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RELATIONSHIP OF GESTATIONAL WEIGHT GAIN WITH EDUCATIONAL STATUS, PARITY AND BIRTH WEIGHT OF THE NEONATES.

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Abstract: Weight gain during pregnancy is an important determinant of fetal growth. Maternal weight gain during the period of pregnancy is one of the vital independent predictors of neonatal birth weight. The present study was conducted to find out the relationship of gestational weight gain with Educational status, Parity and Birth weight of the neonates. A comprehensive questionnaire-cum-interview schedule was designed to collect information. 400 singleton live born normal babies and their mothers were randomly selected. The sample was taken from Tertiary care hospital viz.Trust Maternity Hospital of Sher-e-Kashmir Institute of Medical Sciences (SKIMS) Soura Srinagar. The birth weight of neonate was assessed soon after birth by using scientifically designed weighing techniques. The results of the study revealed that as overall weight during pregnancy increased the mean birth weight of the neonate also increased. It was also found in the study that as the educational level of the respondents increased, the average weight during pregnancy increased. Mean weight gain during pregnancy among literate respondents was more i.e. 12.11kg's ± 1.78kg's as compared to illiterate respondents ,having an average weight gain during pregnancy as 10.62kg's ±1.32kg's .The results are statically significant ($p \leq 0.0001$). The mean Gestational weight gain (GWG)was more among primiparous (2^{nd} para) i.e. 12.85 kg's ± 1.59 kg's and only 10.80 kg's ± 1.00kg's average weight gain was seen in multiparous.(4^{th} Para).

Key Words: Gestational weight gain, Relationship, Educational status, Parity Birth weight and Neonates.

INTRODUCTION:

Weight gain during pregnancy is an important determinant of fetal growth. Inadequate pregnancy weight gain is a significant risk factor for intrauterine growth retardation and low birth weight in infants. Inadequate maternal weight gain during the third trimester of pregnancy is associated with increased risk of spontaneous preterm delivery. Weight gain in pregnancy is not the same thing as "getting fat". Gaining weight is a positive and healthy sign that a women is giving her baby what it needs to develop. Pregnant women need not to put on any weight in the first trimester, but in order to have a healthy baby, it is necessary for them to gain the normal pregnancy weight, a total of 25-35 pounds over the course of nine months. Inadequate weight gain or dieting during pregnancy could have severe ramifications on the health of the baby.

There is good evidence that maternal pre-pregnancy weight, pattern of weight gain and total pregnancy-related weight gain are important factors in determining birth weight of neonates. Birth weight has a major impact on neonatal morbidity and mortality, and also appears to affect long-term health and early adult weight (Mamun et al., 2009).

In normal pregnancy, variable amount of weight gain is a constant phenomenon. In early weeks, pregnant women may lose weight because of nausea or vomiting. During subsequent months the weight gain is progressive until last one or two weeks, when the weight remains static or at times falls. The total weight gain during the course of a singleton pregnancy averages 11kg (24 lb). This has been distributed to 1kg in first trimester and 5kg in second and third trimester. Rapid gain in weight of more than 0.5kg (1lb) a week or more than 2kg (5lb) a month in later months of pregnancy may be the early manifestation of pre-eclampsia and need for careful supervision. Stationary or falling weight is one of the suggestive feature of intrauterine growth retardation or intrauterine death of the fetus. Poor weight gain is too often associated with higher incidence of pre-eclampsia, prematurity, dysmaturity and increased perinatal mortality and impairment of effective lactation **(Dutta 2000).**

Most women gain weight during pregnancy. However, there are exceptions that some mothers do not gain at all or rather lose weight, in such situations the fetal growth is presumed to be at the cost of the mother. There are fetal and maternal components of weight gain, the maternal components (being due to expansion of blood volume, growth of uterus and breast and fat storage) occurs in 2nd trimester and the fetal component (being due to growth of fetus, placenta and amniotic fluid) occurs in 3rd trimester.**(Robinson et al., 2000).**

OBJECTIVES:

1. To find out the relationship of Gestational weight gain with Educational Level and Parity.
2. To find out the relationship of Gestational weight gain and Birth weight of the neonates.

REVIEW OF LITERATURE:

Maternal weight gain during the period of pregnancy is one of the vital independent predictors of neonatal birth weight. Gestational weight gain has high degree of positive relationship (correlation) with the birth weight of neonate **(Shrestha et al., 2010)**. According to **Institute of Medical Guidelines (IOM)**, low maternal weight gains during the entire course of pregnancy are associated with increasing risk of delivering a low birth weight baby.

A significant association was found between maternal weight at term and birth weight in a study conducted by **Shobeiri & Nazari (2006)**.

Pinheiro et al., (2001) conducted a study to determine relationship between maternal weight gain during pregnancy and birth weight of neonate. The study revealed that a greater weight gain in second trimester of pregnancy resulted in a better birth weight of the neonate.

In two systematic reviews and meta-analyses, high gestational weight gain was associated with lower risk of delivering LBW babies with ideal birth weight of the neonates **(Mc**

Donald et al., 2011), whereas low total gestational weight gain during pregnancy was associated with increased risk of having LBW babies **(Han et al., 2011)**.

An unhealthy pre-pregnancy weight i.e gaining an inappropriate amount of weight during the entire course of pregnancy raise the risk for poor pregnancy and birth outcomes.

Education is vital social determinant of many health outcomes, but the relationship between maternal educational attainment and weight gained over the entire course of pregnancy (GWG)) has not been clearly recognized. The 2009 IOM report on pregnancy related weight gain reported that the relationship between educational attainment and GWG is not well-established **(**Rasmussen et al., 2009**)**.

Cohen **et al., 2016** in his study reported that women with high educational level had increased chances of gaining a recommended amount of gestational weight. Those with low level of education had gained inadequate GWG than those with more educational level.

Power et al. (2018) revealed that GWG below recommendations was associated with higher parity (multiparous)

METHODOLOGY

1. DATA SOURCE AND COLLECTION

In the present study both the primary as well as secondary sources of data were used to obtain the desired information.

A) Primary Data: The present study was conducted in a hospital based setting. The sample was primarily collected from Tertiary care hospital viz Trust Maternity Hospital of Sher-e-Kashmir Institute of Medical Sciences (SKIMS) Soura Srinagar .A structured questionnaire and an interview schedule was devised and used for collecting the primary information from the subjects selected(Pregnant Women). A non-stretchable measuring tape and a digital weighing scale were also used to collect information regarding the height and weight of the respondents. Weight of the pregnant women was assessed during the three trimesters of pregnancy by using standard weighing machine and recorded in scientifically designed questionnaire. The baby's birth weight was assessed soon after birth using standard weighing techniques and weighing scale. Weight was recorded on a pre-prepared questionnaire. Mothers were questioned on relevant correlates of birth weight.

B) Secondary Data: Data collected from secondary sources represented the information obtained from books, published or unpublished dissertation, medical and public health journals, and latest information from internet etc.

2. SAMPLE SIZE The present study included a total no. of 400 pregnant women and their neonates .Out of them 211 were from urban area and 189 from rural area. The subjects were selected using a purposive random sampling method. The sample size was determined on the basis of the estimated prevalence of the pregnant women, with the help of the formula:

$$n = \frac{z^2 x\ p\ (1-p)}{}$$

d^2

Where:

n = required sample size

z =confidence level at 95% (standard value of 1.96)

p= estimated prevalence of Pregnant women in Kashmir valley

d = margin of error at 5%.

3. SAMPLE SELECTION PROCEDURE

Pregnant women attending the department of Obstetrics and Gynecology SKIMS hospital situated in Srinagar district were selected for data collection. From among all pregnant women attending the OPD, randomly every 3rd pregnancy was included as per the inclusion/exclusion criteria till a total of 400 normal pregnant women were enrolled and selected as per sample size requirement (purposive random sampling method). The whole process of selection was completed within 8 to 12 weeks. The pregnant women selected were followed throughout their pregnancy till term and confinement to record desired information as per the designed profoma as well as trimester-wise weight gain and neonatal outcome information.

A well formulated interview schedule was used to elicit the information pertaining to socio-demographic characteristics, weight gain pattern during current pregnancy and particulars of neonates at birth. All respondents were given an information sheet detailing the objective and nature of the study. Informal consent was obtained from the selected pregnant women prior to their participation. Birth weight of the neonates was recorded soon after birth.

Inclusion criterion:

1. Pregnant women who knew their weight before pregnancy (pre-pregnancy weight).
2. Women without complications like pre-eclampsia, eclampsia, gestational diabetes, hyper emesis gravidrum, metabolic or chronic disease and so on.
3. Pregnant women not having any other complications during all the three trimesters.
4. Babies born out of term deliveries i.e. full term babies with normal birth eight

Exclusion criterion:

1. Pregnant women with high risk pregnancy like pregnancy with hypertension, diabetes, hyperemesis, metabolic and or other chronic disorders etc.
2. Pregnant women with any other systemic complication developed during pregnancy
3. Babies born out of preterm and post-term deliveries.
4. Babies born of mothers with obstetric complications.
5. Babies born of mothers with medical complications.
6. Babies born with congenital anomalies.

TOOLS USED

The tool used in the present study was essentially a questionnaire. Questionnaire was devised as per objectives of the study. After a thorough and detailed study of the problem and the review of literature, a preliminary questionnaire was framed. This was pre-tested on 10% of the sample size to ensure the validity and feasibility of the questionnaire and was then used in the study. Questionnaire was supplemented by an interview schedule to obtain the desired information.

DATA ANALYSIS

For analysis of data Microsoft Excel and statistical package SPSS were used. The data was tabulated, analyzed and interpreted as per the needs of the study. Besides percentage, mean and standard deviation, other statistical tools were also used to see the correlation of birth weight of neonates with various factors affecting it and significance of the results obtained.

RESULTS AND DISCUSSION:

The results obtained from the present investigation are presented below:

Table 1: Effect of Maternal Weight Gain Changes on Birth Weight of the Neonates:

Total weight Gain (kg's)	N	Mean Birth weight(kg's)	±SD	p-value
8-11	120	2.51	0.20	≤0.0001*
11-14	196	2.91	0.28	
14-17	84	3.51	0.17	

*significant at 5%

Table 1 revealed that as the overall weight during pregnancy increased the mean birth weight of the neonate also increased, with mean birth weight of 2.51kg's ±0.20kg's among pregnant women who gained only 8-11kg throughout the course of pregnancy. Whereas mean birth weight of 2.91kg's± 0.28kg's and 3.51kg± 0.17kg's was seen among pregnant women who gained 11-14 and 14-17 kg's of weight in the entire course of pregnancy. The mean difference between the Birth weights of the neonate is statistically significant.

Women gaining suboptimal weight during the entire course of pregnancy gave birth to lighter babies than women gaining optimal or excessive weight during pregnancy. (**Olafsdottir et.al., 2006**).

A study conducted by **Frederick et al., (2008)** revealed that gestational weight gain is positively connected with infant birth weight. Less than median gestational weight gain is associated with twice the risk of delivering a Low birth weight baby. Risk of delivering macrosomia also increased with gestational weight.

The findings of a study conducted by **Bisai et al. (2007)** showed a positive association between maternal early second trimester (2^{nd} week to 8^{th} week) pregnancy weight and birth weight. A higher incidence of low birth weight and lower mean birth weight was observed in mothers who gained less weight during the entire course of pregnancy. The rate of Low birth weight decreased significantly and mean birth weight of neonate increased with increasing maternal weight.

Table 2: Gestational Weight gain in relation to Educational status of the Respondents

Variable	Category	N	Mean Weight Gain(kg's)	±SD	p- value
Educational Status	Illiterate	76	10.62	1.32	≤0.0001*
	Literate	324	12.11	1.78	

***significant at 5%

Table 3: Gestational Weight gain in relation to Educational Level of the respondents.

Educational Level	N	Weight Gain(kg's)	±SD	p-value
Middle pass	58	10.66	1.10	≤0.0001*
Matriculate	43	11.12	1.48	
10+2	57	11.68	1.64	
Graduate	112	12.83	1.59	
Post graduate	54	13.37	1.44	

*significant at 5%

It was found in the study (Table 3) that as the educational level of the respondents increased the average weight gain during pregnancy also increased. It is quite clear in Table 2 that the mean weight gain during pregnancy among literate respondents was more i.e. 12.11kg's ± 1.78kg's as compared to illiterate respondents, having an average weight gain during pregnancy as 10.62kg's ±1.32kg's .The results are statically significant ($p \leq 0.0001$).

Table 3 revealed that the respondents who were matriculate had average weight gain during pregnancy of 11.12kg's± 1.48kg's, as compared to average weight gain of 12.83kg's ±1.59kg's and 13.37kg's ±1.44kg's among respondents who were graduates and post graduates respectively.

The most recent study found that women with less than a high school education gained insufficient gestational weight gain (GWG) **(**Deputy et al., 2015**)**. Another study **(**Chu et al., 2009**)** found that women with more level of education gained more weight on an average. In New York City, women with high school or little college education were more likely than those with less level of education to gain more than 40 pounds during pregnancy **(**Huynh et al., 2013**)**. Insufficient GWG was more frequently seen among less educated pregnant women **(**Ventura, 1995**)**.

Women with high educational achievement have significantly higher weight gain during the entire course of pregnancy as compared with low-educated women **(Farhangi 2016).**

Table 4: Gestational Weight gain in relation to Parity

Parity	N	Mean Total Weight Gain(kg's)	±SD	p-value
1st para	199	11.17	1.63	≤0.0001*
2nd para	151	12.85	1.59	
3rd para	30	11.63	1.84	
4th para	20	10.80	1.00	

*Significant at 5%

Table 3 revealed that the mean Gestational weight gain (GWG)was more among primiparous (2nd para) i.e. 12.85 kg's± 1.59 kg's and only 10.80 kg's ± 1.00kg's average weight gain was seen in multiparous(4th Para). The findings are in agreement with a study conducted by **Paulino et al. (2015),** who found that the mean GWG was higher among primiparous . Similar findings were also revealed by **Lan-Pidhainy et al. (2013)**, who reported that primiparous women gained more weight during pregnancy than did multiparous women.

Power et al. (2018) revealed that GWG below recommendations was associated with higher parity (multiparous).

MAJOR FINDINGS:

1. As the total weight gain during pregnancy increased the mean birth weight of the neonate also increased.
2. Mean birth weight of 2.51kg's ±0.20kg's was seen among pregnant women who gained only 8-11kg throughout the course of pregnancy. More Mean birth weight of 2.91kg's± 0.28kg's and 3.51kg± 0.17kg's was seen among pregnant women who gained 11-14 and 14-17 kg's of weight in the entire course of pregnancy. The mean difference between the Birth weights of the neonate is statistically significant.
3. As the educational level of the respondents increased, the average weight gain during pregnancy also increased.
4. The mean weight gain during pregnancy among literate respondents was more i.e. 12.11kg's ± 1.78kg's as compared to illiterate respondents, having an average weight gain during pregnancy as 10.62kg's ±1.32kg's .The results are statically significant ($p \leq 0.0001$).
5. Respondents who were matriculate had average weight gain during pregnancy of 11.12kg's± 1.48kg's, as compared to average weight gain of 12.83kg's ±1.59kg's and 13.37kg's ±1.44kg's among respondents who were graduates and post graduates

respectively.

6.Mean Gestational weight gain (GWG)was more among primiparous i.e. 12.85 kg's± 1.59 kg's(2nd para) and only 10.80 kg's ± 1.00kg's average weight gain was seen in multiparous(4th para

CONCLUSION:

It is concluded from the study that Gestational weight gain has a direct bearing on the educational status, parity and Birth weight of the neonate. As the educational level increased Gestational weight gain also increased. As the total weight gain during pregnancy increased the mean birth weight of the neonate also increased. Mean Gestational weight gain (GWG)was more among primiparous i.e. 12.85 kg's± 1.59 kg's(2nd para) and only 10.80 kg's ± 1.00kg's average weight gain was seen in multiparous(4th para).

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