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Complications of low birth weight babies in tertiary care Hospital

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ABSTRACT

BACKGROUND & OBJECTIVE: In public health, Low birth weight is a significant indicator of maternal health care, poverty, healthcare delivery services, and maternal and child nutrition. The objective of this study was to determine the frequency of complications associated with low birth weight in babies.

METHODOLOGY: A prospective observational study was conducted in the pediatric department of POF Hospital (affiliated with Wah Medical College) in Wah Cantt. Study duration was 1 year (1-1-2021 to 1-1-2022). A sample size of 195 low-birth-weight babies was calculated using the WHO calculator. Non-probability convenience sampling was used to select low-birth-weight babies. Birth weight was measured in 1st 24 hours of life. Babies were followed for 1 month to understand detailed complications. The data were analyzed using SPSS version 24. The Pearson chi-square test was used. P-value <0.05 was considered a significant measure.

RESULTS: 195 low birth weight babies were included in the study. There were 142(72.8%) babies with low birth weight, 29(20%) with very low birth weight, and 14(7.2%) with extremely low birth weight. Birth weight has a significant association with both gender (p = 0.005) and gestational age (p = 0.015). Complications due to low birth weight in newborn babies were septicemia 18(9.2%), hyaline membrane disease 38(19.5%), Necrotizing enterocolitis 29(14.9%), neonatal jaundice 21(10.8%), Feeding problems 8(4.1%), etc.

CONCLUSION: Low birth weight is a common factor for neonatal mortality and morbidity. A high frequency of low-birth-weight babies was found in our study. Hyaline membrane disease was the most common complication, followed by cerotizing enterococcal infection, neonatal jaundice, and septicemia.

KEYWORDS: Mortality, Morbidity, Septicemia.

INTRODUCTION

Low birth weight (LBW) is a key public health indicator of poverty, maternal healthcare, healthcare delivery, and nutrition for mothers and children [1]. The World Health Organization (WHO) defines LBW newborns as those weighing less than 2,500 grams at birth, regardless of gestational age [2]. There is clear evidence that newborns with LBW are more likely to die and suffer from illnesses after delivery than babies with normal birth weight. In low-income nations, newborns with low birth weights pose a serious health care burden. According to published research, birth weight is the first weight determined within the first hour following delivery [3].

Optimal fetal development is a major factor leading towards infant survival and social development. Globally, 16% of babies are born with LBW. In developing countries, 19% of babies are born with LBW, while in developed countries, 7% of babies are born with LBW. According to data in Pakistan, 19% of babies born in urban areas have LBW, and 32% of babies born in rural areas have LBW [4]. The incidence of low birth weight is found to be very high in low- and middle-income countries, resulting in more than 20 million births per year [5]. However, a marked variation has been reported in the global and regional rates of low-birth-weight deliveries. Pacific and East Asia reported 6% of low-birth-weight babies, while Sub-Saharan Africa and South Asia reported 13% and 28%, respectively [6]. Moreover, some developed countries are also facing a high rate of low birth weight, including the United States, Spain, Northern Ireland, and the United Kingdom [7]. The incidence of LBW babies is 19% in Pakistan; it ranges from 5% to 23% according to different regions [8].

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Birth weight is not only an indicator of infant health and nutritional status but also helps in understanding the development of babies, including their physical and psychological growth, as well as their survival chances. It is reported that low-birth-weight babies have a significant decrease in cognitive development [9]. Low birth weight babies are 20 times more prone to mortality than heavier babies. Other chronic conditions like coronary heart disease, hypertension, stroke, and non-insulin dependent diabetes mellitus have been associated with these babies later in life. The World Health Organization (WHO) states that LBW babies are at a higher risk of disease burden globally [10].

Low birth weight is a significant public health concern associated with several key indicators, including maternal health, poverty, nutrition, and inadequate healthcare delivery [11]. Despite such a high incidence of low birth weight babies, we still found a lack of knowledge regarding complications and outcomes associated with it in Pakistan [4]. A high incidence of low birth weight (LBW) in Pakistan reflects persistent challenges such as maternal under-nutrition, limited antenatal care, and socioeconomic disparities. However, the lack of awareness about its complications may stem from gaps in community health education, poor dissemination of maternal-child health information, and insufficient training of front-line health workers. Addressing this knowledge gap is crucial for improving neonatal outcomes. That's why this study aimed to determine the frequency of complications due to low birth weight in babies.

METHODOLOGY

A prospective observational study was conducted at the pediatric department of POF Hospital (affiliated with Wah Medical College) in Wah Cantt. Study duration was 1 year (1-1-2021 to 1-1-2022). Inclusion criteria were based upon pre-term babies with an age <37 weeks, all inborn and outborn babies admitted to the neonatal intensive care unit, and both genders. Exclusion criteria were based on babies with congenital anomalies and dimorphic faces. Written consent was taken from the parents of all participating patients. Ethical approval was taken from the corresponding hospital committee (ERC#POFH/ERC/12/19).

A sample size of 195 low-birth-weight babies was calculated using the WHO calculator (frequency of low-birth-weight babies = 46% [7], 95% confidence interval and margin of error = 7%). Babies were selected through convenience sampling. According to the World Health Organization, newborns weighing less than 2,500 grams are classified as having low birth weight. They are further divided into two categories: extremely low birth weight (<1000 g) and very low birth weight (<1500 g). The Gestational age of all babies was assessed by using antenatal ultrasound or the 1st date of the last menstrual period. If mothers were unsure about their due dates and scans were not performed, the modified Ballard scoring system was used to assess gestational age. Birth weight was measured in the first 24 hours of life. All babies were assessed for low birth weight and complications after 1 month of birth.

Data analysis was done with SPSS version 24. For numerical data, the mean and standard deviation of all participants were calculated. For nominal and categorical data, frequencies and percentages were calculated. The Pearson chi-square test was used to observe the association. P values less than 0.05 are accepted as statistically significant.

RESULTS

A total of 195 low-birth-weight babies were included in the study. There were 85(43.6%) male and 110(56.4%) female. Maternal age was 20-35 years in 113 (57.9%) and greater than 35 years in 82 (42.1%). Mothers education was classified as illiterate in 37(19%), primary to intermediate in 76(39%), intermediate to bachelors in 67(34.4%) and masters or higher in 15(7.7%). Parity was reported as primigravida in 72(36.9%) and para >1 in 123(63.1%). Mothers had a history of abortions in 47(24.1%), and 148(75.9%) did not have a history of abortions. Gestational age of babies was ≤ 32 weeks in 92(47.7%) babies and >33-38 weeks was found in 102(52.3%) babies. There were 142(72.8%) babies with low birth weight, 29(20%) with very low birth weight, and 14(7.2%) with extremely low birth weight, as shown in Table-I.

Table-I: Frequency distribution of Low birth weight babies.

Variable	Categories	n (%)
Birth weight in grams	Low birth weight (≤2500 g)	142(72.8)
	Very low birth weight (≤1500 g)	39(20)
	Extremely low birth weight (≤1000 g)	14(7.2)
Gestational age	≤32 weeks	93(47.7)
	33-38 weeks	102(52.3)

Table- II: Complications due to low birth weight.

Complications	n(%)
Septicemia	18(9.2)
Hyaline membrane disease	38(19.5)
Necrotizing enterocolitis	29(14.9)
Neonatal jaundice	21(10.8)
Feeding problems	8(4.1)
Anemia	7(3.6)
Hypocalcemia	7(3.6)
Hypoglycemia	8(4.1)
Intraventricular hemorrhage	8(4.1)
Apnea of pre maturity	10(5.1)
Others	10(5.1)

Complications due to low birth weight in new born babies were septicemia 18(9.2%), hyaline membrane disease 38(19.5%), Necrotizing enterocolitis 29(14.9%), neonatal jaundice 21(10.8%), Feeding problems 8(4.1%), Anemia 7(3.6%), Hypocalcemia 7(3.6%), hypoglycemia 8(4.1%), intraventricular hemorrhage 8(4.1%) and apnea of prematurity 10(5.1%) as shown in table- II.

Table-III: Association between birth weight, gender and gestational age.

Variables	Categories	Birth weight in grams			P -value
		Low birth weight n (%)	Very low birth weight n (%)	Extremely low birth weight n (%)	
Gender	Male	52(26.7)	24(12.3)	9(4.6)	0.005
	Female	90(46.2)	15(7.7)	5(2.6)	
Gestational age (weeks)	≤32 weeks	59(30.3)	24(12.3)	10(5.1)	0.015
	33-38 weeks	83(42.6)	15(7.7)	4(2.1)	
Total		142(72.8)	39(20)	14(7.2)	-

Maternal age was 20-35 years in 113 (57.9%) and greater than 35 years in 82 (42.1%). Mothers education was classified as illiterate in 37(19%), primary to intermediate in 76(39%), intermediate to bachelors in 67(34.4%) and masters or higher in 15(7.7%). Parity was reported as primigravida in 72(36.9%) and para >1 in 123(63.1%). Mothers had a history of abortions in 47(24.1%), and 148(75.9%) did not have a history of abortions. Gender and gestational age were significantly associated with birth weight, as shown in Table-III.

DISCUSSION

In countries with low or middle incomes, low birth weight is a leading cause of neonatal mortality and morbidity [12]. There are multiple factors associated with low birth weight babies in these countries, including age of mother, low income status, multiple gestations, previous history of preterm delivery, overweight mothers, short stature, and anemic mothers etc. literature also reported physical hard work in pregnancy duration as important factor for developing abnormalities and low birth weight [13]. Evidence exists that pre-maturity is also associated with a decreased interval between two births. It is very important to understand morbidities associated with prematurity to enhance the survival rate in low birth weight babies [14].

In our study, There were 142(72.8%) babies with lbw, 29(20%) with very lbw and 14(7.2%) with extremely lbw. In a similar study conducted in Karachi, there were 32.7% very low birth weight babies, 46.7% of babies with normal weight, and 15.1% of babies with normal birth weight [15]. Another study conducted in Pakistan reported that the incidence of LBW babies is 10.04% [16]. Another study reported that the frequency of LBW babies ranges from 19-23% in Lahore and Karachi [17].

In the present study, the Gestational age of babies was ≤ 32 weeks in 92 (47.7%) babies and >33-38 weeks in 102 (52.3%) babies. In a relevant study, the majority of LBW had gestational age <32 weeks. However, a similar study reported that 54.8% of low-birth-weight babies had a gestational age of>32 weeks [18]. The same study reports similar percentages of very low birth weight: 26.4% with birth weight < 2,500 grams and gestational age <32 weeks [19].

In our study, we found higher percentages of females with LBW compared to males ($p < 0.01$). However, the same literature reported contradictory findings. They showed a high percentage of males with LBW as compared to females [20]. At the same time, another similar study reported no difference in LBW babies concerning gender [21]. Complications of low birth weight include breathing problems, bleeding in the brain, and necrotizing enterocolitis [22], blindness, deafness, hydrocephaly, mental retardation, cerebral palsy, Stunted growth, inhibited cognitive development, and developmental disabilities [23].

STRENGTH:

This study is unique due to its large sample size, which contrasts with the relatively small sample sizes typically reported in the already published literature.

LIMITATIONS

To assess the mortality and morbidity associated with low birth weight newborns, a randomized controlled trial must be conducted. Conducting the study at a single clinical center limits its generalizability.

CONCLUSION

Low birth weight is a common factor for neonatal mortality and morbidity. A high frequency of LBW babies was found in our study. Hyaline membrane disease was the most common complication, followed by cerotizing enterococcal infection, neonatal jaundice, and septicemia.

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Authors Contributions:

Sohail Ashraf: Substantial contributions to the conception and design of the work.

Saba Mushtaq: The acquisition and analysis of data for the work.

Ayla Amin: Drafting the work .

Hira Tariq: reviewing it critically for important intellectual content

Usman Ahmed: Interpretation of data for the work.

Muhammad Jahanzaib: Final approval of the version to be published.

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