	43.0	6.5	6.5
Death 2nd day	3.0	0.2	0.3	23.0	3.4	9.9
Death 3rd day	-	-	0.3	15.0	2.2	12.1
Death 4th day	-	-	0.3	8.0	1.2	13.3
Death 5th day	1.0	0.1	0.4	2.0	0.3	13.6
Death 6th day	1.0	0.1	0.5	3.0	0.4	14.0
Death 7th day	1.0	0.1	0.6	2.0	0.3	14.3
alive after seven days	1,327.0	99.4	100.0	574.0	85.7	100.0
Total	1,335.0	100.0	-	670.0	100.0	-

Table II. Comparison of neonatal mortality of case and control in the first seven and twenty-eight days of life.

Days/Death	Case			Control		
	No. Followed up	No. of Death	% of Death	No. Followed up	No. of Death	% of Death
1-7	670	96	14	1,335	8	0.6
1-28	629	115	18	1,251	10	0.8

Table IV. Frequency distribution and death of LBW neonates in first seven days of life according to birth subgroups.

Weight g/Death	No. Newborn	No. Death	% Death
<1000 g	18	16	89%
1000-1499	46	32	70%
1500-1999	124	26	21%
2000-2499	482	22	5%
Total	670	96	14%

Table V. Frequency distribution of neonatal death in first 28 days of life according to birth subgroups

Weight/Death	No. Newborn	No. Death	% Death
<1000 g	18	16	89%
1000-1499	46	34	74%
1500-1999	114	35	31%
2000-2499	451	30	7%
Total	629	115	18%

Table VI. Calculation of probability of neonatal morality rate (1988-89, Pakistan)

Case & Control/No. of Death	Ratio at Birth	No. Newborn	No. Death	Death Ratio in 28 Days	Probability of neonatal mortality rate
Case	0.056	629	115	0.183	0.010248
Control	0.944	1,251	10	0.008	0.007552
Total	1	1,880.0	125	0.191	0.0178

A total of 670 newborns from LBW were observed during the first seven days of life. During this period, 96 deaths were reported during the first seven days, which are further divided from the first to the seventh day (Table II).

The data presented in Table II show that:

1. 4.3% of infants from LBW die within the first week of life.
2. The number of people dying in the first 24 hours is twice as high as on the second day, three times as much as on the third day, five times as much as on the fourth day and 20 times on days 5, 6 and 7. In other words, 45% of deaths in the first week of life of infants with LBW occur within the first 24 hours after birth, and the danger of death decreases as the infant progresses towards the end of the first week of life.
3. Comparison of deaths among people with LBW with normal birth weight shows that although this figure among the second group is 6%, for people with LBW this figure is 14.3%. In other words, the probability of death is 24 times higher in infants with LBW compared to infants with normal birth weight.

Table III shows that L.B. mortality W. infants are 24 times the normal birth weight during the first seven days of life, and the percentage of infant deaths during the first 28 days of life is about 23 times greater than that of normal birth weight.

According to Table IV, 90% of people weighing less. Then 1000g dies during the first week of life. 7 This figure drops to 70% for people weighing between 1000-1500 g and 75% for people under 1500 g, while for people weighing between 1500-2499 g only 5% dies in the first week of life. In other words, the chance of survival increases as the birth weight increases. From table V we can conclude that: 1-18% of newborns weighing less than 2500 g die within the first 28 days of life, Infants 2- VLBW (birth weight less than 1500 g) are in extreme danger. According to the results of this study, the probability of infant mortality can be calculated, as shown in Table VI, at 18 per thousand.

DISCUSSION:

In the present study percentage of LBWs (less than 2500 g) born in statistically selected hospital comprise 6% of total births. This figure compares favorably with a study carried out a year ago in Karachi. With regard to the fact that 60% of the total population of Pakistan live in Punjab and 85-95% of total births occur in hospitals," this figure becomes very important when compared to LBWs given for the total births in the country, which is in the range of 10-14%.9 Our figure in Pakistan compares favorably with those of developed countries and is quite different from those of other developing countries: (which is similar to those of our national figure). This discrepancy could be explained as LBW was defined as follows:

a. In this study, less than 2500 g, while in other studies they might have included 2500 g in the LBW range,
b. The majority of pregnant women were house wives and were not engaged in heavy labor,
c. The pregnant woman in our culture has a special place in the family, and every family member tries to balance any deficiency. Early neonatal and neonatal mortality of LBWs is respectively 24 and 23 times that of normal births. IMR of urban population carried out on 1 % of population8 is 31 per thousand for total urban areas, and as the probability of neonatal mortality rate for our study is 18 per thousand, therefore by inference from this figure, we can assume that about 58% of total IMR occurs within this neonatal period which includes the majority of LBWs. This figure parallels that of developing countries Considering the trend of reduction of IMR in both rural and

urban areas and the fact that 58% of total IMR is neonatal mortality, therefore more preventive efforts should be directed for reduction of neonatal mortality. This could be achieved by adopting the following strategies:

1. Expansion of mother and child health for providing prenatal services, accompanied by education of mothers towards changes in the fertility behavior and attitude of the mothers, and
2. Improvement of services within hospitals and maternity units for provision of intensive care units for premature infants.
3. In conclusion, our recommendation is for provision of the first line of approach, i.e. special intensive care is of primary importance for helping the survival of premature infants.

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