



## RESEARCH ARTICLE

### MALNUTRITION AMONG WOMEN IN BANGLADESH IS A GREAT CONCERN FOR NEAR FUTURE

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#### ABSTRACT

In the study, we investigate extensively the levels, trends and differentials of nutritional status of the ever-married women in Bangladesh. To carry out the task fruitfully we have extracted 15,882 women for analyzing nutritional status from nationally representative Bangladesh Demographic and Health Survey 2011. The findings of this study reveal that the mean Body Mass Index of ever-married women in Bangladesh is  $21.54 \pm 3.94$  kg/m<sup>2</sup> with considerable variations by background characteristics of the respondents considered in this study. Patterns of BMI over the time points reflect that the mean BMI is increasing 0.68 in every four years beginning from 1996. Under the study, the prevalence of underweight women is still very high with 23.6 % in our country though it is decreasing 7.16 percent in every four years. The result of the study shows that only 58.5 percent women are healthy. The women having overweight is also rapidly increasing over time, which is frightening in Bangladesh in the context of health ground. The prevalence of overweight is observed to be 17.9 percent and the overweight is increasing 4.4 percent in every four years beginning from 2004. Even though undernourishment are still remains the dominant phenotype for women of reproductive age in Bangladesh. The findings show that there is a steady increase of the prevalence of overweight and thus establishes the existence of double burden of malnutrition in both rural and urban poor areas of Bangladesh. In Bivariate and multinomial logistic regression analyses, the variables living environment, geographical region, respondent education, respondent working status, husband's education, husband's occupation, access to mass media, socio economic status, food security status, and decision making autonomy have found significant association as well as effect on nutritional status of women in Bangladesh. The insights obtained from this research work represent "A healthy mother is the symbol of a healthy nation".

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## INTRODUCTION

Nutrition is the most indispensable factors for women that manipulate the reproductive behavior of life and which are directly related to the nutritional status at the national level. Adequate sustenance is a prerequisite for maintaining a good health status which in turns a safe reproductive life. A good nutritional status at the reproductive life of women represents a healthy nation providing better socio economic and demographic status. The overall nutritional status of the population in Bangladesh is considered one of the worst in the world (Ahmed & Rahman, 2008). Malnutrition among women is a chronic problem in Bangladesh. Malnutrition includes both undernutrition and over nutrition while in Bangladesh, underweight continues to be common but overweight is also increasing a remarkable rate over time.

Kamal and Islam, 2010 found that both underweight or overweight or obesity co-exists and accounted for over two fifths in the Bangladeshi women. Women in the reproductive age group and children are most vulnerable to malnutrition due to low dietary intakes, inequitable distribution of food within the household, improper food storage and preparation, dietary taboos, infectious disease and care. In women of reproductive age, malnutrition can results in adverse pregnancy outcome (UNICEF, 1998). Maternal mortality rate is still very high in our country. By CIA the world fact book (2014) country rankings Bangladesh is in the 49<sup>th</sup> position among 184 countries according to MMR (240/1,00,000). Undernutrition threatens both the health and survival of mothers because it increases their susceptibility to life threatening disease and their risk of dying especially during childbirth. Undernourished mothers are more likely to give birth to underweight infants. Underweight is associated with pre term birth and low birth weight (Ehenberg, Dieker, and Milluzzi, 2003; Schieve, *et al.*, 2000), malnourished children (Rayhan & Khan, 2006) and poor

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psychological health (Lindstorm, 2006), including high mortality (Visscher, Seidell, & Menotti, 2000). A woman's nutritional status at the time of her gestation period has virulent influences on her health status and for new coming infant. If a woman is under-nourished, prior to conception, this will have an ongoing effect on her child throughout the pregnancy and it can affect both the pregnant woman and developing baby in the short and long-term. The prevalence of obesity is increasing rapidly, and obesity is becoming a problem even in urban areas of developing countries (Seidell, Khan, Williamson, Lissner, & Vadez, 2000). World health organization (2010) estimated global prevalence of obesity 400 million in 2005 and predicted that it would be more than 700 millions in 2015. In South Asian countries, the obesity prevalence has increased more in urban areas due to change in life style. The problem of obesity in Bangladesh is also increasing in an alarming rate. The increasing prevalence of overweight and obesity is a critical health problem for women reproductive life. Obesity has been associated both short and long term health effect for women as well as their offspring's. These studies suggest evidence that underweight and overweight are the double burden for Bangladesh, which may be influenced by socioeconomic and demographic factors. To provide a more ample depiction the aim of this study is to evaluate the levels, trends and associated factors with BMI of ever-married women in Bangladesh.

#### BMI is a good indicator for determining nutritional status

The BMI was invented by Adolphe Quetelet between 1830 and 1850 (Garabed & Eknayan, 2008). BMI is still sometimes called the Quetelet index. A scientist called Ancel Keys first use the name body mass index in 1972 (Keys, Fidanza, Karvonen, Kimura, & Taylor, 1972). He wrote that governments should measures people's BMI to find out whether their people are too fat or too short.

BMI stands for Body Mass Index, is a summary measure of an individual's height and weight, calculated by dividing a person's weight in kilograms by the square of their height in meters. The formula of BMI can be written as-

$$\text{BMI} = \frac{\text{weight (kg)}}{\text{height (m)}^2}$$

Change in nutritional status plays an important role in the course of person's health. Therefore BMI can be used as an indicator for health status, and association with some disease can be expected. Many studies have focused on the relationship between BMI and mortality from past to recent periods (Waalder 1984; Costa 1993; Riley 1994; Fogel and Costa 1997; Allison, Gallagher, and Heo, 1997; Calle, Thun, and Petrelli, 1999). A BMI value of over 30 kg/m<sup>2</sup> has been shown to be a risk factor for hypertension, heart disease, diabetes mellitus, cardiovascular disease and various type of cancer.

On the other hand, a low BMI less than 18.5 kg/m<sup>2</sup> have been associated with a higher risk of hip fracture in women (Gnudi, Sitta, and Lisi, 2009; Morin, Tsang, and Leslie, 2009). Low birth weight and higher mortality rate has also been associated with a low BMI in pregnant mothers (Hosegood & Campbell, 2003). In developing countries many researchers have been shown that women with a BMI less than 18.5 (CED) show a progressive increase in mortality rate and an increase risk of illness (Rotimi, *et al.*, 1999) and other health problems, especially during pregnancy (Allen, 1997) and lactation (Prentice, 1994). In Bangladesh, researchers have investigated the relationship between BMI and mortality (Hosegood and Campbell, 2003; Pierce, *et al.*, 2010) and socio-economic and demographic factors (Prayer, Rogers, and Rahman, 2003; (Shafique, Akhter, Stallkamp, Pee, Panagides, and Bloem, 2007; Khan and Kraemer, 2009).

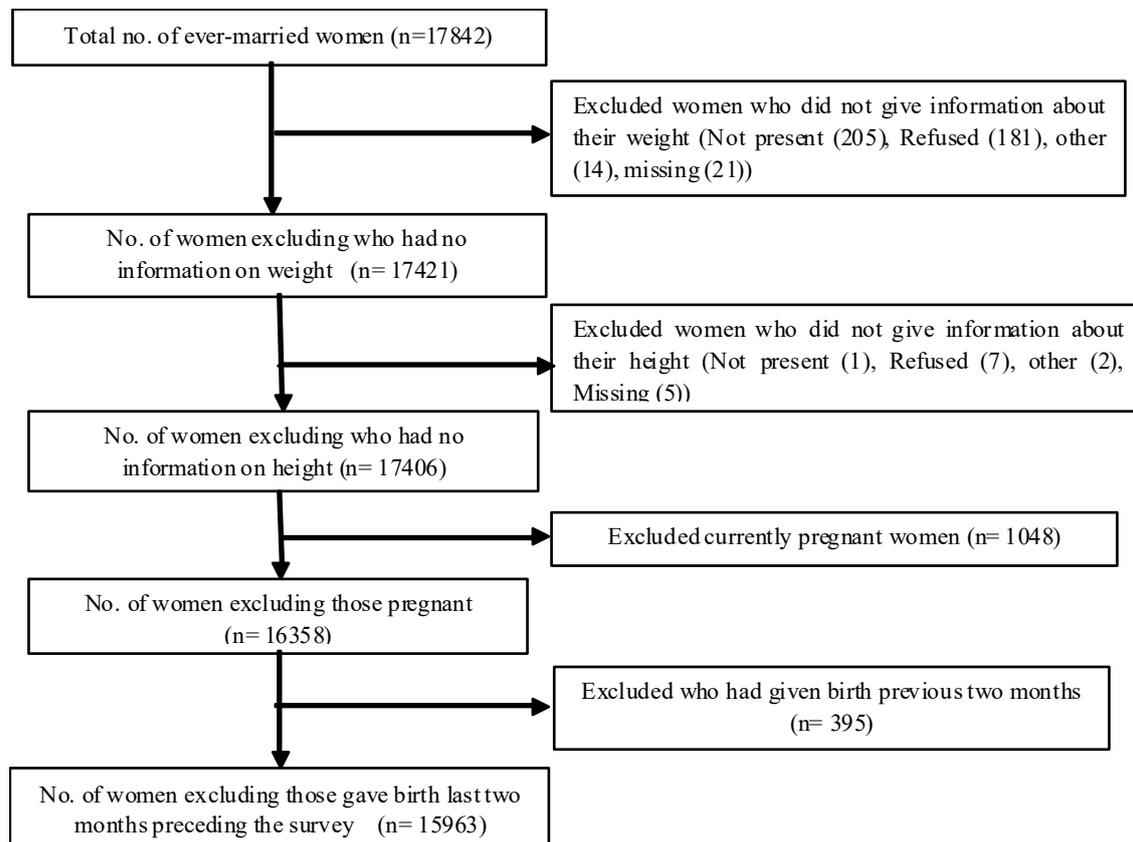


Figure 1. Flow chart shows the selection of target women for the study

## MATERIALS AND METHODS

**The study uses a secondary data, of which the source is bangladesh demographic and health survey (bdhs), 2011.**

This survey is a part of worldwide Demographic and Health Survey. The 2011 Bangladesh Demographic and Health Survey (BDHS) is the sixth survey of its kind conducted in Bangladesh. This periodic survey is conducted every three to four years to serve as a source of population and health data for policy makers, program manager and the research community. The 2011 BDHS was conducted under the authority of the National Institute of Population Research and Training (NIPORT) of the Ministry of Health and Family Welfare. The survey was implemented by Mitra and Associates, a Bangladeshi research firm located in Dhaka. ICF International of Calverton, Maryland, USA provided technical assistance to the project as part of its international Demographic and Health Surveys program (MEASURE DHS), and financial assistance was provided by the USAID. We have extracted 15882 target women out of 17842 from this cross sectional nationally representative Bangladesh Demographic and Health Survey (BDHS), 2011. Respondents who did not give any information on height and weight are excluded from the analysis. Pregnant women were excluded because anthropometric measurements, like body weight, increases rapidly during the pregnancy and indicate both nutritional status of the women and growth of the fetuses, and reduce the specificity of the indicators (WHO 1995). Also the women who had given birth in the preceding two months are excluded from the analysis because of ill health which may give the bias results. For better understanding, a flow chart is given below to show the selection of the target women for the study.

### Outcome Variable

We want to investigate “**Nutritional Status**” of women in their reproductive age. To determine the nutritional status of women we use Body Mass Index (BMI). BMI is a good indicator for interpreting the nutritional status of women which is defined as the weight in kilograms and the height in meters squared. The procedure of calculating BMI is given below-

$$\text{Body Mass Index} = \frac{\text{weight (kg)}}{\text{height (m}^2\text{)}}$$

This variable is coded as three categories such that underweight (<18.5 kg/m<sup>2</sup>), normal weight (18.5 to 24.99 kg/m<sup>2</sup>) and overweight (≥25 kg/m<sup>2</sup>).

### Exposure variables

Various socio-economic and demographic variables are studied in this analysis. We focused on an indicator of SES at the individual household wealth defined in terms of household assets. This variable can be created by adding source of drinking water, time to get water source, type of toilet facility, household has: electricity, radio, television, refrigerator, bicycle, motorcycle/scooter, main floor material, main wall material, main roof material, type of cooking fuel, has mobile phone. This analysis to determine the factors influences the

nutritional status of women in Bangladesh. The composite variable of Access to mass media was determined by adding three variables Frequency of reading newspaper, Frequency of listening radio, Frequency of watching television. The composite variable of food security status was determined by adding five variables Three square meals in the past 12 months, Skip entire meals in the past 12 months, Eat less food in the past 12 months, Eat wheat or rice in the past 12 months, Ask food from relatives or neighbors in the past 12 months. We included a composite variable for decision making autonomy as a measure of women status within the household by aggregating four variables Person’s who usually decides on respondent health care, Person’s who usually decides on large household purchases, Person’s who usually decides on visit to family and relatives, Final say on: respondent health care.

### Statistical analysis

To meet the objectives of this research work sophisticated techniques like univariate, Bivariate, multinomial logistic regression model are utilized.

## RESULTS

The mean BMI of the respondents is found 21.54±3.94 kg/m<sup>2</sup>. About 23.6% of the respondents were underweight (<18.5), 58.5% had normal BMI and the rest 17.9% were overweight. The table demonstrates that more than one third of the women are underweight and overweight which indicate the double burden effect of women nutritional status.

**Table 1. Distribution of the respondents by selected nutrition variables**

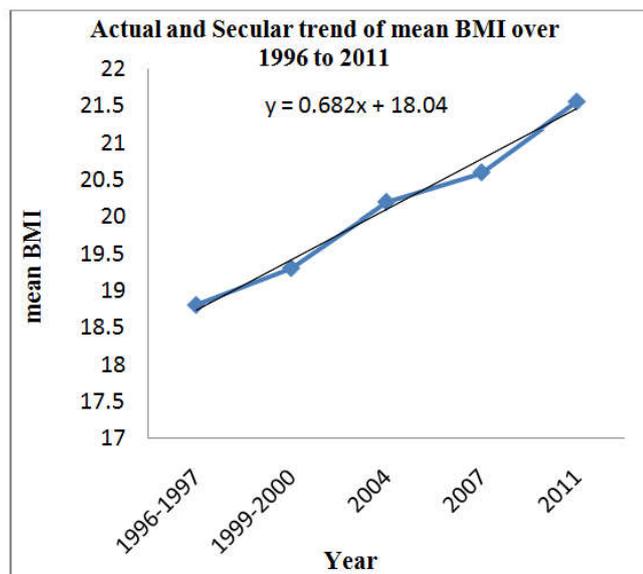
Variables	No.	Percentage	$\bar{X} \pm SD$
BMI of the respondents			
<18.5	3751	23.6	
18.5- 24.9	9292	58.5	
≥25.0	2839	17.9	21.54±3.94

The shape of the distribution of BMI of ever married women in Bangladesh is positively skewed ( $\beta_1=0.958$ ) and leptokurtic ( $\beta_2-3= 2.074$ ).

Percentage of underweight is decreasing and percentage of overweight is increasing at alarming rate over time. The prevalence of underweight was 52% in 1996 to 1997 (BDHS 1996-1997), 45% in 1999 to 2000 (BDHS 1999-2000), 34% in 2004 (BDHS 2004), 30% in 2007 (BDHS 2007). The prevalence of overweight was 9% in 2004 (BDHS 2004), 12% in 2007 (BDHS 2007).

From the above findings we can conclude that the percentage of underweight women are decreasing 7.16 percent and the prevalence of overweight women are increasing 4.4 percent in every 3 to 4 years which is alarming in our country. Since underweight is decreasing and overweight is increasing so the mean BMI is also increasing overtime. According to BDHS the mean BMI was 18.8 kg/m<sup>2</sup> in 1996 to 1997, 19.3 kg/m<sup>2</sup> in 1999 to 2000, 20.2 kg/m<sup>2</sup> in 2004, 20.6 kg/m<sup>2</sup> in 2007, 21.56 kg/m<sup>2</sup> in 2011. Secular trend of mean BMI over time is given in the Figure 2.

**Figure 2. Actual and Secular trend of mean BMI over 1996 to 2011**



The figure plotted above reflects an increasing trend of mean BMI over time in Bangladesh. We can also illustrate from this graph that the mean BMI is increasing 0.68 (kg/ m<sup>2</sup>) in every four years.

### Differentials of Body Mass Index

In this analysis, we test the association between nutritional status and some selected background characteristics by constructing contingency table. Table 2 reveals that whether there is any association between nutritional status and the study variables. The brief description of the Table 2 is given below- From the table 2 it reveals that, living environment of the respondents significantly associated with the nutritional status of women. This elucidate that percentage of underweight (28.0 percent) is highest in rural areas and percentage of overweight (28.4 percent) is highest in urban areas. Regional discrepancy may affect the nutritional status of women. We found that there is an association between nutritional status (an assessment measured by BMI) and different region. The percentage of healthy weighted women is found to be highest (61.8%) in Rangpur division; percentage of underweight is highest (32.2%) in the Sylhet division. Although Khulna division is mainly rural areas but overweight is found to be relatively higher (21.7%), the findings are somewhat paradoxical. The regional differentiation is seen because of industrialization, urbanization, education, socio- economic condition are not uniformly distributed in different region. Therefore, the economic and educational disparities should be reduced in the entire region. Religion is not significantly associated with women Body Mass Index. We have seen that from the table the percentage of respondents is not significantly fluctuate among different groups. There are 58.6 % Muslims women having normal weight and 57.7 % non-Muslims women having normal weight. Our results elucidate that food intake in the context of nutrient are almost uniformly distributed among the religion. Respondents' education has strong association with women BMI. An educated woman aware of food value and that is why they always have

nutritious food. Also the educated women do not take enough time to do physical exercise and not have open place to do physical work so that they likely to be overweight. Percentage of overweight is highest (38.0%) who attain higher education and percentage of underweight is highest (29.9%) who has no education followed by primary (26.0%) because many of them unwilling to disclose that they are illiterate due to egoism. Respondent working status is highly associated with the nutritional status of women of reproductive age.

The percentage of underweight women is highest (27.8%) who working seasonal/ occasional followed by not working (23.6%) and working all year (22.6%). Because working people have more decision making power on households purchase, own health care etc. also the percentage of overweight is highest (20.2%) among women who working all year, 17.9% who are not working and 10.5 % who are working seasonal or occasional as the working women reluctant to do households work and physical exercise. In that case, they mainly depend on servant so that overweight is high in that group. As husband's education is positively correlated ( $r = 0.672^{***}$ ) with spouse education in order that husband's education is also associated with respondents nutritional status. The percentage of underweight is highest (31.8%) whose husband's are illiterate, followed by Primary (26.0%), Secondary (19.9%) and Higher (9.8%). The percentage of overweight is highest (36.2%) whose husbands' are higher educated. Like husband's education, husband's occupation is also associated with women's nutritional status. The percentages of underweight are same and highest (29.9%) whose husbands are in agricultural and others occupation. The percentage of overweight is highest whose husbands are businessman because the businessman may not be more educated so they don't want their spouse work elsewhere for their prestige bias as they have more money so reluctant to allow them for doing job anywhere. Access to mass media is strongly associated with women Body Mass Index. By watching TV and reading newspaper increases awareness about sound health. In addition, there is a bad effect since many women entirely dependent to take entertainment by watching TV, which increases overweight. Our findings also gave the same result. Overweight is highest (22.8%) who exposure to media on the other hand only 8.3% women are overweight who have no access to media. Underweight is highest (32.3%) who have no access to mass media and 19.1 % are underweight who have access to media. Therefore, it should be available to exposure to media to know the importance of health status. From the table, we can make clear that socio economic condition has a significant effect on women nutritional status. Poverty is the main cause of being underweight. Higher socio economic condition is positively and significantly associated with being overweight and negatively associated with being underweight (Khan and Kraemer, 2009). The same findings we have found in our analysis. About one-third (31.3%) poor women are underweight and more than one-fifth (21.4%) rich women are likely to be overweight. The percentage of healthy weighted women is highest (59.2%) in the middle class group. So that, it should be reduce poverty in our country and at the same time, we have to make understand among the rich women about importance of physical exercise and bad effect of fast food.

Table 2. Frequency distributions of the study variables and their association with BMI

Background Characteristics	Sample size (n)	Body Mass Index (kg/m <sup>2</sup> )			Value of test statistics ( $\chi^2$ )	P- value
		<18.5	18.5 to 24.99	≥25		
Total	15882	3751 (23.6)	9292 (58.5)	2839 (17.9)		
Living environment						
Urban	5587	864 (15.5)	3134 (56.1)	1589 (28.4)		
Rural	10295	2887 (28.0)	6158 (59.8)	1250 (12.1)	789.41	0.00
Geographical region						
Barisal	1782	443 (24.9)	1058 (59.4)	281 (15.8)		
Chittagong	2537	549 (21.6)	1495 (58.9)	493 (19.4)		
Dhaka	2725	624 (22.9)	1579 (57.9)	522 (19.2)		
Khulna	2429	450 (18.5)	1453 (59.8)	526 (21.7)		
Rajshahi	2347	528 (22.5)	1385 (59.0)	434 (18.5)		
Rangpur	2262	578 (25.6)	1399 (61.8)	285 (12.6)		
Sylhet	1800	579 (32.2)	923 (51.3)	298 (16.6)	182.07	0.00
Religion						
Muslim	14062	3315 (23.6)	8242 (58.6)	2505 (17.8)		
Other	1820	436 (24.0)	1050 (57.7)	334 (18.4)	0.59	0.74
Respondent education						
Illiterate	4510	1348 (29.9)	2631 (58.3)	531 (11.8)		
Primary	4843	1257 (26.0)	2876 (59.4)	710 (14.7)		
Secondary	5536	1077 (19.5)	3238 (58.5)	1221 (22.1)		
Higher	993	69 (6.9)	547 (55.1)	377 (38.0)	646.67	0.00
Respondent working status						
Not working	13415	3161 (23.6)	7852 (58.5)	2402 (17.9)		
All year	1845	417 (22.6)	1056 (57.2)	372 (20.2)		
Seasonal/ occasional	622	173 (27.8)	384 (61.7)	65 (10.5)	31.67	0.00
Husband's education						
Illiterate	4747	1511 (31.8)	2768 (58.3)	468 (9.9)		
Primary	4253	1107 (26.0)	2572 (60.5)	574 (13.5)		
Secondary	4545	905 (19.9)	2689 (59.2)	951 (20.9)		
Higher	2337	228 (9.8)	1263 (54.0)	846 (36.2)	1052.67	0.00
Husband's occupation						
Agriculture	4551	1363 (29.9)	2783 (61.2)	405 (8.9)		
Business	3570	627 (17.6)	2032 (56.9)	911 (25.5)		
Service	6116	1270 (20.8)	3529 (57.7)	1317 (21.5)		
Others	1645	491 (29.8)	948 (57.6)	206 (12.5)	582.59	0.00
Access to Mass Media						
No	5420	1750 (32.3)	3219 (59.4)	451 (8.3)		
Yes	10462	2001 (19.1)	6073 (58.0)	2388 (22.8)	683.16	0.00
Socio economic status						
Poor	2940	920 (31.3)	1720 (58.5)	300 (10.2)		
Middle	3721	950 (25.5)	2202 (59.2)	569 (15.3)		
Rich	9221	1881 (20.4)	5370 (58.2)	1970 (21.4)	293.41	0.00
Food security status						
Food secure	10353	2039 (19.7)	6062 (58.6)	2252 (21.8)		
Mild food insecure	3835	1110 (28.9)	2277 (59.4)	448 (11.7)		
Moderate food insecure	1659	594 (35.8)	930 (56.1)	135 (8.1)	477.18	0.00
Decision making autonomy						
Low	4024	1118 (27.8)	2385 (59.3)	521 (12.9)		
Medium	4178	910 (21.8)	2509 (60.1)	759 (18.2)		
High	6554	1366 (20.8)	3802 (58.0)	1386 (21.1)	150.73	0.00
Age at first cohabitation (Years)						
10 to 14	6381	1637 (25.7)	3765 (59.0)	979 (15.3)		
15 to 18	7386	1744 (23.6)	4359 (59.0)	1283 (17.4)		
19 & above	2115	370 (17.5)	1168 (55.2)	577 (27.3)	177.91	0.00
Number of children deaths (less than 5 years)						
No children	15768	3705 (23.5)	9234 (58.6)	2829 (17.9)		
1 or 2 children	114	46 (40.4)	58 (50.9)	10 (8.8)	20.08	0.00

\*The values in the bracket indicate the percentage of the respondents.

### Determinants of women nutritional status: A Multinomial logistic Regression Analysis

Table 3 gives the estimation of the logistic regression coefficient to the independent variables, significance probability and relative odds for each category of the categorical explanatory variables. The effect of the predictor variables on women nutritional status is indicated by the odds ratio of each category relative to reference category and p-values are used to identify the significant effects to assess the relative importance

of the categories of the selected variables in the logistic regression. Living environment was found to be highly significant with women nutritional status. Urban residence was associated with increased risk of being overweight (OR= 1.657) and lower risk of being underweight (OR= 0.740). There is found to be regional differentiation due to economic status is not uniformly distributed in the entire region (division). Women living in Khulna and Rajshahi region were more likely to be overweight (OR= 1.109, OR=1.006) than the reference region of Sylhet region. As compared to Sylhet

region women are less likely to be underweight in all the division. From the results of multinomial logistic regression, it was found that respondent's education plays a key role on women nutritional status. Women having illiterate, primary education, secondary education have higher probability of being both in underweight and overweight than higher educated women as they aware about their health status. Respondent working status has an effect on women Body mass index. Like respondent's education, husband's education is also a good indicator of women nutritional status. Because educated husbands gives more attention to their spouse's health status. The women whose husbands are higher educated are significantly and negatively associated with overweight and positively associated with underweight.

Exposure to media increases the knowledge of hygienic health status. In addition, there is a bad effect that some women totally depend to take entertainment by watching TV in that case obesity increases which are alarming. Women who have no access to mass media are more likely to be underweight and less likely to be overweight than the women who have no access to mass media. From the table we can illustrate that socio economic condition influences the women nutritional status. Women who live under poverty are more likely to lead a down in the dumps life, which may affect the nutritional status of women. Women having poor and middle socio economic status have 1.270 and 1.134 times higher probability of being underweight than the richer women. Higher food security may indicate the better socio economic status.

**Table 3. Multinomial logistic regression estimation for the simultaneous effect of background characteristics in the model of nutritional status of ever married women in Bangladesh**

Background Characteristics	Underweight (BMI <18.5)			Overweight (BMI ≥25)		
	Sig.	Odds ratio Exp (β)	95% confidence interval	Sig.	Odds ratio Exp (β)	95% confidence interval
Living environment						
Urban	0.000	0.740	0.670-0.818	0.000	1.657	1.502-1.828
Rural (R)	-	-	-	-	-	-
Geographical region						
Barisal	0.000	0.648	0.548-0.766	0.092	0.839	0.685-1.029
Chittagong	0.000	0.601	0.515-0.701	0.555	0.947	0.791-1.134
Dhaka	0.000	0.669	0.574-0.780	0.007	0.782	0.654-0.935
Khulna	0.000	0.526	0.448-0.619	0.258	1.109	0.927-1.328
Rajshahi	0.000	0.582	0.496-0.682	0.953	1.006	0.836-1.209
Rangpur	0.000	0.680	0.581-0.796	0.000	0.627	0.514-0.765
Sylhet (R)	-	-	-	-	-	-
Respondent education						
Illiterate	0.031	1.422	1.034-1.957	0.044	1.257	1.006-1.571
Primary	0.010	1.509	1.105-2.060	0.178	1.149	0.939-1.405
Secondary	0.003	1.563	1.162-2.103	0.507	1.060	0.893-1.258
Higher (R)	-	-	-	-	-	-
Respondent working status						
Not working	0.446	1.085	0.879-1.340	0.023	1.412	1.049-1.900
All year	0.493	1.090	0.852-1.393	0.162	1.259	0.912-1.739
Seasonal/ occasional (R)	-	-	-	-	-	-
Husband's education						
Illiterate	0.000	1.928	1.575-2.359	0.000	0.436	0.361-0.525
Primary	0.000	1.708	1.407-2.072	0.000	0.485	0.411-0.571
Secondary	0.000	1.493	1.241-1.797	0.000	0.639	0.556-0.734
Higher (R)	-	-	-	-	-	-
Husband's occupation						
Agriculture	0.093	0.889	0.774-1.020	0.078	0.837	0.688-1.020
Business	0.000	0.739	0.634-0.862	0.000	1.450	1.207-1.742
Service	0.036	0.863	0.752-0.991	0.086	1.168	0.978-1.394
Others (R)	-	-	-	-	-	-
Access to Mass Media						
No	0.000	1.205	1.100-1.321	0.000	0.599	0.527-0.681
Yes (R)	-	-	-	-	-	-
Socio economic status						
Poor	0.000	1.270	1.140-1.414	0.000	0.672	0.579-0.779
Middle	0.015	1.134	1.025-1.255	0.000	0.799	0.711-0.898
Rich (R)	-	-	-	-	-	-
Food security status						
Food secure	0.000	0.743	0.650-0.850	0.001	1.453	1.170-1.804
Mild food insecure	0.241	0.920	0.800-1.058	0.433	1.097	0.871-1.381
Moderate food insecure (R)	-	-	-	-	-	-
Decision making autonomy						
Low	0.000	1.230	1.116 - 1.357	0.000	0.662	0.588-0.746
Medium	0.879	0.992	0.898 - 1.097	0.007	0.863	0.775-0.960
High (R)	-	-	-	-	-	-
Age at first cohabitation (Years)						
10 to 14	0.912	1.009	0.864-1.178	0.425	0.940	0.806-1.095
15 to 18	0.720	0.973	0.840-1.128	0.100	0.890	0.775-1.022
19 & above (R)	-	-	-	-	-	-
Number of children deaths (less than 5 years)						
No children	0.004	0.557	0.372 -0 .832	0.458	1.300	0.650-2.602
1 or 2 children (R)	-	-	-	-	-	-

\* (R) indicates the reference category. Reference category of dependent variable is underweight women

Considering moderate food insecurity as reference category, the relative odds ratio corresponding to food security are 0.743 and 1.453, indicating that women with food secure are more likely to be overweight and less likely to be underweight. From the table we can illustrate that respondents with low decision-making power were more likely to be under weight (OR=1.258) than those have high decision-making power. It is come into view that from the table the likelihood of being underweight is less likely among the women who has no children died as compared to 1 or 2 children died. From the aforementioned discussion, we can reach a conclusion that both under nutrition and over nutrition are vulnerable for women reproductive health. Malnutrition is the leading cause of higher prevalence of maternal mortality and morbidity, child mortality, low birth weight, infertility. A framework for maternal malnourishment with some associated factors is given in the next page.

nationally representative and reliable data set and studied the extremes of BMI simultaneously among ever-married non-pregnant women in Bangladesh using various sophisticated statistical techniques.

The findings of this study show that more than one third of the women are malnourished. These findings suggest that Bangladesh is not in an advanced stage of nutritional transition. The present study clearly demonstrated that the mean BMI is rapidly increasing over time 1996 to 2011. The prevalence of underweight is high although it is decreasing gradually and the prevalence of overweight is rapidly increasing over time. The same results have been shown by Khan and Kraemer (2009). Since the underweight continues to be common and the overweight is increasing over time, so it is called the double burden for Bangladesh.

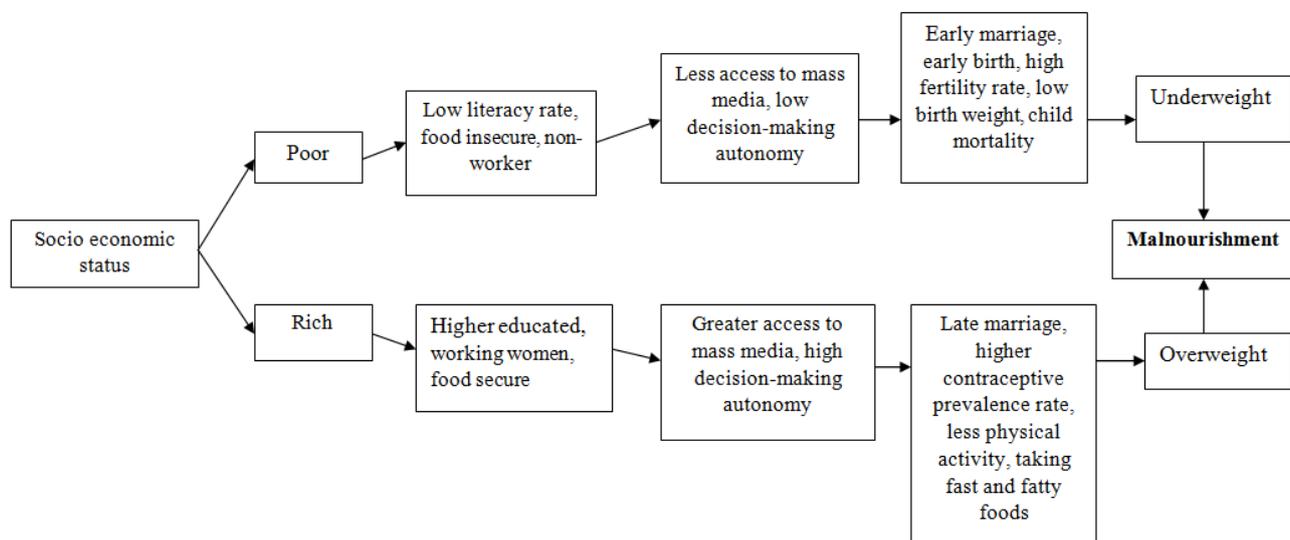


Figure 3. A framework for malnourishment of the respondents with some associated factors

The above-plotted diagram reflects at a glance that in the context of nutritional status poor and rich cohorts are most vulnerable for women who are malnourished.

**DISCUSSION**

The women nutritional status is one of the main indicators for development of a country. In perspective of women’s health system, is an important marker of access quality and effectiveness of the country’s health sector. The maternal mortality ratio as an indicator of maternal health remains unacceptably high in Bangladesh. Healthy mother can give a healthy nation for the future. Bangladesh ranked 49th position in the context of maternal mortality rate out of 184 countries (MMR= 240/100,000) which is unacceptably high (the world fact book, CIA 2010), whereas in Sri Lanka ranked 118th (35/100,000), Malaysia 125th (29/100,000) and Estonia 184th (2/100,000). Thus, the focus of this research work is the nutritional status of ever-married women in Bangladesh. In our analysis, we want to design the prevalence of women nutritional status and how much influenced BMI by various factors. The strength of this study is that it analyzed a

We have to make aware the people to decrease the rate of underweight and overweight. We also observed from Human Development Index (HDI) ranking 2012 Bangladesh is in 146<sup>th</sup> position out of 186 countries and belongs to low development categories. We also observed that the nutritional status and level of development of a country go in hand in hand, which explains why rural women are more undernourished than urban women. Regional disparities of women nutritional status have also been observed in this study due to socio economic discrimination, inequity of health care services and cultural differences. Though Dhaka is the capital of Bangladesh but a large number of underweight respondents have been reside in urban slum areas. Since Sylhet is low densely populated area and agrarian based division the prevalence of underweight is higher in this region. So proper strategies should be taken by the Government to decrease the rate of underweight among women in rural and urban slum areas. Working women with higher education may also have weaker ties to household activities and less physical exercise. Due to this reason, overweight is increasing an alarming rate in these cohorts. The prevalence of underweight is found highest among illiterate and non-working women. As a result, there is a broad

interventional consensus goal to provide universal educations, particularly for girls and women; and empower through equitable social and economic development. Media can play a vital role for improving nutritional status, increasing age at first marriage, age at first conception, bad effect of overweight and good effect of physical exercise. Undernourishment is very common in poor socio economic group and overweight is in rich strata. Therefore, we have to emphasize on these cohorts for improving nutritional status. Access to mass media, socio economic status and decision-making autonomy has also a positive effect on women nutritional status. Higher decision-making power indicates that the women take decision about their own health care, use of contraception, family size and better food security status. Additionally, obesity is considered a condition of high socio economic status (Caballero B, 2007). In this study, we also found that the overweight is higher among the higher socio economic group. The prevalence of women marries before reaching the legal age is highest in our country. For that reason they give birth at early age which may increase the risk of ill health. Higher fertility may increase the risk of ill health which also increases the percentage of underweight. Child mortality and low birth weight are highly associated with women nutritional status. Underweight women are more likely to give birth to ill health children which may increase the child mortality. From the aforesaid statement, we can get a message from this study that "A healthy mother is the symbol of a healthy nation".

We conclude that the prevalence of underweight is decreasing but the prevalence of overweight is increasing in an alarming rate. Therefore, we have to take step to reduce the percentage of both overweight and underweight. We also have to increase the rate of literacy and knowledge of food value. The decision-making autonomy also has to increase because they have lower risk of underweight. Also we have to publicize the risk of overweight because of increasing the risk of chronic disease. Dietary intakes have to improve for higher order fertility. The family planning program should be increase due to increase the birth spacing. Finally, the necessary steps should be taken as the women give importance to their health status. These results confirm the importance of programs to improve maternal nutritional status, especially in view of the high levels of chronic malnutrition in Bangladesh. There is a need to improve nutritional levels of girls and women prior to and subsequent to pregnancy; the current patterns of maternal depletion syndrome seen among older, higher parity women can be prevented. These results suggest that much attention need to be placed on reducing household poverty, increasing rural nutritional resources and discourage to take fast and fatty foods among urban women.

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