

Household Food Insecurity and Associated Dietary and Socio-Economic Factors among Pregnant Women of Mid-West Bangladesh

ABSTRACT

Purpose: The aim of the present study was to estimate the prevalence of household food insecurity and to figure out the dietary and non-dietary factors associated with household food insecurity among pregnant women of mid-west Bangladesh.

Methodology: The study was conducted in four sub-districts of Rajshahi district: Rajshahi Sadar, Godagari, Tanor and Shardah. It was a cross-sectional study which randomly enrolled 150 pregnant women. Household food insecurity among the respondents was calculated by Household Food Insecurity Access Scale (HFIAS).

Results: The mean age of the pregnant women was 29 ± 3 years. About 76% of respondents were food secure, 23% of respondents were mildly food insecure, and only 1% of respondents were moderately food insecure. Severe food insecurity was not observed among the respondents in Rajshahi. About 17% of respondents were anxious and uncertain about their household food supply, about 23% of respondents said that they had to eat foods of insufficient quality and only 1% of respondents replied that they had eat insufficient food during the month prior to study. It was observed that mean Dietary Diversity Score (DDS) and mean Food Consumption Score (FCS) significantly differ ($P<.05$) between food secure and food insecure respondents. Meat, fish and poultry consumption were found higher among the food secure respondents but vegetable consumption was higher among the food insecure group. Some socio-economic factors such as household size, respondents' educational status, husbands' educational status, husbands' occupation and monthly household income were significantly associated ($P<.05$) with household food insecurity of the respondents.

Keywords: Food insecurity, dietary factors, socio-economic factors, pregnant women

INTRODUCTION

About 6–73 % of population is affected by food insecurity in developed and developing countries [1-7]. In Asia, 6.9% people has been found to suffer from severe food insecurity [8]. Maternal and child nutrition have been found to be associated with food insecurity [9-10]. Moreover, maternal anemia [11] and maternal mental illness [12-13] are also associated with food insecurity. Household food security is required to maintain adequate nutrition during pregnancy. Various methods have been employed to measure food insecurity [15-17]. The current study used Household Food Insecurity Access Scale (HFIAS) score to assess food insecurity access. Numerous studies have been conducted on household food insecurity and associated factors. No study has been conducted on the food insecurity among the pregnant women of mid-west Bangladesh. Hence, the purpose of the current study was to measure the

45 prevalence of food insecurity among pregnant women in mid-west Bangladesh and find out the
46 factors associated with food insecurity in this region.

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48 **MATERIALS AND METHODS**

49 **Study Area, Study Design and Study Period**

50 The study was conducted in Rajshahi district which is located in mid-west Bangladesh. It was a
51 cross-sectional study which was undertaken from November, 2018 to February, 2019.

52 **Sampling Technique and Sample Size**

53 150 pregnant women were randomly selected from four sub-districts of Rajshahi: Rajshahi
54 Sadar, Godagari, Tanor and Shardah. The pregnant women who were included in the study was
55 more than 19 years of age and those who had severe diseases such as HIV, Tuberculosis were not
56 included in the study.

57 **Data Collection**

58 A pretested questionnaire was used to collect data on socio-demographic and economic
59 characteristics and household food security status.

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61 **Statistical Analysis**

62 The statistical analysis was done by IBM SPSS Statistics 21.0. The statistical tools which were
63 used were mean, Pearson Chi-square test, independent samples t-test.

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65 **Household Food Insecurity Access Scale (HFIAS) Score Measurement**

66 A questionnaire containing nine occurrence questions and nine frequency of occurrence
67 questions was used to measure HFIAS score [14]. Respondents were divided into four
68 categories: Food secure, mildly food insecure, moderately food insecure, severely food insecure
69 based on the scores. The nine conditions (responses to nine occurrence questions) were
70 combined to create three domains: anxiety and uncertainty of household food supply, insufficient
71 quality of food, insufficient food intake and its physical consequences. Several validation studies
72 have been conducted for evaluating the feasibility of this scale to assess food insecurity in
73 different settings [14-19].

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75 **RESULTS**

76 **Socio-demographic and Economic Characteristics of Pregnant Women**

77 Table 1 illustrates the socio-demographic and economic characteristics of the pregnant women.
78 About 83% and 15% of the pregnant women were on their second and third trimester,
79 respectively. Only 8% of the respondents got married at an adolescent stage. About 9% of the
80 households had had three members and about 29% of households had five or more than five
81 household members. About 50% of the pregnant women had Honors or Masters degree and
82 about 72% of the husbands had completed Honors or Masters degree. No husbands were found
83 to have educational status below HSC. All of the pregnant women was housewife and most of
84 the husbands (79%) were wage earner and about 19% were farmers. About 16% of the
85 households had monthly income of

86

87 **Table 1: Socio-demographic and economic characteristics of the pregnant women**

88 N.B: SSC= Secondary School Certificate, HSC= Higher Secondary Certificate, Hons.= Honors degree,
89 BDT=Bangladeshi Taka

Socio-demographic and economic characteristics		Frequency	Percent
Area	Rural	39	26
	Urban	111	74
Age (in years)	23-28	54	36.1
	29-31	56	37.4
	≥32	40	26.5
Trimester	First Trimester	3	2
	Second Trimester	125	83.3
	Third Trimester	22	14.7
Age at first marriage (in years)	18-19	11	8
	20-23	105	63.3
	≥24	34	28.7
Household size	Three	14	9.3
	Four	93	62
	≥ Five	43	28.7
Educational status of respondents	SSC	21	14
	HSC	53	35.3
	Hons.	75	50
	Masters	1	0.7
Educational status of respondents' husband	HSC	27	18
	Hons.	87	58
	Masters	36	24
Occupation of respondents' husband	Business	1	0.7
	Wage earner	119	79.3
	Agriculture	28	18.7
	Others	2	1.3
Monthly household income (in BDT)	14000-25000	24	16
	25001-30000	64	42.7
	>30000	62	41.3
Earning member	One	108	72
	Two	42	28

90 fourteen-thousand to twenty-five thousand taka and 84% of households had income greater than
91 twenty-five thousand Taka. Most of the families (72%) had one earning member and about 28%
92 of families had two earning members.

93 94 **Household Food Insecurity Status of Pregnant Women**

95 It can be observed from the figure 1.a. that about 76% of the respondents were found food
96 secure, 23% were mildly food insecure and only 1% were moderately food insecure. Severe food
97 insecurity was not found among the respondents in Rajshahi district. Figure 1.b. depicts the three
98 domains of household food insecurity. About 17% of the respondents were anxious and uncertain
99 about household food supply during the past 4-weeks prior to the study. About 23% of the
100 respondents had to eat foods of insufficient quality that is, they had to take less varieties of food
101 and their food preferences were not fulfilled. Only about 1% of the respondents were observed to
102 eat insufficient food. Figure 1.b shows that pregnant women of Rajshahi district did not have to
103 take less amount food but had to eat lesser varieties of food.

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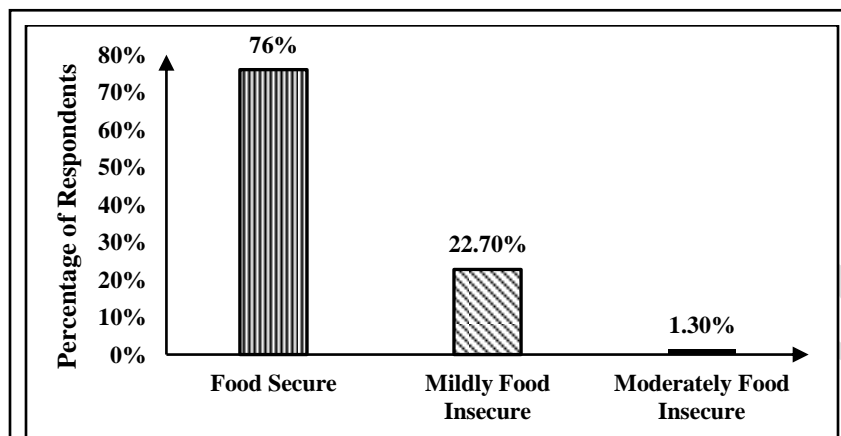


Figure 1.a: Household Food Insecurity Status of Respondents

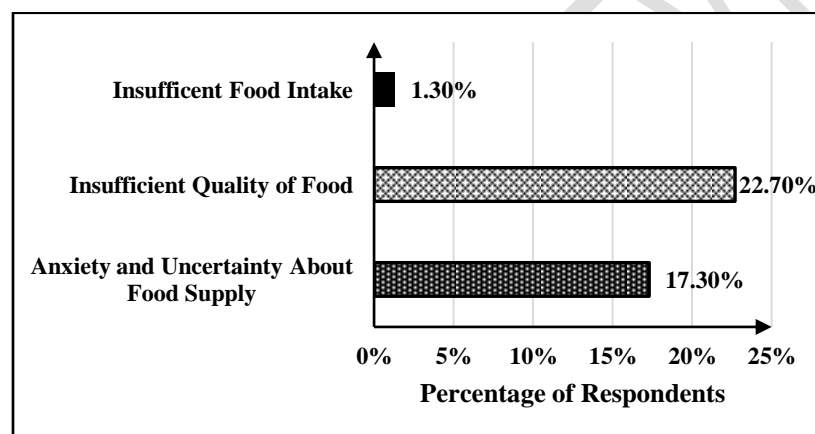


Figure 1.b: Three Domains of Food Insecurity (Access)

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Dietary Factors and Household Food Insecurity

Table 2 displays the mean differences of various dietary scores between food secure and food insecure respondents (by independent samples t-test) along with association of different dietary factors and food security status of the respondents (by Pearson chi-square test). Mean Dietary

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Table 2: Dietary factors and household food insecurity

Dietary factors	Food secure	Food insecure	P-value
Dietary Diversity Score (Mean ± SD)	6.78 ± 1.54	4.34 ± 1.97	< .05 ^a
Food consumption score (Mean ± SD)	65 ± 7.32	60.39 ± 8.15	< .05 ^a
Monthly household food expenditure(in BDT)	7053 ± 483	4367 ± 642	< .05 ^a
Vegetables consumption (%)	74	92	< .05 ^b
Meat, Fish or Poultry consumption (%)	89	54	< .05 ^b
Milk consumption	69	48	< .05 ^b

122 N.B.: BDT= Bangladeshi Taka, ^aP-value was obtained from independent samples t-test, ^bP-value was obtained from
 123 Pearson Chi-square test

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 126 Diversity Score and mean Food Consumption Score varies significantly between food secure and
 127 food insecure pregnant women (P<.05). Mean household food expenditure was higher among the
 128 food secure group than their insecure counterparts. About 92% of the food insecure respondents
 129 reported to eat vegetables during the previous day which was significantly higher than the food
 130 secure respondents. On the other hand, meat, fish or poultry and milk consumption were

Socio-economic factors		Food security	Food insecurity	P-value
Household size	Three	73	4	< .05
	Four	19	14	
	≥ Five	18	82	
Educational status of respondents	SSC	14	54	< .05
	HSC	21	32	
	Hons.	42	9	
	Masters	23	5	
Educational status of respondents' husband	HSC	34	68	< .05
	Hons.	43	32	
	Masters	23	0	
Occupation of respondents' husband	Business	42	22	< .05
	Wage earner	37	14	
	Agriculture	13	54	
	Others	8	10	
Monthly household income (in BDT)	14000-25000	4	73	< .05
	25001-30000	27	21	
	>30000	69	6	

131 significantly higher among the food secure respondents (P<.05).

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 133 **Table 3: Association of household food insecurity and socio-economic factors**

134 N.B: SSC= Secondary School Certificate, HSC= Higher Secondary Certificate, Hons.= Honors degree, BDT=
 135 Bangladeshi Taka, P-value was obtained from Pearson chi-square test

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 137 **Socio-Economic factors and Household Food Insecurity**

138 Table 3 shows the association of socio-economic factors with household food insecurity of the
 139 respondents. Significant associations were found between household food insecurity and family
 140 size, educational status of the respondents, educational status of the husbands, occupation of the
 141 husbands and monthly household income (P<.05). It can be observed from the table that
 142 household size was positively associated with food insecurity. On the other hand, educational
 143 level of the respondents and their husbands, and household income were negatively associated
 144 with food insecurity. Regarding the occupation of the husbands, it can be seen that food
 145 insecurity was more prevalent among farmers in comparison to other occupations.

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 147 **DISCUSSION**

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 149 In Bangladesh, minimum and maximum HFIAS score have been estimated 0 and 26 at national
 150 level, respectively [20]. In contrast, minimum and maximum HFIAS scores were found 0 and 12
 151 respectively in our study. Mean HFIAS was found 3.63 in our study, whereas, the score was
 152 found 7.45 at national level in Bangladesh [20]. It was found in this study that about 76% of

153 households were food secure and 24% of households were suffering from mild and moderate
154 level food insecurity. Available literature suggests that about 60% of rural households have been
155 suffering from food insecurity [21]. In the present study, we found that food insecurity was
156 associated with family size and similar finding was found in several studies [23,26]. Household
157 food insecurity was also associated with educational status and similar findings were also found
158 in three studies [23,25,27]. Ukegbu *et al* (2019) found that food insecurity was higher among
159 farmer headed households. We also found that food insecurity was higher among those
160 respondents, whose husbands were farmers [24].
161 Monthly household income was found to be negative associated with food insecurity in the
162 current study, which was similar to the result found by Tantu AT *et al* (2017) [22]. Dietary
163 diversity and monthly food expenditure significantly varied between food insecure and food
164 insecure respondents in our study. Mulugeta *et al* (2018) reported that food insecurity is
165 associated with dietary diversity and Tantu AT *et al* (2017) found that food expenditure is
166 associated with food insecurity. It might be concluded that the prevalence of food insecurity was
167 found higher among the pregnant women of mid-west Bangladesh than the national prevalence.
168 Several studies support the findings of the current study that food insecurity is associated with
169 household size, educational status of household head, occupation of household head and monthly
170 household income. The authors would like to suggest that food expenditure should be prioritized
171 among other household expenses to reduce food insecurity among the pregnant women.

172 173 **CONFLICT OF INTEREST**

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175 The authors declare no conflict of interest.

176 177 **REFERENCES**

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UNDER PEER REVIEW