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The Effect of Socio-Demographic Characteristics of Pregnant Mothers on Fetal Outcomes

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ABSTRACT
An infant's birth weight has been identified as the best marker of optimal fetal growth and development. Maternal socio-demographics and anthropometry (weight, height etc.) have been identified to influence an infant's birth weight and length. Aim of this study to determine the socio-demographics characteristics of pregnant mother and their impact on fetal outcome. This prospective cohort study was carried out in Government Medical College Jalgaon, Maharashtra. This study enrolled all full term (37 weeks) pregnant women age between 18-35 years with singleton pregnancy. Maternal history and socio-demographic data was recorded. Maternal and neonates anthropometric data like weight, height, BMI, length at birth and circumference of mid arm were recorded. Out of total 121 pregnant women analysed in the present study, majority of them (57%) were 26-30 years of age group. Incidence of low birth weight was very high 64.5%. Majority (59.9%) of the pregnant women in studied cohort belongs to upper class and most of the mother was primiparous. Maternal height and BMI was significantly associated with the LBW babies. Maternal socio-demographic and anthropometric variables were significantly associated with the fetal outcomes. Neonatal morbidity and mortality can be reduces by improving the maternal risk factors. Anthropometry, LBW, neonates, socio-economic status, BMI.

INTRODUCTION

Birth weight is the single most important criterion for determining neonatal and infant survival. Low birth weight is a sensitive indicator of socioeconomic conditions and indirectly measures the health of the mother and child. Babies with a birth weight of less than 2500 gm irrespective of the period of gestation are termed as LBW babies[1]. The first 28 days of life the phenomenon of neonatal period happened to be the most vulnerable time for a child's survival in most parts of the world. Children face the highest risk of dying in their first month of life at an average global rate of 18 deaths per 1,000 live births in 2018[2]. Relatively, it has been opined that the possibility of dying after the first month but before reaching age 1 is 11 per 1,000 live births and after age 1 but before turning age 5 is 10 per 1,000 live births[3]. According to the World Health Organization (WHO,2012) the perinatal period commences at 22 completed weeks (154 days) and ends seven completed days after birth. Poor birth outcome like low birth weight remains significant contributors to under 5 mortality and morbidity worldwide[4]. Infants born prematurely are vulnerable and are at an increased risk of infections including neonatal sepsis, unconjugated Hyperbilirubinemia, respiratory distress syndrome, difficulty in feeding and poor body temperature regulation[5].

One of the most important causes is the mother's anthropometry and her nutritional status[6]. Her socio-economic status (SES) is also often related to her nutritional status. Maternal illiteracy and low SES are known to be major risk factors for IUGR. Whether dietary macro-and micronutrient supplementation in pregnancy can increase birth weight is a controversial issue[7]. Low weight-for-height (WHZ) in children is termed wasting and indicates in most cases a recent and severe process of weight loss, which is often associated with acute starvation or severe disease[8]. Malnutrition in a population over time will lead to stunted growth, low height-for-age (HAZ). Stunted growth is often described as "chronic malnutrition" and is a primary manifestation of malnutrition in early childhood, including malnutrition during fetal development brought on by malnourishment in the mother[9]. This may lead in to a vicious circle the intergenerational cycle of growth failure. Young girls who grow poorly become stunted women and are more likely to give birth to LBW children[10].

Antenatal care (ANC) reduces maternal and perinatal morbidity and mortality both directly, through early detection and treatment of pregnancy related complications and indirectly, through the identification of women and girls at increased risk of developing complications during labour and delivery. For instance, antenatal care decreases the likelihood of maternal anemia during pregnancy and the delivery of a premature or low birth weight baby[11]. The objective of this study was to identify socio-demographic patterns of pregnant women and assess the association of these with low birth weight babies and other neonatal outcomes.

MATERIALS AND METHODS

This observational prospective cohort study was carried out in the Government Medical College Jalgaon the duration of the study was 12 months from November-October 2022-2023. This study enrolled all pregnant women meet inclusion criteria. Full term (37 weeks) pregnant women age between 18-35 years with singleton pregnancy who provide written informed consent were included in this study

Pregnant women aged <18 years, twin pregnancy, when no clear data of gestational age available or any maternal illness affecting birth weight were excluded from the study. Maternal history and socio-demographic data (age, consanguinity, residential status, socio-economic level, educational level and parity) was recorded. Gestational age assessment was based on accurate collection of date of the last menstrual period by the mother, when doubt existed, assessment of newborn using Expanded New Ballard score were used to assign gestational age in completed week.

Maternal weight, height, BMI, mid arm circumference and newborn birth weight, length at birth and circumference of mid arm, chest and head measurements were recorded. Maternal weight was measured at the time of delivery using electronic digital weighing scales with 0.1 kg precision. Maternal height was measured with a reference stadiometer with 0.1 cm precision. All babies born with weight less than 2.5 kg considered as low birth weight babies.

Statistical analysis: Data was expressed as percentage and Mean±S.D. Fischer's exact test or Chi square test was used to analyze the significance of difference between frequency distribution of the data. $p<0.05$ was considered as statistically significant.

RESULTS

A total of 121 full term pregnant women and newborn delivered by them meet all inclusion criteria were enrolled and analysed in the present study. Out of the total newborn the incidence of low birth weight was very higher 78/121 (64.5%) in this study. Maximum number of pregnant women was in the age group of 26-30 years. Only 14% of women were more than 30 years Table 1. Majority (59.9%) of the pregnant women in studied cohort belongs to upper class and only 5.8% of women were belongs to lower class. One third on women were primi, 41% of mother had parity 2 whereas 26% of women were multiparous (Parity $\geq$3) (Table 2 and 5 Fig 1).

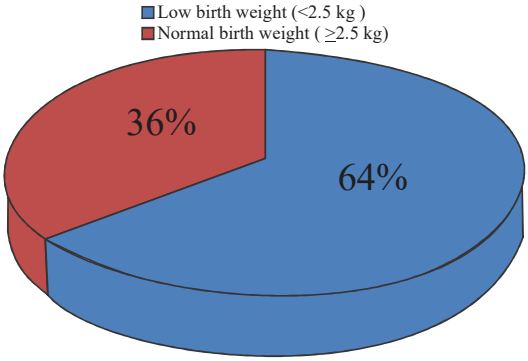

Fig. 1: Incidence of LBW newborn in the study participant

Table 1: Incidence of newborns delivered at various maternal age groups

Maternal age	Number	Percentage
≤25 Years	35	29
26-30 Years	69	57
>30 Years	17	14

Table 2: Socioeconomic status of various mothers

Socioeconomic status	Numbers	Percentage
1 (upper class)	70	59.9
2 (middle class)	44	36.3
3 (lower class)	7	5.8

Table 3: Parity of mother in relation to incidence of newborns delivered

Parity	Number	Percentage
1	40	33
2	50	41
>3	31	26

Table 4: Maternal anthropometric parameters in relation to birth weight of neonate

	LBW	NBW	p-value
Maternal height	148.39±5.27	154.42±6.64	<0.0001
Maternal weight	52.12±7.34	52.70±5.90	0.658
MUAC	24.98±2.35	25.33±1.93	0.417
BMI	23.62±3.71	22.27±2.66	0.030
Wt. gain during pregnancy	8.29±0.75	8.52±0.65	0.096

DISCUSSION

Socio-economic inequalities among pregnant women may have a considerable impact on child health. The early identification of preterm and low birth weight babies is important to initiate any measures to reduce morbidity and mortality among newborn babies. There are various ways to assess the growth of the newborn. Socio-economic inequalities among pregnant women may have a considerable impact on child health[12].

Our study reported vary higher incidence of LBW babies (64.5%) our results comparable with the Rani *et al.*[13] and Mukherjee *et al.*[14], reported incidence of LWB babies were 52.2% and 51.8% respectively. In contrast ot our findings many other studies like Negi *et al.*[15], Gaur *et al.*[16] and Manivannan *et al.*[17], reported very lower incidence of LBW babies.

Majority of the pregnant women were 26-30 Years of age group in the present study, in agreement with the Shaik, *et al.*[18] and Tosson, *et al.*[19]. Maternal age had a positive relation to neonatal birth weight as well as length. In current study most of the participants belong to upper socio-economic class, discordance to our study many researchers found that Lower socioeconomic status have significant risk of poor birth outcomes among pregnant women Kiplagat *et al.*[20], Kim *et al.*[21] and Jordaan *et al.*[22]. In our study chances of LBW was much higher in primiparous women as compared to multiparous, concordance to the our report, Ojha *et al.*[23] and Abdulrahim *et al.*[24], reported that LBW in primiparous mothers was 2.1-2.2 times greater than in multiparous mother.

Higher BMI significantly correlated with the LBW in the present study, consistent to Singh *et al.*[25]. Neonatal birth weight was inversely related to maternal education. This may be explained by awareness about healthy life style and access to healthy food options.

CONCLUSION

The incidence of low birth weight was very high in the present study. Risk of LBW was more in younger mothers, primiparous and lower socio-economic class. Significant correlation was exists between maternal height and BMI with the LBW babies. Assessment of socio-demographics, nutritional and monitoring of anthropometric parameters of pregnant women can be helpful for prevention of maternal and neonatal mortality in the developing countries.

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