



**FREQUENCY AND RISK FACTORS ASSOCIATED WITH LOW BIRTH WEIGHT OF  
NEWBORNS BEING DELIVERED IN A TERTIARY CARE HOSPITAL IN A  
DEVELOPING COUNTRY**

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**ABSTRACT**

**Background:** Being a developing country and having a great issue of malnutrition and chronic diseases, it has been seen that there is a high frequency of low birth weight infants in Pakistan. This study has been done to find out frequency and risk factors associated with low birth weight newborns. **Objective:** To assess the frequency and risk factors associated with a low birth weight of newborns delivering in the labor room of Darul Sehat Hospital, Karachi. **Material and Methods: Study Design:** Descriptive Study. **Study Setting:** Darul Sehat Hospital, Karachi. **Study duration:** 1-month Duration (October 1st, 2019 – November 1st, 2019). **Inclusion criteria** : Patients presenting to Labor Room of Darul Sehat Hospital, consenting to be a part of this research and gave births to infants after 37 weeks of gestation and weighed less than 2500g. **Exclusion criteria:** Patients who did not consent, comatose patients, and those in serious conditions. **Data Collection and analysis:** 138 subjects fulfilling the inclusion criteria were included in our study. After verbal informed consent, a structured questionnaire was handed over or all the questions were directly asked from the patient by the group members in cases of illiterate patients. All the information will be collected in this structured questionnaire. Data will be analyzed by SPSS version 21.0. For quantitative variables, the mean and standard deviation will be computed and for qualitative variables, frequency and percentages will be calculated. **Results:** While trying to estimate frequency, we took random samples of patients among which 87% were born with normal birth weight (i.e 2500 grams) and 13% were born with low birth weight (i.e less than 2500 grams). It was found that work-related stress has been the leading cause of low birth weight in about 55.6% of patients among low birth weight groups. **Conclusion:** Women exposed to certain risk factors tend to give birth to low birth weight babies. Of these, stress, chronic infections, and malnutrition are important contributors.

**KEYWORDS:** Low birth weight, anemia, stress, maternal age, paternal smoking.

**INTRODUCTION**

Low birth weight (LBW) is defined by the World Health Organization as a birth weight of a live-born infant of 2,499 g or less, regardless of gestational age.<sup>[1]</sup> It was indicated in one study that low birth weight was associated significantly with first-cousin marriages and non-significantly with second-cousin marriages. Furthermore, first-cousin marriages can reduce the birth

weight of siblings of consanguineous couples 144 g more compared to non-consanguineous marriage.<sup>[2]</sup> Paternal age is another associated risk factor of low birth weight and other birth defects. In advanced age, a 19% increased risk of low birth weight is observed.<sup>[3]</sup>

A retrospective study was conducted in Japan on a total of 1336 mothers with a mean age of 34 years and body

mass index less than 23 kg per meter square. After full-term delivery of singleton infants, it was concluded that mothers with low body mass index resulted in giving birth to low body weight infants,<sup>[4]</sup> Maternal risk factors like maternal malnutrition,<sup>[5]</sup> socioeconomic status,<sup>[6]</sup> assisted reproduction,<sup>[7]</sup> and young maternal age,<sup>[8]</sup> have been found to contribute to incidences of low birth weight in infants and preterm birth. Stressful life events in one study also increase the risk of low birth weight infants.<sup>[9]</sup>

Certain diseases also elevate the risk of adverse birth outcomes. In a study, infants born to women with *H. pylori* and daily vomiting had slightly reduced birth weight and an increased risk of being small for gestational age. *H. pylori* and daily vomiting did not significantly affect the prematurity rate.<sup>[10]</sup> Tuberculosis,<sup>[11]</sup> and malaria,<sup>[12]</sup> when present in pregnant women cause a deleterious impact on the newborns. Chronic diseases like diabetes, asthma, and hypertension have been linked to morbidity and mortality in the infant, along with preterm birth, microsomia, infant death, increased health care expenditures, and low birth weight.<sup>[13]</sup> Hepatitis B/C infection, carrier state, or co-infections increases the risk of congenital anomalies as well as low birth weight.<sup>[14]</sup>

The use of antibiotics during pregnancy is also a very important cause of low birth weight infants.<sup>[15]</sup> According to a study held in Roman, women who smoke during pregnancy are more likely to give birth to low birth weight infants as compared to non-smokers.<sup>[16]</sup> Also, the newborns who are small for gestational age, are at greater risk of having low birth weight. Smoking, alcohol use, and other social correlates are responsible factors for small for gestational age infants.<sup>[17]</sup>

A cross-sectional study was conducted in 2014 in Zimbabwe showed the prevalence of low birth weight to be 12.8%. The prevalence of low birth weight can be reduced by promoting access to antenatal care services, especially in rural areas.<sup>[18]</sup> Another cohort study has shown that women who suffer from Vitamin D deficiency during pregnancy were more at risk to give birth to low birth weight infants; the prevalence of low birth weight infants in this study was 4.98 percent. In the Chinese population, maternal Vitamin D deficiency elevates the risk of small for gestational age and low birth weight infants.<sup>[19]</sup> Mothers who did not take iron supplements during pregnancy also exhibited an elevated risk of giving birth to low birth weight newborns.<sup>[20]</sup> A study conducted in Iran showed the prevalence of low birth weight was 9.4% in the population. Preterm, neonate female sex, low parity, pregnancy age <18 years, pregnancy age >35 years, delivery by cesarean section, pregnancy risk factors, maternal illiteracy, living in the rural area, consanguineous, and delivery by obstetricians were identified as significant factors associated with low birth weight in this study.<sup>[21]</sup>

## OPERATIONAL DEFINITION

❖ **Low Birth Weight:** Low birth weight (LBW) is defined as a birth weight of a live born infant of 2,499 g or less, regardless of gestational age.

## MATERIAL AND METHODS

**Study Design:** Descriptive Study

**Study Setting:** Darul Sehat Hospital, Karachi

**Study Duration:** One Month duration (October 1st, 2019 – November 1st, 2019)

**Sample Size:** 138 patients

**Sample technique:** Probability purposive technique

## SAMPLE SELECTION

**Inclusion Criteria:** Patients presenting to Labor Room of Darul Sehat Hospital, consenting to be a part of this research and gave births to infants after 37 weeks of gestation and weighed less than 2500g

**Exclusion Criteria:** Patients who did not consent, comatose patients, and those in serious conditions.

**Variables Dependent:** Maternal age, parity, maternal socioeconomic status, maternal diet.

**Variables Independent:** Maternal literacy rate, maternal height.

## DATA COLLECTION AND ANALYSIS

138 subjects fulfilling the inclusion criteria were included in our study. After verbal informed consent, a structured questionnaire was handed over or all the questions were directly asked from the patient by the group members in cases of illiterate patients. All the information will be collected in this structured questionnaire. Data will be analyzed by SPSS version 21.0. For quantitative variables, the mean and standard deviation will be computed and for qualitative variables, frequency and percentages will be calculated.

## RESULTS AND FINDINGS

We took 138 female participants of various ages coming to Darul Sehat Hospital, Karachi to find out the frequency and risk factors of low birth weight newborns being born in the Labor Room. While trying to estimate frequency, we took random samples of patients among which 87% were born with normal birth weight (i.e above 2500 grams) and 13% were born with low birth weight (i.e less than 2500 grams). Out of 138, the majority of 107 (77.5%) were of the age group 20 to 30 years. Other age groups are taken into the research were 30 to 40 years (16.7% pts), 10 to 20 years (4.3% pts) and 40 to 50 years (1.4% pts). Majority 31.2% (43) were educated to secondary school level and illiteracy rate being up to 28.3% (39). This was expected as about 59.4% (82) were from Urban areas while 40.6% (56) were from the rural area. Among our sample population, 95 (68.8%) had C-section done. The neonatal sex proportion was divided into 44.9% males and 55.1% females.

Many risk factors were taken into account such as smoking women, smoking husband, drinking, diabetes

mellitus. It was found that most women were involved in work-related stress (62.8%). Anemia was found to be prevalent in 58.4% of the patients. So we tabulated and cross-referenced these risk factors with low birth weight to find out which of these factors increased the chances of low birth weight. Only patients with low birth weight babies were taken into account. It was found that work-related stress was the leading cause of low birth weight with about 55.6% of patients had babies below 2500 grams. Anemia and smoker husband were the second leading cause in patients having low birth weight babies.

The third risk factor was surprisingly patients who took Calcium supplements with about 33.3% with low birth weight newborns. Other factors and their percentage of low birth weight included were hypertensive disorders (27.8%), Smoker Women(16.7% pts), Gestational, Diabetes Mellitus(16.7% pts), Hepatitis(16.7% pts), Vitamin D (16.7% pts). Drinking(5.6% pts) and thyroid disorder(5.6% pts) were insignificant. However, when normal birth weight babies were taken into account, it was found that about 74.8% of women with calcium intake had the highest percentage of normal birth weight babies while 73.1% of patients with normal birth weight babies had taken Vitamin D.

Variables	Frequency	Percent
<b>Maternal Age</b>		
10-20	6	4.3
20-30	107	77.5
30-40	23	16.7
40-50	2	1.4
<b>Residence</b>		
Urban	82	59.4
Rural	56	40.6
<b>Education</b>		
Tertiary	26	18.8
Secondary School	43	31.2
Primary School	30	21.7
Illiterate	39	28.3
<b>Mode Of Delivery</b>		
C-section	95	68.8
Normal Vaginal	43	31.2
<b>Neonatal Sex</b>		
Male	62	44.9
Female	76	55.1
<b>Neonatal weight</b>		
Low birth weight ( < 2400 gms)	18	13.0
Normal birth weight ( > 2500 gms)	120	87.0

#### Risk factors Frequencies

	Responses		Percent of cases
	N	Percent	
Smoking Women	4	.9%	2.9%
Smoking Husband	44	9.7%	32.1%
Drinking	1	.2%	.7%
Gestational Diabetes Mellitus	10	2.2%	7.3%
Hypertensive Disorder	30	6.6%	21.9%
Asthma	6	1.3%	4.4%
Anemia	80	17.6%	58.4%
Hepatitis	3	.7%	2.2%
Thyroid Disorder	6	1.3%	4.4%
Stressful Work	86	18.9%	62.8%
Vitamin D	90	19.8%	65.7%
Calcium Intake	95	20.9%	69.3%
Total	455	100.00%	332.1%

**Risk factors\*Neonatal weight Cross-tabulation.**

	Neonatal weight		Total	Chi-square
	Low Birth weight (<2400 grams)	Normal Birth weight (>2500 grams)		P value
Smoking Women	3 16.7%	1 8%	4	13.942 .005
Smoking Husband	8 44.4%	36 30.3%	44	
Drinking Alcohol	1 5.6%	0 .0%	1	
Gestational Diabetes Mellitus	3 16.7%	7 5.9%	10	
Hypertensive Disorder	5 27.8%	25 21.0%	30	
Asthma	2 11.1%	4 3.4%	6	
Anemia	8 44.4%	72 60.5%	80	
Hepatitis	3 16.7%	0 .0%	3	
Thyroid Disorder	1 5.6%	5 4.1%	6	
Stressful Work	10 55.6%	76 63.9%	86	
Vitamin D	3 16.7%	87 73.1%	90	
Calcium Intake	6 33.3%	89 74.8%	95	
Total	18	120	138	

**DISCUSSION**

The purpose of this research was to find out frequency and risk factors associated with low birth weight in newborns of patients coming to the labor room of Darul Sehat Hospital, Karachi. Many studies have been conducted in the past in various parts of the world to conclude that there is a strong link between various risk factors affecting mothers during pregnancy and as a result they are having low birth weight babies. This research will further add points to the topic at hand. Work-related stress during pregnancy was significantly associated with LBW in this study. A greater proportion of LBW babies were born to mothers having stress at work.

In our study, it was found that younger mothers had more LBW babies as compared to older mothers (above 30 years). Hence preventing early marriages would contribute significantly to reducing the number of LBW infants. We also took anemia as one of the risk factors in our study and it was found that while anemia was majorly causing LBW in babies, however, a large number of anemic mothers (60.5%) did give birth to normal weight babies. Low maternal hemoglobin level was found to be associated with higher chances of LBW babies. This could be due to varying degrees of anemia which were not taken into account, duration of anemia, etc.

In our research, other various factors such as asthma, diabetes, and high blood pressure were taken into account. However, in our study, about 16.7% of women with diabetes had LBW babies. In our study, high blood pressure was diagnosed in about 20% of the cases, and only 16% of those reported LBW in babies. This is also consistent with other studies that suggest a small percentage of hypertensive women have LBW babies while others do not.

In our research smoking by women was insignificant, however, their husbands' were found to be smokers in and this showed a positive correlation between LBW babies and gestation in a smoker's atmosphere. This is probably due to the sensitivity of fetal growth to the toxic substances found in cigarettes. Vitamin D deficiency was found to be in a positive correlation with LBW babies. It is recommended for women to take Vitamin D supplements during pregnancy to decrease the risk of LBW babies and SGA.

**CONCLUSION**

A significant percentage of low birth weight babies is found to be associated with work-related stress in the mother, malnutrition, anemia, and chronic infections. Moreover, smoking history in the father also affected the fetal weight negatively. Pregnant women should be educated regarding the use of folate and vitamin D supplements during pregnancy; they should avoid

stressful work as it may affect the fetal weight adversely; nutrition and general health should be maintained throughout pregnancy to avoid such complications.

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