RELATION BETWEEN EARLY PREGNANCY BMI AND GESTATIONAL WEIGHT GAIN WITH NEONATAL BIRTH WEIGHT

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Abstract:Study objective is to study the influence of early pregnancy BMI on neonatal birth weight. To Study the association between gestational weight gain and neonatal birth weight. An observational correlational study, consisting of 1031 pregnant women, with singleton uncomplicated pregnancy, booked at Krishna Institute of Medical Sciences, Karad before 12 weeks of pregnancy, conducted between June 2014 to December 2015. After getting written informed consent from the patient, patients included in the study. Those who developed any complication during the study were excluded. With rising BMI, weight gain in pregnancy is greatly increased. Maternal pregnancy BMI has a positive association with the birth weight of neonatal. Lower BMI is significantly linked to a relatively low weight gain lower birth weight.

Keywords: Gestational weight gain, Neonatal birth weight, Pregnancy, BMI

1. INTRODUCTION

Birth weight plays an significant part in the growth of baby life, youth and adult well-being. Low birth weight is a major contributing factor for negative health effects, like certain childhood diseases. On the opposite extreme of the birth weight scale, macrosomia raises the likelihood of caesarean section childbirth, including risks such as shoulder dystocia [1]. The gestational cycle influences the efficiency of the human capital and relies on the situation intrauterine. Healthy pregnant women with a good nutritional status definitely improve baby outcomes. In emerging countries the low birth weight rate was four times greater than in developed nations. Every year more than 9 million babies die, 98 per cent occur in developing countries and most of them are due to low birth weight. Optimum maternal weight gain is therefore essential for better performance [2].

2. AIMS & OBJECTIVES

To Study the influence of early pregnancy BMI on neonatal birth weight. To Study the association between gestational weight gain and neonatal birth weight. To Find Out the relationship between early pregnancy BMI and maternal gestational weight gain.

3. REVIEW OF LITERATURE

Pre-pregnancy pregnancy mass index and gestational weight gain are important predictors of birth weight. This has been clearly recognized since 1990 when the Institute of Medicine (IOM) revised the recommendations for weight gain during pregnancy. In 2009 the IOM again revised the recommendations for increasing gestational weight gain [3]. In 2014 the Government of India's National Health Mission (NHM) released the same recommendations for maternal weight gain during pregnancy dependent on BMI birth [4]. A large body of data links a high pre-pregnancy BMI with a number of fetal and maternal complications including fetal death, pre-eclampsia, gestational diabetes, low neonatal Apgar score macrosomia, excessive postpartum weight retention and complicated deliveries (shoulder dystocia)[5,6]. Therefore it becomes important to know the association between early pregnancy BMI and gestational weight gain in relation to neonatal birth weight. This understanding will help prevent the hazards of low birth weight and macrosomia in our population. Energy balance and body weight are sustained in health by the consumption of dietary energy (calories) in an amount equal to the daily expenditure of energy. Simply put under nutrition results from the intake or absorption of fewer calories than energy spent and over nutrition represents less expenditure of energy than calories consumed. An increased incidence of urinary tract infections is observed in obese women. As previously reported there was no increase in infection of genitals or lesions in obese women. Incidence of caesarean section rate for obese women was over 20% compared to nearer 10% for normal weight women. There was also increased risk for anaesthesia related complications for the obese mother including perioperative thromboembolic events, post-operative infection, risk and difficulty with anaesthesia and increased risk of mortality. Maternal obesity was also established as a risk factor for shoulder dystocia. This could be because of association of obesity with diabetes mellitus. Obese women are found to have higher rates of post-partum hemorrhage. Increased incidence of wound infection has also been seen in obese women after caesarean section.

Women planning pregnancy should be counselled regarding ideal weight and importance of losing weight before entering pregnancy. Nutritional education, behaviour modification, dieting and exercise should be stressed on. In obese women in whom these strategies have been unsuccessful, bariatric surgery should be considered. Counselling should also include the maternal risks, fetal risks and delivery, including access to timely cesarean section, risks of cesarean section and fetal monitoring issues. Assess the co- morbidities of women including diabetic screening and cardiology evaluation in morbidly obese women [7]. Obese women require longer period of hospitalization. Graduated compression stocking, hydration and early mobilization is recommended. Women should be encouraged to breast feed. Increased post-partum weight retention is noted in obese women. Women should be encouraged to exercise and maintain diet control [8]. Needs to be chosen according to maternal relative weight and concomitant metabolic or vascular disorders, combined OC pills are contraindicated if BMI>40. There is also increased risk of venous and arterial thromboembolism and increased failure rate in obese women. Intrauterine devices are effective but technically challenging. In India, the average weight of a normal newborn infant born at term gestation is around 2.8 kg which is less than that in the more affluent societies.Expected weight of newborn infants born at a given gestational age is generally estimated from the intra uterine growth charts. Babies with birth weight ranging between

10th and 90th percentile on such a chart are considered appropriate for date or appropriate for gestational age (AFD or AGA). New born babies with a birth weight less than 10th percentile are categorized as small for date or small for gestational age (SFD or SGA) infants [9].

In the absence of serious pathological states, low birth weight infants given good postnatal care catch up in physical growth compared with the full term infants, within a period of 2-3 years. The SGA infants do well for the first 2-3 months of life after which they generally continue to lag behind the normal neonates in respect to both weight and height. The cognitive development of the low birth weight neonate without birth injuries or hypoxia. appears to lag behind the full term infant during the first year of life. The SGA babies are at greater risk for developing neuro motor handicaps such as attention deficit or learning disabilities. The greater the degree of fetal growth retardation, higher is the risk.

The long term prognosis of LBW infants is modulated by the cause of LBW - Pre-eclamptic toxaemia of pregnancy and placental dysfunction may cause birth asphyxia resulting in cerebral palsy, mental retardation or convulsions. Intrauterine infections may lead to congenital malformations and brain damage. Twin pregnancy predisposes the infant especially the second twin to birth injury and asphyxia. Likewise there is a higher incidence of birth trauma and anoxia in the first born infants of young mothers.

Quality of neonatal care is intimately linked to prognosis of LBW infants. Infant well cared for immediately at birth at the appropriate level of care have good prognosis. Environmental and social factors - The quality of subsequent perinatal and medical care, supervision, social and environmental factors determine the long term outcome.

4. METHODOLOGY

An observational correlational study, consisting of 1031 pregnant women, with singleton uncomplicated pregnancy, booked at Krishna Institute of Medical Sciences, Karad before 12 weeks of pregnancy, conducted between June 2014 to December 2015. After getting written informed consent from the patient, patients included in the study. Those who developed any complication during the study were excluded. The goal was to include as many cases as possible within the study period. With the help of pre-designed questionnaire, basic information collected, weight gain noted during every antenatal check-up visit and information regarding gestational age at delivery and birth weight of neonate collected following delivery. Singleton uncomplicated pregnancy, booked for regular antenatal care before 12 weeks of pregnancy at Krishna Hospital, Karad coming for antenatal check-ups regularly.

5. OBSERVATION & RESULTS

Table 1: Age distribution of subjects studied

Age in years	Number of subjects	Percentage (%)
18-20	157	15.23
21-25	847	82.15
26-30	26	2.53
>30	1	0.09

Total	1031	100
Mean ± SD	23.90 ± 4.46	

As shown in table no. 1, out of 1031 cases studies 15.23% were in 18-20 age group, 82.15% were in 21-25 age group. The mean age of the participants was 23.90 ± 4.46.

Table 2: Religion distribution of subjects studied

Religion	Number of subjects	Percentage (%)
Hindu	920	89.23
Muslim	68	6.59
Others	43	4.48
Total	1031	100

As shown in table no. 2, out of 1031 patients studied 89.3% were Hindu, 6.59% were Muslim, 4.48% were from other religions.

Table 3: Education level of subjects studied

Education level	**Number of subjects**	**Percentage (%)**
<12 years in school	**395**	**38.31**
>12 years in school	**635**	**61.59**
Total	**1031**	**100**

As shown in table no. 3, 38.31% had education less than 12 years of school while 61.59% had education more than 12 years of school.

Table 4: Birth weight (kg) of subjects studied

Birth weight (kg)	**Number of subjects**	**Percentage (%)**
<2.50	**158**	**15.32**
2.50-2.99	**417**	**40.45**
3.00-3.49	**335**	**32.49**
3.5-3.99	**94**	**9.12**
4.00 & above	**27**	**2.62**

Total	**1031**	**100**
Mean ± SD	**2.94±0.42**	

As shown in table no. 4, 40.45% cases had neonatal birth weight between 2.5kg to 2.99kg, 32.49% cases had neonatal birth weight between 3kg to 3.49kg. The mean neonatal birth weight was 2.94±0.42 kg.

6. DISCUSSION

The study was done with 1031 pregnant women with singleton uncomplicated pregnancy booked at Krishna Hospital, Karad by 12 weeks of pregnancy for antenatal care between June 2014 to December 2015. The majority of the women belonged to upper middle class 31.81%, with middle class being 27.74% and upper class being 27.74%. A very large correlation (r value= 0.624, p value <0.001) was noted between gestational weight gain and birth weight in the upper class. The education level of 38.31% of the women in our study was less than 12 years in school. A very large correlation (r = 0.794 and p<0.001) was seen between estational weight gain and birth weight in these women. 83.12% of women in the study were housewives and 16.88% were working women. There was a statistically more significant correlation (r value =0.756, p<0.001) between gestational weight gain and birth weight in housewives, when compared to working women (r value = 0.476, p<0.001). □ The women in our study were divided into 4 BMI groups based on their early pregnancy BMI. 14.45% were underweight, 71.97% were normal weight 11.83% were over-weight and 1.75% were obese. A statistically significant correlation was noted between BMI and gestational weight gain. It was seen that weight gain significantly increased with increasing BMI (p<0.001) in the 1st trimester, with a similar trend in the 2nd trimester (p<0.001), while weight gain was not statistically associated with increasing BMI in 3rd trimester (p value 0.744). Overall, weight gain is significantly correlated with increasing BMI with p<0.001. It was also seen that obese women gained less net weight (11.80±1.64) when compared to women to other BMI classes.

7. CONCLUSUONS

Weight gain in pregnancy is significantly increased with increasing BMI. Maternal pre pregnancy BMI is positively associated with neonatal birth weight. Lower BMI is significantly associated with lower birth weight of relatively low weight gain. There is independent as well as combined effects of early pregnancy BMI and gestational weight gain on infant birth weight. Increasing total weight gain was positively and significantly associated with increasing birth weight. Gestational weight gain within the NHM guidelines was associated with decreased risk of delivering low birth weight neonates and with decreased risk of macrosomia. The study shows weight gain in pregnancy is significantly increased with increasing BMI. It was seen in our study that increasing total weight gain was positively and significantly associated with increasing birth weight. It was further observed that weight gain in 2nd trimester contributed more to birth weight. In addition, our study results suggested that gestational weight gain within the NHM guidelines was associated with decreased risk of delivering low birth weight neonates and with decreased risk of macrosomia. When women gained weight below NHM recommendations, there was increased incidence of low birth weight. Hence the role of physicians for proper counselling and advice to pregnant women regarding physical activity, dietary habits and weight gain should be further emphasized. study results, taken together with existing literature, suggest an independent role of pre-pregnancy BMI as a determinant of neonatal birth weight, as well as complex relationships between pre-pregnancy BMI, gestational weight gain, and other

maternal factors with fetal growth, as measured by size at birth. The results are of public health importance because pre-pregnancy BMI and gestational weight gain are modifiable risk factors of adverse pregnancy outcomes.

8. REFERENCES

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