Journal of Food Security, 2019, Vol. 7, No. 1, 28-32
Available online at http://pubs.sciepub.com/jfs/7/1/5
Published by Science and Education Publishing
DOI:10.12691/jfs-7-1-5

Prevalence and Associated Factors of Food Insecurity among Women Garment Factory Workers in Bangladesh

Sadika Sharmin[1,2,*], Noor Aman Bin A. Hamid[3], Wan Abdul Manan Bin Wan Muda[2]

[1]Department of Rural Sociology, Bangladesh Agricultural University, P.O. Box-2202, Mymensingh, Bangladesh
[2]Programme in Nutrition, School of Health Science, University Sains Malaysia, P.O.Box-16150, Kelantan, Malaysia
[3]Department of Community Medicine, School of Medical Science, University Sains Malaysia, P.O.Box-16150, Kelantan, Malaysia
*Corresponding author: nivin_1983@yahoo.com

Received December 04, 2018; Revised January 09, 2019; Accepted February 17, 2019

Abstract A significant number of female workers (1.6 million) are employed in different types of garment factories. Garment factory workers in Bangladesh are the lowest paid workers in the world. Achieving food security and other basic needs are a challenge due to financial constraints. The purpose of this study was to examine the food insecurity of women garment factory workers in Bangladesh. The study was carried out using a cross-sectional survey. The validated Bengali version of the Cornell-Radimer questionnaire was used for the purpose of collecting data on food insecurity. Logistic regression was performed to assess the association of food insecurity with socio-demographic, socio-economic and working condition variables. The results found that 71.9 percent of the women garment factory workers' households faced food insecurity and 28.1 percent were food secure. Household size (OR2.02, 95% CI, 1.52-2.69, *P*=<0.001), being the head of the household (OR 0.42, 95% CI, 0.21- 0.82, *P*=0.012), and job satisfaction felt by the respondents (OR 0.50, 95% CI, 0.32-0.79, *P*= 0.003) were associated factors linked to food insecurity of women garment factory workers. To maintain food security, the government should raise the workers' salary in tandem with the food prices in the market. Overtime salary per hour should be increased and proper payment of extra working hours should be ensured.

Keywords: *food insecurity, women garment factory workers, prevalence, Bangladesh*

Cite This Article: Sadika Sharmin, Noor Aman Bin A. Hamid, and Wan Abdul Manan Bin Wan Muda, "Prevalence and Associated Factors of Food Insecurity among Women Garment Factory Workers in Bangladesh." *Journal of Food Security*, vol. 7, no. 1 (2019): 28-32. doi: 10.12691/jfs-7-1-5.

1. Introduction

Bangladesh has come a long way since its status as a chronical food deficit country in the 1970s. In the last three decades, even as its population has more than doubled, food production has kept pace with its population growth. Bangladesh has attained food self-sufficiency at the aggregate level. Applying the technologies of green revolution (based on new seed, fertilizer and irrigation technologies), crop production has accelerated. The government eliminated subsidies on agricultural inputs and removed bans on private sector imports of agricultural machinery.These policy changes have induced private investment into small scale irrigation such as shallow tube wells and power pumps. This has contributed to the faster growth of the dry season irrigated rice (boro).With increased production in boro rice, total rice production has more than tripled. Non crop agriculture production has also grown at an even faster rate. People's access to food has also improved, including for the poorer segments of the population. This is evident from the rapid decline in poverty- which has fallen from 56.6 percent in 1991-92 to 31.5 percent in 2010. The purchasing power of the people has continued to improve in recent years [1]. The gross national income of Bangladeshi people was 955 US dollar in 2011-12 fiscal year, 1054 US dollar in 2012-13 and 1190 US dollar in 2013-14 fiscal year [2]. At the same time, there was a marked declaration in population growth. It fell from 2 percent in the 1980s to 1.3 percent in the last decade [1].

Despite the impressive gains achieved over the last few decades, a number of concerns still remain. By using the Household Food Insecurity Access Scale (HFIAS), one quarter of the population (40 million) were found food insecure in 2014 (HFIAS index measures food insecurity of a household with several dimensions-whether a household is worried about being able to feed itself for the whole year, and whether some members of the household skip meals or go to bed hungry or eat less amount of food or usual food). It was found that 11 million people were identified to suffer from acute hunger as measured by the Food Deficit Scale (FDS) (the dimensions of the FDS index measures household food insecurity based on specific parameters- whether any household is running without

food, members are going to sleep being hungry or passing the whole day and night without food) [3].

In Bangladesh, the primary export items are ready-made garments (RMG), frozen foods, jute goods, leather and leather products and unrefined jute [4]. The export earnings of RMG were 19089.69 million US dollar, and this contributed to 78.6 percent of the country's total export [5]. Majority of the workers in the ready-made garment industry are females (1.6 million). This number covers 85 percent of the total number of workers [6]. The rapid growth of the ready-made garment industry in Bangladesh has been facilitated by the following factors: cheap labour, lack of employment options for women and simple technology. A small capital requirement, economic changes, and policies also encouraged the growth of this particular industry [7]. Since goods can be produced at a lower cost in Bangladesh compared to other countries, it is one of the reasons for the relatively cheap cost of labour in this country. This cheap cost of labour is a result of national policies, massive unemployment and the willingness of women to work for low wages [8]. When compared to other minimum monthly wages in the apparel industry of different countries, Bangladesh is at the bottom [9]. The highest and minimum salary division for garment workers respectively are 107 USD and 156 USD in Vietnam, 180 USD and 321 USD in the Philippines, 116 USD and 125 USD in Pakistan, 104 USD and 266 USD in Indonesia, 155 USD and 321 USD in China [9]. With this minimum wage, maintaining food security, and a minimum standard of living is still a challenge for the garment workers in Bangladesh.

As far as the current literature is concerned, there is very limited study concerning food insecurity of female garment factory workers in Bangladesh. This study intended to explore the food insecurity situation of women garment factory workers in Bangladesh. Associated factors that have a positive or negative impact on this area were also investigated. The objectives of this study are to determine the food insecurity status and its associated factors among female garment factory workers in Bangladesh.

2. Materials and Methods

2.1. Study Design and Time

A cross-sectional study was conducted in this survey. The data collection took a total of seven months, within the period between February 2014 and August 2014.

2.2. Study Area

The study was carried out in Dhaka and Gazipur in Bangladesh. These two cities are the major cities in Bangladesh for garment factories.

2.3. Sample Size

A single proportion formula was applied to determine the sample size for food insecure female garment factory workers: $(1.96/\Delta)^2$ P(1-P). The prevalence of food insecurity was 85.2 percent among the food insecure mothers in palm-plantation households, Negeri Sembilan, Malaysia [10]. The required sample size was calculated for logistic regression analysis:

N=20k/P [11]

k= number of independent variables

P= percent from the previous study

N=20x16/0.85=376.47˜376

After including 20% dropout=376+75.2=451.2˜ 451.

Due to the limitation of time and resources, the researcher limited her sample size to 434.

The present research uses the records of garment factories located in Dhaka and Gazipur. The records were collected from BGMEA office, Dhaka. Non-probability sampling was used in the selection of garment factories [12]. Three sections, namely the finishing, quality control and sewing were purposively selected as these were the most female-concentrated sectors. Twenty-two respondents from every sector were selected using the convenience sampling [13].

2.4. Instrument

A validated Bengali translated version of the Cornell-Radimer questionnaire was used [14] to examine the food insecurity status of female garment factory workers. The Cornell-Radimer questionnaire used in this study was a modified version [15] of the original one [16]. The survey was entirely answered in week four (on the last week of the month) to know the entire food insecurity situation of the family. The questionnaire was modified with four sub-scales. The four subscales were: household food insecurity, individual (mother's) food insecurity, individual (mother) hunger and child hunger [17,18].The items were measured with a three-point Likert scale: (1= often true, 2= sometimes true 3= never true) and (1= yes, 2= no and 3= don't know).

Apart from that, the basic characteristics of the respondents were also collected. The participants were asked about their socio-demographic and socio-economic statuses such as age, household size, household head, educational qualification, agricultural farming, female workers' total income, possession of physical assets, bonus received, allowance for accommodation, medical allowance and compensation for work injury. The data on their working conditions such as working hours including overtime hours, getting casual leave, maternity leave, sick leave, enjoying public holidays, job satisfaction, the experience of harassment, application of labour law and facilities of labour union were also acquired from the participants.

2.5. Data Collection

A total of 434 female garment factory workers aged 19-40 years old were interviewed. Pregnant or breastfeeding female workers or workers who had health problems were excluded. The workers in the households were wives. Unmarried women were not interviewed as the mother's food insecurity, and the child food insecurity were measured using the Cornell-Radimer questionnaire. The research process was explained to the participants, and the consent forms were distibuted to them so they can provide their consent. Before the data collection, the researcher reassured the participants not to be embarrassed as this

was only a part of the study. The participants had the freedom to stop their involvement in the study at any time.

In ensuring that the questions in the Cornell-Radimer questionnaire easy to understand, the respondents were asked about their food expenses. The researcher asked the questions in a local language in order to make the queries comprehensible to them. Taka 50 were awarded to each participant after the completion of the interview. The tools were endorsed by the University Human Ethics Committee from University Sains Malaysia prior to obtaining the data.

2.6. Statistical Analysis

The collected data from this study were analysed using Statistical Package for Social Sciences (SPSS) version 22.0. Descriptive statistics were used to check missing data. Firstly, basic characteristics of the respondents and data gathered through Cornell-Radimer questionnaire were tested for normality. As the distributions of all variables were normal, parametric tests were performed. When analysed, continuous variables were presented in the means with standard deviations, and categorical data were expressed as a frequency with percentages. Logistic regression was performed to assess for the significant associated factors correlated with food insecurity as the outcome of interest. Screening by simple logistic regression, independent variables ($p<0.25$) was included in the multiple logistic regression. Independent variables included were agricultural farming, household size, household head, total income, two hours overtime and good job satisfaction.

2.7. Ethical Approval

The study was approved by the Human Ethics Committee, University Sains Malaysia (USMKK/PPP/JEPem [265.3.(9)], and the Human Ethics Committee of the Faculty of Agricultural Economics and Rural Sociology, Bangladesh Agricultural University.

3. Results

A total number of 434 female garment factory workers participated in the study. The mean age of the participants was 29.32 (SD 5.42) years. A majority (48.2 percent) of the participants were educated up to primary level while 42.6 and 9.2 percent of the respondents received education up to secondary and a higher level respectively. The mean household size was 4.77 (SD 0.85) people. Following the patriarchal family structure in Bangladesh, most participants' households in this study were male-headed (82.7 percent). Only 17.3 percent families were headed by mothers after the death of their husbands or divorced.

The income level of the workers ranged from Tk. 5400 (US dollar 68.81)-Tk. 13908 (US dollar 177.21) per month depending on the grade. The total income included basic income, overtime salary, allowances and bonuses (1 US dollar = 78.48 Taka). A total of 62.4 percent of the participants had agricultural land in their own villages. The lands were cultivated by their family members.They got minimal support by getting crops and cereals from agricultural farming. Most female workers (95 percent) worked overtime. A total of 58.5 percent of the female garment factory workers were satisfied with their jobs while 41.5 percent of the workers were impartial (in the middle between satisfaction and dissatisfaction). The socio-demographic characteristics and working condition of the women garment factory workers are presented in Table 1.

Table 1. Socio-demographic characteristics of female garment factory workers with their working condition (n=434)

Variable	n(%)	Mean(SD)
Age (y)		29.32(5.42)
19-23	69(15.9)	
24-28	141(32.5)	
29-33	119(27.4)	
34-38	79(18.2)	
>38	26(6.0)	
Education level		
Primary (I-V)	209(48.2)	
Secondary (VI-IX)	185(42.6)	
Higher secondary (X-XII)	40(9.2)	
Household size		4.77(0.85)
3-4	162(37.3)	
5-6	265(61.1)	
7-8	6(1.4)	
≥9	1(0.2)	
Head of household		
Husband	359(82.7)	
Respondent	75(17.3)	
Agriculture farming		
No	163(37.6)	
Yes	271(62.4)	
Women's total income (Tk.)		8502.57(1258.90)
Tk.5000-Tk.7999	146(33.6)	
Tk.8000-Tk.10999	267(61.5)	
Tk.11000-Tk.13999	21(4.8)	
Working Condition		
Job satisfaction		
Neutral	180(41.5)	
Good	254(58.5)	
Doing overtime		
No	22(5.1)	
Yes	412(94.9)	

1 US dollar = 78.48 taka

The food insecurity characteristics of women garment factory workers are presented in Table 2. A high percentage of households in this population were food insecure (71.9 percent). The mothers' food insecurity was categorised by individual food insecurity which was found to be at 48.4 percent while individual hunger was at 47.2 percent. Child hunger was found to be at 14.7 percent.

Table 2. Food insecurity status of women garment factory workers using Cornell-Radimer questionnaire (n=434)

Variable	Frequency (%)
Food Secure	**122 (28.1)**
Food Insecure	**312 (71.9)**
Individual Insecure	210 (48.4)
Individual Hunger	205 (47.2)
Child Hunger	64 (14.7)

Table 3. Simple and multiple logistic regression of factors associated with food insecurity among women garment factory workers (n=434)

Factors	n(%)	Simple Crude OR (95%CI)	logistic regression *P* -value	Multiple Adjusted OR (95% CI)	Logistic Wald Statistics (df)	Regression *P*-value
Agriculture farming						
No(Ref)	163(37.6)					
Yes	271(62.4)	0.94(0.61, 1.45)	0.795			
Household size	434(100)	1.95(1.48, 2.57)	**<0.001**	2.02(1.52, 2.69)	23.86(1)	**<0.001**
Household Head						
Husband (Ref)	359(82.7)					
Respondent	75(17.3)	0.48(0.25, 0.91)	**0.025**	0.42(0.21, 0.82)	6.26(1)	**0.012**
Total income						
Tk.5000-Tk.7999(Ref.)						
Tk.8000-Tk.10999	0.74(0.47, 1.14)	**0.175**				
Tk.11000-Tk.13999	1.67(0.46, 6.07)	0.429				
Doing overtime						
No (Ref)	22(5.1)					
Yes	412(94.9)	1.04(0.39, 2.73)	0.929			
Job satisfaction						
Neutral (Ref)	180(41.5)					
Good	254(58.5)	0.51(0.33, 0.78)	**0.002**	0.50(0.32, 0.79)	8.89(1)	**0.003**

In simple logistic regression, agricultural farming, respondent as household head, total income (Tk.8000-Tk.10999) and good job satisfaction were found as significantly associated with food insecurity ($p<0.25$). The results from multiple logistic regression showed larger households were more likely to be food insecure (OR_{adj} 2.02, 95% CI, 1.52-2.69, P=<0.001) than smaller ones. Women garment factory workers as the head of household were less prone to be food insecure (OR_{adj} 0.42, 95% CI, 0.21- 0.82, P=0.012). Respondents who were satisfied in their jobs were less inclined to be food insecure (OR_{adj} 0.50, 95% CI, 0.32-0.79, P= 0.003) (Table 3).

4. Discussion

A majority of the female garment factory workers were found to be household food insecure in this study. Poverty forces many females in rural areas to migrate to urban areas and take up jobs in garment factories. This group of women belong to extremely poor households [19]. Using the Cornell-Radimer questionnaire, a study found that 98 percent industrial workers' households were food insecure in Virginia [20]. That study found that the scarcity of money to buy food was the main reason for a large percentage of industry workers' households being food insecure.

The data also showed that the percentage of individual insecurity (48.4 percent) and individual hunger (47.2 percent) among female garment factory workers' households was high. Unable to purchase enough food due to lack of money, the respondents sacrificed foods for the sake of their husbands and children. In rural households in Bangladesh, the 'feast or famine' situation becomes a problem, especially for low-income individuals, particularly mothers. They often restrict their food intake and sacrifice their own nutritional requirements to protect their children from hunger [21].

Household size was significantly associated with food insecurity in this study. This result is consistent with the findings of earlier studies [22,23,24]. Large family size increases the odds of any house to be food insecure. If the household size increases with a limited income, achieving equality and assuring a sufficient amount of food for all family members is a challenge. Small amounts of food intake usually happen regardless of the quality of diet [22]. There was contrary evidence showing that the households were food secure despite its large size [25,26,27]. It can be assumed that through the financial contribution of the household members, the presence of more adults in a household makes it food secure.

Female garment factory workers as family heads were associated with household food security. As head of the households, these female workers could better manage their monetary expenses to buy food. By supervising more family spending and other expenses in well-organized manners, they had more control over their household. This finding is similar to other findings in Kenya and Malawi [28].

Poor job satisfaction is associated with food insecurity as found in this study. The overall feeling of scarcity and vulnerability in jobs hindered female garment factory workers from getting convenient access to family meals. Though specific time schedules were fixed to allocate lunch, non-standard work schedules force them to miss family meals and opt for takeout meals. Job satisfaction can predict the worker's self-reported efforts to have safe food. This statement is justified by the conceptual model revealing the relationships of the reasoned action approach predicting food safety behaviours and intentions [29]. Working mothers in the USA with low job security were found to be food insecure [30].

5. Conclusion

The results of the study showed a high prevalence of food insecurity, individual insecurity and individual hunger among female garment factory workers. The workers' basic salary should be adequate to correspond with the food price inflation in the market [31]. Other social security measures should also be considered such as job protection and working condition.

Acknowledgments

The authors gratefully acknowledge the University Science Malaysia (USM) fellowship for the financial support throughout this study. The authors wish to thank all participants from twenty garment factories in Dhaka and Gazipur, Bangladesh for their active participation.

Competing Interests

The authors declare that they have no significant competing financial, professional or personal interests that might have influenced the performance or presentation of the work described in this manuscript.

References

[1] Osmani, S.R., Ahmed, A., Ahmed, T., Hossain, N., Huq, S., Shahan, A. (2016). Strategic review of food security and nutrition in Bangladesh. World Food Programme.

[2] Bangladesh Bureau of Statistics. *Statistical yearbook ofBangladesh*, Ministry of Planning, Dhaka, 2016.

[3] Hellen Keller International and James P. Grant School of Public Health. *State of food security and nutrition in Bangladesh: 2014*, BRAC University, Dhaka, 2015.

[4] Love, J. & Chandra, R. "Testing export-led growth in Bangladesh in a multivariate VAR framework", *Journal of Asian Economics*, 15. 1155-1168. 2005.

[5] Bangladesh Bureau of Statistics.*Statistical yearbook of Bangladesh 2013*, Statistics and Informatics Division, Ministry of Planning, Dhaka, 2014.

[6] Islam M.Z., Shamim A.A, Kemi V., Nevanlinna A., Akhtaruzzaman M. "Vitamin D deficiency and low bone status in adult female garment factory workers in Bangladesh", *British Journal of Nutrition*, 99(6), 1322-1329, June 2008.

[7] Rashid, M. A. (2006). "Rise of readymade garments industry in Bangladesh: entrepreneurial ingenuity or public policy", *Workshop on Governance and Development*, Dhaka.

[8] Kabeer, N., & Mahmud, S. (2004). *Chains of fortune: linking women producers and workers with global markets*, Commonwealth Secretariat, London, 2004, 133-164.

[9] Sheng, L. Minimum wage in the apparel industry continues to rise in most Asian countries in 2016, https://shenglufashion.com/2016/ (acceessed on 15 July, 2016).

[10] Mohamadpour, M., Sharif, Z.M., Keysami, M. A. "Food insecurity, health and nutritional status among sample of palm-plantation households in Malaysia", *Journal of Health Population and Nutrition*, 30(3). 291-302.September 2012.

[11] Peduzzi, P., Concato, J., Kemper, E., Holford, T.R., Feinstein, A.R. "A simulation study of the number of events per variable in logistic regression analysis", *Journal of Clinical Epidemiology*, 49(12).1373-1379. December 1996.

[12] Lucas, S.R. "Beyond the existence proof: ontological conditions, epistemological implications, and in-depth interview research", *Quality and Quantity*, 48(1). 387-408. January 2014.

[13] Sauders, M., Lewis, P., Thornhill, A. *Research methods for business students*, Prentice Hall, Harlow, 2012.

[14] Sharmin, S., Isa, M., Manan, W.A. "Validity and reliability of Bengali translated Cornell-Radimer questionnaire measuring food insecurity", *Health and Environment Journal*, 8(1). 10-22. 2016.

[15] McIntyre, L., Glanville, N.T., officer, S., Anderson, B., Raine, K.D., Dayle, J.B. "Food insecurity of low-income lone mothers and their children in Atlantic Canada", *CanadianJournal of Public Health*, 93(6). 411-415. November 2002.

[16] Radimer, K.L., Olson, C.M., Campbell, C.C. "Development of indicators to assess hunger", The *Journal of Nutrition*, 120(suppl_11). 1544-1548. November 1990.

[17] Kendall, A., Olson, C. M. & Frongillo Jr, E. A. "Validation of the Radimer/Cornell measures of hunger and food insecurity", *The Journal of Nutrition*, 125(11). 2793-2801. November 1995.

[18] Radimer, K. L., Olson, C. M., Greene, J. C., Campbell, C. C. & Habicht, J.-P. "Understanding hunger and developing indicators to assess it in women and children", *Journal of Nutrition Education*, 24(1). 36S-44S. January 1992.

[19] Rahman, M. A.*Women's employment in garment factories in Bangladesh: emancipation or exploitation?* (Dissertation), University of Warwick, Coventry, 2010.

[20] Essa, J. S. *Nutrition, health, and food security practices, concerns, and perceived barriers of Latino farm/industry workers in Virginia.* (Dissertation). Virginia Polytechnic Institute and State University, Blacksburg, 2001.

[21] Edin, K., Boyd, M., Mabli, J., Ohls, J., Worthington, J., Greene, S., Redel, N. & Sridharan, S. *SNAP food security in-depth interview study*, United States Department of Agriculture, Alexandria, 2013.

[22] Bartfeld, J. & Wang, L. *Local-level predictors of household food insecurity*, Institute for Research on Poverty, University of Wisconsin-Madison, Madison, 2006.

[23] Zerafati Shoae, N., Omidvar, N., Ghazi-Tabatabaie, M., Houshiar-Rad, A., Fallah, H. & Mehrabi, Y. "Is the adapted Radimer/Cornell questionnaire valid to measure food insecurity of urban households in Tehran, Iran?" *Public Health Nutrition*, 10(8), 855-861, August 2007.

[24] Hackett, M., Melgar-Quiñonez, H. & Álvarez, M. C. "Household food insecurity associated with stunting and underweight among preschool children in Antioquia, Colombia". *Revista Panamericana de Salud Pública,* 25(6), 506-510, June 2009.

[25] Isanaka, S., Mora-Plazas, M., Lopez-Arana, S., Baylin, A. & Villamor, E. "Food insecurity is highly prevalent and predicts underweight but not overweight in adults and school children from Bogota, Colombia." *The Journal of Nutrition*, 137(12), 2747-2755, December 2007.

[26] Vinck, P. *Republic of Uganda: comprehensive food security and vulnerability analyses (CFSVA)*, World Food Programme, Rome, 2006.

[27] Weigel, M. M., Armijos, R. X., Hall, Y. P., Ramirez, Y. & Orozco, R. "The household food insecurity and health outcomes of US–Mexico border migrant and seasonal farmworkers". *Journal of Immigrant and Minority Health*, 9(3), 157-169, July 2007.

[28] Kennedy, E. & Peters, P. "Household food security and child nutrition: the interaction of income and gender of household head". *World Development*, 20(8), 1077-1085, August 1992.

[29] Hinsz, V. B. & Nickell, G. S."The prediction of workers' food safety intentions and behavior with job attitudes and the reasoned action approach".*Revista de Psicología del Trabajo y de las Organizaciones*, 31(2), 91-100, August 2015.

[30] Devine, C. M., Farrell, T. J., Blake, C. E., Jastran, M., Wethington, E. & Bisogni, C. A. "Work conditions and the food choice coping strategies of employed parents". *Journal of Nutrition Education and Behavior*, 41(5). 365-370. September 2009.

[31] Riaduzzaman, M. "Health and nutritional status of female garment workersin Bangladesh: a critical analysis". *International Journal of Research in Humanities and Social Studies*, 4(3), 19-29, March 2017.