Original Article

Association between socio-demographic factors and nutritional status among women of reproductive age living in a Dhaka peri-urban community

*Nahid Yasmin[1], Mahmuda Hassan[2] Masuma Khan[3], M Alamgir Mandal[4], Sayma Sultana[5], Husne Ara Khatun[6], Nila Akter Keya[7] and Dipa Saha[8]

Abstract

Background: Concepts of malnutrition encompass both under- and over-nutrition. In Bangladesh, underweight continues to be more common, but prevalence of overweight shows an increasing rate since past few years. Underweight or overweight/obesity co-exists and accounted for over 20% Bangladeshi women. Poor nutritional status not only affects women's health and their working capabilities but also remains an important determinant of pregnancy outcome. Identifying determinants of nutritional status of married women of reproductive age (MWRA) in such resource-limited settings remains important including other physical, intellectual, academic professional attainments.

Objectives: To find out if socio-demographic status is associated with that of nutritional status among women of reproductive age living in semi-urban communities of Dhaka, Bangladesh.

Materials and Methods: This cross-sectional study was conducted among 419 MWRA (ranging 15 to 49 years) from November 2015 through April 2016 in a peri-urban community of Keraniganj, Dhaka. With informed verbal consent from respondent's (MRA) socio-economic status (SES) were recorded to determine if their nutritional status (Body mass index- BMI and left Mid-upper Arm Circumference- MUAC) remain as risk factor as assessed by history of diseases and clinical examinations.

Results: Mean (**±SD**) age of 419 MWRA was 29.6 ±8.9 years ranging from 15-49 years, 173 (41.3%). Of them age of 173 (41.3%) ranged between 21-30 years. Of 413 MWRA, 25 (6%) were pregnant and 73 (17.4%) were lactating mothers. Average number of family member was 5.3±2.6 with a family income of 15,382.5 ±12241.6. of all, 334 (79.7%) were housewives who completed their primary, 199 (47.5%) have completed secondary (SSC) and 104 (24.8%) higher secondary-HSC. Of these MWRA 88 (28.0%) had a history of suffering from at least one chronic disease. Of all these MWRA, BMI of 198 (47.3%) were normal, 136 (32.5%) had overweight, and 60(14.3%) were obese, and, MUAC in 315 (75.2%) were normal, 72(17.2%) were obese, 32 (7.8%) were malnourished: 23 (5.5%) severely, 5(1.2%) mildly and 4 (1.05%) moderately.

Conclusion: Finding yields that most of the MWRA had better nutritional status with normal BMI (kg/m^2) and MUAC. Larger family size, lower educational level and financial status compounded by chronic diseases had an influence on MWRA's poor nutrition. Our findings suggest that strategies for preventing malnutrition (both underweight and overweight/obesity) among reproductive women needs to be implemented considering their socioeconomic status. We strongly suggest further studies in this area before it can be taken as representative since it was conducted in only one peri-urban community.

Key words: Body Mass Index, Nutrition, Double Burden Malnutrition (DBM), Married Women Reproductive age, Nutritional status, Semi urban community.

1. Professor, Dept. of Community Medicine, Ad-din Women`s Medical College,2 Bara Maghbazar, Dhaka.
2. Professor, Department of Pediatrics, Ad-din Women's Medical College, 2 Bara Maghbazar, Dhaka.
3. Assistant Professor, Department of Pediatrics, Ad-din Women's Medical College, 2 Bara Maghbazar, Dhaka.
4. Associate Professor & Head, Department of Physical Medicine & Rehabilitation. TMSS Medical College & Hospital, Bogura, Bangladesh.
5. Assistant Professor, Dept. of Gynae & Obs, Ad-din Women's Medical College, 2 Bara Maghbazar, Dhaka.
6. Associate Professor, Dept. of Gynae & Obs, Ad-din Women's Medical College, 2 Bara Maghbazar, Dhaka.
7. Research Officer, Ad-din Research Unit (ARU), Ad-din Women's Medical College, 2 Bara Maghbazar, Dhaka.
8. Associate Professor, Dept. of Child Neurology, Ad-din Women's Medical College, 2 Bara Maghbazar, Dhaka.

Correspondence: Dr. Nahid Yasmin, Associate Professor, Dept. of Community Medicine, Ad-din Women`s Medical College,2 Bara Maghbazar, Dhaka. E-mail: drnahidyasmin@gmail.com

Received Date : 03 August, 2019
Accepted Date : 05 January, 2020

Introduction:

In Bangladesh, malnutrition is a chronic problem among women. Malnutrition includes both under nutrition and over nutrition while in Bangladesh, underweight continues to be common but overweight is also increasing at a remarkable rate over time.

The burden of maternal under nutrition continues to remain high in South Asia and parts of Africa. In South Asia, the prevalence of maternal under nutrition, both acute and chronic, ranges between 10 to 40%.[1] The proportion of women reported to be under-weight in most low- and middle-income countries ranges from 10 to 19%.[2-5] Prevalence of maternal underweight and stunting remains high in Bangladesh about one third of ever-married women remains underweight and approximately half of women have a height of <150 cm.[1]

Maternal height could affect intrauterine growth genetically and/or environmental due to factors. Maternal weight prior to conception reflects nutritional status potentially available to the growing fetus. Reproduction has been identified as a possible cause of under nutrition among women in low socioeconomic status.

Mid-upper arm circumference (MUAC) remains another common anthropometric measurement to evaluate the nutritional status too.[1-4] However, MUAC has been useful in the assessment of nutritional status, particularly in community settings. In Bangladesh, recent estimates of the population mean BMI range between 19 and 20 kg/m^2, that remains lower than that of U.S.A. (~27 kg/m^2) and Japan (~23.5 kg/m^2) and ever less than our neighbor country India (21.7 kg/m^2).[1,7]

BMI <18.5 kg/m^2 is considered as an indicator of under-nutrition that may represents an individual's morbidity or other physiological and functional impairments.[7-10] Reportedly, body mass index (BMI) (kg/m^2) have a U- or J-shaped association with mortality in South-East Asian populations.

Association between socioeconomic status and BMI in low-income settings like Bangladesh, suggests that rural people is likely to be subjected to changing patterns of food availability, food composition, and consumption behavior. Studies shown that rural women were less likely to be overweight than those in urban areas. Findings underscore woman living in the more urbanized regions were at higher risk of being overweight and those living in the typically agriculture-based region deemed to be at risk of being underweight.[11-13]

Under nutrition in MWRA has been attributed to a multitude of factors, including upstream variables that the finding of a community-level WASH (water, sanitation and hygiene) practices in Ethopia,[14-16] food stability status, as well as household- and individual-level factors such as land ownership, household income and wealth, women's education level, age at first marriage, age at first delivery, multiparity and short birth interval.[1]

Robust estimates of levels and identification of determinants of nutritional status of women in resource-limited settings are important for targeting services and initiation of risk-specific interventions. The aim of this study is to find out the association between socio-demographic factors and nutritional status among married women of Bangladesh.

Materials and methods

Study design and period

This cross-sectional study was done from November 2015 through April 2016 among 15 to 49 years of rural women of some selected villages of Keraniganj, Dhaka.

Data Collection

Total 419 women were enrolled after taking informed consent. Convenient sample technique was followed to select the villages & respondents. Then epidemiological, demographic, nutritional status and risk factors of malnutrition was evaluated by taking history and clinical examination. Data was collected through a predesigned questionnaire. Pre testing was not conducted in this study. After taking verbal consent from the respondents, data was collected by face-to-face interview & height, weight & MUAC were measured using weighing machine & measuring tape ensuring privacy and confidentiality. Trained personnel were appointed to measure anthropometric data of height and weight using a standardized procedure. After collection, the data was checked & cleaned; followed by editing, coding and categorizing to detect errors or omissions and to maintain consistency and validity.

Inclusion and Exclusion criteria

Inclusion: Bangladeshi women of reproductive age those who were willing to participate.

Exclusion: Severely ill women and who were not willing to participate.

Statistical analysis

The data collected was analyzed using Statistical Program for Social Sciences (SPSS) V. 22.0. For descriptive statistics means, standard deviations & ranges for numerical data and frequencies & proportions for categorical data were calculated. Results were considered statistically significant if $p<0.05$.

Ethical Clearance

The research protocol was approved by the ethical committee of Ad-din Women's Medical College. There was no conflict of interest.

Result:

All these 419 women were (9.6 **±8.9) years ranging from** 15 to 49 years. Majority of them 173 (41.3%) were between the ages of 21-30, 25 (6%) were pregnant women and 73 (17.4%) were lactating mother. Among the respondent 334(79.7%) were housewife and completed their primary 199 (47.5%) and secondary 104 (24.8%) school. Most of the husband of the respondent completed their primary 180 (43%) and secondary 89 (21.2%) school **(Table I).**

Table 1: Socio-demographic status among the respondents (N=419)

Socio-demographic profile	N (%)
Age (years) Mean ± SD	29.6 ± 8.9
<20 years	88 (21%)
21-30 years	173 (41.3%)
31-40 years	110 (26.3%)
>40 years	48 (11.5%)
Occupation	
Housewife	334 (79.7%)
Service Holder	22 (5.3%)
Business	10 (2.4%)
Day Laborer	8 (1.9%)
Unemployed	15 (3.6%)
Educational status	
Illiterate	87 (20.8%)
Primary	199 (47.5%)
Secondary	104 (24.8%)
Higher secondary	22 (5.3%)
Graduate	5 (1.2%)
Post graduate	2 (0.5%)
Husband's education	
Illiterate	77 (18.4%)
Primary	180 (43%)
Secondary	89 (21.2%)
Higher secondary	26 (6.2%)
Graduate	5 (1.2%)
Post Graduate	4 (1%)
Others	38 (9%)
Pregnant women	25 (6%)
Lactating Mother	73 (17.4%)

In terms of BMI, our study revealed, 198(47.3%) were normal weight, 136(32.5%) overweight, and 60(14.3%) obese and regarding MUAC, 315(75.2%) were normal, 72(17.2%) obese, 23(5.5%) severe malnourished, 5(1.2%) mild malnourished and 4(1.05%) moderate malnourished. **(Table II).**

Table 2: Nutritional status among the respondents (N=419)

Nutritional status	N (%)
Body Mass index (BMI) Mean ± SD	25.1 ± 4.7
Under weight (<18.5)	23 (5.5%)
Normal (18.5-24.99)	198 (47.3%)
Over weight (25-29.99)	136 (32.5%)
Obese (30-39.99)	60 (14.3%)
Morbidly obese (>40)	2 (0.57%)
MUAC (mm) Mean ± SD	278.5 ± 54.5
Severely malnourished (<160)	23 (5.5%)
Moderately malnourished (160 -184.99)	4 (1%)
Mild malnourished (185 – 219.99)	5 (1.2%)
Normal (220-320)	315 (75.2%)
Obese (>320)	72 (17.2%)

Average number of family member was (5.3 ±2.6). Majority 273(65.2%) of the respondents were from medium size family (4-6 members), 79(18.9%) were from small size family (1-3 members) and 67(16%) from large size family (more than 6 members). Average family income was 15,382.5±12241.6 BDT and 41.9% respondents live in tin made houses. It was found that 78.3% were not suffering from any chronic disease, 21.0% suffering from one chronic disease, and 5% suffering from two chronic diseases & 2% suffering from three chronic diseases. Major number of parity 2-3 was 205 (48.9%), 0-1 was 153(36.5%) and more than 3 was 153(36.5%) (Table 3).

According to educational status, most of the respondent had normal BMI and MUAC. None of the graduate and post graduate respondent had underweight or morbid

Table 3: Predisposing factor affecting nutritional status among the respondents (N=419)

Predisposing factors	N (%)
Income status (monthly)	
Low (1500-9000)	111 (26.5%)
Middle (9001-40,000)	292 (69.7%)
High (40,001-100000)	16 (3.8%)
Physical activity	
High activity	44 (10.5%)
Moderate activity	318 (75.9%)
Sedentary life style	56 (13.4%)
Stressful condition	
Very stressful	44 (10.5%)
Occasional	226 (53.9%)
No stress	149 (35.6%)
Chronic disease (Need to give proper percentage according to page number 6 in result part)	88 (28%)
Family size (family member)	
Small (1-3)	79 (18.9%)
Medium (4-6)	273 (65.2%)
Large (7-13)	67 (16%)
Parity (Number of child)	
0-1	153 (36.5%)
2-3	205(948.9%)
>3	61 (14.6%)

obesity. On the other hand underweight, obesity and morbid obesity were found more among the respondents who had low educational status. Among the illiterate respondents, 5 (5.74%) were underweight, 44 (50.7%) were normal, 23 (26.43%) had over weight, 14 (16.09%) were obese, and 1 (1.14%) were morbidly obese. Among the respondent who completed primary school 10 (5.02%) were underweight, 77 (38.69%) were normal, 83 (41.70%) were overweight, 23 (11.5%) were obese and 1(1.14%) were morbidly obese. Underweight was found more not only in low income respondent 13 (11.71%) but also in high income group 2 (12.5%). Over weight were found more in middle income group 93 (31.84%) and high income group 8(50%) but also found in low income group accordingly 35 (31.57%) and 15 (13.51%).

According to MUAC measurement, most of the respondent in obese group had primary education 35(17.58%) followed by 16 (18.39%) illiterate, 17 (16.34%) secondary education, 3 (13.63%) higher secondary education and 1(20%) had graduate background. On the other hand, severe and moderate malnutrition were commonly found in low educational status group and low-income group. **(Table 4 and 5).**

Table 4: Association between educational and income status with BMI of the respondents (N=419)

	Under weight (23)	Normal (198)	Over weight (136)	Obese (60)	Morbidly obese
Educational status					
Illiterate (87)	5(5.74%)	44 (50.7%)	23 (26.43%)	14(16.09%)	1(1.14%)
Primary (199)	10 (5.02%)	77(38.69%)	83(41.70%)	23(11.5%)	1(0.01%)
Secondary (104)	6 (5.76%)	61(58.65%)	24(23.07%)	13(12.5%)	0
Higher secondary (22)	2(9.09%)	12(54.54%)	5(22.72%)	3(13.63%)	0
Graduate (5)	0	3(60%)	19(20%)	1(20%)	0
Post graduate (2)	0	1(50%)	0	1(50%)	0
Income status					
Low (111)	13(11.71%)	48(43.24%)	35(31.53%)	15(13.51%)	0
Middle (292)	8(2.73%)	146(50%)	93(31.84%)	43(14.72%)	2(0.01%)
High (16)	2(12.5%)	4(25%)	8(50%)	2(12.5%)	0

Table 5: Association between educational and income status with MUAC of the respondent (N=419)

	Severely malnourished (23)	Moderately malnourished (4)	Mildly malnourished (15)	Normal (315)	Obese (72)
Educational status					
Illiterate (87)	2(2.29%)	1(1.14%)	3(3.44%)	65 (74.71%)	16(18.39%)
Primary (199)	13(6.53%)	3(1.5%)	0	148(74.3%)	35(17.58%)
Secondary (104)	4(3.84%)	0	2(1.92%)	81(77.88%)	17(16.34%)
Higher secondary (22)	3(13.63%)	0	0	16(72.72%)	3(13.63%)
Graduate (5)	0	0	0	4(80%)	1(20%)
Post graduate (2)	1(50%)	0	0	1(50%)	0
Income status					
Low (111)	9(8.10%)	1(0.9%)	2(1.8%)	86(77.47%)	13(11.71%)
Middle (292)	13(14.13%)	3(1.02%)	3(1.02%)	220(75.3%)	53(18.15%)
High (16)	1(6.25%)	0	0	9(56.25%)	6(37.5%)

Discussion

A study in Southern Laos found was conducted to evaluate differentials in the prevalence of anemia among non-pregnant, ever-married women was 41.3% (urban: 37.2 % and rural: 43.5 %).[2] Anemia was less pronounced among non-pregnant women using contraception ($p < 0.05$), among non-pregnant, ever-married women of reproductive age in Bangladesh, and to examine associations with demographic, socioeconomic, and nutritional factors. Data for this cross-sectional study were taken from Bangladesh Demographic and Health Survey (BDHS).[3,6]

From this study it was found that of all 346 (82.6%) non-lactating mothers and 73(17.4%) lactating mothers. 88 (28.0%) were suffering from at least one disease. A study was conducted to evaluate the prognosis of chronic and acute diseases. This remains similar to a national data from Mexico (Health needs and health service use by older-than-60-year-old beneficiaries of the Mexican Institute of Social Security (IMSS)).[2]

This study was found that, 318 (75.9%) perform moderate physical activity, 56 (13.4%) perform sedentary physical activity, and 44 (10.5%) perform high physical activity. In this study it was found that, 226 (53.9%) were occasionally under mental pressure, 149 (35.6%) were not at all under mental pressure and 44 (10.5%) were very stressful. It was also found that, 292 (69.7%) were in middle income group, 111 (26.5%) were in low income group and 16 (3.8%) were in high income group. And 173 (41.3%) were between the ages of 21-30, 110 (26.3%) were between the ages of 31-40, 88 (21.0%) were less than 20 years and 48 (11.5%) were more than 48 years.

According to family size 273 (65.2%) were medium size family, 79 (18.9%) were small size family and 67 (16.0%) were large size family. In this study, 205 (48.9%) has 2-3 children, 153 (36.5%) has 0-1 child, and 61(14.6%) has more than 3 children. It was also found that, 198 (47.3%) were normal weight, 136 (32.5%) were overweight, 60 (14.3%) were obese, 23 (5.5%) were underweight and 2 (0.5%) was morbidly obese.

A study was conducted by the National Nutrition Monitoring Bureau (NNMB) which shows the chance of overweight/obesity and abdominal obesity was significantly ($P<0·01$) higher among women aged 40-60 years, those belonging to Christian religion. [17-21]

A study was conducted in the Bangladesh that examined the patterns, prevalence, and socioeconomic factors influencing the ever- women of being underweight and overweight over normal weight. Data used in this study has been extracted from Bangladesh Demographic and Health Survey. The results confirmed the co-existence of underweight and overweight among women as the prevalence of underweight, normal weight, pre-overweight, overweight, and obesity was 24.1%, 46.7%, 12.8%, 13.5%, and 2.9% respectively.[19] In this

study it was found that, 198 (47.3%) were normal weight, 136 (32.5%) were overweight, 60 (14.3%) were obese, 23 (5.5%) were underweight and 2 (0.5%) was morbidly obese. Among the primary educated women 83 (41.70%) were overweight, 77 (38.69%) were normal weight, 23 (11.5%) were obese, 10 (5.02%) were underweight and 1 (1.14%) was morbidly obese by BMI. And among the middle income group 146 (50%) were normal weight, 93 (31.53%) were overweight, 43 (14.72%) were obese, 2 (0.01%) were morbidly obese and among the low income group 13 (11.71%) were underweight, 48 (43.24%) were normal, 35 (31.53%) were overweight, 15 (13.51%) obese by BMI. The study found that, among the middle income group 220 (75.34%) were normal, 53 (18.15%) were obese, 13 (14.13%) were severely malnourished and 3 (1.02%) were mild malnourished and moderate malnourished by MUAC.

Conclusion

Findings of this study showed that most of these women of reproductive age had better nutritional status with normal BMI (kg/m^2) and MUAC. Larger family size, lower educational level and financial status compounded by chronic diseases had an influence on MWRA's poor nutrition. This study suggests that strategies for preventing both underweight and overweight/obesity simultaneously among reproductive women need to be implemented considering regional context and their socioeconomic status (SES).

References

1. Osmani S & Sen A (2003) The hidden penalties of gender inequality: fetal origins of ill-health. Econ Hum Biol 1, 105– 121.
2. Black RE, Allen LH, Bhutta ZA et al. (2008) Maternal and child undernutrition: global and regional exposures and health consequences. Lancet 371, 243–260.
3. Victora CG, Adair L, Fall C et al. (2008) Maternal and child undernutrition: consequences for adult health and human capital. Lancet 371, 340–357.
4. Bryce J, Coitinho D, Darnton-Hill I et al. (2008) Maternal and child undernutrition: effective action at national level. Lancet 371, 510–526.
5. Black RE, Victora CG, Walker SP et al. (2013) Maternal and child undernutrition and overweight in low-income and middle-income countries. Lancet 382, 427–451.
6. National Institute of Population Research and Training, Mitra and Associates, & ICF International (2014) Bangladesh Demographic and Health Survey 2014. Dhaka and Rockville, MD: NIPORT, Mitra and Associates, and ICF International
7. Pierce BL, Kalra L, Argos M, ParvezF,Chen Y. A prospective study of body mass index and mortality in Bangladesh. Int J Epidemiol.2010; 39(4): 1037–1045.
8. Hossain MG, Bharati P, Aik S, Lestrel PE, AbeerA et al. Body mass index of married Bangladeshi women: trends and association with socio-demographic factors. J Biosoc Sci. 2012; 44(4):385-99.
9. Subramanian SV, EmreÖzaltin, Jocelyn E. Finlay. Height of Nations: A Socioeconomic Analysis of Cohort Differences and Patterns among Women in 54 Low- to Middle-Income Countries. PLoS One. 2011; 6(4). .
10. Chen Y, Ge W, Parvez F, Bangalore S, Eunus M et al. A prospective study of arm circumference and risk of death in Bangladesh. Int J Epidemiol.2014; 43(4): 1187–1196. doi: 10.1093/ije/dyu082
11. AkhterN,Sondhya FY. Nutritional status of adolescents in Bangladesh: Comparison of severe thinness status of a low–income family's adolescents between urban and rural Bangladesh. J Educ Health Promot.2013; 2: 27.
12. Chorghade G, Barker M, Kanade S, Fall C. Why are rural Indian women so thin? Findings from a village in Maharashtra. Public Health Nutr Author manuscript.2006; 9(1): 9–18
13. Peytremann-Bridevaux I, Faeh D, Santos-Eggimann B. Prevalence of overweight and obesity in rural and urban settings of 10 European countries. Preventive medicine. 2007 May 1;44(5):442-6.)
14. Fenn B, Bulti AT, Nduna T et al. (2012) An evaluation of an operations research project to reduce childhood stunting in a food-insecure area in Ethiopia. Public Health Nutr 15, 1746–1754.
15. World Health Organization, UNICEF & US Agency for International Development (2015) Improving Nutrition Outcomes with Better Water, Sanitation and Hygiene: Practical Solutions for Policy and Programmes. Geneva: WHO

16. Hasnain MG, Akter M, Sharafat MSI, Mahmuda A. Morbidity patterns, nutritional status, and healthcare-seeking behavior of female garment workers in Bangladesh. Electron Physician.2014; 6(2): 801–807.

17. Meshram II, Balakrishna N, Sreeramakrishna K, Rao KM, Kumar RH et al. Trends in Nutritional Status and Nutrient Intakes and Correlates of Overweight/Obesity among Rural Adult Women (e"18-60 Years) in India: National Nutrition Monitoring Bureau (NNMB) national surveys. 2015;1-10

18. Nambooze J, Fujimura M, Inaoka T. Nutritional status and functional capacity of community-dwelling elderly in southern Laos. Environ Health Prev Med.2014; 19(2): 143–150.

19. Razak F, Corsi DJ, Subramanian S. Change in the Body Mass Index Distribution for Women: Analysis of Surveys from 37 Low- and Middle-Income Countries. PLoS Med.2013;10(1).

20. Compernolle S, Cocker KD, Abbott G, Verloigne M, Cardon G et al. Do sedentary behaviors mediate associations between socio-demographic characteristics and BMI in women living in socio-economically disadvantaged neighborhoods? Int J Behav Nutr Phys Act. . 2015; 12: 48.

21. Meshram II, Balakrishna N, Sreeramakrishna K, Rao KM, Kumar RH et al. Trends in Nutritional Status and Nutrient Intakes and Correlates of Overweight/ Obesity among Rural Adult Women (≥18-60 Years) in India: National Nutrition Monitoring Bureau (NNMB) national surveys.2015;1-10