Original Research Article

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 determine~~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 with the~~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 eaten an insufficient amount of food during the month prior to study. It was observed that the mean Dietary Diversity Score (DDS) and mean Food Consumption Score (FCS) significantly differed ($P < .05$) 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 the population is affected by food insecurity in developed and developing countries [1-7]. In Asia, 6.9% of the 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. 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 prevalence of food insecurity among pregnant women in mid-west Bangladesh and find out the factors associated with food insecurity in this region. Various methods have been employed to measure food

Comment [X1]: A sentence on Bangladesh and or India will increase the value of the discussion later

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insecurity [15-17]. The current study used the 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 prevalence of food insecurity among pregnant women in mid-west Bangladesh and find out the factors associated with food insecurity in this region.~~

MATERIALS AND METHODS

Study Area, Study Design and Study Period

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

Sampling Technique and Sample Size

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

Data Collection

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

Statistical Analysis

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

Household Food Insecurity Access Scale (HFIAS) Score Measurement

A questionnaire , compiled by (here give the authors of 14 if they were the original compilers) containing nine occurrence questions and nine frequency of occurrence questions, was used to measure the HFIAS score [14]. Several validation studies have been conducted for evaluating the feasibility of this scale to assess food insecurity in different settings [14-19]. In this study, r~~R~~espondents were divided into four categories: Food secure, mildly food insecure, moderately food insecure, severely food insecure, based on the scores. The nine conditions (responses to nine occurrence questions) were combined to create three domains: anxiety and uncertainty of household food supple, insufficient quality of food, insufficient food intake and its physical consequences. ~~Several validation studies have been conducted for evaluating the feasibility of this scale to assess food insecurity in different settings [14-19].~~

RESULTS

Socio-demographic and Economic Characteristics of Pregnant Women

Table 1 illustrates the socio-demographic and economic characteristics of the pregnant women. About 83% and 15% of the pregnant women were on their second and third trimester, respectively. Only 8% of the respondents got married at an adolescent stage. About 9% of the households had had three members and about 29% of households had five or more than five household members. About 50% of the pregnant women had Honors or Masters degree and about 72% of the husbands had completed Honors or Masters degree. No husbands were found to have an educational status below HSC. All of the pregnant women were~~as~~ housewives~~fe~~ and

Comment [X4]: One does not start a sentence with numbers. Rather say: A random sample of 150 pregnant women from four….. were selected. It increases the value of the study if more is known about how the random selection of the sample was done and what the size of the population is. How did the researcher decide on the sample size?

Comment [X5]: More information is necessary on data collection. Did someone else compiled and tested it or did the author compiled it and how was it tested?

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Comment [X7]: This is also part of Data collection or should come before statistical analysis.. Data collection can be subdivided into a questionnaire regarding demographic date and a questionnaire regarding the HFIAS. It is also necessary to know how the dietary diversity score was determined, e.g. how many food groups were used? How was the food consumption score determined? How was the HFIAS score determined?

Comment [X8]: A short paragraph on the procedure that was followed and who gathered the data could be valuable. E.g. were field workers trained or did the author complete all the questionnaires or did the participants complete it? How was the information checked?

Comment [X9]: First explain this or write it out and put the abbreviation in brackets. Then use the abbreviations only. Even though it is underneath the table, the table and text should be structured in such a way that it can be read independently of each other

most of the husbands (79%) were wage earners and about 19% were farmers. About 16% of the

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

households had monthly income of

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

	≥ 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

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

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

Household Food Insecurity Status of Pregnant Women

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

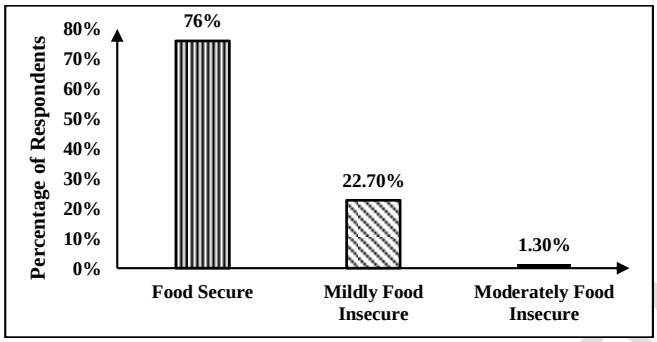

Figure 1.a: Household Food Insecurity Status of Respondents

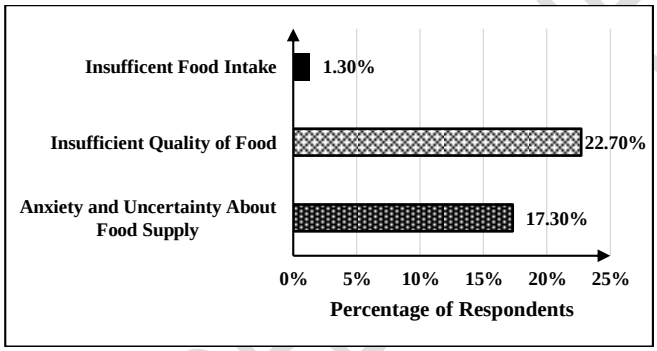

Figure 1.b: Three Domains of Food Insecurity (Access)

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). The mMean Dietary

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]

N.B.: BDT= Bangladeshi Taka, [a]P-value was obtained from independent samples t-test, [b]P-value was obtained from Pearson Chi-square test

Comment [X10]: To make the table more informative provide the n of the food secure and food insecure groups in these two cells

Comment [X11]: Was fruit grouped together with vegetables?

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

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

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	

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

Socio-Economic factors and Household Food Insecurity

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

DISCUSSION

In Bangladesh, the minimum and maximum HFIAS score have been estimated as 0 and 26 at national level, respectively [20]. In contrast, minimum and maximum HFIAS scores were found 0 and 12 respectively in our study. Mean HFIAS was found 3.63 in our study, in comparision with a score of ~~whereas, the score was found~~ 7.45 at national level in Bangladesh [20]. It was found in this study that about 76% of households were food secure and 24% of households were suffering from mild and moderate level food insecurity. Available literature suggests that about 60% of rural households have been suffering from food insecurity [21]. In the present study, we

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found that food insecurity was negatively associated with family size and similar findings were ~~was found~~reported ~~–~~in other~~several~~ studies [23,26]. Household food insecurity was also associated with educational status, with ~~and~~ similar findings ~~were also found~~ in three other studies [23,25,27]. This study indicated that food insecurity was higher among those respondents whose husbands were farmers and that is in line with the study of Ukegbu *et al* (2019), who found that food insecurity was higher among farmer headed households~~.~~ ~~We also found that food insecurity was higher among those respondents, whose husbands were farmers~~ [24].

Monthly household income was found to be negatively associated with food insecurity in the current study, which was similar to the result found by Tantu AT *et al* (2017) [22]. Dietary diversity and monthly food expenditure significantly varied between food insecure and food insecure respondents in this~~our~~ study. Mulugeta *et al* (2018) reported that food insecurity is associated with a low dietary diversity and Tantu ~~AT~~ *et al* (2017) found that a low food expenditure is associated with food insecurity. It might be concluded that the prevalence of food insecurity was found higher among the pregnant women of mid-west Bangladesh than the national prevalence. Several studies support the findings of the current study that food insecurity is associated with household size, educational status of household head, occupation of household head and monthly household income. The authors would like to suggest that food expenditure should be prioritized among other household expenses to reduce food insecurity among the pregnant women.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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Comment [X16]: Is this correct as reference 21 indicated that 60% of rural households were food insecure?

Comment [X17]: This is not the recommended format for the references but it is consistent, except for the journal names.

Comment [X18]: In some cases abbreviations are used and in others not?

Comment [X19]: Why is this journal in capital letters

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