Anthropometric Assessment of Nutritional Status in Pregnant Women in Different Trimesters Attending at the Antenatal Clinic of DMCH

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ABSTRACT

Background: Adequate nutritional status of expectant mothers is essential for their health maintenance and good pregnancy outcome. To assess the anthropometric measurements of pregnant women.

Methodology: Cross sectional study, 245 pregnant women was included whom attended at antenatal clinic of Dhaka Medical College hospital. Main outcome measures: 38% pregnant women were found with overweight or obese and 20% were found underweight that was related with chronic energy deficiency, vitamin deficiency and Iron deficiency anemia.

Result: A total of 245 women were in this study, the highest number (48.16%) was found visited in the second trimester, 32.24% were in third and 19.5% in 1st trimester respectively. The mean age of women attending in this study was 23%. It was surprising that our upcoming mother's did not have good height, around 60% were found less than five feet and 24% women were less than four feet eight inches, which indicated that a significant proportion of women might need to have surgical intervention during delivery. Not only the height, but also the weight of our respondents was found much poor and 16% of total attending women had weight below 40 kilogram.

Conclusion: Our study revealed that the majority of the women suffered from chronic energy deficiency which could be the potential factor for delivering malnourished babies. All pregnant women should be motivated to have an antenatal check up throughout the pregnancy, increase birth spacing to hold their proper nutritional status and encourage them to delivery their babies in hospital.

Key Words: Anthropometry, Trimester, Pregnant Women

Introduction

Nutrition is one of the most important factors influencing the quality of human life. Nutritional status is an important health indicator to assess a country's health status and morbidity pattern. Nutritional disorders are very frequent in women and involve a high risk of morbidity and mortality. Studies on nutritional status are very important in the women of childbearing age because of low to moderate prevalence of possible deficiencies.[1] The relationship between nutritional status and health of mothers and newborn is well documented.[2] Morbidity and mortality are inversely related to socio-economic status.[3]

Pregnant women, represent the most vulnerable to nutritional deprivation. Most vulnerable, because their

nutritional requirements are proportionally higher and the effects of malnutrition are severe and long-lasting.[4,5]

Adequate nutritional status of expectant mothers is essential for their health and pregnancy outcomes. Due to increased nutritional requirements pregnancy is a critical period for meeting the body's demand for macro and micronutrients. Thus, anaemia and vitamin A deficiency (VAD) are highly prevalent nutrient deficiencies encountered in pregnant women, affecting 53.8 million (55.8%) and 7.2% million (6.8%) on a global scale, respectively.[6,7] Both deficiencies have been shown to result in serious health consequences including increased morbidity and mortality of both mother & child.[8]

Materials and Method

This descriptive type of cross-sectional study was conducted among the pregnant women attending at the antenatal clinic of DMCH from January 2011 to April 2011. There was purposive selection of the study site as the study population was available at the site.

● The sample size were calculated by using the formula, $n = \dfrac{z^2 pq}{d^2}$

    n = the desired sample size.

    z = the standard normal deviate usually set at 1.96, corresponds to the 95% confidence level.

    p = the proportion in the target population estimate to have a particular characteristics and desire accuracy at 80%

    q = I - P = 1 - 0.80 = 0.2

    d = degree of accuracy desired, usually set at 0.05.

    So the sample size is:

    $n = \dfrac{(1.96)^2 (0.80) (0.2)}{(0.05)^2}$

    = 245

There was purposive selection of sample size. Pretested semistructure questionnaire were used as data collection instruments.

● The anthropometric measurements to the subjects had to be considered, height, weight. Body weight was measured to the nearest 0.5 kg, on a portable weighing scale. Standing height was measured with a wall mounted scale to the nearest 0.5 kg, on a portable weighing scale. Standing height was measured with a wall-mounted scale to the nearest 0.5 cm, with head in the Frankfurt horizontal plane,' while standing straight on a horizontal surface with the heels together the shoulders released, arms at the sides and without shoes. Height and weight were used to calculate Quetelet or Body Mass Index BMI [weight (kg)/height (m^2)]. The classifications of BMI applied in this study were recommended by World Health Organization.[9] BMI values of <18.5 kg/m^2 and ≥25 kg/m^2 represented thinners and overweight, respectively. An acceptable weight was considered to fall within these two extremes. In the case of pregnant women, BMI of <19.8 kg/m^2 indicated and underweight individual, while BMI of 19.8-26 kg/m^2 was considered to be within the normal range.[10]

Result

Table 1: Age distribution of the patients

Age (in years)	Frequency	Percent	Mean±SD
≤20	59	24.1	
21-25	108	44.1	
26-30	64	26.12	
31-35	9	3.7	23.32±4.16
>35	5	2.04	
Total	**245**	**100.0**	

Table 1 shows the distribution of ages of patients attending at the antenatal clinic of DMCH. The mean age of patients was about 23.32 years.

Table 2: Height of the respondent women

Age(in years)	Frequency	Percent	Mean±SD
≤20	59	24.1	
21-25	108	44.1	
26-30	64	26.12	
31-35	9	3.7	23.32±4.16
>35	5	2.04	
Total	**245**	**100.0**	

Table 2 shows frequency distribution of the height of the pregnant women who attended at the anti-natal clinic of DMCH. Proportion of women with optimum height (more than 5 feet) constituted about 40% of the total women which indicates that majority of the women (about 60%) suffered from chronic energy deficiency as indicated by their low stature/ height.

Table 3: Weight of the pregnant women

Weight (Kg)	Frequency	Percent	Mean ± SD
≤40	40	16.3	
41 - 50	109	44.5	
51 - 60	76	31.0	49.26 ± 8.21
>60	20	8.2	
Total	245	100.0	

Table 3 shows the frequency distribution of weight of the patients under study. The findings reveal that majority of the pregnant women suffered from chronic energy deficiency (CED) as indicated by low weight even during pregnancy.

Table 4: Relationship between income and number of children

Monthly income	No. and %	1	2-3	4-5	>5	Total
3000 - <5000	No.	4	20	7	3	34
	%	11.8	58.8	20.6	8.8	100
5000 -0 <1000	No.	30	30	24	13	97
	%	30.9	30.9	24.7	13.4	100
10000 - 0 <15000	No.	39	29	3	2	73
	%	53.4	39.7	4.1	2.7	100
>1500	No.	20	20	1	0	41
	%	48.8	48.8	2.4	0.0	100
Total	No.	93	99	35	18	245
	%	38.0	40.4	14.3	7.3	100

Table 4 shows the relationship between monthly income of the respondents and number of children. Table depicts that the number of children is highest among monthly income 3000-<5000 taka. About 58.8% of the respondents monthly family income ranged 3000-5000 whole had 2-3 children and only 11.8% of them had one child. Whereas about 48.8% of the families had monthly income >15000 taka had less than three children. However, table clearly shows the reverse relationship between children number and family income, family those had higher number of children had low income and low children number had high income.

Table 5: Weight of the body in accordance to their period of gestation

Weight (Kg)	1st trimester (n=48)		2nd trimester (n=118)		3rd trimester (n=79)		Total
	No	%	No	%	No	%	
≤40	17	42.5	14	35.0	9	22.5	40
41-50	14	12.84	62	56.88	33	30.27	109
51-60	12	15.78	36	47.36	28	36.84	76
>60	5	25.0	6	30.0	9	45.0	20

Table 5 shows the frequency distribution of weight of the pregnant women in their various stages of gestational period. In the 1st trimester, there were only 48 women and 42.5% of them were less than 40 kg where as in the 2nd and 3rd trimester, number of the pregnant women with >40 kg and >50 kg increased significantly. The number of pregnant women in the 2nd and 3rd trimester was found 118 and 79 respectively, and body weight 40 Kg was more in 1st trimester than 2nd trimester and 3rd trimester which was 42.5% vs 35% and 22.5% but had no 35% vs 22.5% body weight in 40 Kg of 3rd trimester.

Table 6: BMI status of the pregnant women

BMI	Frequency	Percent
Under weight (<18.5)	49	20.00
Normal (18.5 -24.9)	103	42.04
Over weight (25 - 29.9)	74	30.20
Obese (>30)	19	7.76
Total	**245**	**100.0**

Table 6 shows the frequency distribution of the pregnant women who attended the anti-natal clinic of DMCH. It is clear from the table that more than 38% of the women were either over weight or obese where as 42.04% were normal BMI. Maternal malnutrition is the primary and the basic cause of low birth weight around the world. It has been found that in Bangladesh, the incidence LBW is about 40%-50%, and low/poor pregnancy weight gain on pre-pregnancy malnutrition resulted chronic energy deficiency during pregnancy, can be attributed as the major cause of LBW for most of the babies.

Table 7: BMI status at different trimester of pregnancy

BMI	1st trimester (n=48)		2nd trimester (n=118)		3rd trimester (n=79)		Total
	No.	%	No.	%	No.	%	
Under weight (<18.5)	18	36.73	17	34.69	14	28.57	49
Normal (18.5 24.9)	17	16.05	58	56.13	28	27.18	103
Over weight (25 -29.9)	7	9.45	35	47.29	32	43.24	74
Obese (>30)	6	31.57	8	42	5	26.31	19

Table 7 shows the relationships between the age of gestation and the BMI status. Out of 245 respondents, 49 of them were underweight although pregnancy and only 103 of them were normal in all the trimesters of pregnancy. However, it is surprising that 93(38%) of them were either over weight or obese which is much higher than the percentage of women who put on weight that is more than 7 kg and above.

It is important to note that in our country, about 35%-45% baby do born with low birth weight. It is also important to remember that the study was a cross sectional in design and thus, follow up of the individuals from 1st trimester was not possible in this study

Table 8: Distribution of patients in accordance to their pregnancy period

Trimester	Frequency	Percent
1st trimester	48	19.59
2nd trimester	118	48.16
3rd trimester	79	32.24
Total	**245**	**100.0**

Table 8 shows the frequency of distribution pattern of the patients in accordance to their pregnancy stage.

Number of patients in 2nd and 3rd trimester was significantly higher than that of the 1st trimester, as almost all the pregnant women can recognize that they are pregnant about four months.

Table 9: Educational status of the pregnant women

Educational status	Frequency	Percent
Illiterate	23	9.4
Up to primary	98	40.0
Up to secondary	74	30.2
Up to higher secondary	37	15.1
Up to graduate	13	5.3
Total	**245**	**100.0**

Table 9 shows the frequency distribution of educational status, 9.4% were illiterate, 40% were completed primary, 30.2% were secondary, 15.1% were completed higher secondary and 5.3% were found graduate. Majority patients had lower level of education due to the economic constraint, early marriage and social barriers.

Table 10: Monthly family income of the respondents

Monthly Income (Tk.)	Frequency	Percent	Mean ± SD
3000 < 5000	34	13.9	
5000 - 10000	97	39.6	
>10000 - 15000	73	29.8	12326 ±5541
>15000	41	16.7	
Total	**245**	**100.0**	

Table 10 shows monthly family income, maximum 39.6% had monthly income>5000-10000 taka, followed by 29.8% had monthly income>10000-15000 taka, 16.7% had monthly income>15000 taka and 13.9% had monthly income 3000-<5000 taka. The average income was 12326 5541 taka.
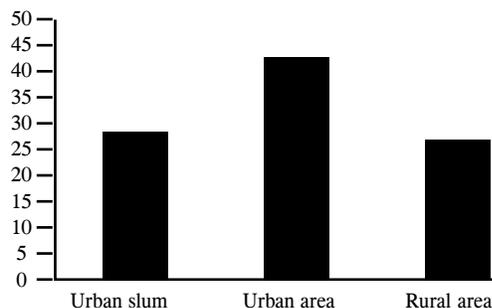

Fig. 1: Residential status of the patients

Fig.1 shows the distribution pattern of the respondents as per their dwelling status. Highest proportions of respondents (44%) were from the urban areas, and about 28% respondents are from rural areas. However, about 29% of the respondents are from the urban slum which clearly shows that, they need the services more necessarily. On the other hand mothers of urban area were found likely to be had good nutritional status and less anemic during pregnancy.

Discussion

In country like Bangladesh, pregnant women represent the most vulnerable to nutritional deprivation. Severe anaemia has been suggested to be associated with a high risk of maternal mortality.[13] Malnutrition rates have seen a marked decline in Bangladesh throughout the 1990s, but remained high at the turn of the decade.[12] Case of anaemia still high in pregnant women has low consciousness about the importance of anaemia prevention and the danger of less iron supplement.[11]

In our study, proportion of women with optimum height (more than 5 feet) constituted about 40% of the total women which indicates that majority of the women (about 60%) suffered from chronic energy deficiency as indicated by their low stature / height. Similar kind of study conducted at Thailand Christopher et al found prevalence of iron deficiency anaemia and vitamin A deficiency were 15.1% among pregnant women in northeast Thailand.[16]

The mean weight of women was about 49 kg, weight of 61% women less than 50 kg while they were pregnant (with different trimester). Although weight of about 40% women was more than 50 kg, still majority of the pregnant women were less than 50 kg. This findings is similar to the thesis result of Farhana Haseen, she found that one third of women were found chronically malnourished (height < 145cm. According to BMI (<18.5 kg/m^2) more than half of women were chronic energy deficient. Among these energy deficient women, 14% were severely energy deficient (<16.0 kg/m2). Anemia was found in about half of the women of study population.[15]

In our study we found 42.04% women had normal BMI, where 20% (<18.5) were underweight, 30.20% overweight (25-29.9), and 8% were obese (>30). In a study on pregnant women Sohana et al. found around 43% women have normal BMI which has a clear relationship with their socio-economic status.[14]

Our findings reveal that majority of the pregnant women suffered from chronic energy deficiency (CED) as indicated by low weight even during

pregnancy. In the 1st trimester, there were only 48 women and 42.5% of them were less than 40 kg where as in 2nd and 3rd trimester, number of the pregnant women with more than 40 kg and more than 50 kg increased significantly. The number of pregnant women in the 2nd and 3rd trimester was 118 and 79 percent respectively, and body weight 40 kg was more in 1st trimester than 2nd and 3rd trimester which was 42.5% vs. 35% and 22.5%. Sohana et al., found that the prevalence of chronic energy deficiency [CED, body mass index (BMI) < 18.5 kg/m^2] continues to be major nutritional problem among Bangladeshi women.

In our study, out of 245 respondents, 103 of them were normal in all the trimesters of pregnancy. It is surprising that 93 (38%) of them were either over weight or obese which is much higher than the percentage of women who put on weight that is more than 07 kg and above. This data set shows that a significant proportion of pregnant women put additional weight which is detrimental for the overall outcomes of the pregnancy.

Conclusion

We know that there is a strong relationship between weight gain during pregnancy and weight of the baby at the womb. It is important to note that in our country, majority of babies do born with low birth weight. Pregnant women are suffering from chronic deficiency anemia which resulted with pregnancy related complications. Mass motivational activities should be in the mass media particularly on proper weight during pregnancy to have better pregnancy outcome. However, our study has some limitations like short duration and lack of representativeness of samples. Further studies on this issue should be conducted to assess the anthropometric condition of pregnant women.

Conflict of interest : None.

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