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FOOD SECURITY STATUS AND FOOD CONSUMPTION AMONG URBAN AND RURAL PREGNANT WOMEN OF JASHORE DISTRICT IN BANGLADESH

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ABSTRACT

Introduction: *The study aimed to explore food security status and food consumption pattern among urban and rural pregnant women of Jashore district in Bangladesh.*

Methodology: *It was a cross-sectional study on 154 randomly selected pregnant women from rural (N=77) and urban (N=77) area of Jashore district. Food security status was determined using the Household Food Insecurity Access Scale (HFIAS) and food consumption was assessed by Food Consumption Score (FCS).*

Results: *The mean age of the respondents was 25 years and 56.5% of the respondents were in their third trimester and 43.5% were in their second and first trimester. Monthly household income (in BDT), husband's occupation and education, respondent's occupation and education were found significantly higher (P< .05) in urban area. Significant association (P< .05) was found between household food insecurity access and area. Mean Household Food Insecurity Access Scale (HFIAS) score was found higher in rural area than that of urban area. About 58% of respondents had highly acceptable food consumption, and 35% reported of acceptable food consumption and only about 7% was found with borderline food consumption status. Food consumption pattern of the respondents was significantly (P< .05) different between rural and urban areas, monthly food expense categories, number of earning members, monthly household income categories.*

Conclusion: *The study revealed that no respondents of the urban setting was experiencing any levels of food insecurity and only 7.8% of rural pregnant women was experiencing food insecurity of mild and moderate level.*

KEYWORDS: *Food security, food consumption, pregnant women, Bangladesh.*

INTRODUCTION

According to the report of World Food Summit (1996), food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life [1]. Several pillars of food security have been identified by World Health Organization (WHO), Food and Agriculture Organization (FAO) [2] of the United Nations. The four dimensions of food security are availability, access, utilization and stability [3].

About 10% of the world population suffers from severe food insecurity and this percentage is highest in Africa (29.8%) and lowest in Northern America and Europe (1.4%). In 2017, the percentage of severely food insecure people in Asia has been found to be 6.9% [4]. Household food insecurity has been found to be associated with maternal nutrition, growth of infants and young children [5-6]. Adequate maternal nutrition is indispensable for the mother herself and also for healthy birth outcome. To ensure adequate nutrition for the mother, household food security (underlying cause of malnutrition) and sufficient food intake (immediate cause of malnutrition) are vital along with proper care [7].

Maternal undernutrition during pregnancy causes insufficient growth of placenta and fetus [8-10]. During the peri-implantation period and placental development, it has been seen that maternal dietary intake of nutrients is essential for fetus growth [11-13]. Recent Literature illustrates that maternal Body Mass Index (BMI) [14-15] and mid-upper arm circumference (MUAC) are significantly associated with food insecurity [14]. Moreover, household food insecurity has been found to be positively related to maternal anemia [16], maternal mental illness [17-18]. Maternal diet quality deteriorates with increased food insecurity in rural Bangladesh [19]. Hence, food security and food consumption status are required to be satisfactory during pregnancy where maternal health and fetus growth do not have to compromise.

Although national surveys and several studies have been conducted regarding food security and food consumption in Bangladesh focusing on different age groups and on physiological conditions, there has been a scarcity of data concerning food security status and food consumption among pregnant women particularly in Jashore district. The current study aimed to explore the food security status of urban and rural pregnant women of Jashore district in Bangladesh by Household Food Insecurity Access Scale (HFIAS) and to investigate the food consumption status by Food Consumption Score (FCS)

MATERIALS AND METHODS

***Study Area, Study Design and Study Period*:** The study area was Jashore district which is located in Khulna division in southern part of Bangladesh. The study area was purposively selected because it is an emerging urban setting which offers suitable location for studying rural-urban complementarities. A cross-sectional study was conducted from November, 2018 to February,2019.

***Sampling Technique and Sample Size*:** A sample of 154 pregnant women were randomly selected from rural (N=77) and urban (N=77) area of Jashore district. Data was collected from four sub-districts of Jashore: Sadar, Jhikargacha, Chaugacha and Sharsha. Pregnant women of 15-35 years of age at their first or second pregnancy were included in the study and those who were reported to have diseases such as HIV, Tuberculosis were excluded from the study.

***Data Collection*:** A pretested close-ended questionnaire was used to collect data on socio-demographic characteristics, economic status, food consumption status and household food security status.

***Statistical Analysis*:** All statistical analysis was conducted using IBM SPSS Statistics 21.0. Several statistical tools were used such as Pearson Chi-square test, One-way ANOVA, independent samples t-test.

***Calculation of Household Food Insecurity Access Scale (HFIAS) Score*:** A standard questionnaire comprises of nine occurrence question and nine subsequent frequency of occurrence question were used to measure HFIAS score for each household [20]. Based on the scores, respondents were divided into four categories: Food secure, mildly food insecure, moderately food insecure, severely food insecure. Also, three domains were constructed using the experience of different conditions of the food insecurity access by the respondents or any member of their households and consequently. Later, the nine conditions (responses to nine occurrence questions) were clustered into three domains. The formation of the three domains according to their conditions are shown below:

Domain 1: Anxiety and uncertainty about the household food supply	Condition 1
Domain 2: Insufficient Quality (includes variety and preferences of the type of food)	Condition 2 + Condition 3 + Condition 4
Domain 3: Insufficient food intake and its physical consequences	Condition 5 + Condition 6 + Condition 7 + Condition 8+ Condition 9

Although HFIAS is a method to assess the prevalence of food insecurity [20], several validation studies have been conducted to see the feasibility and appropriateness of the scale in different settings to measure food insecurity [21-22].

***Calculation of Food Consumption Score (FCS)*:** The FCS is a composite score which has been constructed focusing on three criteria: dietary diversity, food frequency, and relative nutritional importance of different food groups [23]. The FCS has been validated by several studies [24-25]. World Food Program (WFP) uses the thresholds for different levels of food consumption are: poor food consumption (0 to 21), borderline food consumption (21.5 to 35) and acceptable food consumption (> 35).Regarding the diet of Bangladeshi population, providing emphasis on fish and oil intake and for detailed analysis, these thresholds have been adapted for Bangladesh as follows: poor food consumption (0 – 28), borderline food consumption (28 – 42), acceptable food consumption (42- 51) and highly acceptable food consumption (> 52).

RESULTS AND DISCUSSION

***Socio-demographic and Economic Characteristics of Pregnant Women*:** The association of area type and various sociodemographic and economic characteristics of the respondents were analyzed (Table 1). Significant associations were found between area and respondent's educational and occupational status, husband's educational and occupational status, monthly household income in BDT, age of the mother in years. The mean age of the respondents was 25±4 years. About 57% of the respondents were in their third trimester of pregnancy, 35% were in their second trimester and 8% were in their first trimester. Most of them were Muslim and only 2.6% were Hindus. About 65% and 31.2% of the rural respondents had completed SSC and HSC respectively. About 47% of the urban respondent had completed honors degree, whereas only about 1% of rural pregnant women had completed honors degree($p<.05$). About 68% of the urban husbands had completed masters degree, whereas only about 1% of rural husbands had completed masters degree ($p<.05$).

It was seen that majority of the respondents were housewife both in urban (76.6%) and rural areas (98.7%), and about 20% of urban respondents were found to be wage earner, whereas, the percentage was negligible (1.3%) among their rural counterparts. No rural respondent was found to do any type of business but only 2.6% of urban respondents said that they were involved in business. Regarding the occupation of the respondents' spouses, it was observed that most of the urban counterparts (79.2%) were wage earner and most of the rural counterparts (74%) were farmers. No adolescent pregnant women were found in urban area and about 10% of rural pregnant women were found as adolescent.

Table 1: Socio-demographic and economic characteristics of pregnant women by urban and rural area

Characteristics	Total	Urban	Rural	P-value
	Percentage	Percentage	Percentage	
Religion				
Islam	97.4	96.1	98.7	.311[a]
Hindu	2.6	3.9	1.3	
PW educational status				
Less than or equal to SSC	32.4	0.0	64.9	
HSC	31.8	32.5	31.2	.000 [a]
Honors	24.0	46.8	1.3	
Masters	11.7	20.8	2.6	
Husband's educational status				
Less than or equal to SSC	19.4	0.0	39.0	
HSC	26.0	0.0	51.9	.000 [a]
Honors	20.1	32.5	7.8	
Masters	34.4	67.5	1.3	
PW occupation				
Housewife	87.7	76.6	98.7	
Business	1.3	2.6	0.0	.000 [a]
Wage earner	11.0	20.8	1.3	
Husband's occupation				
Business	16.2	20.8	11.7	
Wage earner	40.9	79.2	2.6	.000 [a]
Agriculture	37.0	0.0	74	
Others	5.8	0.0	11.7	
Trimester				
1st	8.4	6.5	10.4	
2nd	35.1	36.4	33.8	.678 [a]
3rd	56.5	57.1	55.8	
Age (in years)				
Less than 18	5.2	0.0	10.4	
19 to 25	54.5	37.7	71.4	.000 [a]
26 to 30	29.9	44.2	15.6	
31 to 35	10.4	18.2	2.6	

N.B: PW= Pregnant women, SSC= Secondary School Certificate, HSC= Higher Secondary Certificate, [a] P-value was obtained using chi-square test.

Figure 1 shows that about 60% of the urban households' monthly income were greater than BDT 25,000, whereas no household was found in rural area with monthly income greater than BDT 25,000. About 41% of the urban households' monthly income were between 15,001 to 25,000 BDT, and only about 7% of the rural households' monthly income were between 15,001 to 25,000
BDT.

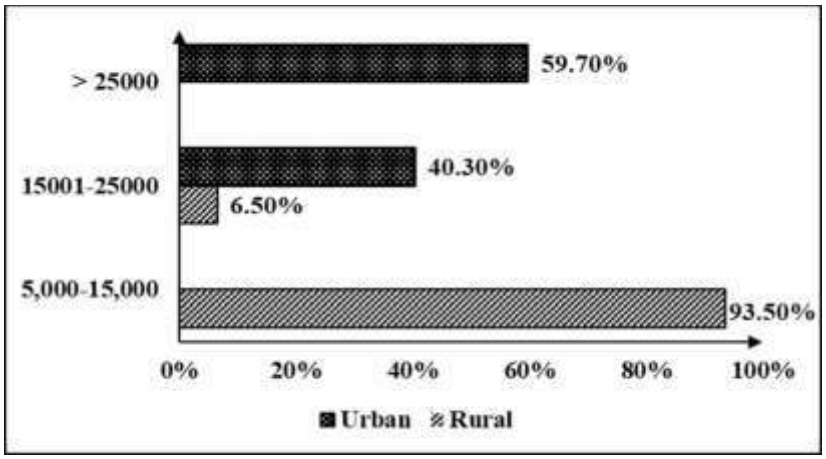

Figure 1: Monthly household income of the respondents' households in BDT (BDT=Bangladeshi Taka)

***Household Food insecurity Access Scale (HFIAS) Score of The Respondents*:** Table 2 depicts the association between area and household food security by HFIAS. It was found that, overall about 96% of the respondents were found to be food secure, about 2% of respondents were mildly food insecure, and about 2% were found as moderately food insecure. No respondents were found to be severely food insecure. In urban area, all of the households were found food secure, on the other hand 7.8% of respondents were found as food insecure at mild and moderate level in rural area, and about 92.2% of rural pregnant women were food secure.

HFIAS category	Total	Urban	Rural	P-value
	Percentage	Percentage	Percentage	
Food Secure	96.1	100	92.2	.044[a]
Mildly food insecure	1.9	0.0	3.9	
Moderately food insecure	1.9	0.0	3.9	

Table 2: Household Food insecurity Access Scale (HFIAS) score of the respondents by area
N.B: HFIAS= Household Food Insecurity Access Scale, [a] Pearson-chi square was conducted.

***Rural Respondents by Three Domains of HFIAS*:** Figure 2 shows the frequency distribution of rural respondents by three domains of HFIAS. Since no respondent was found as food insecure among the urban respondents, the figure below only highlights the respondents of rural area who falls within three domains of food insecurity reflecting various combinations of experience or conditions. It is observed in the figure that most of the rural pregnant women experiencing food insecurity falls within the conditions of domain 2, that is, they had to take foods of insufficient quality during the past four weeks of the study. Four respondents experienced anxiety and uncertainty of food (Domain 1) and three respondents had experience of insufficient food intake and its physical consequences (Domain 3).

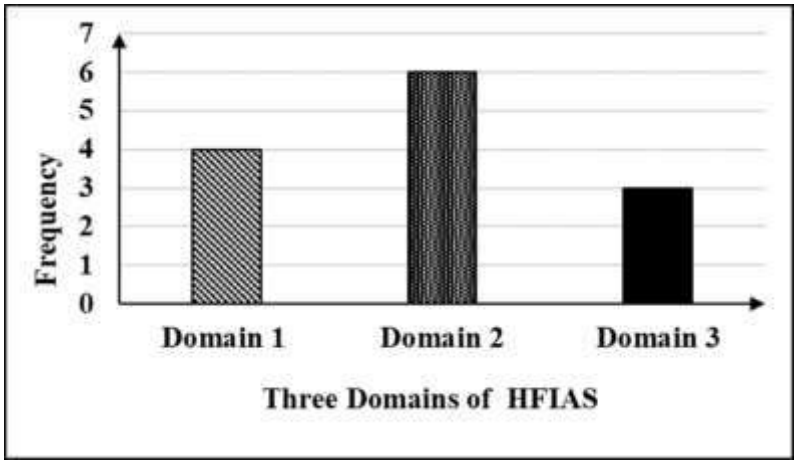

Figure 2: Rural respondents by three domains of household food insecurity access (Domain 1= Anxiety and uncertainty of food; Domain 2= Insufficient quality of food; Domain 3= Insufficient food intake and its physical consequences).

***Food Consumption Status of Pregnant Women by Area*:** Figure 3 shows that about 58% of the total respondents had highly acceptable food consumption pattern, 35% had low acceptable food consumption, whereas only 7% had borderline food consumption. No respondents were found with poor food consumption status. Among the urban respondents, about 82% were found with highly acceptable food consumption, 18% were that of low acceptable food consumption and no respondent was found to have borderline food consumption in urban area. In contrast, about 14% of the rural respondents had food consumption status of borderline level, about 52% were found with low acceptable food consumption and 34% of the rural respondents were found with highly acceptable food consumption. Significant association ($p<.05$) was found between area type and food consumption status among pregnant women.

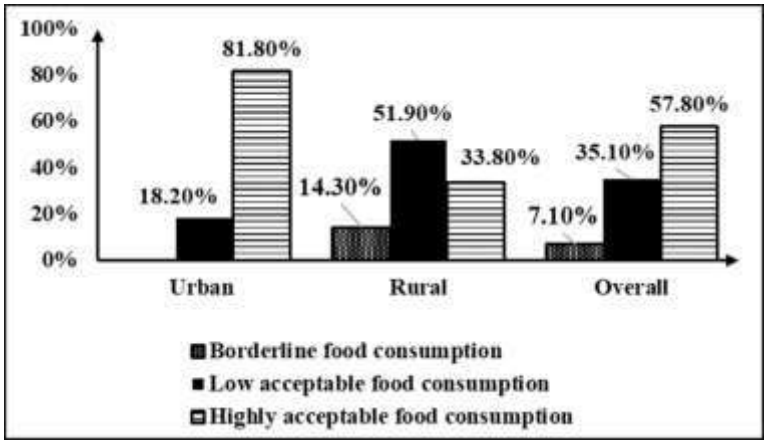

Figure 3: Food consumption status of pregnant women by area

***Food Consumption Score (FCS) by Area and Socio-Economic Variables*:** Table 3 shows the mean FCS comparison by several background characteristics of the respondents. It can be seen from the table that FCS was significantly different between rural and urban area ($P< .05$). The rural pregnant women had an FCS of 48.48 and urban pregnant women had an FCS of 59.51. The composite score also varied significantly among different household income categories.

The highest FCS (62.87) was found in the households with income greater than twenty-five thousand taka and lowest FCS (48.30) was seen among the households with monthly income of five thousand to fifteen thousand taka. Mean FCS was 53.87 among the households with income greater than fifteen thousand to twenty-five thousand taka. FCS was higher among the respondents whose monthly food expense was greater than eight-thousand to ten-thousand taka. Mean FCS was 53 among those with monthly food expense of four-thousand to eight-thousand taka. FCS of 48.30 was found among them whose monthly food expense was below four thousand Taka. FCS also varied significantly according to the number of earning members in the family. The table

shows that households with two earning members had a higher FCS of 63.32. On the other hand, households with only one earning member, had an FCS of 52.55. Independent samples t-test and one way-ANOVA were conducted to observe the significant differences of mean FCS between various background characteristics of the respondents.

Table 3: Food Consumption Score (FCS) by area and socio-economic characteristics of the respondents

Characteristics	Frequency	FCS (Mean ± SD)	P value
Area			
Urban	77	59.51 ± 10.04	.000*
Rural	77	48.48 ± 6.15	
Monthly household income (in BDT)			
5000-15000	72	48.3056 ± 6.29809	.000**
15001-25000	36	53.8750 ± 7.05223	
>25000	46	62.8696 ± 10.22222	
Food expense (in BDT)			
0-4000	68	48.3015 ± 6.34525	.000**
4001-8000	35	53.0000 ± 7.11771	
8001-10000	51	62.9578 ± 10.15554	
Income members			
One	134	52.5597 ± 9.32255	.000*
Two	20	63.3250 ± 9.28393	

N.B: BDT= Bangladeshi taka, FCS= Food Consumption Score, ***** P-value was obtained using independent samples t-test, **P-value was obtained using one-way ANOVA

In case of nutritional relevance, FCS has been found to be a cheaper, quicker and easier food consumption measure as compared with other measures, except Dietary Diversity Score [26]. In the present study, mean FCS has been found 54 (min= 35.5, max=89), whereas mean FCS was found 64.59 (min=0, max=112) for Bangladesh. Mean HFIAS score has been found 7.45 (min=0, max=26) for Bangladesh at national level [26], but in this study, mean HFIAS score was 0.17 (min=0, max=5). Evidence shows that about 60% of rural households have been suffering from food insecurity [27], in contrast, present study shows that only about 8% of rural households are suffering from food insecurity of mild and moderate level. In Khulna division, about 18% of the households have been found with poor or borderline food consumption [27] and current study explored that 14% of rural households experienced borderline food consumption, which almost supports the existing evidence. In a study concerning Satkhira in Bangladesh, no relation was observed between FCS and household monthly income [28]. In the contrary, current study showed that mean FCS was significantly different between various monthly household income categories.

CONCLUSION

It can be concluded from this study that the urban pregnant women were more food secured than that of rural area in Jahsore district and no respondent was found with poor food consumption status. Urban settings were strongly associated with increased food security, food consumption status, monthly household income, pregnant women educational status and occupation, husband's educational status and occupation, adolescent pregnancy.

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