

**ORIGINAL ARTICLE**DOI: <https://doi.org/10.3329/mediscope.v10i2.67990>**Necessity of Fire Safety Measure Intervention among Garment Workers**SH Rimmi¹, MI Jahid², S Hossain³, MM Chowdhury⁴, S Mostarin⁵, *MG Abbas⁶**Abstract**

Background: Providing Bangladesh with low-cost garment industries has had terrible results, including fires and building collapses that have claimed lives and injured hundreds of employees. **Objective:** This study was carried out to assess the effectiveness of educational intervention programs in increasing fire safety measures among garment workers. **Methods:** This was a quasi-experimental study conducted among purposively selected 160 garment workers with a semi-structured questionnaire through face-to-face interviews from 1st January to 31st December, 2021 in a factory situated in Narayanganj district. **Results:** Before the educational intervention, about one-third (29.4%) of respondents had a strong awareness of fire safety; after the intervention, that number increased to 92.5%. All of them (100.0%) had clear knowledge about fire alarms and fire extinguishers after the intervention. After the intervention, the percentage of people who needed sufficient training for fire safety measures improved from 70.6% to 95.6%. **Conclusion:** The results show that there is a critical need for safety intervention in the sector, which may include safety training for industry workers and health education to reduce the number of fatalities, disabilities, and societal financial burdens.

Keywords: Fire, Knowledge, Safety, Intervention, Safety measure.

Introduction

Safety is a crucial and obligatory function in and around the industry; the garment sector has developed here rapidly because it is a labor-intensive industry.¹ Unfortunately, governmental safety regulations and interventions in Bangladesh are either nonexistent or of very low quality. Safety lapses are significant concerns, and the authorities involved are severely penalized by the

safety regulatory authorities for any acts of omission and commission.²

The most significant export from Bangladesh is clothing, although the working conditions and fire safety procedures/records in the factories are either lacking or not up to par. Despite many initiatives to curb fire accidents in the garment industry, there are still a significant number of fire occurrences in this industry.¹ Unfortunately, there are no comprehensive statistics on the current

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status of fire incidents and management practices in the readymade garment factories in Bangladesh.³

The risk, harm, or danger that an employee is exposed to at work is known as an occupational hazard, whereas such exposures to the employee cause occupational diseases.⁴ The knowledge of these interactions between work and health is fundamental in understanding and practicing occupational health and safety, but the importance of safety at the workplace is often overlooked.⁵

To develop a healthy and safe working environment, it is important for a strong management commitment, as well as significant employee involvement, to create a workplace that is healthy and safe.⁶

Some of the most significant qualities a scientist can possess include the desire to comprehend and explain things and to view things as they truly are. These virtues and values can be considered norms or standards that guide the selection of theories, and they can then be seen as principles of methodology.⁷ Fire safety science is based upon the scientific method that can be defined in terms of three characteristics: reductionism, consistency, and denial. The complexity of the real world is reduced in experiments whose results are validated by their repeatability and knowledge is built by refutation of hypotheses.⁸

Garment industries are now at an increasing level of profit and continuous expansion, however, the outcomes of the work are scarce. Still, the workers have to work in a potentially dangerous environment for as long as 14-16 hours every day.⁹ Revealed the poor work environments and lack of safety measures, particularly while a factory in a rented building. The factors were overcrowded, not properly cleaned, hot and humid, noisy, had the glare of light, and safety signs were not properly marked and visible.¹⁰

This study employed a slightly larger sample size and an interview-style data collection technique that involved face-to-face interviews, allowing

researchers to gather precise data and quantitatively analyze the relationships between knowledge and practice related to safety information as well as look into the factors that influence these outcomes.

Objective: This study sought to ascertain how well an educational intervention program improved textile employees' fire safety procedures.

Materials and Methods

Study design and settings

The present quasi-experimental study (a Before-After study of Intervention) was carried out among 160 purposively selected garment workers which were conducted in Knit concerned factory situated at Narayanganj. This study discusses, in brief, the absence of safety measures for workers in garment industries in Bangladesh based on the working environment of the industry, their ages, the existing facilities of the factory, causes of negligence, and the causes of fire accidents.

Data collection and analysis

Data were collected by a pretested semi-structured questionnaire through face-to-face interviews during the study period of January to December 2021. The data were checked and cleaned followed by categorizing data, coding and post-coding into IBM SPSS v23. The analysis was carried out by using both descriptive and inferential statistics and presented with tables and charts.

Ethical approval

Ethical approval for this study was obtained from the Institutional Review Board (IRB) of the National Institute of Preventive and Social Medicine (NIPSOM) (Memo: NIPSOM/IRB/2021/18, Dated: 13.12.2021). Informed written consent was taken from all the respondents.

Results

Table 01 describes the mean age of the respondents as 29.02 ± 5.32 years where half of them (49.4%) were from the 28-35 years age group. The majority were female (57.5%).

Four-fifth of the respondents were Muslim. Seven-tenth (70.0%) of respondents were unmarried. More than half of the respondents were primary-level educated (67.5%) and worked here for 1-5 years of duration (65.6%). The mean monthly income was 13251.36±2822.40 taka.

Table 01: Socio-demographic characteristics of the respondents

	Frequency (f)	Percentage (%)
Age (in years)		
20-27	66	41.3
28-35	79	49.4
≥ 36	15	9.4
Mean ±SD	29.02 ±5.32	
Gender		
Male	68	42.5
Female	92	57.5
Religion		
Islam	128	80.0
Hindu	32	20.0
Marital status		
Unmarried	112	70.0
Married	43	26.9
Divorced	3	1.9
Widow/Widower	2	1.3
Educational status		
Primary	108	67.5
Secondary	53	32.5
Duration of employment (in years)		
1-5	105	65.6
6-10	55	34.4
Family size		
Nuclear family	76	47.5
Joint family	84	53.5
Monthly family income (in taka)		
<10000	29	18.1
10001-15000	106	66.3
>15000	25	15.6
Mean ±SD	13251.36 ±2822.40	
Residence of respondent		
Urban	117	73.1
Rural	43	26.9

Table 02 shows that the knowledge regarding fire safety measures before and after intervention where more than half (55.6%) had a concept about fire safety measures before intervention and after intervention it was changed to 96.3%. It was found that seven-tenth (70.6%) of respondents need proper training for fire safety measures which was changed to 95.6% after the intervention.

Table 02: Knowledge regarding fire safety measures before and after intervention (n=160)

		Before intervention	After Intervention
Concept about fire safety measure	Yes	89 (55.6%)	154 (96.3%)
	No	70 (43.8%)	6 (3.7%)
	Don't know	1 (0.6%)	
Fire alarm in your work place	Yes	140 (87.5%)	160 (100.0%)
	No	19 (11.9%)	
	Don't know	1 (0.6%)	
Fire extinguisher in your workplace	Yes	151 (94.4%)	160 (100.0%)
	No	6 (0.6%)	
	Don't know	3 (1.9%)	
Proper emergency lighting	Yes	132 (82.5%)	155 (96.9%)
	No	19 (11.9%)	2 (1.3%)
	Don't know	9 (5.6%)	3 (1.9%)
Fire related hazards in garment factories	Yes	85 (53.1%)	156 (97.5%)
	No	70 (43.8%)	4 (2.5%)
	Don't know	5 (3.1%)	
Available fire exit or emergency staircase	Yes	108 (67.5%)	159 (99.4%)
	No	8 (5.0%)	1 (0.6%)
	Don't know	44 (27.5%)	
Fire exit or emergency staircase been proper maintained	Yes	71 (44.4%)	156 (97.5%)
	No	12 (7.5%)	4 (2.5%)
	Don't know	77 (48.1%)	
Available signage for escape route	Yes	93 (58.1%)	157 (98.1%)
	No	15 (9.4%)	1 (0.6%)
	Don't know	77 (32.5%)	2 (1.3%)
Routes are blocked by storage materials	Yes	48 (30.0%)	5 (3.1%)
	No	74 (46.3%)	154 (96.3%)
	Don't know	38 (23.8%)	1 (0.6%)
Need a proper training for fire safety measure	Yes	113 (70.6%)	153 (95.6%)
	No	17 (10.6%)	2 (1.3%)
	Don't know	30 (18.8%)	5 (3.1%)

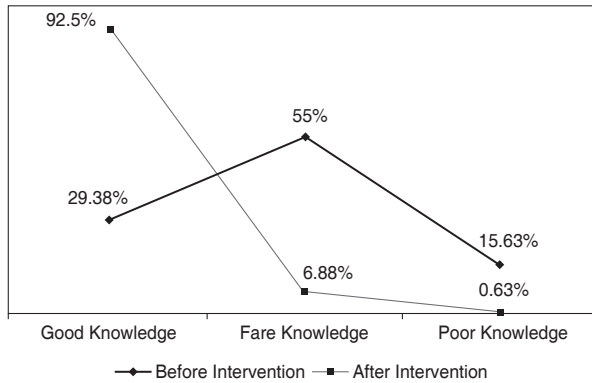


Figure 01: Distribution of the respondent's statement according to knowledge score (n=160)

Figure 01 shows that fifty-five percent of respondents had fair knowledge before intervention and after intervention, it was changed to good knowledge which was about 92.5%.

Discussion

Since 1990, over 350 workers have died, and some 1500 injuries in fire-related incidents in garments industries in Bangladesh. Till 2000, there were more than a hundred fires in industries in Bangladesh. More than 5000 workers were killed. The study mentioned some recent fire accidents in garments factories in Bangladesh.¹¹ A study was conducted in Ethiopia where a total of 260 respondents, with a 96.3% response rate, were interviewed.¹² All participants were male. The median age of respondents was 25, and the mean \pm (SD) age of respondents was $24.67 \pm (4.9)$ with approximately equally distributed within the age category. Most of the respondents were between grade nine and twelve or going to secondary school (70.4%).

A pre-test and post-test using the same questionnaire were conducted to determine the overall improvement change in this report as the study assessed an educational intervention program on safety measures among textile workers. All the positive answers were scored and accordingly, the mean knowledge score among the respondents was 10.84 ± 2.358 before intervention and 14.41 ± 0.999 after intervention. Statistics revealed that the knowledge scores

were not significant. ($p < 0.01$). Before and after the intervention, knowledge scores were seen to be statistically significant or not which was done by paired t-test.⁵

Only three-tenths (29.4%) of the respondents in this study had good knowledge, followed by more than half (55.0%) of those who had fair knowledge, and 15.6% of those who had poor knowledge before intervention (out of 160 respondents). However, following intervention, the scenario was altered, and we discovered that most respondents (92.5%) had a strong understanding of fire safety measures, a small number (6.9%) had fair knowledge, and only 0.6% had poor knowledge. The findings of this study were comparable to those of a study done in Nigeria, where an intervention raised the study subjects' total knowledge scores.¹³ The study found that educational intervention was very efficient in raising textile workers' understanding of fire safety measures. This may be because responders who are in learning environments are better at receiving and adopting interventions of any kind, provided they are well-designed and delivered through effective interpersonal communication. The researcher's sincerity and commitment to creating and delivering safety measure educational interventions utilizing various materials and other health education methods to raise their knowledge level may also be a contributing factor in this successful outcome.

In this current study, it was observed that among the statement of respondents who had a lack of knowledge of proper exit routes to reach the place of safety only 23.8% responded correct statement. However, following intervention, 98.1% of respondents stated that they were aware of the appropriate departure path and could reach a secure location. It was also observed that the routes were blocked by storage material which was mentioned by three-tenth of respondents (30.0%) before intervention. But after intervention it was changed to 98.1% mentioned that there were no storage materials which were blocked the exit routes. These study

findings were similar to the study conducted in 2016 by Vandyck E.⁶

Most of the respondents (87.5%) mentioned the correct frequency of fire alarms before intervention and all of them had the correct idea about fire alarms after intervention. These study findings were similar to the studies conducted in India.¹⁵⁻¹⁷ Majority of the respondents expressed the need for basic training on fire safety preparedness (86.5%) and had never been trained in fire safety preparedness (84.0%), contrary to this study's findings, workers had little knowledge of how to prepare for a fire.¹⁸

It was reported that 88.8% of the respondents were aware of the fire hazards associated with their jobs before intervention. But after intervention, all of them (100.0%) were aware of the fire hazards associated with their job. This study's findings were similar to the study conducted in Nigeria where the results show that most of the respondents (72.5%) were aware of the hazards associated with their jobs; three-tenth (30.0%) have had formal training on hazards and safety measures; four-tenth (40.0%) do not use personal protective devices, and ninety percent (90.0%) of the respondents reported symptoms relating to hazard exposure. Where these exist, there is a need to promote adherence to these practice guidelines.^{5,18}

Conclusion

Even though there was a noticeable improvement in the workers' knowledge of fire safety and control following the intervention, the safety issue should still come first. Between the pre-test and post-test, there was a noticeable impact of fire safety training on the knowledge of the workforce. It is recommended that manufacturers train employees regularly and consistently in fire prevention and safety measures, develop a safety schedule so they can oversee every workplace, and have a thorough awareness of the daily workers. The study found that institutions should set up fire safety equipment like fire alarms and fire extinguishers and raise awareness because when those items are avail-

able, workplace conditions may be improved more effectively and with greater worker involvement. The results show that there is a critical need for safety intervention in the sector, which may include safety training requirements in the sectors for health education.

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