RESEARCH ARTICLE

A prospective observational study to assess maternal and foetal outcome in underweight pregnant women

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ABSTRACT

Objective: To assess the pregnancy outcome in underweight pregnant women and recommended preventable measures. **Methodology**: This prospective study is done between January to December 2014 in P.B.M Zanana Hospital, S.P Medical college Bikaner. About 400 pregnant women who were registered in antenatal clinic were included. Relevant history was taken, women were assessed during pregnancy and followed till puerperium. **Result**: The incidence of underweight pregnant women was 17.2% in randomly selected 1000 pregnant women in ANC clinic of our hospital. Most of underweight women (61%) had poor weight gain (<5kg) during pregnancy with mean weight gain 5.48 kg. 78% of underweight pregnant women had moderate anaemia with mean Hb 8.64 gm/dl. The p value was equal to 0.0001. They had increased risk of delivering low birth weight (LBW) babies (28.5%) with mean birth weight 2.62 kg in underweight women (p value =0.0001). Poor weight gain in pregnancy in underweight pregnant women also had increased risk of delivering LBW babies (36%). **Conclusion**: Our study population has higher prevalence of underweight pregnant women (17.2%) compared to European (8%) and American (3.4%) data. In light of data from our study we conclude better antenatal care services, better nutrition, and better health education and improve awareness that underweight women have increased risk of adverse maternal and fetal outcome during and after pregnancy. So underweight is emerging problem like obesity, poses a challenge to health care providers for giving and living standards in society for reduction of adverse perinatal outcome.

Keywords: Underweight pregnant women, Weight Gain, Low Birth Weight (LBW)

In any community, the mother and the child have always been considered as one unit-be it biologically, socially, or culturally. The biological support that the mother gives to the child during its growth and development through pregnancy and lactation, in turn, depends on her own nutritional status. The unfortunate nutritional situation prevalent in many developing countries reflect the effects of maternal under-nutritional level on the outcome of pregnancy [1].

Although much recent research in developed countries has focused on the association between high maternal body mass index (BMI) and adverse pregnancy outcomes, in many developing countries, maternal underweight remains more common than

overweight and therefore represents a more important risk factor for poor birth outcomes.

The body mass index (BMI), or Quetelet index, is a measure for human body shape based on an individual's mass and height. Maternal BMI is one of predictor of nutritional status of mother. Low maternal BMI ($<18.5kg/m^2$) shows imbalance between energy intake and energy expenditure, might be a general marker of minimal tissue reserve. A malnourished mother gives birth to undernourished infant who struggle to thrive. A low body mass index (BMI) and suboptimal weight gain during pregnancy are long recognized risk factors for delivery of infants too small for gestational age [2].

Despite the current obesity epidemic, at the other end of the spectrum, maternal underweight is also common. For instance, 4.3% of pregnant women in the UK [3] and 9.0% of women in China [4] are underweight at the first antenatal visit according to the World Health Organization's (WHO's) definition of body mass index (BMI) <18.5 kg/m^2.

A low BMI status, indicative of Chronic Energy Deficiency [CED], is a particularly important aspect of the nutritional risk of women in a community during the reproductive years. This risk can be exacerbated by early marriage. The social pressure to conceive early and thus gain status through fecundity further aggravates the problem.

Female illiteracy, early age marriages and early childbearing is commonly encountered in Indian female which is associated with low body weight. In India social and biological reasons, most of women of the reproductive ages are amongst the most vulnerable to malnutrition. In an increasingly weight-conscious society, constantly bombarded by media images of skinny models, many young women strive to be 'thin.' Eating disorders such as anorexia and bulimia are increasing among young women in their 20's and 30's [5]. Underweight women may suffer from improper nutrition, anemia, and other conditions. When pregnant, this may result in an inability to sustain an adequate intrauterine environment for a developing fetus. Pregnancy outcome is worst in babies from mothers with low body mass index as compared to

healthy weight mothers with respect to increased incidence of preterm birth, low birth weight, anemia and increased neonate mortality on the neonatal ward.

In recent years, in connection with epidemic prevalence of overweight and obesity among society in developed countries, most researchers paid attention to examine the association between excessive pre pregnancy weight and obstetric complications. Conversely maternal underweight also the influence on perinatal outcome which has largely neglected by researchers. So we decided to undertake this study to find the effect of maternal low BMI on maternal and fetal outcome.

Materials and Methods

This prospective hospital based study was conducted in the Department of Obstetrics and Gynecology, P.B.M and Associated group of Hospitals, attached to Sardar Patel Medical College, Bikaner during study period of one year from January to December 2014. All women attending antenatal OPD in first trimester were selected for this study. The height and weight were measured. Two comparative groups of 200 women each were studied- 1) Underweight group (case) - 200 antenatal patients with low BMI ($<18.5kg/m^2$), 2) Normal weight group (control)-200 antenatal patients with normal BMI ($18.5kg/m^2$-$24.99kg/m^2$). The height (in meters) of study participants was recorded at first antenatal clinic (ANC) visit while the weight (kg) was recorded at each visit. The measurement were used to calculate Quetelet's index or BMI (BMI = Weight in kg/height in meter^2).

All routine blood and urine investigations were carried out with ultrasonography for fetal well being. Women who develop pregnancy related complications (PIH, antepartum haemorrhage, preterm labour pains or premature rupture of membranes), any blood transfusion, overall weight gain during pregnancy were noted. All subjects were managed by labour room staff as standard practice. Course of labour, mode of delivery and outcome of labour were noted in detail. Any intrapartum / postpartum complication and its

Table 1: Distribution of cases according to weight gain in pregnancy				
Weight gain during pregnancy. (kg)	Underweight Group		Normal Weight Group	
	No.	%	No.	%
≤ 5	122	61.00	83	41.50
5.1-10	69	34.50	106	53.00
10.1-15	9	4.50	10	5.00
>15	0	0.00	1	0.50
Mean	5.48		6.38	
SD	2.69		2.45	
p value	0.0001 (S)			

Results

Table no. 1 shows distribution of cases according to weight gain in pregnancy. Less than or equal to 5kg weight gain was much more in underweight group (61%) compared to normal weight group (41.5%). Mean weight gain in normal weight group was 6.38 kg and in underweight group was 5.48 kg. On comparing weight gain in normal weight group and underweight group, the difference was statistically significant ($p<0.001$). Table no.2 shows the severity of anemia in both normal weight and underweight group. Normal Hb was present in 24% cases of normal weight and 8.5% cases of underweight group. 78% of underweight women and 54% of normal weight women were moderate anemic. Mean Hb of underweight women was 8.64 and of normal weight women was 9.73. The

management were recorded. Also need for any blood transfusion, operative intervention, duration of hospital stay, maternal morbidity were noted. Obstetric outcome of these patients were studied in terms of duration of labour, mode of delivery and occurrence of complications. In the newborn sex, weight, Apgar score, gestational age and congenital anomalies, type of resuscitation if required were noted. Suggestive development of respiratory distress syndrome,

Table 2: Severity of anemia in both normal weight and underweight group				
Hb Level in gm/dl	Underweight Group		Normal Weight Group	
	No.	%	No.	%
<7	10	5.00	2	1.00
7 to <10	156	53.00	108	54.00
10-10.9	17	8.50	42	21.00
≥ 11	17	8.50	48	24.00
Mean	8.64		9.73	
SD	1.26		1.31	
p value	0.0001 (S)			
S- Significant				

Table 3: Percentage of low birth weight babies				
Weight of Babies	Underweight Group		Normal Weight Group	
	No.	%	No.	%
Normal Birth Weight	142	71.00	172	86.00
Low Birth Weight (1.5 to <2.5Kg.)	57	28.50	25	12.50
Very Low Birth Weight (<1.5Kg.)	1	0.50	3	1.50
Total	200	100.00	200	100.00
Mean	2.62		2.89	
SD	0.40		0.48	
p value	0.0001(S)			
S- Significant				

intracranial or intra-ventricular haemorrhage, septicemia etc were noted. Mothers and newborn were followed till discharge from the hospital.

Data was analysed including mean, standard deviation and p value were calculated using student 't' test using primer software. p value <0.05 was considered significant.

difference was statistically significant ($p<0.001$). Table no. 3 shows that percentage of low birth weight babies (LBW) in underweight group was 28.5% and in normal weight group was 12.5%. The mean birth weight was 2.89 in normal weight group and was 2.62 in

underweight group. On comparing the data, difference

Table 4: Weight gain during pregnancy (kg)									
Baby weight (Kg)	**≤ 5**		**5.1 - 10**		**10.1 – 15**		**> 15**		
	Underweight No (%)	Normal weight No (%)	Underweight No (%)	Normal weight No (%)	Underweight No (%)	Normal weight No (%)	Underweight No (%)	Normal weight No (%)	Total
Normal (≥2.5)	78(63.93)	69(83.13)	55(79.71)	93(87.74)	9(100)	9(90)	0	1(100)	314
LBW (1.5 to <2.5)	44(36.07)	13(15.66)	13(18.84)	11(10.38)	0	1(10)	0	0	82
VLBW (<1.5)	0	1(1.20)	1(1.45)	2(1.89)	0	0	0	0	4
Total	122(100)	83(100)	69(100)	106(100)	9(100)	10(100)	0	1(100)	400

was statistically significant (p<0.001). Table no.4 shows the correlation of weight gain in pregnancy with baby weight.

Discussion

Adverse effects of low BMI are preferentially targeting the foetus, whereas high BMI has a higher impact on maternal health. Underweight women is rapidly emerging problem among in developing countries like India where there is still prevalence of malnutrition, illiteracy, poverty etc. and also in developed countries due to weight conscious society which not only affect the health of mother and foetus but also the whole community and future generation.

In our study mean weight gain in normal weight group was 6.38 kg and in underweight group was 5.48 kg. On comparing we found that there was lesser weight gain in pregnancy in underweight women as compared to normal weight pregnant women. This is because of malnourishment, lack of adequate nutrition, lack of awareness, poverty, early age marriages which leads to less weight gain during pregnancy. Similar findings were present in a study by Ehrenberg et.al [6] and Zafari Mandana et.al [7].

In our study 78% of underweight women were moderate anaemic. Mean Hb of underweight women was 8.64gm/dl and of normal weight women was 9.73gm/dl (p<0.001). This shows that underweight pregnant women had associated moderate to severe anaemia due to faulty food habits such as improper intake and availability of food, food fadism, lack of iron rich diet and iron reserves. Other reasons may be nutritional deficiency, worm infestation and faulty absorption. Our findings are similar to study by Sebire NJ et.al [8] and by S.R Srivastava [9]. In our study area the prevalence of anaemia among pregnant women is very high (83.75%) compared to other studies (45.2%) in literature. This is due to fact that in Western Rajasthan the incidence of baseline anaemia is very high. According to NFHS 2005-2006, 53% of women in Rajasthan are anaemic. The overall prevalence of severe anaemia among pregnant women in Bikaner district was 13.1% upto 38.2% in NFHS survey.

In our study we found that percentage of low birth weight babies (LBW) in underweight group was 28.5% . The mean birth weight was 2.89kg in normal weight group and was 2.62kg in underweight group , we found significant association between underweight pregnant women and low birth weight (p<0.001).This is because underweight women were malnourished, had inherent faulty food habits, had minimal tissue reserves, less dietary intake which did not met normal physiological nutrition demand of pregnancy leading to inadequate weight gain during pregnancy, inadequate hemodynamic response did not gave proper intrauterine environment which may deaccelerate the foetal growth leading to low birth weight babies. Our findings are similar to study by Sebire et. al [8] and S. Ralph et.al. [10].

We found that in group of women who had weight gain less than and equals to 5 kg, the percentage of low birth weight babies in underweight group was more (36.07%) than in normal weight group(15.66%). However if underweight women gain optimal weight gain in pregnancy the risk of delivering low birth weight babies is less as compare to equivalent gain in normal weight group. Thus if we improves the nutrition of underweight women and vigilant weight gain monitoring during antenatal care in pregnancy, it will definitely decrease the risk of low birth weight babies (LBW). Our findings were similar to study by Erika et.al [11] and Li Y et.al [12].

Conclusion

As all over the world obesity is emerging problem, conversely underweight among women is also mounting issue, as developing countries are unable to rise from shackles of poverty, malnutrition, illiteracy and on another side due to weight consciousness among society which also increasing the problem of underweight in developed countries. So we have to decide and implement strategies at all health care levels for detection and prevention of underweight before and during conception to get better pregnancy outcome. These strategies include adequate nutrition and iron supplementation among adolescent girls, early registration in ANC clinics, timely detection and referral of high risk pregnancy so as to improve pregnancy outcome.

Conflict of interest: None. **Disclaimer:** Nil.

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