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ASSOCIATION OF MATERNAL SOCIO-DEMOGRAPHIC FACTORS WITH GESTATIONAL AGE AND NEONATAL BIRTH WEIGHT

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ABSTRACT

Background of the Study: There are many cases in our country that are suffering from the situation of pre mature birth of babies. Mothers are one of the silent victims in this situation who are facing dire difficulties to handle the abnormalities during gestation period. This study reveals the dynamic and demographically slotted picture of relation of socio-demographic factors and pre mature deliveries.

Methodology: In this cross-sectional study, a total of 118 mothers with their new born were enrolled. The socio-demographic data of mothers' along with gestational age and Neonatal birth weight. Were observed using a structured questionnaire. Duration of study was 6 months from 20, January 2021 to 20, July 2021. Chi-square analysis was used to find the Association of maternal socio-demographic factors with gestational age and Neonatal birth weight. Test reveals that P value for educational level, socioeconomic class, employment status and pregnancy induced complication was (0.007), (0.009), (0.002), (0.009) respectively, so they were found associated with preterm birth while low birth weight association was found only with pregnancy induced complications with a P value of (0.009).

Conclusion: It is concluded that pre-term birth is associated with educational level, socioeconomic class and employment status of mothers and pregnancy induced complications and the low birth weight was found to be associated with pregnancy induced complications only.

Keywords: *Maternal factors, neonate, pre-term birth, gestation period, low birth weight, socio demographic, age.*

Introduction

Preterm birth, characterized by the delivery of a baby prior to the completion of 37 weeks of gestation, remains the primary factor contributing to perinatal morbidity and mortality[1].According to the World Health Organization (WHO), around 15 million infants are delivered prematurely, meaning before the completion of the 37th week of gestation, on an annual basis. Moreover, this global phenomenon is on the rise. There are 184 nations with varying rates of preterm birth, ranging from 5% to 18% of all births[2]. Research conducted in Pakistan indicates that 21.64 percent of infants are born prematurely. Very preterm refers to babies born between 28 and 32 weeks of gestation, moderately preterm refers to babies born between 32 and 37 weeks, and extremely preterm refers to babies born before 28 weeks of gestation[3]. An individual's lower socioeconomic position is correlated with an increased probability of giving birth prematurely

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socioeconomic position. Married mothers were found to have a reduced risk of preterm birth compared to single or cohabiting mothers[4, 5]. An association has been established between a low birth weight (LBW) and several health problems in the short and long term, as well as an elevated mortality risk. The World Health Organization (WHO) defines low birth weight (LBW) as a birth weight below 2500 grams [6]. There is a strong correlation between low birth weight and other adverse health consequences. Low birth weight (LBW) is a widely recognized factor that contributes to the death and health problems of newborns. It leads to long-term issues related to nutrition and development. LBW is the primary cause of neonatal mortality, responsible for 15-20 percent of all newborn fatalities globally. LBW can be attributed to either preterm delivery or intrauterine growth restriction. In poor Asian countries, intrauterine growth restriction is the predominant cause of poor fetal development. This condition is mostly impacted by socioeconomic and maternal factors that occur both before and during pregnancy[7, 8]. Infants born prematurely have a 20-fold higher likelihood of experiencing complications and mortality compared to infants of average weight at birth. Low birth weight is believed to be caused by preterm birth and intrauterine growth retardation (IUGR). Intrauterine growth restriction (IUGR) is a result of insufficient blood flow between the uterus and placenta, as well as poor fetal nutrition. These factors have a direct impact on the fetus's overall physical measurements. The infant with intrauterine growth restriction (IUGR) displays the characteristic indicators of undernourishment. Preterm birth, leading to low birth weight (LBW), is caused by factors such as extrauterine infection, trauma, sickness, intrauterine growth restriction (IUGR), fetal infection, and anomalies[9]. In addition, engaging in physical activity while pregnant is a causative element in the occurrence of low birth weight and impaired growth. The interbirth interval exhibits a significant correlation with low birth weight, fetal death, and premature birth[10]. The significance of the factors that are related to the pre-term birth directly hits the commanding harmful risks in the life of mothers. Education system is one of the truest causes of premature deliveries[11]. Maternal demographic, socioeconomic, and clinical profiles were acquired, including characteristics such as smoking, BMI, alcohol use, gestational diabetes, and mental health factors, as well as gestational duration and birth weight. Premature birth was linked to maternal age, the lack of gestational diabetes, high working hours, and mental stress, according to the researchers. Emotional stress was also linked to a lower birth weight in the cases group[12]. Through non-statistical methods and by applying different manual tests and formulas the common causes were recognized to claim it in then paper. There were different risky elements that neither were nor endorsed by the practical entities[13]. The ratio between the participants was about the 78% as these women have some physical activities either in their homes or outside the home in the form of some job or hectic activities[14]. The p value for this purpose was less than 0.5 as this value is more than critical value. This value was further reduced to get the exact p value for the risk factors in order to track the deformability of the matter. The association of jobs and the pressure induced by them was first time seen in 2001 as many women were getting ill due to the over burden from the work and they were also doing part time jobs with actual jobs[15]. He conducted the interviews from lower class family women and women who didn't have any source of income; he found out that when the estrogen level becomes low it triggers the baby to get down in the direction and final delivery of the baby before the time[16]. House wives and they had abortions for about 3 times and they don't have babies. The conclusion of his study was the comprehensive inference which ultimate affects the behavioral statistics of the mothers to collaborate with the preterm birth[17]. The purpose of this study is to examine the relationship between Pakistani pregnant women's pregnancies' demographic and maternal socioeconomic factors, as well as their physical characteristics, and the risk of premature birth among premature infants.

Methodology

The data collection was started after approval from higher authorities of respective hospitals. The informed consent was taken from participants. The objective and protocol of the study were explained to them. They were ensured that they have right to withdraw from the study at any time.

It was made sure that data will remain confidential and will be maintained. After initial screening, the participants were enrolled in the study. The maternal socio-demographic factors were recorded through structured questionnaire. The child weight and gestational age were noted from mother's file.

Study Design
It was a Cross sectional study.

Study Setting
Data was collected from Hameed Latif Hospital, Bahria Hospital, and Children Hospital, Lahore

Duration of study
The study was completed in 6 months after the approval of synopsis.

Sample size
Sample size of 118 was calculated using following formula.

Estimated Proportion	0.55
Desired Precision of estimate	0.09
Confidence Level	0.95
Population Size	N/A

Sample size required for Specified Inputs

Large population	118

Sample Technique
Convenient non-random sampling was used to collect the participants of study.

Sample selection criteria
The following is the sample selection criteria for the study.

Inclusion Criteria
1. Mother age range from 21 to 40 years
2. Mothers with their new born
3. Mothers with singleton new born

Exclusion Criteria
1. Mothers of still-born neonates.
2. Mothers that underwent infertility treatment

Results

The results of data analyzed through SPSS 21.0 are presented in two parts: one is descriptive statistics and the second is inferential statistics.

Descriptive Statistics
Almost all the variables in this study were categorical variables. So, that was summarized in frequency and respective percentages. The pictorial representation of data was through pie chart and bar charts with percentages.

Inferential Statistics

It includes the contingency tables and chi-square analysis of outcome and exposure variables. The p-value was set at 0.05. The mother factors including age, BMI, socio-economic status, education level, parity, mode of delivery, number of children, and pregnancy induced complications were the exposure factors It is concluded that pre-term birth is associated with educational level, socioeconomic class and employment status of mothers and pregnancy induced complications and the low birth weight was found to be associated with pregnancy induced complications only.

Education Level of Mothers		Gestational Age			P-value
		Pre-Term	Full Term	Total	
	Primary	3 (6%)	2 (3%)	5 (4%)	
	Middle	9 (19%)	0 (.0%)	9 (8%)	
	Matric	13 (27%)	21 (30%)	34 (29%)	p= 0.007
	Intermediate	12 (25%)	26 (37%)	38 (32%)	
	Graduation	9 (19%)	16 (23%)	25 (21%)	
	Masters	2 (4%)	5 (7%)	7 (6%)	

Table: 1 Association between Education Level of Mother and gestational age

Explanation

p= 0.007

The results shows that there is association between educational level of mother and pre-term birth of neonate with p-value is 0.01, which represents that lower level of education can lead to low gestational age of neonate and pre-term delivery. Educated women can make better use of family planning and take care of her health which may result in full-term delivery.

Employment Status of Mothers		Gestational Age			P Value
		Pre-Term	Full Term	Total	
	Working Women	23 (48%)	15 (21%)	38 (32%)	0.002
	Non-Working Women	25 (52%)	55 (78%)	80 (68%)	

Table: 2 Association between Employment Status of Mother and gestational age

Explanation

p= 0.002

The results shows that there is association between employment status of mother and pre-term birth of neonate with p-value is 0.002, which represents those working women had a tough life style, long working hours and exertion at work place and had an incomplete gestational period than the non-working women.

Socio-economic Status of Mothers		Gestational Age			p-value
		Pre-term	Full Term	Total	
	Lower Class	11 (23%)	3 (4%)	14 (12%)	
	Middle Class	35 (73%)	63 (90%)	98 (83%)	.009
	Upper Class	2 (4%)	4 (6%)	6 (5%)	

Table:3 Association between Socio-economic Status of Mother and gestational age

Explanation

p= 0.009

The results shows that there is association between Socio-economic Status of mother and pre-term birth of neonate with p-value is 0.009, hence Socio-economic Status is related to gestational age of fetus and healthy delivery. And low socio-economic status can affect the pregnancy outcome.

Pregnancy induced Complication to Mothers	Gestational Age			P-Value
	Pre-term	Full Term	Total	
Gestational Diabetes	7 (15%)	3 (4%)	10 (9%)	.002
High Blood Pressure	18 (38%)	31 (44%)	49 (42%)	
Abnormal Fetal Position/Movement	9 (19%)	2 (3%)	11 (9%)	
Others	12 (25%)	19 (27%)	31 (26%)	
None	2 (4%)	15 (21%)	17 (14%)	

Table:4 Association between Pregnancies induced Complication to Mother with gestational age

Explanation

p= 0.002

The results shows that there is association between pregnancy induced Complication to mother and pre-term birth of neonate with p-value is 0.002, which reflects that the diseases induced during pregnancy may affect the gestational age of pregnancy and result in pre-term delivery.

Pregnancy induced Complication to Mothers	Neonate Birth Weight					p
	Low-Birth Weight	Healthy Birth Weight				
Complication Category	<2.5	2.5-2.9	3-3.5	3.5-4	Total	.009
Gestational Diabetes	7 (15%)	1 (3%)	2 (7%)	0	10 (%)	
High Blood Pressure	18 (38%)	12 (31%)	18 (60%)	1 (100%)	49 (42%)	
Abnormal Fetal Position/ Movement	9 (18%)	2 (5%)	0	0	11(9%)	
Others	12 (25%)	14 (36%)	5 (17%)	0	31 (26%)	
None	2 (4%)	10 (26%)	5 (17%)	0	17 (14%)	

Table:5 Association between Pregnancy induced Complications to Mothers and gestational weight

Explanation

p= .009

It shows that there is association between Pregnancy induced Complication to Mothers and birth weight of neonate with p-value is 0.009. The results of cross tabulation represents that the low birth weight is more common among mothers with Pregnancy induced Complication to Mothers such as gestational diabetes and hypertension etc.

Discussion

This study was carried out to find the association between maternal socio-demographic variables like age, BMI, socioeconomic class, education level, employment status, parity, mode of delivery, and number of children and neonate factors including low birth weight and pre-term delivery. The results of this study showed that the pre-term delivery is associated with socio-economic status, employment status and educational level, whereas low birth day weight is associated the

gestational diabetes, pregnancy induced hypertension, and other condition developed during pregnancy. These results were consistent with results of a study which stated that premature birth was associated with greater maternal age, absence of gestational diabetes, long working hours and emotional stress. Age is an important factor in terms of the fertile period of a women as well as the child bearing capacity of mother. The results of this study found no association between age of mother and pre-term birth and low birth weight. However, low birth weight and pre-term birth was more common in mother above 35 years. The results of this study were similar to the finding of a study carried out by Zainab Taha et al. in 2020; they reported that the advancing maternal age is not independently associated with low birth weight and pre-term delivery[2].The same results were produced by a study of Shanshan Wang et al, in 2020 that the women with childbearing age ranged from 20 to 40 years, the chances of low birth weight are more common when maternal age exceed than 36 years[18].Body Mass Index (BMI) during pregnancy or gestational weight gain is a significant physiological change in female body. Association between BMI during pregnancy and pre-term birth and low-birth weight was determined in this study and the result showed no significant difference in birth weight and pre-maturity, however, the frequency of pre-term birth and low birth weight was more in mothers. Likewise, a study of Fabia Pigatti Silva et al. in 2019 represented that high gestational weight gain is associated with pre-term birth[19].The same results were produced in a study by Ying Hu et al. in 2020[20].Socioeconomic disparities were found to be associated with pre-term birth in this study. The results were parallel to a study conducted in Japan by Ikuyo Hayashi et al. in 2020; they also reported that the lower socioeconomic status is associated with low gestational age of neonate which had a long-term effect of the life of newborn[21].The results of this study reported that the education level of mother is associated with low- birth weight and pre-term birth. The same results were concluded by a study of Milagros Ruiz et al. in 2015, who conducted a systematic review on data of twelve European countries and find out that the education level is a risk for developing low- birth weight and pre-term birth[22].Employment status of mothers with working and non-working women is 32.7% and 67.3% respectively in this study. The employment status was found to be associated with pre-term birth representing that long working hours and nature of work at job place might had an adverse effect on maternal health leading to pre-term birth. The same results were produced by a study of Mariana Buen in 2020; they concluded that household activities are less likely to be a cause of pre-term birth[23].While a study conducted by Farnoush Khojasteh in 2016 reported lifting heavy objects at home by non-working women can lead to pre-term birth and low birth weight[24]. While inparallel to the findings of this study, the results presented by a systematic review conducted by Temesgen Getaneh in 2020 that the pregnancy induced hypertension is associated with both low birth weight and pre-term birth[25].

Conclusion

It was concluded that the pre-term birth is associated with educational level, socioeconomic class and employment status of mothers and pregnancy induced complications. However, the neonatal birth weight as found to be associated with pregnancy induced complications only. No association was found between neonatal birth weight and any other socio-demographic variable of mother.

AUTHORS' CONTRIBUTION:

The following authors have made substantial contributions to the manuscript as under:

Conception or Design: Muhammad Usman Jameel, Sarwat Anees

Acquisition, Analysis or Interpretation of Data: Adnan Hashim, Muhammad Usman Jameel, Sarwat Anees

Manuscript Writing & Approval: Muhammad Usman Jameel, Qurat ul Ain

All authors acknowledge their accountability for all facets of the research, ensuring that any concerns regarding the accuracy or integrity of the work are duly investigated and resolved.

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