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Original Research Article

Effect of maternal weight gain during pregnancy and gestational hypertension on birth weight of the baby

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ABSTRACT

Background: Birth weight is not only an indicator of child growth and development but also valuable indicator of maternal health, nutrition and quality of life. Many maternal factors have been postulated to determine the birth weight of the baby like maternal age, weight, height, education, parity, antenatal care, maternal habits like smoking, sex of the baby and maternal comorbidities like hypertension.
Methods: This study was conducted in Kempegowda institute of medical sciences Bangalore during the period of December 2019 to June 2021.All babies born with weight <2.5 kg weight were included in the study irrespective of gestational age. Mothers were divided into 3 categories based on weight gained during pregnancy into less than 10 kg, 10 to 15 kg and more than 15 kg weight gain. Low birth weight babies included in the study were categorized based on weight gain of the mother and presence of various maternal comorbidities like hypertension, diabetes, anemia, hypothyroidism.
Results: Analysis showed that among 150 low birth weight babies 110 babies were born to mothers with weight gain less than 10 kg (73.3%), 37 (24.7%) babies were born to mothers with weight gain 10-15 kg and 3 (2%) babies were born to mothers with weight gain more than 15 kg. We also found that among all mothers of low-birth-weight babies 33.7% mothers did not have any comorbidities and gestational hypertension was found in 20.7% of mothers showing it as important risk factor for low-birth-weight babies.
Conclusions: Our study shows adequate maternal weight gain during pregnancy independently influences birth weight of the baby. Thus, mother's nutritional care should be appropriate to maintain adequate weight gain. Among all maternal comorbidities gestational hypertension is a major risk factor for low-birth-weight babies.

Keywords: Low birth weight, Gestational hypertension, Maternal weight gain during pregnancy

INTRODUCTION

Children's health is tomorrow's wealth. Healthy Children are assets to the nation. Intrauterine growth and development is a process in human life cycle and its aberrations can result in profound influence in later life. This is assessed by birth weight of the baby. Birth weight is not only an indicator of child growth and development but also valuable indicator of maternal health, nutrition and quality of life.[1]

Low birth weight is defined by WHO as weight of live born infant less than 2500 grams irrespective of gestational age.[2] Low birth weight can be further classified into: very low birth weight (VLBW)-birth weight less than 1500 grams. Extremely low birth weight (ELBW)-birth weight less than 1000 grams.[3]

Low birth weight is an indicator of multifaceted public health problem. This includes maternal malnutrition, ill health, hard work and poor healthcare during pregnancy.

Many maternal factors have been postulated to determine the birth weight of the babies. These include socio-biological factors of mother and many other factors. Important among these factors are maternal age, weight, height, education, parity, antenatal care, maternal habits like smoking, sex of the baby and maternal comorbidities.[4] Among these various maternal factors influencing birth weight of the child maternal weight gain during pregnancy is very important factor determining birth weight of the baby.[5]

Gestational hypertension is increasingly found in mothers in recent days. Hypertension causes premature ageing of placenta which results in reduced blood flow to fetal circulation. This results in chronic fetal hypoxia. Nutrients required for appropriate development of the baby won't be supplied to the baby resulting intrauterine growth restriction.[6,7] Objective of this study is to study the effect of maternal weight gain during pregnancy and gestational hypertension on birth weight of the baby.

METHODS

This prospective descriptive study was conducted in Kempegowda institute of medical sciences Bangalore during the period of December 2019 to June 2021. All babies born with weight less than 2.5 kg weight were included in the study irrespective of gestational age. Babies with major congenital anomalies and syndromes were excluded as these conditions influence the birth weight of the baby. Ethical clearance was taken as there were no ethical issues associated with the study. Informed consent were taken from mothers. Detailed history of the mother was taken and her weight gain was noted. Maternal weight in first trimester during her first visit to the obstetrician was noted down. All the mothers who were included in this study had documented weight in the first trimester. Weight in last trimester that is during delivery was also noted down. Weight gain during pregnancy was calculated. Mothers were divided into 3 categories based on weight gained during pregnancy into less than 10 kg, 10 to 15 kg and more than 15 kg weight gain. low birth weight babies included in the study were categorized based on weight gain of the mother. 150 babies were included in the study as calculated by formula 4pq/d2 p-0.25 q-0.75 d-0.075. Babies were also categorized into various groups based on presence of maternal comorbidities like gestational hypertension, diabetes, anemia, hypothyroidism. Data were entered into Microsoft Excel and statistical analysis was carried out in Statistical package for social sciences (SPSS) software version 17.0. Qualitative variables were presented as percentages.

RESULTS

In this study 150 low birth weight that is weight less than 2.5 kg babies were included. Analysis showed that among 150 low birth weight babies 110 babies were born to mothers with weight gain less than 10 kg; this accounts for about 73.3%. 37 babies were born to mothers with weight gain 10-15 kg that is 24.7% and 3 babies were born to mothers with weight gain more than 15 kg that is 2%. A significant association was observed between low birth weight babies and weight gain of mother during pregnancy that is 73.3% low birth weight babies had maternal weight gain less than 10 kg. We also found that among all mothers of low-birth-weight babies 33.7% mothers did not have any comorbidities and gestational hypertension was found in 20.7% of mothers showing it as important risk factor for low-birth-weight babies.

Table 1: Weight gain during pregnancy and proportion of low-birth-weight babies.

Weight gain during pregnancy	No. of babies	Proportion
<10 kg	110	73.3
10-15 kg	37	24.7
>15 kg	3	2
Total	150	100

Table 2: Maternal comorbidities and low birth weight babies.

Comorbidities	No. of babies	Percentage*
Nil	50	33.3
Hypertension	31	20.7
Diabetes mellitus	15	10.0
Epilepsy	0	0.0
Hypothyroidism	22	14.7
Anemia	29	19.3
Others	42	28.0

DISCUSSION

Maternal weight also plays an important role in deciding birth weight of the baby. Mothers with less than 40 kg are known to produce low birth weight babies.[8] Ideally during pregnancy a mother should gain weight of 9 to 11 kg. Mothers with weight gain less than 9 kg are known to produce IUGR babies. Mothers with under-weight not only produces IUGR babies but also associated with premature birth, neonatal morbidity. Studies show that irrespective of maternal stature, maternal underweight is associated with 2.43% of fold increase in risk of producing low birth weight babies.[9] Few studies also show that mothers with excessive weight gain that is more than 15 kg are associated with low birth weight babies.[10] Mothers with high weight gain are associated with comorbidities like gestational diabetes mellitus and hypertension. Among these comorbidities hypertension is a major risk factor which causes intrauterine growth restriction due to chronic placental insufficiency. These conditions interfere with weight of the baby adversely.[11]

In our study 110 babies were born to mothers with weight gain less than 10 kg, this accounts for about 73.3%. 37

babies were born to mothers with weight gain 10-15 kg that is 24.7% and 3 babies were born to mothers with weight gain more than 15 kg that is 2%. This shows 73.3% of low-birth-weight babies have maternal weight gain less than 10 kg. This implies that adequate maternal weight gain is important to have babies with a normal birth weight.[12] High and low BMI and high and low weight gain during pregnancy are associated with low-birth-weight babies.[13]

We found in our study that among all mothers of low-birth-weight babies 33.3% did not have any comorbidities and 20.7% mothers had hypertension during pregnancy. This implies that among all maternal comorbidities gestational hypertension is a major risk factor for low-birth-weight babies. Limitation of the study is small sample size and can't be generalized to general population.

CONCLUSION

Birth weight is not only an indicator of child growth and development but also valuable indicator of maternal health, nutrition and quality of life. These include socio-biological factors of mother like maternal age, weight, height, education, parity, antenatal care, maternal habits like alcohol, smoking and maternal comorbidities. Among these various maternal factors influencing birth weight of the child maternal weight gain during pregnancy is very important factor determining birth weight of the baby. In our study 73.3% of low birth weight babies had maternal weight gain less than 10 kg. Many studies including our study shows adequate maternal weight gain during pregnancy independently influences birth weight of the baby. Thus mothers nutritional care should be appropriate to maintain adequate weight gain. Among all maternal comorbidities gestational hypertension is a major risk factor for low birth weight babies. If blood pressure is controlled efficiently during pregnancy incidence of low birth weight can be reduced significantly.

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