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Original Article

Health Status, Occupational Hygiene & Safety Practices among Female Workers in Bangladesh

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Abstract

Background: With the rising of baking industries in Bangladesh, more female workers are surprisingly engaged compared to male workers. The major aim of this study was to observe the working conditions, available safety facilities and hygiene maintained by the female workers.

Methods: A cross sectional survey was carried out among the randomly selected 384 female workers from different baking industries located at Dhaka and Tangail regions in Bangladesh by a well-designed semi-structured questionnaire.

Results: About 33% of all respondents opined the machine room was congested, 27% narrow packaging and sealing room while 37% unhealthy storage areas**.** Two industries did not have proper accident prevention facilities**.** Although all the industries had monitoring personnel hygiene practices, about 40% of the workers were found not strictly maintaining some basic personal hygiene criteria. Socio-demographic result showed that the workers education level and monthly family income were poor. About 59.1% of all workers were suffering from various degrees of Chronic Energy Deficiencies (CED). It was also observed that nutritional status of the workers significantly related to their expenditure of the foods and working loads (χ^2 Value < 0.05).

Conclusion: The survey revealed that the occupational hygiene and safety practices were not at satisfactory level in some selected food industries in Bangladesh. The currently available food safety tools and system like Hazard Analysis and Critical Control Points (HACCP) should be adapted by the industries and concurrently ensure the sufficient wages for workers.

Keywords: Industrial female workers, Occupational hygiene, Safety practices, Chronic Energy Deficiencies (CED)

Introduction

Occupational hygiene is a great concern in all food industries for food safety and wholesomeness in both developed and developing countries. However, food industries in developing countries are more prone to occupational risks due to some social, financial, technical and managerial constraints (1). More safety preventive equipment, advanced instruments, trained and skilled labor, regular monitoring, evaluation and audit inspection, modern quality control laboratory facilities and all of these, need huge investments. Thus, many industries in developing countries grow without proper occupational safety and hygiene facilities development. Furthermore, a lot of manual work is done by unskilled labor without proper personal safety instrument. As a result, occupa-

tional accidents occur or exposure of chronic health risks but a little incidence is accounted in local or national level (2). Occupational hygiene has been assimilated with scientific knowledge and public-spirited. It embraces the art of enthusiasm, gratitude, appreciation, monitoring, evaluation and control of working environmental bad factors, which responsible for various morbidity or mortality or significant discomfort among workers or other exposure citizens of those areas. It includes the study of chronic as well as acute conditions emanating from hazards posed by physical, chemical, biological agents and stress in the occupational environment.

Occupational accidents are common in every country and have a serious negative impact on the victims, families and co-workers with both physiological and psychological consequences (3, 4). Again, the questions of industrial or occupational hygiene strike at the very root of our social system; they deal with the relation of capital and labor, and the relation of man to his fellow men (5). The human and economic costs of occupational accidents and diseases remain high and call for concerted efforts to handle them (6). The International Labor Organization (ILO) estimates that more than 2 million workers die each year while affecting 160 million people at avoidable occupational diseases. The health of the workers, their levels of working capacity and efficiency, professional reliability as well as their safety are influenced by the working conditions, ergonomic, psychological, social factors and lifestyles (7, 8).

The workers have a right to work and rest in a clean and hygienic environment. Not only is poor hygiene a risk to workers' health but it can also reduce productivity and morale. An untidy workplace can be a health and safety risk, lead to the spread of diseases and prevent workers from evacuating in case of a fire or accident.

The constitution of Bangladesh has recognized fundamental rights of the workers at work places including necessary social protection. Globalization and changing economic condition influencing traditional workplace values, nature of employment, working condition, welfare facilities, industrial relations and contemporary social protection system. The introduction of free market economic policies, unbalanced economic and industrial reforms posed serious challenges to job security and social protection of workers in different sectors.

About 700 recognized food industries in Bangladesh are currently involved in substantial produces of confectionary and snacks, cake, pastry and bakery items, dairy and ice cream, beverages and fruit juices, sea fish, fruits and vegetable processing and preservation throughout the year (9). The export-oriented ready-made garment sector has continued to consolidate its predominant position in Bangladesh followed by food and agriculture sector covering a wider range of employment. Again, an interesting feature was observed in industrial job market where management authority prefers female workers, as they are less mobile and less likely to engage in the union activities (10). Women are employed in this industry mainly to exploit the comparative advantages of their disadvantages, like the low price of their labor, their lower bargaining power and their submissiveness. However, the paid employment of female workers outside home has improved the living standard, better financial independence and access to material resources, which may influence their health and nutritional status (11). It is generally believed that women's empowerment lead to better nutrition for themselves and for their families (12, 13). Therefore, in this study, the nutritional status of employed female workers in several baking industries in Bangladesh was assessed concurrently with health hygiene and occupational safety measures.

Materials and Methods

Study design

The cross-sectional study was designed and the probable random sampling method was employed to assure a representative number of female workers from the selected six baking industries in Dhaka and Tangail regions, Bangladesh.

An observational approach was also adopted as it reduces the effects of the data collection process on the behaviors of the observed population.

Sample size calculation

The total sample size was 384 as determined by the statistical method.

Data collection tools and procedures

A semi-structured, well-designed questionnaire was developed to obtain relevant background information on industries, working conditions, and hygiene and safety measures after pre-tested other baking industries. At the same time, socioeconomic and anthropometric information was also collected from selected female workers. The subjects were weighed wearing minimal cloths and bare footed with strict privacy maintained by female-trained data enumerator. Three weight measurements were obtained using a bathroom weighing scale and the average was calculated and recorded to the nearest 0.1 kg. The height was measured with a wooden measuring board without shoes and recorded to the nearest 0.1 cm. Body Mass Index (BMI) is the best indicator of nutritional status of adults.

$$BMI = \frac{Weight\ in\ kg}{Height\ \ in\ m^2}$$

Data analysis

The data set were first checked, cleaned and entered into the computer from the numerical codes on the form. The frequency distributions of the entire variables were checked by using SPSS 16.0 windows program and chi square (χ^2) test was done for association between nutritional status of the female workers and other socio-economic factors.

Results

Baking industries in Bangladesh has the traditional culinary arts and history. A lot of home-scale to large-scale baking industries not only produces substantial amount of cake, pastry, confectionary and bakery items, but also involves a huge employment generation especially young women. Tables 1 and 2 show the background information of the selected baking industries and socio-demographic information of the selected female workers. A total number of 384 female workers were selected from six baking industries at Dhaka and Tangail region. Three industries were medium-large scale and others were small scale. The highest number of total employees was found in 'D' industry and it was multistoried building. The lowest number of total employees was found in 'F' industry and it was tin roof building. Table 2 shows the demographic, socio-economic conditions of the selected female workers of those industries. More than ninety percent were Muslims and their ages were between 20.7 to 25 years. Their poor educational level was probably one of the main reasons behind poor income. Again, the maximum earning was spent on foods.The working areas in baking industries involved mainly processing machine unit, packaging or sealing section, raw and finished product storage room. Regarding the conditions of these working areas, Table 3 shows that about 44% of all respondents opined the machine room was wider and sufficient while 33% of them complained that it was congested and uncomfortable.

Table 1: Background information of the selected baking industries

Region and Industry code		Establishing Year	Areas (Decimal)	Housing infrastructure	No. of workers		Female respondents
					Total	Female	
Dhaka	A	1995	375	One –storied Building	386	212	96
	B	1953	182	Four –Storied Building	139	95	64
	C	2005	35	One –storied Building	60	39	32
Tangail	D	1998	414	Multi-Storied Building	512	308	96
	E	2005	80	One –storied Building	110	72	64
	F	1990	47	Tin roof Building	55	36	32

Table 2: Demographic and socio-economic information of the selected female workers (n=384)

Features	Frequency	Percentage	Range
Age (yr) of the female workers			20.7-25.0
20-21	63	16.4	
22-23	174	45.3	
24-25	147	38.3	
Religious			-
Muslim	346	90.1	
Hindu	38	9.9	
Educational level			-
Illiterate	47	12.2	
≤ Class 8	205	53.4	
>Class 8	132	34.4	
Number of family members in family			3-6
3-4	197	51.3	
5-6	187	48.7	
Monthly family income (*Tk.)			3704-6560
3000 - 4499	112	29.2	
4500 – 5999	178	46.4	
6000- 7499	94	24.5	
Monthly expenditure on foods (*Tk.)			3436-5222
3000 - 4499	199	51.8	
4500 – 5999	185	48.2	

*78 Tk. = 1US$, December 2013

In case of packaging and sealing room, about two-third of them opined that it was wider and sufficient but 27% complained that it was narrow but still workable. Unhealthy and congested storage areas were the main complaint by the 37% of all respondents while only 20% said it was wider and sufficient for storage raw and finished products. Fire or explosions in food industries can damage or even destroy all facilities. Table 4 highlights the presence of safety & sanitation monitoring committee and monitoring system about personnel hygienepractices by the industries. It was noted that four industries out of six had all kinds of fire and accident prevention amenities. Moreover, all industries had the first aid boxes and monitoring system about proper personal hygiene practices.

Table 3: Respondent's opinion about the conditions of the working areas (n=384)

Working areas/ Features	Frequency	Percentage
Machine Room		
Wide and sufficient space	169	44.0
Narrow but still workable	89	23.2
Congested and uncomfortable	126	32.8
Packaging and Sealing Room		
Wide and sufficient space	255	66.4
Narrow but still workable	103	26.8
Congested and uncomfortable	26	6.8
Storage Room		
Wider and sufficient space	151	39.3
Small but good condition	91	23.7
Unhealthy and congested	142	37.0

Table 4: Observations of the safety measures and prevention facilities in different industries (n=6)

Safety Measures and Prevention Facilities	Dhaka (n=3)	Tangail (n=3)	Total (n=6)
Proper Fire Prevention Facilities			
Fire prevention Accessories available	66.7 (2)	66.7 (2)	4 (66.7)
Presence of Emergency exit door	100 (3)	33.3 (1)	4 (66.7)
Accident Prevention Facilities			
Properly stored unused equipment	66.7 (2)	66.7 (2)	66.7 (4)
Properly stored toxic substances	100 (3)	33.3 (1)	66.7 (4)
Doctors and health personnel available	66.7 (2)	33.3 (1)	50.0 (3)
Presence of First Aid Boxes	100 (3)	100 (3)	100 (6)
Presence of safety & sanitation monitoring committee	66.7 (2)	33.3 (1)	50.0 (3)
Presence of monitoring system about personnel hygienepractices	100 (3)	100 (3)	100 (6)

Table 5: Personal hygiene practices by the female workers in different industries

Types	Dhaka (n=192)	Tangail (n=192)	Total (n=384)
Regular bath with soap	65.6 (126)	62.0 (119)	63.8 (245)
Sometimes used soap	34.4 (66)	38.0 (73)	36.2 (139)
Brushing teeth daily with tooth paste	93.2 (179)	92.2 (177)	92.7 (356)
Wearing clean and adequate cloths	89.1 (171)	81.3 (156)	85.2 (327)
Proper frequently hand washing	79.7 (153)	139 (72.4)	76.9 (292)
Strictly followed above all personal hygiene	66.7(128)	54.7 (105)	60.7 (233)

There is a direct correlation between poor personal hygiene and foodborne illness. For this reason, it is critical that workers understand and practice good basic hygiene habits, including regular bath with soap, brushing teeth daily with toothpaste, wearing clean and adequate clothes, proper frequently hand washing. Table 5 surprisingly noted that although all industries have been monitoring personal hygiene system but it was found that only 60.7% of the workers strictly followed all these hygienic parameters. Moreover, not all the workers and supervisory staff were using aprons, caps, gloves, masks at their mandatory sections where applicable. The survey showed that only 37% of the workers said they worn their mandatory accessories during any inspection or audit.

The overall nutritional status of the female workers in all industries was not at satisfactory level as about sixty percent of them were malnourished in different degrees of chronic energy deficiency (CED) according to BMI classification (Table 6). Fig. 1 shows the association between nutritional status of the female workers and two variables and Chi-square values shows that it was significantly related with expenditure on foods (χ^2= 0.009) and working loads (χ^2= 0.043) of that industries.

Table 6: Nutritional status of the respondents according to BMI

Nutritional status		BMI	n (%)
Malnourished	CED_3 (severe)	< 16.0	23 (6.0)
	CED_2 (moderate)	16.00-16.99	61(15.9)
	CED_1(mild)	17.00 – 18.49	143 (37.2)
Normal (Well-nourished)		18.50 – 24.99	157(40.9)
Over nutrition		25.00 – 29.99	-
Total			384 (100)

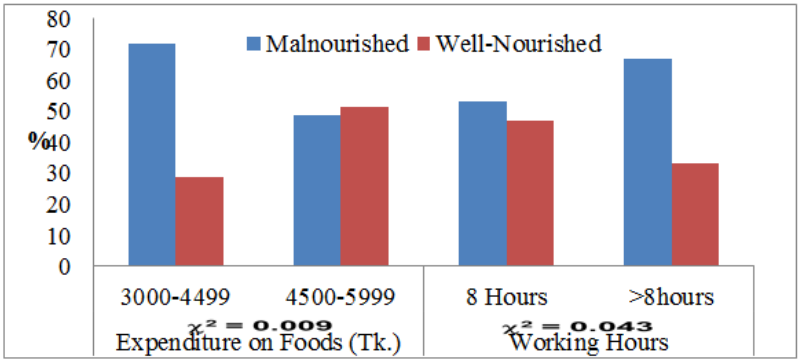

Fig. 1: Association between nutritional status and expenditure on foods or working loads of the female workers

Discussion

Results of the study indicate that the socio-economic features of female workers was not at satisfactory level as their wage was very poor, only 47.5-84.1$ but can help to improve the quality of life. Since, women's productive empowerment would lead to higher level of income with increased food consumption and nutritional status (14). Higher expenditure of foods significantly shows better nutritional status of the female workers and this expenditure obviously depends on monthly income. Usually industry owners and management authority prefer female workers, as they are less likely to engage in the union activities, the low price of their labor, their lower bargaining power, and their submissiveness. Moreover, the industry owners and management authoritydo not provide sufficient maintenance and funds to buy protective equipment. Not much attention is thus given to the safety of processing machines, equipment and tools as well as their link to health requirements.

According to Safe Work Australia, the layout of work areas should be designed to provide sufficient clear space between furniture, fixtures and fittings so that the workers can move about freely without strain or injury and evacuate quickly in case of emergency (15). Thus, industries must have sufficient and wide space in all these areas for comfortable working and product safety. Not all the workers and supervisory staff were using aprons, caps, gloves, masks at their mandatory sections where applicable. Employees will clean hands, arms, gloves, aprons, boots, etc., as often as necessary during the handling procedures and then sanitize any equipment as often as necessary during handling procedures to prevent contamination of foods or packaging materials. Management should explain to employees the many ways of keeping themselves clean.

The FDA white paper cited poor personal hygiene and improper hand washing as the third most important cause of foodborne illness and more than ninety percent of outbreaks related to food handlers involved sick workers. Problems associated with these outbreaks included poor personal hygiene, poor hand washing, open sores, improper glove use, and eating while on the job (16). In all food industries, including baking industries in Bangladesh should have valid and active safety, sanitation and hygiene committee and trained personnel needed to strictly monitor and give training to the female workers as practicing good personal hygiene helps to ensure good health and prevent the spread of illness. Female workers should understand that human bodies open surface (i.e., skin, hair, mouth and nasal cavities) carry a variety of microorganisms some of which are pathogenic. Eating and drinking should be restricted to certain areas away from the production sites, where chemicals and other hazardous substances are in use, and where they are stored.

Nutritional status of an individual is a complex phenomenon but largely depends on multiple factors such as better socio-economic conditions,

living place and lifestyle patterns etc. It is well known that when workers' income rises then its consequences had better impact on health and nutrition. However, in case of female workers not only income factors but also other environmental aspects, activity pattern, hours of work, expenditure on foods, time available for meals and break time etc. play a vital role.

Conclusions

The nature of female workers activities in baking industries are moderate to heavy and always maintained personal and industrial hygiene, wearing caps, gloves, masks etc. Some social and economic benefits and occupational safety should be modified by the industrial authority. As the female workers in baking industries are mostly less educated, the industrial authority or management must train their workers to develop skillness periodically. Again, it should be necessary to improve safety measures and prevention facilities and provide standard living wages in all industries for better culminating outcomes of the nation.

Ethical considerations

After verbal consent, the data were collected and strictly maintained the privacy of the all information given by the female workers.
Ethical issues (including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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