

Original Research Article

Maternal body weight: as predictor of birth weight of new born

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ABSTRACT

Background: Low birth weight (LBW) is a major public health problem in developing countries, the causes of LBW are multifactorial, associated with maternal, foetal and placental factors. In addition, factors related with maternal anthropometry such as maternal weight, height and BMI also predict anthropometry of new-born. In particular, maternal nutrition during pregnancy has been regarded as an important determinant of foetal growth. Infant size, such as birth weight, was reported to affect not only infant mortality, but also childhood morbidity. To know the association of maternal weight as predictor of birth weight of new-born.

Methods: Study among 700 pregnant women using predesigned and pre-tested questionnaire after taking informed consent. Information was collected regarding socio-demographic data and maternal weight and anthropometry of the new-born was collected.

Results: Our study showed association of maternal weight and birth weight of new-born, there was no association of maternal weight with length and chest circumference of new-born.

Conclusions: In our study association between maternal weight and birth weight of new-born was positively and statistically significant.

Keywords: Maternal weight, Birth weight, New-born, Anthropometry

INTRODUCTION

Birth weight of an infant is the single most important determinant of its chances of survival, healthy growth and development. There are two main groups of low birth weight babies, in countries where the population of low birth weight infants is less, major cause is short gestation period and in countries where the proportion is high; the majority of cases can be attributed to foetal growth restriction.¹

Specific biological and psychological needs must be met to ensure the survival and healthy development of the child and future adult. First week of life is the most crucial period in the life of an infant, it is most important as majority of all infant deaths occur within the first

month of life because, the new-born has to adapt itself rapidly and successfully to an alien external environment. The risk of death is the greatest during the first 24 to 48 hours after birth, problem is more in rural areas where expert obstetric care is scarce, and the home environmental conditions in which the baby is born is usually unsatisfactory.²

Many previous studies have investigated the role of maternal nutritional status, indicated by maternal anthropometry, to predict infant as well as maternal outcomes of pregnancy. Indicators such as maternal height, pre-pregnancy weight, weight gain during pregnancy, body mass index (BMI).³ Maternal exposure to nutrition during the period from conception to birth may have an impact on foetal growth as well as the

child's health. In particular, maternal nutrition during pregnancy has been regarded as an important determinant for foetal growth.⁴ Hence the present study is conducted to estimate the maternal weight as predictor of birth weight of new-born. To know the association of maternal weight as predictor of birth weight of new-born.

METHODS

It was a hospital based cross-sectional study conducted among pregnant women who are admitted in obstetrics and gynaecology department and labour room, at Dr. Prabhakar Kore charitable hospital, Belagavi, from 1st January to 31st December 2017, by using formula $n=4pq/d^2$, with p is prevalence of low birth weight (LBW) babies among women with low BMI as 50%, d (allowable error) is 4. Pregnant women who delivered at Dr. Prabhakar Kore charitable hospital were included in the study. Babies who are born with congenital anomalies and mothers suffering from medical conditions like diabetes mellitus, hypertension, cardiac problems etc were excluded from the study. Ethical clearance is obtained by J. N. Medical College Institutional Ethics Committee for Human subject's research.

Data collection

Pre-designed and pretested questionnaire was used to collect the relevant data. Data was collected regarding socio-demographic, obstetric history etc. Maternal weight is measured and neonatal birth weight, length, head circumference and chest circumference were measured.

Statistical analysis

Categorical outcome was summarised by rates. The percentage and analysis of variance, f value was calculated to know the association of maternal weight with birth weight of the new-born, $p < 0.05$ was considered as statistically significant.

Data was collected from the patients who were admitted in the obstetrics and labour wards for delivery after taking informed consent. Information about the socio-demographic and obstetric history were obtained from the patient by interviewing them using pre tested questionnaire. Some of the information about weight at different trimesters, height haemoglobin level etc was recorded from the case records. Body mass index was calculated by the values obtained from above by using the formula, BMI is weight in kg/height in m².

Neonatal anthropometric measurements (weight, length, head circumference and chest circumference) were measured and recorded. The neonatal weight was measured within 1hr by using digital weighing scale, length was measured with the help of infant meter. The head circumference and chest circumference were measured by using non flexible measuring tape. Pilot

study was conducted among 20 pregnant woman and required corrections were made.

RESULTS

In Table 1, our study 53.7% participants were between age group of 21-25 years, 30.3% between 26-30 years, 13% were less than 20 years, above 30 years 3%. In this study the majority of the study participants belonged to joint family were 79%, and remaining participants were belonged to nuclear family were 21%. Majority of study participants were residing in rural area i.e., 56.4%, remaining in urban area 43.6%. In our study 78.86% were Hindu by religion, 13.71% were Muslims and 7.43% belonged to other religion.

Table 1: Socio-demographic and obstetric profile of pregnant woman.

Particulars	Number	Percentage
Age in years		
≤20	91	13.0
21-25	376	53.7
26-30	212	30.3
>30	21	3.0
Type of family		
Nuclear	147	21.0
Joint	553	79.0
Place of residence		
Rural	305	43.6
Urban	395	56.4
Religion		
Hindu	552	78.9
Muslim	96	13.7
Other	52	7.4
Educational status		
Illiterate	39	5.5
Primary education	241	34.5
Secondary education	308	44.0
PUC/diploma	56	8.0
Graduate	56	8.0
Socio-economic status		
Class I	51	7.3
Class II	64	9.1
Class III	119	17.0
Class IV	271	38.7
Class V	195	27.9

In the present study, majority of study participants i.e., 39.57% belonged to class IV socio-economic status, followed by 26.71% belonged to class V, 17.30% class III, 8.71% class II, 7.71% class I. In this study 5.5% did not have any formal education 34.5% studied up to primary school level, 44% up to high school, 8% up to pre-university college, 8% up to graduation.

Table 2: Association of maternal weight with birth weight, length, head circumference and chest circumference.

Maternal weight	<40 kg	41-50 kg	>50 kg	F	P
No. of mothers	15	220	465		
Parameter of new-born					
Birth weight	2.82±0.4	2.76±0.39	2.86±0.39	5.2785	0.0053
Length	50.8±2.3	50.33±2.5	50.78±2.5	2.4220	0.8948
Head circumference	34.6±1.4	34.57±1.15	34.84±1.23	3.9371	0.019
Chest circumference	32.06±1.7	31.75±1.9	32.06±2.09	1.7550	1.7141

Our study showed that maternal weight was positively associated with birth weight and head circumference of the new-born. and not statistically significant with length and chest circumference of the new-born.

DISCUSSION

In our study the mean age of the study participants was 24.28±3.34 years. The study conducted by Gala et al showed the mean maternal age was 25.93±4.36 years, another study conducted by Sutan et al showed the mean maternal age was 29.6±4.63 years.^{5,6} The mean birth weight of the babies born to the mothers was 2.82±0.4 kg, the study conducted by Khan et al showed the mean birth weight of the baby was 3.41±0.56 kg.⁷ The mean length of the new-born was 50.57±17.6 cm, the study conducted by Bisai et al showed that the mean length of the new born showed 47.63±1.9.⁸ Another study conducted by Yucel et al showed that the mean height was 50.5±1.9 cm the mean head circumference of the new-born was 34.71±1.22 cm, the study conducted by Bisai et al showed the mean head circumference of the new born 32.79±1.3, Gala showed the mean head circumference was 33.45±1.53 cm, and the mean chest circumference of the new-born was 31.92±2.05 cm, the study conducted by Bisai et al showed the mean chest circumference was 30.01±1.7.^{9,8,5} The mean maternal weight of the mother at 1st, 2nd, and 3rd trimester was 49.86±9.75, 52.85±9.70, and 51.93±9.86, the study conducted by Gala et al also showed the mean maternal weight was 57.02±11.57 kg.⁵

In our study, prevalence of LBW was 31.09%, 34%, 20% among mothers with less than 40 kg at 1st, 2nd, and 3rd trimester respectively. Among mothers with 41-50 kg prevalence of LBW was 14.9%, 19.7% and 23.64% at 1st, 2nd and 3rd trimester respectively. And among mothers with more than 50 kg prevalence of LBW was 14.28%, 13.65% and 14.41% at 1st, 2nd and 3rd trimester respectively. When compared with mothers who gave normal birth weight babies and who gave birth to LBW babies, maternal weight at all three trimesters showed statistically significant association with birth weight of the new-born. This observation was on par with the studies conducted by Emmanuel et al, Mitra et al, Jananthan et al which showed that the maternal weight showed positive association with birth weight of the new-born.^{4,10,11}

In our study showed that the maternal weight was positively associated with the anthropometry of the new-born. The study showed that maternal weight was positively associated with birth weight and head circumference of new-born with p<0.01. The study didn't show any statistical significance with the length and chest circumference of the new-born.

CONCLUSION

In the present study we found positive association between maternal *weight in all the trimester showed positive association with the birth weight and head circumference of new-born. All the three trimesters maternal weight didn't show any significance with length and chest circumference of the new-born.

Limitation

It was hospital-based study cannot extrapolate results to the community. Many of the variables were collected from the record, hence may have some flaws. A longitudinal study would have thrown more light on the study.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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