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Original Article**Impact on Mother and Foetus due to Excessive Weight gain in Pregnancy**Naher FK^{1*}, Alam MHMM², Hossain E³, Hossain M⁴, Parvin R⁵, Anam DK⁶.

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Abstract

Introduction: During pregnancy there is increased calorie requirement to the extent of 300 kcal over the non-pregnant state during second half of pregnancy. But some mother wants to take extra more calories for a healthy baby, but their fetal weight is not so much increased. Only weight gain during pregnancy cannot improve the fetal outcome. Too much and too little weight gain during pregnancy both are problematic during pregnancy. **Objectives:** The aim in this Study objective impact of Early pregnancy weight, and pregnancy weight gain of mother on maternal and fetal outcome and also see the impact of excessive weight gain of mother on fetal outcome. **Materials and methods:** It was a prospective observational study conducted in Gynae and Obstetric department of Shaheed Ziaur Rahman Medical College Hospital Bogura, from June 2019 to December 2019. A total of 100 patients were selected. All the patient were in ante-natal chek-up, delivered in hospital by cesarean section at or more than 37 week of gestation. **Results:** Normal BMI mothers shows good outcome. High birth weight neonates are more in mothers who gain more weight during pregnancy. Low birth weight baby present on all group of patient. **Conclusion:** Early pregnancy over weight and excessive weight gain of mother during pregnancy have some increase in birth weight of the infants, but it does not exclude low birth weight infant, and it causes various complications.

Key word: Excessive Maternal weight gain, fetal birth weight, Maternal and fetal Outcome.

Introduction

For thousands of years obesity was rarely seen¹ but now it is an emerging problem. In 1997 the World Health Organization (WHO) formally recognized obesity as a global epidemic.² In normal pregnancy, variable amount of weight gain is a constant phenomenon. In early weeks, patient may lose weight because of nausea and vomiting. During subsequent months, the weight gain is progressive until the last 1 to 2 weeks, when the weight remains static. The total weight gain during the course of a singleton pregnancy for a healthy woman averages 11 kg (24 lb). This has been distributed to 1 kg in first trimester and 5 kg each in second and third trimester³.

Periodic and regular weigh checking is of important to detect abnormality. Rapid weight gain more than 0.5 kg (1 lb) a week, or more than 2 kg (4lb) a month in later months of pregnancy may be the early

manifestation of preeclampsia and need for careful supervision. Stationary or falling weight may suggest intrauterine growth retardation or intrauterine death of fetus. Obese women are in increased risk of complications in pregnancy, labor and puerperium³. Normal pregnancy has been implicated in the development of obesity in women having healthy weight previously⁴, due to excessive eating. Benifit of weight management is numerous.

Ideally weight gain should depend on pre-pregnancy Body Mass Index (BMI) level³. According to Institute of Medicine (IOM) in 2009 recommended weight gain for women with <18.5 BMI- 12.5-18 kg, normal BMI 11.5-16 kg. Overweight women can gain 7-11.5 kg, and an obese woman (BMI>30) should not gain more than 5-9kg⁵. Maternal nutrition and weight gain during pregnancy are directly related to the newborn weight.

However, it may not be as specific as there are other factors for low birth weight infants³.

Infant birth weight is recognized as the leading indicator of health among infants and also affects a wide range of subsequent outcomes later in life. The incidence of neonates with high birth weight has increased in recent years. High birth weight (HBW) is associated with neonatal morbidity and mortality and also associated with many other complications later in life. These complications include shoulder dystocia, birth trauma asphyxia and neonatal deaths. Later in life these neonates have a high risk of Obesity, Hypertension, Diabetes mellitus and Cancer. Among the risk factors, high pre-pregnancy body mass index (BMI) and excessive gestational weight gain has been reported as well-established risk for adverse pregnancy outcome.

The IOM (Institute of Medicine) Gestational weight gain guidelines provide clinicians with a basis for practice. Health care providers who care for pregnant women should determine a woman's BMI at the initial prenatal visit. It is important to discuss appropriate weight gain, diet, and exercise at the initial visit and periodically throughout the pregnancy⁶. For Indian and Asian population cut off for BMI is less as they have more of subcutaneous fat.

Objectives

1. To see the impact of Early pregnancy weight, and pregnancy weight gain of mother on maternal and fetal outcome and
2. To see the impact of excessive weight gain of mother on fetal outcome.

Materials and Methods

It was a prospective observational study. A total of 100 patients were randomly selected from the cohort of patients delivered at the hospital Shaheed Ziaur Rahman Medical College Hospital Bogura, from June 2019 to December 2019, who are booked. Weight of the mother is taken at their antenatal checkup in a special card. All the patients delivered by cesarean section, and weight is taken before CS. Total weight gain is measured. After cesarean section (CS), both mother and baby were followed up for 2 weeks. Maternal and fetal outcome was observed. All the

patients delivered by cesarean section (CS) and pregnancy continued up to 37 weeks were included in this study. The exclusion criteria were the patient with Pregnancy with Obstetrical complications--Twin/ in vitro fertilization (IVF) pregnancy/ intrauterine device (IUD)/ intrauterine growth retardation (IUGR), pregnancy with previous history of diabetes mellitus (DM)/ hypertension (HTN). Each participant was informed about the research objectives, methods and techniques in details, and written informed consent was taken from them. Data were collected ensuring the privacy and confidentiality by face-to-face interview and examination. The Ethical Review Committee of the SZMCH approved the protocol of the study.

Results

During the study period total 847 cesarean sections were done. Among them 100 booked cases were studied. In this study early pregnancy body weight of the mother is grouped into 3 parts- (Low BMI) <45kg, (Normal BMI) 46-70kg, and (Over weight) >71. In this study no obese mother was found. Age of the mother was 18-35 years. Parity was primigravida to 5th gravida. Socio-economic status of the mother was also seen. Before delivery maternal weight was rechecked and total weight gain was divided into 3 groups- Group 1-(0-5kg), Group 2-(6-11kg) and group 3-(>11kg). After delivery fetal weight was again divided into 3 groups.

Table-I: Data of the study Population (n=100)

Parameters	Number of the patients	Percentages
Age in years		
<20yrs	14	14
21-30yrs	72	72
>31yrs	14	14
Parity		
0	34	
1	47	
>2	19	
Socio-economic condition		
Low	34	
Average	58	
High	18	

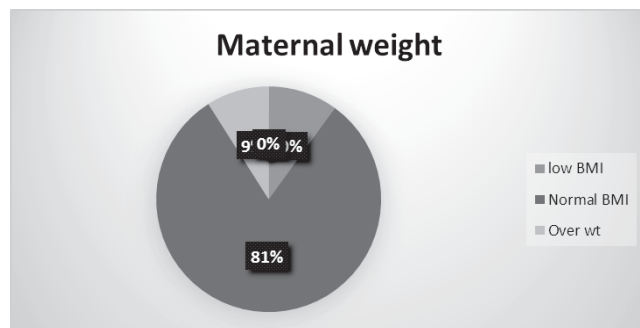
**Chart-1**

Figure shows maternal weight in early pregnancy. Maternal weight maximum in normal BMI. Fetal weight was maximum in healthy weight in our study.

Table-II: Weight of the mother in early pregnancy with their fetal weight(n=100)

Early Pregnancy weight of mother in Kgs	Number of cases	Fetal wt <2.5kg	Fetal weight 2.5-3.4kgs	Fetal wt>3.5kg
<45kg kgs (Low BMI)	10	3	7	0
46-70kgs (Normal BMI)	81	8	64	9
>71kg (Over weight)	9	0	9	0
Total	100	11	80	9

Table shows early pregnancy over weight mother and under weight mother having no over weight baby. But under weight mother having Low birth weight baby.

Table-III: Pregnancy weight gain of the mother with their fetal weight:

Pregnancy weight gain of mothers in Kg	Number of cases	Fetal wt <2.5kg	Fetal wt 2.5-3.4kg	Fetal wt >3.5kg
0-5 kg	7	1 14.29%	6 85.71%	0
6-11kg	57	6 10.53%	48 84.21%	3 5.26%
>11kg	36	4 11.11%	26 72.22%	6 16.66%
Total	100	11	80	9

Table shows when mothers gain more weight during pregnancy there is increase fetal weight, but low birth weight infant also. Studies have shown positive correlations between gestational weight gain with the birth weight of the infant. Mother who gain average weight during pregnancy, gives healthy weight infant. Low birth weight infant present in all group.

Table-IV: Complications of overweight baby, in this study group were:

Maternal Complications	Number of case	Fetal complications	Number of case
Backache	25	Respiratory distress	4
GDM	14	Admission of baby	10
Gestational edema	12		
Less fetal movement	6		
Frequent visit to doctor	29		
Polyhydramnios	4		
Epigastric pain	15		

Discussion

Our study shows antenatal weight gain has a role, in respect to fetal and maternal outcome. According to our study early pregnancy normal weight patients have higher propensity to gain more weight than over weight mother and consequently have fetal weight is more. Moreover, those who have low BMI also have more risk to LBW, Which is similar to an Indian study⁷. In our study antenatal weight gain is much more high in normal BMI group which is not similar to another study which showed antenatal weight gain is much more with high BMI⁸.

Obesity has become a serious global public health problem. Infant's birth weight recognized as the leading indicator of health among infant and also affects a wide range of subsequent outcomes of her/his later life. The incidence birth weight of neonates has increased in recent years. Many studies in the past have revealed that high birth weight of the neonate is associated with increased neonatal mortality and morbidity and complications in their later life. The complications of the neonate are shoulder dystocia, birth trauma, asphaxia and neonatal death. And in later life these neonates have high risk for obesity, HTN, DM and cancer. Among the mothers, high pre-pregnancy body mass index and excessive gestational weight gain were reported as established risk factors for adverse pregnancy outcome⁹.

For indian and Asian population cut off for BMI is less as they have more of subcutaneous fat¹⁰. In 2010 Chang et al¹¹ in Taiwan and Haugen et al¹² in 2014

proved weight gain is less than IOM recommendations increased the risk of low birth weight baby among normal weight nulliparous women. Our study shows no significant correlation with their study.

Neonatal complications are less in our study, which is similar to an Indian study⁷. The result of several large population based cohort studies published after the release of the IOM guidelines suggested no harm in setting more restrictive weight gain limitations⁶. One systemic review found that over weight and obese women who gain less weight than the ranges recommended by the IOM do not have an increased risk of having a low birth weight infant, which is similar in our study. In our study 81% Mother gain normal weight; there is no adverse maternal and fetal outcome. Pregnancy is traditionally a time when women feel they should be 'eating for two' and resting, but it is also a time when behaviours can be challenged with the aim of not only improving the women's health, but more importantly from a motivational point of view, the health of her baby¹³.

Conclusion

Early pregnancy over weight and excessive weight gain of mother during pregnancy have some increase in birth weight of the infants, but it does not exclude low birth weight infant, and it causes various complications. Patients with pre-pregnancy over weight and obesity have higher likelihood of high birth weight in infants who are at risk of polycystic ovarian disease/Diabetes Mellitus/Hypertension and cancer in later life. Pre-pregnancy weight loss is the key to reduction of complications. Patients with high BMI should have early pregnancy booking and send to dietitian for appropriate diet. Antenatal fetal monitoring is essential for patients with high BMI. Time to time different recommendations has been made to optimize weight gain as it has been shown by different studies that optimal weight gain can improve pregnancy outcome. Individualized care and clinical judgment is necessary in the management of the overweight and obese women.

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