Article

Assessment of nutritional status and other associated factors of lactating mother at Gangni Pauroshava in Meherpur district, Bangladesh

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Abstract: The present study was to provide information about the nutritional status of lactating women as well as proffer solutions that are aimed at improving maternal nutrition in the study area. The study area was Gangni union of Meherpur district. 105 exclusively breastfeeding women aged 16-35 years old were initially enrolled in the study. Of these study lactating women completed 24h dietary recall food intake. The findings was about 16.2% lactating mothers were under 19 years, 53.3% respondents were between the ages of 20-25 years, 23.8% respondents were between the ages of 26-30 years and 37.1% lactating mothers had completed primary education. About 95.2% respondents were housewife and 4.8% respondents were service holders. The finding was 56.2% respondents have one child and 38.1% respondents have 3 family members, 43.8% respondent has 4 family members. About 7.6% respondents are underweight, 55.2% respondents are normal, 33.3% respondents are overweight and 3.8% respondents are obese. Total 7.6% respondents are underweight, 55.2% respondents are normal, 33.3% respondents are overweight and 3.8% respondents are obese where 5.7% respondents under 19 year aged and 1.9% respondents over 30 year aged are underweight. About 40% respondents got surgerian delivery where 60% respondents got normal delivery. It was found that 100% respondents maintain hygiene such as washing hands before eating foods, washing hands after using bathroom, brushing teeth regularly, avoiding nasty foods etc.

Keywords: food; nutrition; maternal health; awareness

1. Introduction
Possessing a land area of 147570 square kilometers and over 16 million populations. Bangladesh is the ninth most populous country and one of the most densely populated countries in the world (BBS, 2003). Over population and poverty are omnipresent in Bangladesh and causing many types of population hazards and malnutrition is one of them. The high prevalence of under nutrition in Bangladesh is popularly attributed to a combination of extreme poverty, environmental insult and poor health. Specially, women are particularly vulnerable; suffering from social, economic and nutritional deprivation to a far greater extent than men (Giashuddin *et al*., 2003). The lactation period is a major source of concern in developing countries because of its positive impact on the health and nutrition of infants. Lactating women from developing countries are considered nutritionally vulnerable groups because this period places a high nutritional demand on the mother. Inadequate maternal diet during this period will lead to poor secretion of nutrients in breast milk and this can have long term impact on the child's health (Picciano, 2001; Marcos *et al*., 2003; Jones *et al*., 2010). A lactating woman should produce about 700 to 800ml of milk per day and this requires an extra energy need of about 500 calories per day (Sylvia and Mary, 2002). Women who are severely malnourished have reduced lactation performance (Allen, 2012), thus, the quantity of milk produced depends a lot on the mother's diet. The

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diet consumed by the mother will not only fulfill her own nutritional needs but will also enable her to produce enough milk for her infant. Nutritional status is an indication of the overall well-being of a population (Sylvia and Mary, 2002; Haileslassie *et al.*, 2013). Lactation has different effects on maternal nutritional status depending on its duration, intensity, as well as cultural diversity (Rasmussen and McGuire, 1996). Breastfeeding when practiced either exclusively or otherwise had no significant negative effect on the nutritional status of the mothers (Sanusi and Falana, 2013). Irrespective of breastfeeding pattern, lactation also had no profound effect on maternal body composition (Ukegbu and Uwaegbute, 2012). However, the high energy cost of lactation as well as the nutritional and health risk it could pose for the woman emphasizes the need for continuous monitoring of their nutritional status and dietary intake in poor resource countries. South western part of the country observed poor dietary intakes among lactating women studied (Ijarotimi, 2010). Information regarding the nutritional status and dietary intake of lactating mothers in the study area is scarce. It is well known that lactating women should substantially increase their intake of dietary energy, protein and other nutrients. Because breastfed babies of separate ethnic groups living in the same area have different average weights and lengths (Chasnyk *et al.*, 2011), there is a possibility that the actual intake of energy, protein and other nutrients may differ among different ethnicities. It is known that, compared with the total population, indigenous people as a rule experience more health related problems (Rakibul and Mashhood, 2010). The nutrient intake of lactating women is one of the most important determinants of women's health, well-being and the ability for long-term successful breastfeeding. Human lactation is a natural process, which is well established to provide many health benefits for both mothers and their infants. Lactation also has many favorable effects on women, including reducing the incidence of type 2 diabetes, metabolic syndrome (Gunderson *et al.*, 2010; Stuebe *et al.*, 2005), cardiovascular disease (Stuebe *et al.*, 2010; Schwarz *et al.*, 2009) and cancer (Stuebe *et al.*, 2009). The nutrient intake of lactating women affects the nutrient content of breast-milk and maternal health (Lönnerdal, 1986). As noted, many essential nutrients are secreted into breast-milk and represent a significant proportion of nutrient intake in the maternal died, including docosahexaenoicacid (DHA) (Scopesi *et al.*, 2001; Guesnet and Alessandri, 2011; Makrides *et al.*, 1996), most vitamin including vitamin B_2 (Bates *et al.*, 1982), vitamin A (Haskell and Brown, 1999) and vitamin D (Mulligan *et al.*, 2010; Hollis and Wagner, 2004). Thus nutritional requirements for lactating women are higher compared to women who do not breastfeed (Cheng *et al.*, 2009; Dang *et al.*, 2008). Perinatal health of the infants is closely linked to the well-being of mothers (Whitehead, 1979; Takimoto *et al.*, 2003). The nutrients that infants receive from breast-milk, and the mother's overall physical and mental health during breastfeeding, are all factors that affect the baby's early health and will continue to influence their health into later life (Paul, 2010). Nutritional status and dietary pattern of lactating mother in Bangladesh is very poor. So, it was a common cause of child malnutrition. Millions of children are suffering from one or more forms of malnutrition, including low birth weight, stunting, underweight, and micronutrient deficiencies, especially vitamin A, iron, and iodine. Globally more than one third of the child deaths are attributable to malnutrition. Furthermore, maternal under-nutrition has also become a matter of great importance because of the fact that malnutrition in a child's life begins with the mother. Maternal under-nutrition rate is measured by proportion of women who have Body Mass Index (BMI, weight in kg divided by height in meters squared) less than 18.5 $kg/m^{2.}$ It is strongly related to the delivery of low-birth weight babies. Although maternal under-nutrition has decreased in Bangladesh during the last decade, from 53% in 1996/97 to 32% in 2005, it is still a matter of concern to ensure a healthy future generation. This survey is an attempt to identify the current nutritional status and consumption pattern of the vulnerable group including lactating mother in the selected areas of Bangladesh. Information on their dietary pattern and nutrition awareness will provide a picture of the prevailing daily food intake pattern and nutritional status of the rural area of Bangladesh. So this can be used as a tool to take integrated interventional program to achieve sustainable food security and therefore, improvement of nutritional status of the nation. The objective of this study was therefore to provide information about the nutritional status of lactating women as well as proffer solutions that are aimed at improving maternal nutrition in the study area.

2. Materials and Methods
2.1. Study area
The study area was Gangni union of Meherpur district. It is located in between 23^0 49' and 23^0 81' north latitudes and in between 88^0 45.3' and 88^0 75.5' east longitudes (Figure 1). 105 exclusively breastfeeding women aged 16-35 years old were initially enrolled in the study. Of these study lactating women completed 24h dietary recall food intake.

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Figure 1. Map of Gangni union of Meherpur district showing the study area.

2.2. Study design

The study was cross-sectional in design and 24-hour recall method and 7-day food frequency questionnaire were used for assessing dietary consumption pattern as well as dietary diversity of the targeted population group from the pre-selected households.

2.3. Study population

The study households were selected purposively from the list of households that were previously selected in consultation with household level. Personal interviews were conducted to collect a 24h diet recall questionnaire from 105 lactating women.

2.4. Data collection

After arrival at the selected district, first step was to locate the selected villages having higher number of lactating mothers. Mapping of the villages was done with the help of local people. Then pre-tested questionnaire, based on 24-hour recall method was applied to collect dietary information. Primary respondent was the female members of the households including lactating mothers. The respondents were asked to recall all food items that they had consumed on the last day prior to the interview.

2.4.1. Socio-demographic characteristics

A structured questionnaire was used to obtain information on socio-demographic characteristics of the subjects such as age, occupation, education, income, number of children, household size.

2.4.2. Anthropometric measurements

Weight measurement was taken using a portable bathroom scale. The subjects were asked to remove any clothing which might change body weight and remove their shoes while standing erect on the weighing scale. Readings were taken to the nearest 0.1kg. Height was measured using a portable height to meter with a movable head piece while subjects stood erect on bare foot. Measurement was taken to the nearest 0.1cm. BMI was calculated as weight (kg) divided by height (m^2) for each subject (Table 1). All measurements were taken and recorded in duplicates using standard procedures.

Table 1. Classification of BMI according to WHO.

Body Mass Index (BMI)	Nutritional Status
Below 16	Chronic under nutrition
16-17.49	Severe under nutrition
17.5-18.49	Under nutrition
18.5-24.99	Normal weight
25-29.99	Over weight
30-34.99	Mild obesity
35-39.99	Moderate obesity
More than 40	Several obesity

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2.4.3. Twenty four hour dietary recall

The dietary interview is comprised of two sections: the Dietary Recall section and the Post Recall section. The Dietary Recall section includes the 24-hour dietary recall and a set of health related and data retrieval questions. The Post-Recall section includes fish/shellfish questions, food security questions, and questions about the recent health of child SPs. The 24-hour dietary recall collects a list of all the foods and beverages an SP consumed within a 24-hour period; the time of consumption and the name of the eating occasion; detailed food descriptions and amounts of the reported foods; where it was obtained; and whether it was eaten at home or not. The recall is followed by a set of health-related questions. The data will be collected using the new USDA AMPM instrument. Information collected from the 24-hour dietary recall will be coded and linked to a database of foods and their nutrient composition. Calculation of total daily nutrient intakes will be derived from the data. The information obtained will be used to describe the food and nutrient intake of the population.

2.5. Data management and analysis

All completed questionnaires were checked for inconsistency and errors by the supervisor before computerization. A coding manual and data entry layout was prepared and thereafter data were entered using the SPSS 16.0 version software.

3. Results

3.1. Basic information of the respondents

It was found that, 105 households in Meherpur District. Total number of participated lactating mother is 105 (Table 2).

Table 2. Background information of the respondents from the surveyed households.

District	Meherpur
No of surveyed household	105
No of participated lactating mother	105
No of missing lactating mother	0

3.2. Socio-economic characteristics of the respondents

About 16.2% lactating mothers were under 19 years, 53.3% respondents were between the ages of 20-25 years, 23.8% respondents were between the ages of 26-30 years and 6.7% respondents age over 30 years (Table 3).

Table 3. Percentage distribution of respondents according to their age group.

Age	Respondents	Percentages (%)
<19	17	16.2%
20-25	56	53.3%
26-30	25	23.8%
>30	7	6.7%
Total	**105**	**100.0%**

3.2.1. Educational status

About 37.1% lactating mothers had completed primary education, only 1.9% had not completed primary education. About 22.9% had acquired secondary education, 22.9% had acquired secondary education and about 15.2% had acquired graduate and above (Table 4).

Table 4. Percentage distribution of respondents according to their educational status.

Educational Status of Respondent	Respondent	Percentages (%)
Illiterate	2	1.9%
Primary	39	37.1%
Secondary	24	22.9%
Higher secondary	24	22.9%
Graduate & above	16	15.2%
Total	**105**	**100.0%**

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3.2.2. Occupation
The occupation of participant lactating mothers was divided into two groups: housewife and service holders. About 95.2% respondents were housewife and 4.8% respondents were service holders (Table 5).

Table 5. Percentage distribution of respondents according to their occupation.

Occupation of mother	Respondent	Percentages (%)
Housewife	100	95.2%
Service holder	5	4.8%
Total	**105**	**100.0%**

3.2.3. Number of children
About 56.2% respondents have 1 child, 37.1% respondents have 2 children and 6.7% respondents have 3 or more children (Table 6).

Table 6. Percentage distribution of respondents according to their number of children.

Number of children	Respondent	Percentages (%)
1	59	56.2%
2	39	37.1%
3 and above	7	6.7%
Total	**105**	**100.0%**

3.2.4. Family Members
About 38.1% respondents have 3 family members, 43.8% respondent have 4 family members where 18.1% respondents have 5 family members (Table 7).

Table 7. Percentage distribution of respondents according to their family members.

Family members	Respondent	Percentages (%)
3	40	38.1%
4	46	43.8%
5	19	18.1%
Total	**105**	**100.0%**

3.2.5. Husband's occupation
About 27.6% were service holder, about 26.7% were businessmen, 13.3% were farmer, 19.0% were day labor and 13.3% were other occupation (Table 8).

Table 8. Percentage distribution of respondents according to their husband's occupation.

Husbands occupation	Respondent	Percentages (%)
Service holder	29	27.6%
Business	28	26.7%
Farmer	14	13.3%
Day labor	20	19.0%
Others	14	13.3%
Total	**105**	**100.0%**

3.2.6. Family income per month
About 3.8% respondents family income were <5000. 26.7% income range were 5000-10000, 36.2% income range were 10000-20000, and 33.3% income range were >20000 (Table 9).

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Table 9. Percentage distribution of respondents according to their family income per months.

Family income per month	Respondent	Percentages (%)
<5000	4	3.8%
5000-10000	28	26.7%
10000-20000	38	36.2%
20000+	35	33.3%
Total	**105**	**100.0%**

3.3. Nutritional status of lactating mothers
3.3.1. Body mass index (BMI)

About 7.6% respondents are underweight, 55.2% respondents are normal, 33.3% respondents are overweight and 3.8% respondents are obese (Table 10).

Table 10. Percentage distribution of respondent's body mass index (BMI).

Body mass index (bmi)	Respondents	Percentages (%)
Underweight	8	7.6%
Normal	58	55.2%
Overweight	35	33.3%
Obese	4	3.8%
Total	**105**	**100.0%**

3.4. Comparison of family income and age specific BMI of lactating mothers.
3.4.1. Ages range according to body mass index (BMI)

Total 7.6% respondents are underweight, 55.2% respondents are normal, 33.3% respondents are overweight and 3.8% respondents are obese where 5.7% respondents under 19 year aged and 1.9% respondents over 30 year aged are underweight, 10.5% respondents under 19 year aged, 25.7% respondents 20-25 year aged are 19.0% respondents 26-30 year aged are normal, 25.7% respondents 20-25 years aged, 4.8% respondents 26-30 years aged and 2.9% respondents over 30 years aged are overweight, 1.9% respondents 20-25 years aged and 1.9% respondents over 30 years aged are obese (Table 11).

Table 11. Percentage distribution of respondents ages range according to body mass index.

Body mass index (BMI)	Age range of respondents				Total
	<19yrs	20-25yrs	26-30yrs	>30yrs	
Underweight	5.7% (6)	0.0% (0)	0.0% (0)	1.9% (2)	7.6% (8)
Normal	10.5% (11)	25.7% (27)	19.0% (20)	0.0% (0)	55.2% (58)
Overweight	0.0% (0)	25.7% (27)	4.8% (5)	2.9% (3)	33.3% (35)
Obese	0.0% (0)	1.9% (2)	0.0% (0)	1.9% (2)	3.8% (4)
Total	**16.2% (17)**	**53.3% (56)**	**23.8% (25)**	**6.7% (7)**	**100.0% (105)**

3.4.2. Body mass index (BMI) according to family income per month

total 7.6% respondents are underweight, 55.2% respondents are normal, 33.3% respondents are overweight and 3.8% respondents are obese where 4.8% respondents family income range from 5000-10000 and 2.9% respondents over 20000 are underweight, 3.8% respondents family income under 5000, 14.3% respondents 5000-10000, 20% respondents 10000-20000 are normal, 7.6% respondents family income range from 5000-10000, 12.4% respondents 10000-20000 and 13.3% respondents over 20000 are overweight, 3.8% respondents family income range from 10000-20000 are obese (Table 12).

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Table 12. Percentage distribution of respondents Body Mass Index (BMI) according to family income per month.

Body Mass Index (BMI)	Family income per month				Total
	<5000	**5000-10000**	**10000-20000**	**20000+**	
Underweight	.0%(0)	4.8%(5)	.0%(0)	2.9%(3)	7.6%(8)
Normal	3.8%(4)	14.3%(15)	20.0%(21)	17.1%(18)	55.2%(58)
Overweight	.0%(0)	7.6%(8)	12.4%(13)	13.3%(14)	33.3%(35)
Obese	.0%(0)	.0%(0)	3.8%(4)	.0%(0)	3.8%(4)
Total	**3.8%(4)**	**26.7%(28)**	**36.2%(38)**	**33.3%(35)**	**100%(105)**

3.5. General knowledge, practices and hygeinity practices of lactating mothers
3.5.1. Birth delivery status
About 40% respondents got surgerian delivery where 60% respondents got normal delivery (Table 13).

Table 13. Percentage distribution of respondents according to their delivery status.

Surgerian or normal	Respondents	Percentages (%)
Surgerian	42	40.0%
Normal	63	60.0%
Total	**105**	**100.0%**

3.5.2. Physical activity
The Physical Activity of participant lactating mothers. 2.9% respondent ware moderate worker and 97.1% respondent were primary workers (Table 14).

Table 14. Percentage distribution of respondents according to their physical activity.

Physical Activity	Respondent	Percentages (%)
Moderate	3	2.9%
Primary	102	97.1%
Total	**105**	**100.0%**

3.5.3. Knowledge about importance of colostrum
About 68.6% respondents were known about the importance of colostrum and 31.4% respondents were unaware (Table 15).

Table 15. Percentage distribution of respondents about the importance of colostrum.

Knowledge about importance of colostrum	Respondents	Percentages (%)
Yes	72	68.6%
No	33	31.4%
Total	**105**	**100.0%**

3.5.4. Knowledge about early initiation of breastfeeding after birth
About 94.3% respondents were known about the importance of early initiation of breastfeeding and 5.7% were unaware (Table 16).

Table 16. Percentage distribution of respondents about the importance of early initiation of breastfeeding after birth.

Knowledge about early initiation of breastfeeding after birth	Frequency	Percentages (%)
Yes	99	94.3%
No	6	5.7%
Total	**105**	**100.0%**

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3.5.5. Knowledge about importance of exclusive breastfeeding

About 90.5% respondents were known about the importance of exclusive breastfeeding and 9.5% respondents were unaware (Table 17).

Table 17. Percentage distribution of respondents about the importance of exclusive breastfeeding.

Knowledge about importance of exclusive breastfeeding	Frequency	Percentages (%)
Yes	95	90.5%
No	10	9.5%
Total	**105**	**100.0%**

3.5.6. Knowledge about foods for baby after 6 months

100% respondents were known of which foods are needed for the baby after 6 months (Table 18).

Table 18. Percentage distribution of respondent knowledge about foods for baby after 6 months.

Knowledge about foods for baby after 6 months	Respondents	Percentages (%)
Yes	105	100.0%
No	0	0.00%
Total	**105**	**100.0%**

3.5.7. Hygiene practices

Here, 100% respondents maintain hygiene such as washing hands before eating foods, washing hands after using bathroom, brushing teeth regularly, avoiding nasty foods etc (Table 19).

Table 19. Percentage distribution of respondents according to hygiene practices.

Hygiene practices	Respondents		Percentages (%)
	Yes	No	
Avoiding nasty foods	105	0	100.0%
Washing hand before eating	105	0	100.0%
Washing hand after using bathroom	105	0	100.0%
Brushing teeth regularly	105	0	100.0%

4. Discussion

The study was assessed to give a situation of lactating mother's nutritional status and associated factors in rural Bangladesh. The nutritional status of lactating mother was measured by Body Mass Index (BMI), weight in kilogram divided by height square in meter, based on WHO standard classification. Out of the total participants measurement had taken most of them were in the normal BMI range 58(55.2%), that is from 18.5-24.9kg/m^2. One third of the study participants 35(33.3%) had BMI from 25-29.9kg/m^2 which were overweight. Whereas eight (7.6%) of participants were underweight with BMI less than 18.5kg/m^2 and 4(3.8%) of them had BMI of greater than thirty which were obsess. This indicates that the prevalence of underweight was significant which was found to be similar with the finding of Darussalam, 21.2% underweight, (WFP and UNICEF, 2010). This is may be attributed to the impact of socio -demographic factors such as family income, family size, husband education, occupation status of mother and nutritional information which may contributed to the incidence of dietary inadequacies. On the other hand compared to similar study in Mekele, Ethiopia the underweight in Nekemte was lower, 25% (Haileslassie *et al.*, 2013). This study revealed that family income has a due effect on the nutritional status of lactate mother. Those mothers who have monthly family income 5000-10000 were less likely exposed to underweight. This finding is similar with the UNICEF study on lactate mothers (UNICEF, 2010). This indicates that household economic status is positively associated with maternal nutrition status, which is a pre-requisite for access to adequate dietary intake and improved nutritional status for members of maternal nutritional status. In developing countries, it has been reported that the income of a household is an important determinant of its access to food which in turn is a major determinant of child and maternal nutrition and wellbeing (Miller *et al.*, 2005). Epidemiological studies have reported on the relationship between diet and poverty; and the report established that the purchasing power of a family indicates the level of household food security and types of diets that are ultimately consumed by household members (Kirna, 2005). Occupational is also another important socioeconomic variable explaining nutritional status. According this study, employment

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of women was a significant factor for nutritional status of mothers as compared with mother employment. House wife and unemployed mothers were more vulnerable to under nutrition than service holder or other occupation mothers. The probable reason for this could be that House wife and unemployed mother workers have lower educational status than mothers working employed (EDHS, 2005) and they have relatively less decision-making autonomy and less control over income than women with governmental employers. Women's paid employment could provide an additional income source that can improve food security of the household and raise the status of women by allowing them to have more control over resources. Some evidence also indicates that the nutritional impact of increased household income is a function of the income earner and the kind of income (ACC/SCN, 2003). This founding was similar with that unemployed women were at high risk of under nutrition, even in households with a relatively better socioeconomic status. On the hand husband education and nutritional information are other factors that significantly associate to nutritional status of lactate mother. Regarding husband education, those families whose husband had minimum of primary education were less likely exposed to under nutrition. The finding of the study stated that individuals with a higher educational level had better nutrition knowledge and higher nutrition knowledge of employed women in study area. As can be seen in the multivariate logistic regression analysis identified family income, family size and definition of food as the most determinant factors of nutritional status of lactating mother. The sample showed that, as compared to low monthly income (<1000 birr) family the high monthly income family lactating mothers were almost 0.25 less likely vulnerable to under nutrition. The study also showed that lactating mothers who have knowledge of food were less likely develops under nutrition.

5. Conclusions

The present findings uncovered information on the nutritional status, and associated factors among lactating mothers in selected areas. This study revealed that the prevalence of underweight, normal, overweight and obesity were 8(%), 240(75%), 15(4.7) and 5(0.3%), respectively. From the finding of this study, it can be also concluded that low income lactate mothers have the highest rates of underweight. From multiple logistic regression analysis the common determinant factors that significantly affect nutritional status of lactating mothers were family size and family income. However, other predictable variables like age, marital status, culture, ethnicity, religion, husband occupation, and nutritional information have no association with nutritional status of lactating mothers. Proper family planning and the way that lactating mothers increase their income should be designed by concerned body.

Conflict of interest

None to declare.

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