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Assessment of Nutrient Intake of 1st Trimester Poor Pregnant Women Among the Districts of Kushtia, Chuadanga and Jhenaidah in Bangladesh

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Abstract: Aim/Objectives: To collect nutrient intake and nutritional status of the 1st trimester poor pregnant women among the district of Kushtia, Chuadanga and Jhenaidah in Bangladesh. Study design: This expected study was carried out among 100 poor 1st trimester pregnant women and incidence of nutrient intake and nutritional status among them was observed. Description and cross-sectional study methods, anthropometric method, laboratory methods and structure questionnaire were used to collect required data, face to face interviews with the pregnant women and examine of physical condition and dietary intake of 1st trimester poor pregnant women. To collect the nutritional condition, socioeconomic condition of the malnourished pregnant women were classified from group according to family income basis. Nutrient intake during 1st trimester of pregnancy is a very important factor. In this period nutritional status has important impact on the maternal and fetal health outcome. Both macronutrient and micronutrient intake during pregnancy supports fetal growth. Insufficiency in nutrient intake during the 1st trimester can have harmful effect on mother and fetus. On the other hand, excessive nutrient intake specially carbohydrate intake may be risk like gestational diabetes. So, amount of carbohydrate intake prevents gestational diabetes. Whereas high protein intake could have adverse effect on the fetal growth. Some micronutrients are needed for improvement of the fetus. As folic acid prevents neural tube defects and iodine prevent cretinism. Intake of calcium, to prevent hypertension disorder of pregnancy. So, we provide an overview of the most recent evidence regarding to macronutrient and micronutrient requirement during 1st trimester pregnancy.

Keywords: Macronutrient, Micronutrient, Neural Tube, Cretinism, Outcome

1. Introduction

Pregnancy is the term used to describe the period in which a fetus develops inside a mother's womb [1]. During 1st trimester pregnancy various symptoms/sign may arise as stop menstruation, tender breast, change color of areola of breast, nausea, vomiting.

The length of normal pregnancy can be from 37 weeks to 42 weeks. The 1st trimester is the time in between fertilization of the egg by sperm due to conception.

The 1st trimester is 12 weeks of pregnancy. Pregnancy has three trimester, 1st trimester is 0-13 weeks, 2nd trimester is 14-26 weeks, 3rd trimester is 27-40 weeks.

The 1st trimester is the most dangerous; in this period birth defect occur. Pregnancy-related physical symptoms occur in the first trimester [2-4]. Nausea is reported by approximately 80% of women, while vomiting affects 35%–40% in the first trimester [5-10]. 1st trimester is a very important stage of fetal development. In this period fetal heart and stomach

completely form, lung continue to develop past the 1st trimester.

Nutritional requirement increases during the 1st trimester of pregnancy. In this period maintaining a healthy balance diet is important for maintaining optimal health throughout life.

Adequate food and nutrient intake during pregnancy universally recognized as optimal for fetus development and maternal health.

It has long been recognized that pregnancy also increases a women's need for protein, Vitamins and minerals. Some repeat suggests that the usual dietary intake of certain nutrients is inadequate to meet the needs of pregnant women. and many suggest that supplementary intake of one or more nutrients must be desirable.

In the past, several reports issued by expert food and nutrition bound comities on maternal nutrition have given detailed consideration or certain vitamins, minerals and protein. It is more important that she consumes nutrient which will give her both the energy and the specific micro nutrients which are essential for maintain her and her growing baby's health.

In the districts of Kushtia, Chuadanga and Jhenaidah of Bangladesh poor nutrients intake causes substantial impact on pregnancy out comes and neonatal health. Pregnancy specially 1st trimester, food supplement use may be prescribed and iodized salt, vitamin b complex, zinc and folate, bread and cereals also play an important role to meet the increased nutritional demands of pregnancy.

During pregnancy, the maternal diet must provide an adequate supply of energy to support the mother's usual requirements as well as those of the growing fetus. Extra calorie is required for the synthesis of new tissue of fetus placenta and amniotic fluid and maternal adipose tissue.

Calorie requirements during the 1st trimester generally do not differ from those of non-pregnant women but increase between 10-30 weeks of gestation. However, energy needs of individual women vary widely during pregnancy, depending on their physical activity levels BMI, and metabolic rate. Appropriate maternal calorie intake is important to prevent poor pregnancy out come and fetal complication.

Protein is need in both structural and functional, biological role, adjustments in protein metabolism occurs within several weeks of conception in order to maintain maternal homeostasis while accommodating increased fetal demands and preparing for lactation.

2. Methodology

The survey form was prepared in two sections. The first part was conducted in order to assess nutrient intake status by anthropometric measurement with physical examination as pulse rate, B. P and BMI measurement and nutrient intake history of the poor 1st trimester pregnant women.

The second part was prepared for investigation, as Hb%, Blood sugar, amount macronutrient intake, the study design a cross sectional study was conducted.

A total of 100 poor 1st trimester pregnant women were randomly selected from rural and urban area of Kushtia, Chuadanga and Jhenaidah district adjoining, sadar hospital, MCWC, H & FWC, Community clinic and home visit of Bangladesh.

Data were collected by face to face interview with the poor 1st trimester pregnant women. The study design a cross sectional study was conducted. It includes their economic and Socio demographic data, cultural practice, food habits and literacy condition, physical and clinical examination. The study instrument was questionnaire and some standard technique of anthropometric measurements.

A questionnaire was developed to obtain relevant information on anthropometric data, dietary information, health information, socio economic condition, information of age, height, monthly family income, mother's education level and pathological condition as Hb%, blood sugar, nutritional knowledge was collected by using a structured questionnaire. Height, weight and BMI measured using standard technique, 24 hours recall method was used for obtaining data on nutrient intake.

2.1. Subjects

This study was conducted in the districts of Kushtia, Chuadanga and Jhenaidah of Bangladesh. We included three districts of the Western khulna Division in our study which are Kushtia, Chuadanga and Jhenaidah district. We collected data from the Kushtia, Chuadanga and Jhenaidah district adjoining Sadar hospital, MCWC, H & FWC, Community clinic, home visit under the division of Khulna, Bangladesh, there are total 1,47,05229 population. male 51.05% and female 48.95%. (according to the 2011 Bangladesh censures). In Kushtia district total population 19,43,868 whereas male 50.01% female 49.99% in Chuadanga district total population 11,29,015 whereas male 50.03% and female 49.97%. In Jhenaidah district total population 17,71,304 whereas male 50.04% and female 49.96% respectively. About hundreds of 1st trimester poor pregnant women were selected randomly from Kushtia, Jhenaidah and Chuadanga district. The subjects were elected from family income 6000 Tk (63 USD), 8000 TK (85 USD), 10000 Tk (11 USD) and 15000 Tk (16 USD) respectively.

Some exclusive criteria as mother with severe malnutrition resulting from iron deficiency, anemia, metabolic diseases, asthma and hypertension from the study. In Bangladesh 50% of pregnant women and 40% of non-pregnant women suffer from anemia, 57% of non-pregnant women are zinc deficient and 22% of non-pregnant women are deficient in B12 (icddr, b et al. 2013).

2.2. Survey Procedure

A structured questionnaire was used for the survey and mothers were asked for face to face interview by the survey team. One survey team containing three members was assigned to visit the hospital, H & FWC, Community clinic and home visit to conduct the survey. The study was conducted from July 12-2021 to October 31. 2021.

Survey team was also appointed to visit not more than two

to three women per day to ensure quality of data to be collected. At the end of each day, the collected recording was evaluated by the experts to ensure completeness and consistency. Incomplete and unaccepted reporting was corrected by re-visit and re-examine the relevant institutes and households.

In this study, informed written consent was taken from every respondent explaining the nature and purpose of the study and it was confirmed that the personal information will be kept confidential and signed by them.

2.3. Education and Socio-Economic Characteristics

To collect the educational status and socio-economic condition by detail questionnaire containing open ended questionnaire were used, Age and physical condition of the pregnant women were recorded. History of calorie intake according to monthly family income separately were recorded. Number of pregnant women was categorized into 15, 25, 30 and more 30 in this study.

Educational condition of pregnant women was categorized into class five, J. S. C (Junior School Certificate), S. S. C (Secondary School Certificate), H. S. C (Higher Secondary Certificate), B. A/BSS and above to collect the level of education, occupation of their husband was also collected.

Amount of macronutrient intake as carbohydrate, protein and fat were recorded by gram, and take history of taking medication also recorded. The family income was studied. The classification of family income in this study was made by face to face questionnaire, monthly family incomes were 6000Tk, 8000Tk, 10000Tk and 15000Tk. respectively.

3. Result and Discussion

3.1. Determination of Economic Status of 1st Trimester Pregnant Women

This study collected economic information of 100 pregnant women who come to take medical advice to the different level of rural health center. 30% family earn about 6,000/- thousand-taka, 25% family earn 8,000/- thousand-taka, 30% family earn 10,000/- thousand taka and 15% family earn 15,000/- thousand taka per month respectively. Most of the pregnant women family (85%) is earning very less money who can be consider as very poor family.

3.2. Determination of Primary Health Status of 1st Trimester Pregnant Women

The primary health status the pregnant women having in 1st trimester was categorized into four income level such as six thousand taka per month, eight thousand taka per month, ten thousand taka per month and fifteen thousand taka per month respectively. Primary health status was determined with the measurement of body mass index (BMI), random blood sugar (RBS), hemoglobin (Hb) percentage, pulse rate per minute and blood pressure (BP) respectively. This study was found to be BMI 21.05 for six-thousand-taka income group, 22.16 for eight-thousand-taka income group, 22.02 for ten-thousand-taka income group and 23.81 for fifteen-thousand-taka income group respectively (see Table 1).

BMI is the simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. World health organization (WHO) describes the normal BMI range of an adult is between 18.5-24.9 kg/m^2, however people in Asian criteria focused the normal BMI range of an adult is between 18.5-22.9 kg/m^2. This study found the BMI level of pregnant women of 1st trimester in between 21.05 to 23.81 kg/m^2 that ideally indicated the normal health status though a little bite higher BMI was determined for fifteen thousand taka per month income family group. A similar result was obtained for random blood sugar with little bite higher level of it to the pregnant women of higher income family group (see Table 1). Furthermore, almost a consistent hemoglobin percentage ranges 9.08-9.19 gm/dl was determined for all pregnant women regarding income level although different literature demanded the normal hemoglobin level of 1st trimester pregnant women is to 11.6-13.9 [11]. Therefore, a disappointing result concerning hemoglobin was found in this study because WHO indicated anemia in pregnant women when a blood test shows an Hb value of less than 11 gm/dl (WHO, 1972). Besides an observational study was found that anemia during pregnancy is associated with detrimental pregnancy outcomes, including preterm birth, low birth weight, infection and hemorrhage [12]. In addition, this study was shown that all the pregnant women have normal pulse rate as well lower blood pressure (see Table 1). This low blood pressure may arise from the inadequate and improper intake of nutrients due the poverty of family having 1st trimester pregnant women.

Table 1. Determination of BMI, RBS, Hb, pulse rate and BP of respondents.

Income level	Pregnant women (n)	BMI	RBS	Hb (gm/dl)	Pulse rate/min	BP/min of Hg
6000Tk	30	21.05±2.10	5.35±0.78	9.19±1.19	71.67±4.51	105/68.2 ±9.67/7.25
8000Tk	25	22.16±1.93	5.75±0.74	9.08±0.84	71.68±5.95	110.4/67.4±6.98/6.72
10000Tk	30	22.02±2.51	5.55±0.93	9.18±0.79	75.27±6.14	106/68±9.73/8.80
15000Tk	15	23.81±2.87	6.10±0.49	9.13±0.93	74.73±2.87	108/66±9.33/6.40

Note: Income level of each family having 1st trimester pregnant women expressed as thousand taka per month.

3.3. Determination of Macronutrient Intake of 1st Trimester Pregnant Women

Macronutrients are essential for pregnant women and her baby. It helps for organ development of the fetus and increase maternal health status. The macronutrient carbohydrate, protein and fat is essential during pregnancy. All of the Bangladeshi pregnant women eat almost same food like rice,

fish, meat, egg, pulse, different types of vegetables and seasonal fruits, milk and other types of fast foods. Here, all of the food's items are counted in 100gm. Rice contain 25.0gm carbohydrate, 2.1 gm protein, 0.1gm fat. Rui fish contain no carbohydrate, 16.6gm protein and 2.7gm fat. Katla fish contain no carbohydrate, 19.9-21.4gm protein and 2.8-4.9gm fat. Silver cup fish contain no carbohydrate, 17.5gm protein and 6 gm fat. Beefs red meat contains no carbohydrates, 19.7gm protein 14.2gm fat. Goat red meat contains no carbohydrates, 20.7-21.4gm protein 03.6gm fat. Goat meat liver/kidney contains 1.3gm carbohydrates, 19.3-20.0gm protein 7.5gm fat. Chicken contain no carbohydrate. 22.3gm protein. Chicken liver/kidney contains 0.7carbohydrate, 16.9gm protein 4.9gm fat. Poultries red meat contains no carbohydrates, 11.0gm protein 03.6gm fat. Milk (cow) contains 4.1gm carbohydrate, 3.1gm protein and 0.1gm fat. Milk (goat) contains no carbohydrate, 3.5gm protein and 4.1gm fat. Bread contain 49.7gm carbohydrate, 7.5gm protein and 1.2gm fat. Different types of fruits contain different amounts of nutrient like mango contain 14.7gm carbohydrate, 0.9gm protein and 0.5gm fat, Banana contain 29.2gm carbohydrate, 1.3gm protein and 0.8 gm fat. Apple contains 13.5gm carbohydrate, 0,3gm protein and 0.2 gm tit. Guava contains 10.9gm carbohydrate, 1.0gm protein and 0.5 gm fat. Grapes contains 20.2gm carbohydrate, 0.5 gm protein and 0.6 gm fat.

In 6000-taka monthly pregnant women (n=30) the maximum amount of carbohydrate intake 281.67gm and minimum 150.30gm. Therefore, mean carbohydrate intake was 196.70gm where standard deviation was found to be 31.11gm. The maximum amount of protein 100.82gm and minimum 27.40gm where mean of protein 43.51gm and standard deviation 18.03. The maximum Fat 40.68 and minimum 04.96gm. Here, the mean of fat 13.09gm and standard deviation 5.45.

In 8000-taka monthly pregnant women (n=25) the maximum amount of carbohydrate intake 391.68gm and minimum 165.07gm. Therefore, mean carbohydrate intake was 194.90gm where standard deviation was found to be 43.08gm. The maximum amount of protein 62.64gm and minimum 31.05gm where mean of protein 43.21gm and standard deviation 8.21. The maximum Fat 18.29 and minimum 05.99gm. Here, the mean of fat 10.93 and standard deviation 3.36.

In 10000-taka monthly pregnant women (n=30) the maximum amount of carbohydrate intake 262.61gm and minimum 172.63gm. Therefore, mean carbohydrate intake was 195.09gm where standard deviation was found to be 18.84gm. The maximum amount of protein 69.03gm and minimum 33.14gm where mean of protein 46.07gm and standard deviation 8.90. The maximum Fat 20.04 and minimum 07.64gm. Here, the mean of fat 12.97 and standard deviation 3.30. In 15000-taka monthly pregnant women (n=15) the maximum amount of carbohydrate intake 204.0gm and minimum 167.44gm. Therefore, mean carbohydrate intake was 176.61gm where standard deviation was found to be 12.82. The maximum amount of protein 57.08gm and minimum 30.98gm where mean of protein 45.54gm and standard deviation 14.40. The maximum Fat 29.91 and minimum 08.86gm. Here, the mean of fat 31.26 and standard deviation 5.48.

Table 2. *Daily intake of net carbohydrates, proteins and fats of respondent.*

Income level	Pregnant women (n)	Carbohydrate	Protein	Fat
6000Tk	30	196.7±31.11	43.57±18.03	14.66±7.46
8000Tk	25	194.90±43.08	43.24±8.21	10.93±3.36
10000Tk	30	195.09±18.84	46.07±8.90	12.97±3.30
15000Tk	15	176.61±12.82	45.55±14.40	13.26±5.45

Note: Income level of each family having 1st trimester pregnant women expressed as thousand taka per month.

3.4. Determination of Energy Intake Ratio Obtained from Macronutrient of 1st Trimester Pregnant Women

During pregnancy extra calories is needed than normal requirements. In this data Pregnant women are intake less calorie than requires. So, the growth of fetus is not fulfilled in 1st trimester pregnant women need minimum 1800 calories. Here in 1st trimester monthly family income 6000 taka pregnant women contain maximum 1413.21 calories and minimum 904.75 calories, where standard deviation 239.09, in 8000 taka Family Income pregnant women contain maximum 1776.25 calories and minimum 901.29 calories, where standard deviation 173.53, in 10000 taka Family Income pregnant women contain maximum 1312.12 calories and minimum 983.17 calories where standard deviation 82.68 and in 15000 taka Family Income pregnant women contain maximum 1282.81 calories and minimum 913.62 calories, where standard deviation 97.92.

Table 3. *Calculated energy and ratio obtained from carbohydrates, proteins and fats (1).*

Family Income	Carbohydrate	Protein	Fat	Total energy intake	Energy intake ratio
6000 TK	786.80±124.44	174.28±72.12	131.94±67.14	1093.02±263.70	5.96t1.32t1.00
8000 TK	779.60±172.32	172.96±32.84	98.37±13.44	1050.93±218.60	7.93t1.76t1.00
10000 TK	780.36±75.37	184.28±35.60	116.73±13.2	1081.37±124.17	6.69t1.58t1.00
15000 TK	706.44±51.28	182.20±57.60	119.34±21.8	1007.98±130.68	5.92t1.53t1.00

Energy intake in this study of the 1st trimester poor pregnant women in deferent as per family income. Income level 6000Tk. pregnant women's total calorie intake 32388.07 whereas maximum calorie intake 1481.41 and minimum

calorie intake 913.40 and mean calorie intake 1079.60.

Income level 8000Tk. pregnant women's total calorie intake 26230.47 whereas maximum calorie intake 1776.25 and minimum calorie intake 901.29 and mean calorie intake 1049.45.

Income level 10000Tk. pregnant women's total calorie intake 32504.19 where was maximum calorie intake 1312.12 and minimum calorie intake 983.17 and mean calorie intake 1083.47.

Income level 15000Tk pregnant women's total calorie intake 15121.41 whereas maximum 1282.81 and minimum 913.62 and mean 1008.09.

Table 4. *Calculated energy and ratio obtained from carbohydrates, proteins and fats (2).*

Family income level	Total calorie	Maximum calorie	Minimum calorie	Mean calorie	Ratio
6000Tk	32388.07	1481.41	913.40	1079.60	35.46:1.62:1.00
8000Tk	26230.47	1776.25	901.29	1049.45	29.10:1.97:1.00
10000Tk	32504.19	1203.82	983.17	1083.47	33.06:1.23:1.00
15000Tk	15721.41	1282.81	913.62	1008.09	17.20:1.40:1.00

3.5. Determination of Educational Status and Calorie Intake of First Trimester Poor Pregnant Women

In this study educational status evaluated in the form of attended primary school (class 5), high school (J. S. C), S. S. C passed, H. S. C passed, BA/BSS passed and above. Educational success of the respondents showed that 11% malnourished and 89% severe malnourished.

The distribution in the two groups are low calorie intake and severe low-calorie intake. For primary level (Class-5) was 2% low calorie intake and 23% severe low-calorie intake, for J. S. C 1% low calorie intake and 4% severe low calorie intake, for S. S. C passed 6% low calorie intake and 46% severe low calorie intake, for H. S. C passed 1% low calorie intake and 3% severe low calorie intake and for BA/BSS and above 1% low calorie intake and 3% severe low calorie intake respectively (See table 5).

Table 5. *Educational status and calorie intake of first trimester poor pregnant women.*

Educational Condition	Low calorie intake (Malnourished) n=11	Severe low-calorie intake (Severe Malnourished) n=89
Primary (class - 5)	2 (2%)	23 (23%)
J. S. C (Class-8)	1 (1%)	4 (4%)
S. S. C passed	6 (6%)	56 (56%)
H. S. C passed	1 (1%)	3 (3%)
BA/BSS and above	1 (1%)	(3%)

(For, 1200 – 1799 low calorie and 900 – 1199 severe low calorie)

Data were expressed number (Percentage).

4. Conclusion

Lack of adequate nutrient intake during 1st trimester pregnancy can cause serious health problem for both the mother and her fetus. In this study the nutritional situation of 1st trimester pregnant women. In the district of Kushtia, Chuadanga and Jhenaidah of Bangladesh due to illiterate, poverty and socio-economic status that influences inadequate nutrient intake of 1st trimester pregnant women. This study also indicates inadequate nutrient intake, health status and lack of health education of pregnant women in this region. Therefore, it is recommended the necessity of the regular advice about nutrient intake and health education program for 1st trimester malnourished pregnant women. In this situation, they face various types of complication like fatigue, weakness, chronic renal disease and placental infraction. They also carry malnourished baby and delivered premature baby. They suffer from severe malnutrition and arise various problem for her fetus. If individuals are conscious about nutritional knowledge, nutritional value of macro and micro nutrient and habits. They can easily overcome those problem and can make good health without excess money wasting. For 1st trimester pregnant women's daily requirement energy is minimum 1800 calorie. But study show that the women nutrients intake only 904.75, 901.29, 983.17 and 913.62 calories respectively on family income basis.

However. Maternal malnutrition increases the risk of gestational anemia, hypertension, miscarriages, fetal death, preterm delivery and maternal mortality in this period.

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