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Maternal Risk Factors of Low Birth Weight among New Born Babies at Tertiary Care Hospital, Lahore

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Abstract

Objective: To identify maternal risk factors associated with low birth weight among newborn babies at Lady Aitchison Hospital, Lahore.

Methodology: It was case control study that was done among 150 newborn babies delivered at Lady Aitchison Hospital, Lahore through non probability convenient sampling. Results were obtained using SPSS version 23.0. Chi Square and Odds ratio was calculated and also logistic regression was applied.

Results: The mean weight of case and control babies was 1.72 ± 0.38 Kg and 3.37 ± 0.49 Kg while mean gestational age was 34.63 ± 2.35 weeks and 36.91 ± 1.35 weeks respectively. The baby's gender showed that 50.7% were males and remaining were females. There were 68.7% pre-term babies and consanguinity was seen in 46% couples. Applying logistic regression showed that mother occupation [AOR (95% CI): 11.248 (2.316-54.627)] and family class [AOR (95% CI): 10.551 (2.168-51.344)] remained risk factors while term pregnancy [AOR (95% CI): 0.082 (0.026-0.260)] and better hemoglobin level [AOR (95% CI): 0.132 (0.042-0.413)] showed protective effect.

Conclusion: Results from this emphasizes that the sociodemographic profile as well as pregnancy duration with better hemoglobin levels must be monitored for better outcome.

Key words: Low Birth Weight, Pre Term, Risk Factors.

Introduction

The multifactorial phenomenon characterized by weight of new born <2500 gram (gm) is termed as low birth weight (LBW). The adverse result ranges from short term to long term thus making it major problem of public health nature around the globe. Babies with a birth weight of less than 2500g, irrespective of the period of their gestation, are termed as LBW babies. The prevalence of LBW being problem of public health nature among developing countries is preventable. The contribution of LBW is substantially high to mortalities related to childhood, infant, as well as neonatal and also, enhances morbidity among these age groups. The weight gained by the infant from birth serves as an important maternal health indicator as well as nutritional status either during the course of pregnancy or the prior period of her life. [1]

For determining the health status regarding any community, the most important indicator used is infant's birth weight which is highly associated with neonatal deaths as well as natural growth and development processes in children. [2] In 2000, the WHO also released a report, stating that LBW infants made up 14% of all births throughout the world, and such a value accounted for 56.11% of all births in Iran. [3] The incidence of LBW in different parts of the world is similarly varied; in other words, LBW rates in Africa, Asia, Europe, and Latin America have been reported to be 14.3%, 18.3%, 4.6%, 10%; respectively. [4] This amount has been also reported by 10% and 4.4% in Iran, and in the city of Yazd, respectively. [5] Moreover; LBW occurring in developed and developing countries can impose heavy burdens on family members, and health systems. [6] There is acute problem of LBW in almost 50% neonates born in South Asia, while in Pakistan the percentage of LBW among neonates is almost 5%. The statistics from Pakistan national surveys showed that there was an estimated 12 to 25 percent occurrence of LBW among new born and also scarce literature is available comprising risk factors

among reproductive age group women (15-49 years) that could cause LBW. [7]

The occurrence of LBW is associated with women low body mass index as well as anemia as shown from literature from Karachi, Quetta, Larkana and Turkey. [8-12] Socioeconomic status and acceptability of antenatal care is also risk factors that need to be addressed.[13] Recent research studies have also revealed that adolescents born with LBW are three times more likely to suffer from psychiatric and behavioral disorders including attention deficit hyperactivity disorder (ADHD). [14] Likewise, it has been reported that LBW infants have lower intelligence quotient (IQ) scores than normal babies.[15]

Furthermore, recent epidemiological studies have shown that LBW can augment the risk of mortality during infancy and other life stages; it is even associated with diseases, such as hypertension, atherosclerosis, [16] diabetes, stroke, and obesity in adulthood.[17] In Iran, infants constitute the most common age group affected with child mortality, and 50% of these cases are due to LBW. [15]

It should be noted that various factors including genetic, environmental, fetal, maternal, and paternal ones can affect LBW.[18] In addition, factors such as hyperglycemia, history of pregnancy-induced hypertension, types of obstetric violence, maternal age, birth season, use of iron supplements during pregnancy, birth order, gestational age, and maternal education can have an impact on birth weight. [18, 19]

The data for evaluating as well as monitoring the set goals of progress for nation regarding reduced neonatal problems and also infant mortalities or morbidities by using birth weight statistics. The available data should be improved by conducting exploratory population based researches time to time. As can be seen, local studies have sufficient information regarding low birth weight problems in infants a topic which has been regularly taken up in international and regional data. The policy makers, therefore, have to rely on national as well as international figures to prevent and control low birth weight in our country, province and Lahore district alike. It is due to the facts mentioned above that this very important study was taken up to be conducted at Lady Aitchison Hospital, Lahore for assessing low birth weight babies incidence delivering at tertiary care level hospital in Lahore city and also the associated risk factors.

Methodology

This case control study was carried out among 150 new born babies delivered at Lady Aitchison Hospital,

Lahore. The cases and controls were selected conveniently during specified period (15-01-2020 to 15-06-2020). The sample size was calculated using WHO sample size calculator 2.0 taking 44.3% proportion among cases and 31.4% among controls. [20] The macrosomic or congenital anomalies babies were excluded from the study. After informed consent from parents, the newborn babies were examined and data regarding socio-demographic and risk factors were collected on a structured questionnaire. The researcher herself interviewed the parents/guardian and record data of maternal factors. The data was reviewed and entered on questionnaire was analyzed using SPSS Version 23.0. The normality was checked using Kolmogorov-Smirnov test. Frequency along with percentages was calculated for categorical variables and Mean±SD was calculated for quantitative variables. Mann Whitney test and chi square test was used for association; odds ratio was also calculated and OR>1 was considered as risk factor and p-value <0.05 were taken as significant. Logistic regression was also applied.

Results

A total of 150 mothers (75 cases and 75 controls) having single ton live births were enrolled in the study. The mean age among enrolled mothers was 29.89±4.98 years. The mean weight of case and control babies was 1.72±0.38 Kg and 3.37±0.49 Kg while mean gestational age was 34.63±2.35 weeks and 36.91±1.35 weeks respectively. The baby's gender showed that 50.7% were males and the remaining were females. There were 68.7% pre term babies and consanguinity was seen in 46% couples. The mean distance of respondent from the health facility was 34.02±54.86 Km.

The table below shows the mean comparison of various factors among cases and controls. The hemoglobin levels was lower in cases as compared to controls, pre term babies were mostly present in cases, lower marriage duration also found significant and distance from the health facility also showed significant results (Table I).

Mother occupation showed 61.4% were housewives while 35.8% were working mothers (p=0.002). There were 37.7% poor mothers among cases and 56.7% were not poor (p=0.026). Regarding complications and other medical conditions, it was observed that 67.9% of the mothers had complications during pregnancy as compared to 2.4% cases that had no complication during pregnancy (p<0.001). It was also observed that 61.7% of the mothers were having complications during delivery as compared to 42.2% of the mothers who were not having complications during delivery (p=0.020). Regarding term pregnancy, 75.9% were pre term and

Table I: Comparing Means of various factors within Study Groups

Variables	Study Groups		Mann Whitney Test	p value
	Cases Mean±SD	Controls Mean ± SD		
Hemoglobin Level (g/dL)	7.32±1.17	8.95±0.98	-7.349	<0.001*
Babies Weight (Kg)	1.72±0.38	3.37±0.49	-10.617	<0.001*
Gestational Age (Weeks)	34.63±2.35	36.91±1.35	-6.385	<0.001*
Marriage Duration (Years)	7.69±3.74	9.92±3.90	-3.721	<0.001*
Distance Health Facility (KM)	34.39±44.29	33.65±64.02	-2.723	0.006*

*p-value <0.05

21.1% were full term among cases (p<0.001). The cases showed 44.8% antenatal visits was ≤4 and 76% was >4 visits (p=0.004). The cases showed 83.1% hemoglobin levels was ≤8 and 20.3% was >8 level (p<0.001). Applying logistic regression showed that mother occupation [AOR (95% CI): 11.248 (2.316-54.627)] and

family class [AOR (95% CI): 10.551 (2.168-51.344)] remained risk factors for low birth weight while term pregnancy [AOR (95% CI): 0.082 (0.026-0.260)] and better hemoglobin level [AOR (95% CI): 0.132 (0.042-0.413)] showed protective effect (Table II).

Discussion

Low birth weight among babies is considered an important public health problem across the globe particularly among the people of developing countries. The estimates shown by WHO showed that almost 25 million babies that are born every year have LBW and among them, five million die worldwide. [21] LBW was caused by various factors that contribute towards it, both related to fetus and mother. There is an interrelation seen among social and biological maternal risk factors. The

mortality related to LBW could possibly be reduced very easily because the modifications could be made to the risk factors if they are detected earlier and therefore managed using simple techniques. [22]

In this study, the mean weight of cases was comparable with the study done by Dr. Naveed et al, showing the almost same weight of their study participants as ours. [23] In a study by Abida Sultana et al, Gulnaz et al, and Brig. Khalid showed that LBW was present among 27.4%, 10.04% and 32.46% babies respectively. [24-26] In another study by Marziyeh Safari and associates showed the prevalence of LBW was very low i.e., 4.7%. [27] This implies that low birth weight is found in almost every part of the world and there must be strategies to reduce its prevalence.

Mother occupation was considered as risk factor in the study results and previous literature showed that mother occupation was shown as a risk factor and in some literature it was not shown to be risk factor. [25, 27] The mean hemoglobin level of mothers was also found statistically significant Anemia was found to be risk factor in a study by Habib and others. [20] There were 59% anemic mothers in a study done at Rahim Yar Khan. [23]

Table II: Association of Maternal Factors with Low Birth Weight Occurrence

Variables		Study Groups		OR (CI-95%)	p-value	β	AOR (CI-95%)	p-value
		Cases (%)	Controls (%)					
Mother Occupation	House Wife	51 (61.4)	32 (38.6)	2.855 (1.459-5.593)	0.002	2.42	11.248 (2.316-54.627)	0.003*
	Working	24 (35.8)	43 (64.2)					
Family Class	Poor	20 (37.7)	33 (62.3)	0.463 (0.233-0.918)	0.026	2.356	10.551 (2.168-51.344)	0.004*
	Not Poor	55 (56.7)	42 (43.3)					
Complications During Pregnancy	Yes	74 (67.9)	35 (32.1)	84.571 (11.167-640.491)	<0.001	-4.211	1.015 (0.001-1.410)	0.065
	No	01 (2.4)	40 (97.6)					
Complications During Delivery	Yes	37 (61.7)	23 (38.3)	2.201 (1.129-4.292)	0.020	-0.214	0.807 (0.263-2.483)	0.807
	No	38 (42.2)	52 (57.8)					
Term Pregnancy	Pre	60 (75.9)	19 (24.1)	11.789 (5.466-25.429)	<0.001	-2.504	0.082 (0.026-0.260)	<0.001*
	Full	15 (21.1)	56 (78.9)					
Antenatal Visits	≤ 4	56 (44.8)	69 (55.2)	0.256 (0.096-0.685)	0.004	0.740	2.096 (0.541-8.128)	0.284
	> 4	19 (76)	06 (24)					
Hemoglobin Level	≤ 8	59 (83.1)	12 (16.9)	19.359 (8.455-44.328)	<0.001	-2.021	0.132 (0.042-0.413)	<0.001*
	> 8	16 (20.3)	63 (79.7)					

* p-value <0.05; OR = Odds Ratio; AOR = Adjusted Odds ratio; β = Regression Coefficient

Having low hemoglobin levels was found significant with low birth weight as demonstrated by results of Gulnaz and colleagues. [25]

The family class was also found significant , while in a study by Dr. Muhammad Naveed showed that socioeconomic level (59%) was a risk factor for LBW. [23] There were 32% low socioeconomic class mothers that gave birth to babies having low weight. [24] Family income was found significant with low birth weight in a study by Habib and others. [25]

Lower the antenatal visits i.e., ≤4, higher the chances of low birth weight. In a study by Muhammad Habib showed that having less than 2 antenatal visits was a risk factor for developing low birth weight [20] and study by Abida Sultana and others showed that antenatal visits were missing in 11.6% of the respondents. [24] In a study from Ethiopia showed that antenatal care was a risk factor for low birth weight babies. [28] Being pre term also served as risk factor for low birth weight as also shown in a study that 94% of the babies having low weight were premature. [23] In a study by Brig. Khalid Mehmood showed that 37% of LBW babies were preterm. [26] Complications either during pregnancy or delivery served as risk factor for low birth weight and the supported in study done by Gulnaz, [25] Brig. Khalid, [26], Dilip Kumar [29] and in study from Ethiopia. [28] In a study by Habib, showed that occupation (AOR: 1.82; 95% CI: 1.26-2.44) and having low social class was (AOR: 2.43; 95% CI: 1.34-2.88) risk factors. [20]

Conclusion

The mother's occupation, poor family class, had pre term baby, had less antenatal visits, suffered from complications, had low hemoglobin levels were associated with low birth weight babies. After adjusting the mother occupation and family class remained risk factors for low birth weight and protective effect was shown by having full term babies and higher hemoglobin levels.

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Authors Contribution:
[1,3]Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work & Final approval of the version to be published
[2,4,5] Drafting the work or revising it critically for important intellectual content;