

Occupational safety and health risk of seaport workers: A study in Bagerhat District

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ABSTRACT

Background: Workplace safety is intricately linked to the health risks faced by individuals in their jobs. It guarantees a secure and healthy work atmosphere while safeguarding colleagues, family, employers, and clients from potential dangers. Various health issues for employees can arise from occupational hazards.

Objectives: The main objective of this study aimed to examine the occupational safety and health risk of seaport workers at Mongla Port of Bangladesh.

Materials & methods: The research was explanatory, and purposive sampling was utilized to choose 346 participants from the port. The data were examined using descriptive statistics, Chi-square tests, and correlation analysis.

Results & discussion: Most of the respondents utilized helmets, safety glasses, and protective clothing while at work. A significant portion of the population (61.0 percent) experienced at least one health issue, while only a small fraction (9.0 percent) had life insurance coverage. The study revealed a statistically significant connection between the length of employment and financial satisfaction ($p < 0.007$). Additionally, there was a moderate positive correlation ($r = .295^{**}$) between treatment costs and monthly household income. Occupational health has implemented a care process that incorporates preventive measures and health-promoting strategies suited for the work circumstances of this group.

Conclusion: Occupational health has the theoretical and practical understanding necessary to establish a care process that incorporates prevention and encourages health strategies suitable for the working conditions of this group of employees.

Keywords: occupation risk, seaport, safety glass, machinery

INTRODUCTION

Work environment has major impact to increase the likelihood of catastrophic accidents occurring in large hazards facilities, affecting workers, the public, and the environment [1]. Occupational health and safety term tends to the safety, health, and well-being of those who work are employed [2]. Although working conditions in connection to occupational safety and health have improved significantly over the last few decades around the world, the overall worldwide situation remains bad [3]. The Bangladeshi ports authority is no exception to industry and organization, since it has yet to match worldwide best practices on occupational safety and health best practices [4]. Port related incidents occur because of a lack of health and safety culture and training and the International Maritime Organization has taken some major players to promote occupational safety and health and overcome obstacles in the implementation of occupational safety and health in fulfilling its duty to regulate the maritime industry and improve working and living conditions for seafarers. Thus, there is a need to examine the significance of safety and health in an organization, which is vital in boosting

productivity and quality workspace [5]. The aim is to answer how effective occupational safety and health practices by organizations are promoting safety policies and health awareness which form the fulcrum of this research.

With the global economic integration process accelerating, international trade is becoming more and more frequent. Mongla Port is one of the major ports in Bangladesh, especially in Southwestern Bangladesh (**Figure 1**). However, throughout history, the work condition of port workers has always been not optimistic, which historians have reported in records since the 19th century. It is also observed that the technical revolution of port work mechanization, particularly involving loading and discharging, etc., has progressed very slowly [6]. Employees have a right to a safe workplace under section 195 of the labor act. The provisions relating to worker safety are found in section 75 of the act of 2006 [7]. It also forbids personnel from performing tasks where the vapors are likely to be flammable unless they take measures.

In addition, under chapter VII, sections 79-88, the labor act of 2006 ensures some other employee health and safety measures [7, 8]. According to this chapter, workers should be advised of hazardous procedures that are also harmful to their

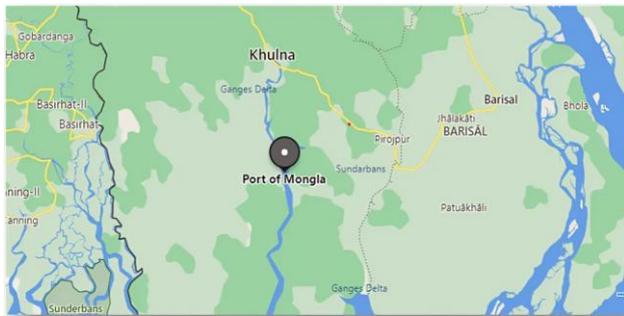


Figure 1. Map of the Mongla Port (Source: Google Maps)

health. In terms of women, it is forbidden for them to operate near the equipment. The government has the authority to enact regulations to ensure the safety of workers in factories and other industrial establishments. Dirt is to be eliminated from the establishment daily by sweeping the floors, workrooms, staircases, and hallways [9]. Thus, the transfer of the COVID-19 can be halted by keeping the workplace clean. Occupational health and safety can be important for moral, legal, and financial reasons [8]. All organizations have a duty of care to ensure that employees and any other person who may be affected by the organization's undertaking remain safe. Moral obligations would involve the protection of employees' lives and health [10]. Legal reasons for occupational safety and health practices related to the preventative, punitive, and compensatory effects of laws that protect workers' safety and health [11].

Since there is no industry production workshop in the harbor and wharf, the enterprises and the employees are rarely aware of any occupational hazards [12]. Chronic fatigue can be caused by irregular working hours and overtime employment. This could be related to a lack of rest time between shifts as well as occupational stress [13]. In a competitive market, combining work flexibility with overall protection of occupational and public safety and health is proposed for discussion [14]. Despite this, limited information summarizes the range and implications of hazards for port workers [15]. However, numerous studies have been accomplished by the area of the occupational health and safety through range of publications over the world. This paper aims to collate and describe the major occupational hazards of seaport workers, their health effects, how they can be controlled and what additional knowledge is required to improve our understanding of them.

MATERIALS AND METHODS

Observing the quantitative research design, this study is explanatory in nature and the study was carried out on workers who were chosen purposively in Mongla Sea Port of Bagerhat District. Mongla Sea Port was purposively selected as the area of the study, because it is concerned with the safety, health, and well-being of those who work or are employed. To achieve the study objectives, some specifications were made to identify the respondents, the data were collected from

- (1) the workers who had permanent jobs in the Mongla Sea Port, Bagerhat, Khulna and
- (2) have at least 5 years working experience in seaport.

The interview schedule (**Appendix A**) containing both open and closed questions in English as well as designed for data

Table 1. Personal information of the respondent

| Variable | Frequency | Percentage | M & SD |
|--------------------------|-----------|------------|------------------|
| Age | | | |
| ≤ 20 | 25 | 7.2 | |
| 21-30 | 150 | 43.4 | 32.98 & 9.925 |
| 31-40 | 93 | 26.9 | |
| 41-50 | 55 | 15.9 | |
| 51 ≥ | 23 | 6.6 | |
| Sex | | | |
| Female | 15 | 4.3 | |
| Male | 331 | 95.7 | |
| Religion | | | |
| Islam | 273 | 78.9 | |
| Santana | 73 | 21.1 | |
| Marital status | | | |
| Divorced | 3 | 0.9 | |
| Married | 236 | 68.2 | |
| Single | 107 | 30.9 | |
| Year of schooling | | | |
| Illiterate | 9 | 2.6 | |
| 1-5 (primary) | 61 | 17.6 | |
| 6-10 (secondary) | 164 | 47.3 | 8.92 & 3.741 |
| 11-12 (higher secondary) | 65 | 18.7 | |
| 13-16 (graduation) | 45 | 13.0 | |
| 17-18 (post-graduation) | 2 | 0.5 | |

collection. 346 respondents were identified from study area through purposive sampling because it enables researchers to squeeze a lot of information out of the data. This allows researchers to choose cases that help answer research questions or achieve research objectives as well as this study used homogeneous sampling [16]. Primary data were collected on 2 April 2022 by data collectors who were undergraduate students of sociology discipline, Khulna University. Personal and socio-economic background of the respondent were analyzed through descriptive statistics (frequency distribution) and different statistical tests like Pearson's Chi-square and correlation were utilized to measure the relationship of different variables. The studies including contributors were reviewed and permitted by Khulna University Ethical Clearance Committee. Written informed consent for participation was mandatory for this study as well as ethical reference number was KUECC-2023-09-53 which was approved by the Research and Innovation Center at Khulna University.

RESULTS

Personal Information of the Respondent

Data in **Table 1** shows that most of the respondents (43.4 percent) belonged to the age group 21-30 years and their average age was 32.98 with a standard deviation (SD) of 9.925. Besides, it was found that most of the respondents (95.7 percent) were male and only 4.3 percent respondents were female. Again, data revealed that a large share (78.9 percent) was Muslim and 21.1 percent respondents was Santana in religion. Furthermore, data display that a huge proportion of the workers (68.2 percent) were married, 30.9 percent were single as well as 0.9 percent were divorced. The data in **Table 1** also illustrated that 2.6 percent of people who belonged in the category were non-literate. 17.6 percent respondents were found in group 1-5 (primary), 47.3 percent in group 6-10 (secondary), 18.7 percent people 11-12 (higher secondary) group, 13.0 percent in 13-16 (graduation) category and only 0.5

Table 2. Household information of the respondent

| Variable | Frequency | Percentage | M & SD |
|---------------------------------|-----------|------------|--------------|
| Family type | | | |
| Extended | 106 | 30.6 | |
| Nuclear | 240 | 69.4 | |
| Number of family | | | |
| ≤ 4 | 169 | 48.8 | 4.97 & 1.728 |
| 5-8 | 164 | 47.3 | |
| 9 ≥ | 13 | 3.8 | |
| Head of the family | | | |
| Parent | 101 | 29.2 | |
| Self | 230 | 66.5 | |
| Spouse | 15 | 4.3 | |
| Living arrangement | | | |
| Alone | 11 | 3.2 | |
| With children | 2 | .6 | |
| With parents | 132 | 38.2 | |
| With spouse | 201 | 58.1 | |
| Type of house | | | |
| Kaccha | 58 | 16.8 | |
| Pukka | 110 | 31.8 | |
| Semi pukka | 178 | 51.4 | |
| Ownership of house | | | |
| Owner | 229 | 66.2 | |
| Rent free | 16 | 4.6 | |
| Rented | 101 | 29.2 | |
| Spouse occupation | | | |
| Housewife | 201 | 85.2 | |
| Worker | 16 | 6.7 | |
| Others | 19 | 8.1 | |
| Spouse year of schooling | | | |
| Illiterate | 33 | 13.9 | 5.99 & 3.871 |
| 1-5 (primary) | 88 | 37.2 | |
| 6-10 (secondary) | 90 | 38.1 | |
| 11-12 (higher secondary) | 15 | 6.3 | |
| 13-16 (graduation) | 10 | 4.2 | |
| Number of children | | | |
| 1 | 42 | 18.5 | 2.26 & 1.163 |
| 2 | 101 | 44.5 | |
| 3 | 52 | 22.9 | |
| 4 | 32 | 14.1 | |

percent of respondents who belonged to the category 17-18 (post-graduation). The average year of schooling was 8.92 with an SD of 3.741.

Household Information of the Respondent

The data in **Table 2** reveal that among all the respondents, 30.6 percent lived in extended family and 69.4 percent in nuclear family. Findings also show that 66.5 percent of own respondents were head of the family, 29.2 percent were parents, 2.0 percent were spouses and lastly 1.7 and .6 percent were siblings and children. Here a large proportion 58.1 percent were living with spouse, 38.2 percent with parents, 3.2 percent were alone and only a small proportion 0.6 percent were living with children. Furthermore, data show that 16.8 percent were living in kaccha houses, 31.8 percent are living in pukka houses and 51.4 were living in semi-pukka houses. Findings also show that the 66.2 percent of respondents were the owners of the house, 29.2 percent were rented, and 4.6 percent were rent free. Moreover, it reveals different kinds of spouse occupation. There were 85.2 percent were housewife, 6.7 percent were worker, and 8.1 percent spouse's occupation was others. **Table 2** also shows the distribution of respondent's spouse by years of schooling. The data on **Table 2** shown showed that 13.9 percent of people who belonged in the

Table 3. Respondents working condition

| Variable | Frequency | Percentage | M & SD |
|---|-----------|------------|------------------------|
| Occupation of head of the family | | | |
| Worker | 293 | 84.7 | |
| Business | 35 | 10.1 | |
| Others | 18 | 5.2 | |
| Duration of employment | | | |
| ≤ 10 | 249 | 71.9 | 8.61 & 6.299 |
| 11-20 | 80 | 23.1 | |
| 21 ≥ | 17 | 4.9 | |
| Working hour | | | |
| ≤ 4 | 1 | 0.3 | 8.95 & 1.925 |
| 5-8 | 204 | 58.9 | |
| 9-12 | 125 | 36.1 | |
| 13 ≥ | 16 | 4.6 | |
| Nature of payment | | | |
| Daily | 131 | 37.9 | |
| Monthly | 171 | 49.4 | |
| Weekly | 44 | 12.7 | |
| Monthly income of head | | | |
| ≤ 10,000 | 34 | 9.8 | 19,127.45 & 7,293.100 |
| 10,001-20,000 | 207 | 59.8 | |
| 20,001-30,000 | 87 | 25.1 | |
| 30,001 ≥ | 18 | 5.2 | |
| Total monthly income | | | |
| ≤ 15,000 | 66 | 19.1 | 25,314.45 & 10,812.718 |
| 15,001-30,000 | 203 | 58.6 | |
| 30,001-45,000 | 62 | 17.9 | |
| 45,001 ≥ | 15 | 4.3 | |
| Monthly family expenditure | | | |
| ≤ 15,000 | 99 | 28.6 | 22,263.01 & 9,680.859 |
| 15,001-30,000 | 199 | 57.5 | |
| 30,001-45,000 | 37 | 10.7 | |
| 45,001 ≥ | 11 | 3.1 | |
| Amount of savings | | | |
| ≤ 25,000 | 61 | 42.6 | 41,762.24 & 31,934.783 |
| 25,001-50,000 | 44 | 30.8 | |
| 50,001-75,000 | 12 | 8.4 | |
| 75,001 ≥ | 26 | 18.2 | |
| Amount of loan | | | |
| ≤ 25,000 | 27 | 29.3 | 46,445.65 & 28,178.148 |
| 25,001-50,000 | 42 | 45.7 | |
| 50,001-75,000 | 5 | 5.4 | |
| 75,001 ≥ | 18 | 19.6 | |

category were illiterate. 37.2 percent of respondents were found in group 1-5 (primary). 38.1 percent respondents were found in group 6-10 (secondary). 6.3 percent of people belonged to 11-12 (higher secondary) group, and only 4.2 percent of respondents who belong to the category 13-16 (graduation). Here the mean (M) and the SD was 5.99 and 3.871, respectively.

Working Condition of the Respondent

Here, it is seen that most of the head of the family of the respondent (84.7 percent) were worker, 10.1 percent businessman and 5.2 percent others (**Table 3**). Here most of the respondent's duration of employment was between 1-10 years and that was 71.9 percent. The 23.1 percent of respondents' duration of year was between 11-20 years and the rest was 21-30 and it was 4.9 percent, here the M and SD were 8.61 and 6.299, respectively. Here data represented that most of the respondent's working hours were approximately between 5-8 hours and that was 58.9 percent, second highest percentage was 36.1 percent and that were between 9-12 hours. There were least percentage and that was 4.6 percent in 13-16 hours

Table 4. Respondents information on occupational safety

| Variable | Frequency | Percentage |
|--------------------------------------|-----------|------------|
| Wearing helmet | | |
| No | 109 | 31.5 |
| Yes | 237 | 68.5 |
| Wearing safety glass | | |
| No | 112 | 32.4 |
| Yes | 234 | 67.6 |
| Wearing safety dress | | |
| No | 108 | 31.2 |
| Yes | 238 | 68.8 |
| Wearing face mask and hand gloves | | |
| No | 80 | 23.1 |
| Yes | 266 | 76.9 |
| Wearing shoes | | |
| No | 75 | 21.7 |
| Yes | 271 | 78.3 |
| Using ventilation system | | |
| No | 65 | 18.8 |
| Yes | 281 | 81.2 |
| Maintain alarm and fire extinguisher | | |
| No | 51 | 14.7 |
| Yes | 295 | 85.3 |
| Investigating injuries | | |
| No | 79 | 22.8 |
| Yes | 267 | 77.2 |
| Checking machine and equipment | | |
| No | 50 | 14.5 |
| Yes | 296 | 85.5 |
| Workplace friendliness | | |
| Agree | 181 | 52.3 |
| Disagree | 24 | 6.9 |
| Neutral | 96 | 27.7 |
| Strongly agree | 44 | 12.7 |
| Strongly disagree | 1 | 0.3 |

and 0.3 percent were in 1-4 hours. The M and SD was 8.95 and 1.925, respectively. The respondents' nature of payment was daily 37.9 percent, monthly 49.4 percent, and weekly 12.7 percent. The data also showed that the higher 59.8 percent respondent's monthly income was between 10,001 and 20,000, here M and SD was 19,127.45 and 7,293.100, respectively. Findings show that the highest 57.5 percent of the respondents were between 15,001 and 30,000 and the M and SD were 22,263.01 and 9,680.859, respectively. Furthermore, 42.6 percent of the population had their savings between 1 and 25,000 along with here the M and SD were 41,762.24 and 31,934.783, respectively. The higher 45.7 percent of the respondents were between 25,001 and 50,000 Taka Loan BDT, and the M and SD were 46,445.65 and 28,178.148, respectively.

Occupational Safety of the Respondent

Here the data revealed that 68.5, 67.6, and 68.8 percent wore helmet, safety glass, and safety dress during work, respectively (Table 4). On the other hand, 31.5, 32.4, and 31.2 percent of the respondents respectively did not wear helmet, safety glass, and safety dress. However, 68.5, 67.6, and 68.8 percent wore helmet, safety glass, and safety dress during work. The data also shows that 23.1, and 21.7 percent of the respondents respectively did not wear face masks and hand gloves and shoes during work. However, 76.9 and 78.3 percent of workers wore face masks, hand gloves and shoes during work. According to the data 18.8 and 14.7 percent said that the workplace did not use ventilation system and maintain alarm and fire extinguisher. Most of the workers 81.2 and 85.3 percent said that the workplace used ventilation systems and

Table 5. Respondents information on health problem and care-seeking

| Variable | Frequency | Percentage | M & SD |
|---------------------------------------|-----------|------------|----------------------|
| Proper sanitation facility | | | |
| No | 98 | 28.3 | |
| Yes | 248 | 71.7 | |
| Suffering any type of health problems | | | |
| No | 211 | 61.0 | |
| Yes | 135 | 39.0 | |
| Types of health problems | | | |
| Aches & pain | 42 | 31.1 | |
| Fever-All type | 26 | 19.2 | |
| Gastrointestinal illness | 37 | 27.4 | |
| Respiratory illness | 10 | 7.4 | |
| Skin/eye/ENT related illness | 15 | 11.1 | |
| Waterborne illness | 5 | 3.7 | |
| Duration of illness | | | |
| ≤ 10 | 96 | 71.1 | 9.45 & 7.445 |
| 11-20 | 27 | 20 | |
| 21-30 ≥ | 12 | 8.9 | |
| Care-seeking | | | |
| Modern | 82 | 60.7 | |
| Traditional | 53 | 39.3 | |
| Nature of treatment | | | |
| Allopathy | 43 | 31.8 | |
| Homeopathy | 14 | 10.3 | |
| Pharmacy/drug store | 34 | 25.1 | |
| Self-care | 30 | 22.2 | |
| Traditional | 14 | 10.3 | |
| Cost of treatment | | | |
| ≤ 1,000 | 93 | 68.9 | 1,006.65 & 794.938 |
| 1,001-2,000 | 29 | 21.5 | |
| 2,001 ≥ | 13 | 9.6 | |
| Life insurance | | | |
| No | 315 | 91.0 | |
| Yes | 31 | 9.0 | |
| Amount of premium | | | |
| ≤ 3,000 | 25 | 80.6 | 2,845.16 & 2,589.059 |
| 3,001-6,000 | 3 | 9.6 | |
| 6,001-9,000 | 1 | 3.2 | |
| 9,001 ≥ | 2 | 6.4 | |
| Source of major medical support | | | |
| Life insurance | 16 | 4.6 | |
| Property | 175 | 50.6 | |
| Savings | 155 | 44.8 | |

maintained alarm and fire extinguishers. Again, the data showed that 22.8 and 14.5 percent said that the workplace did not investigate injuries and check machine and equipment. Most of them 77.2 and 85.5 percent said that the workplace investigates injuries and check machines and equipment regularly. Most of the workers agreed on workplace friendliness and the percentage was 52.3, 6.9 percent disagreed, 27.7 was neutral, 12.7 percent strongly agreed and last but not the least only 0.3 percent strongly disagreed.

Information About Health Problems and Care-Seeking of the Respondent

Table 5 showed that 71.7 percent had proper sanitation facilities as well as 61.0 percent had any type of health problems. Furthermore, 31.1 percent had aches and pain, 27.4 percent had gastrointestinal illness, 11.1 percent had skin/eye/ENT related illness and even 3.7 percent had Water-Bourne illness. Their duration of illness was 71.1 percent in 1-10 days, 20 percent was between 11-20 days and lastly 8.9 percent was between 21-30 days. The M and SD are 9.45 and

Table 6. Challenges faced by respondents

| Variable | Frequency | Percentage |
|------------------------------|-----------|------------|
| Water supply problem | | |
| No | 206 | 59.5 |
| Yes | 140 | 40.5 |
| Electric problem | | |
| No | 274 | 79.2 |
| Yes | 72 | 20.8 |
| Transport problem | | |
| No | 235 | 67.9 |
| Yes | 111 | 32.1 |
| Knowledge about hand washing | | |
| No | 45 | 13.0 |
| Yes | 301 | 87.0 |
| Seeking economic help | | |
| No | 244 | 70.5 |
| Yes | 102 | 29.5 |
| From where | | |
| GO | 29 | 28.4 |
| NGO | 73 | 71.5 |
| Socially secure | | |
| No | 54 | 15.6 |
| Yes | 292 | 84.4 |
| Financially secure | | |
| No | 167 | 48.3 |
| Yes | 179 | 51.7 |
| Happiness in life | | |
| Not at all | 39 | 11.3 |
| Somewhat | 178 | 51.4 |
| Very much | 129 | 37.3 |

7.445, respectively. Moreover, 60.7 percent of respondents took modern care, 39.3 percent seek traditional care. Findings displayed that most of the respondent's 22.2 percent of respondents took self-care, 10.3 percent traditional care, 31.8 percent allopathy, 10.3 percent homeopathy, and 25.1 percent took pharmacy/drug store. The data also reveals the distribution of cost of treatment of the respondents. There 68.9 percent of respondent's amount of treatment was between 1 and 1,000, 21.5 percent were between 1,001 and 2,000 and only 9.6 percent was between 2,001 and 3,000. The M and SD are 1,006.65 and 794.938, respectively. According to **Table 5**, among all the respondent's 9.0 percent had any life insurance and 91.0 percent did not have any life insurance. There 80.6 percent of respondent's amount of premium was between 1 and 3,000 and the M and SD are 2,845.16 and 2,589.059, respectively. Therefore, 44.8 percent had savings in case of major medical emergency, the source of financial support, 50.6 percent had property and 4.6 percent had life insurance.

Challenges Faced by the Respondents

Table 6 shows that 40.5, 20.8, and 32.1 percent had water supply problems, electric problems, and transport problems in their area. 59.5, 79.2, and 67.9 percent supposed that there was no water supply problem, electric problem, or transport problem in their area. According to the data 13.0 percent had no knowledge of hand washing before taking meals and 87.0 percent had aware of this knowledge. It epitomized that 29.5 percent of respondents seeking economic help from any organization and the rest of 70.5 percent did not take any help. Most of the workers 71.5 percent of respondents seeking economic help from NGO along with 28.4 percent seeking help from GO. **Table 6** also discovered that most of the people 84.4, 51.7 percent felt socially and financially secure and rest of them 15.6 and 48.3 percent of people felt socially and financially

Table 7. Chi-square test (relationship among variable)

| Variable | Do you feel financially secure | | Test statistics ^{df} | p |
|------------------------|--------------------------------|-------------|-------------------------------|---------|
| | No | Yes | | |
| Total monthly income | | | | |
| ≤ 10,000 | 5.4% (9) | 2.8% (5) | 21.477 ^{a(5)} | .001*** |
| 10,001-20,000 | 49.7% (83) | 31.3 (56) | | |
| 20,001-30,000 | 31.7% (53) | 35.2% (63) | | |
| 30,001-40,000 | 10.2% (17) | 21.2% (38) | | |
| 40,001-50,000 | 1.8% (3) | 5.0% (9) | | |
| 50,001 ≥ | 1.2% (2) | 4.5% (8) | | |
| Monthly expenditure | | | | |
| ≤ 10,000 | 9.0% (15) | 7.3% (13) | 19.092 ^{a(5)} | .002*** |
| 10,001-20,000 | 52.1% (87) | 42.5% (76) | | |
| 20,001-30,000 | 32.3% (54) | 29.6% (53) | | |
| 30,001-40,000 | 5.4% (9) | 14.5% (26) | | |
| 40,001-50,000 | 0.0% (0) | 5.6% (10) | | |
| 50,001 ≥ | 1.2% (2) | 0.6% (1) | | |
| Duration of employment | | | | |
| ≤ 10 | 79.0% (132) | 65.3% (117) | 15.842 ^{a(5)} | .007*** |
| 11-20 | 17.4% (29) | 28.5% (51) | | |
| 21 ≥ | 3.6% (6) | 6.2% (11) | | |

Note. p < 0.01***; p < 0.05**; & a: Chi-square

insecure. According to the data 37.3 percent of respondents were very much happy with their present lifestyle, 51.4 percent were somewhat happy and 11.3 percent were not at all happy.

Chi-Square Test

The results reported in **Table 7** revealed the socio-economic features of seaport workers and impact on financial satisfaction. The findings of chi-square tests clarified that monthly family income, monthly family expenditure and duration of employment was significantly associated with financial satisfaction. **Table 7** showed the statistical relationship between monthly family income and financial satisfaction was highly significant (p < 0.001). **Table 7** also displayed the statistical relationship between respondent's monthly family expenditure and financial satisfaction was highly significant (p < 0.002). **Table 7** disclosed here that the statistical relationship between duration of employment and financial satisfaction was also highly significant (p < 0.007).

Correlation Analysis

From **Table 8**, we can see that there was a positive strong correlation (r = .887**) between monthly family expenditure and monthly family income. **Table 8** also exposed that there was a positive moderate correlation (r = .295**) between cost of treatment and monthly family income. There was a positive moderate correlation (r = .263**) between cost of treatment and monthly family expenditure. There was a positive weak correlation (r = .172**) between age and monthly family expenditure. There was a positive strong correlation (r = .699**) between duration of employment and age. Besides, there was a weak negative correlation (r = -.150**) between year of schooling and duration of employment.

DISCUSSION

This study clarified that a higher percentage of respondents wore helmets, safety glasses, and safety attire while at work. Consequently, it also indicated that under twenty-five percent of the respondents did not wear face masks, hand gloves, or shoes during their work. Nevertheless, most workers did wear

Table 8. Correlation analysis

| Variables | Monthly income | Monthly expenditure | Cost of treatment | Age (in year) | Duration of employment | Year of schooling |
|------------------------|----------------|---------------------|-------------------|---------------|------------------------|-------------------|
| Monthly income | - | | | | | |
| Monthly expenditure | .887** | - | | | | |
| Cost of treatment | .295** | .263** | - | | | |
| Age (in year) | .155** | .172** | .109 | - | | |
| Duration of employment | .169** | .209** | .069 | .699** | - | |
| Year of schooling | .142** | .050 | .144 | -.160** | -.150** | - |

Note. **Correlation is significant at the 0.01 level (2-tailed) & *Correlation is significant at the 0.05 level (2-tailed)

face masks, hand gloves, and shoes while working. Furthermore, most workers utilized a ventilation system and maintained alarms and fire extinguishers. According to the data, a few workplaces did not implement a ventilation system or maintain alarms and fire extinguishers [17]. Additionally, the study revealed that the workplace did not conduct investigations into injuries or check machines and equipment. Based on the most recent European data, approximately 4 million individuals were injured at work and missed more than three days of work [18]. In this study, most injuries were investigated, and machines and equipment were checked regularly. Another study identified that the port industry is both intriguing and potentially high-risk, as the constantly changing circumstances introduce continuously shifting risks [19].

Furthermore, various ailments such as aches and pains, all types of fever, gastrointestinal disorders, respiratory conditions, skin, eye, and ENT-related illnesses, as well as waterborne diseases, have drawn the attention of the respondents. In contrast, the most prevalent non-communicable diseases included hypertension (8.3%), obesity (5.6%), diabetes mellitus (3%), and acute myocardial infarction (0.5%). The findings also indicated that hypertension, obesity, and diabetes are the most common non-communicable diseases [20]. Nevertheless, a majority of respondents opted for modern medical care, while others pursued traditional remedies. Consequently, these individuals and their families encounter social and economic challenges due to occupational accidents [21]. Additionally, the national economy is significantly impacted, as employers experience financial losses and a reduction in workdays [22].

According to the study presentation, a small number of respondents possessed life insurance, while a larger percentage did not have any life insurance coverage [23]. Consequently, less than fifty percent of all respondents had savings set aside for major medical emergencies, which served as their financial support, alongside property, and only a few percent had life insurance. A moderate percentage of respondents reported issues with water supply, electricity, and transportation in their area. However, there were instances where there were no problems related to water supply, electricity, or transportation in their vicinity [24]. The study indicated that a small percentage of respondents lacked knowledge about hand washing before meals, while the majority were aware of this practice. Furthermore, measures such as ventilation, alarm systems, and fire extinguishers were implemented, and a significant number of respondents' industries were examined concerning worker injuries and illnesses. Conversely, 85.5 percent of respondents' industries conducted regular machinery checks [25], demonstrating that the necessary measures to ensure the safety and health of all individuals affected by port operations should be managed in

a manner that balances operational hazards with the costs associated with reducing or eliminating accidents.

The results of chi-square tests indicate that monthly family income, monthly family expenditure, and duration of employment are significantly linked to financial satisfaction. Additionally, there exists a moderate positive correlation between the cost of treatment and monthly family expenditure. Furthermore, a weak positive correlation is observed between age and monthly family expenditure. Moreover, a strong positive correlation is noted between duration of employment and age. Conversely, the findings demonstrate a highly significant relationship among the factors examined and investigated, suggesting that the management of the organization should implement and promote specific safety codes within the business.

CONCLUSION

The research directed that various issues hinder the establishment of an effective occupational health system within the seaport industry. At the management level, awareness regarding occupational health and safety was relatively low, and despite some awareness, the execution of occupational health system services was inadequate. There was an insufficient number of qualified personnel to fulfill health and safety responsibilities, and those employed in these roles lacked specialization in the relevant field. The medical facilities available on-site were deemed unsatisfactory. A significant portion of the management failed to acknowledge the importance of engaging workers in discussions at the policy-making level. At the workers' level, there was a lack of awareness regarding the importance of occupational health and safety. Chemical safety and physical hazards are commonly faced in the industry. Additionally, workers were not informed about their legal rights. There was also a deficiency in technical facilities, such as air quality monitoring and biological assessments.

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REFERENCES

- Zwetsloot GIJM, Gort J, Steijger N, Moonen C. Management of change: Lessons learned from staff reductions in the chemical process industry. *Saf Sci.* 2007;45(7):769-89. <https://doi.org/10.1016/j.ssci.2006.08.028>
- Karanikas N, Hasan SMT. Occupational health & safety and other worker wellbeing areas: Results from labour inspections in the Bangladesh textile industry. *Saf Sci.* 2022;146:105533. <https://doi.org/10.1016/j.ssci.2021.105533>
- Park J, Park J-S, Han B, Kim Y. Vulnerability of employees in businesses with fewer than five workers (micro-enterprises) to occupational safety and health problems. *Am J Ind Med.* 2017;60(12):1056-65. <https://doi.org/10.1002/ajim.22783> PMID:29063618
- Anik AH, Toha M, Tareq SM. Occupational chemical safety and management: A case study to identify best practices for sustainable advancement of Bangladesh. *Hyg Environ Health Adv.* 2024;12:100110. <https://doi.org/10.1016/j.heha.2024.100110>
- Torp S, Moen BE. The effects of occupational health and safety management on work environment and health: A prospective study. *Appl Ergon.* 2006;37(6):775-83. <https://doi.org/10.1016/j.apergo.2005.11.005> PMID:16380071
- Costa V, Souza KR, Teixeira LR, Hedlund CJ, Filho LAF, Cardoso LS. Health and labour from the perspective of railway dock workers in Rio Grande do Sul, Brazil. *Cien Saude Colet.* 2015;20(4):1207-16. <https://doi.org/10.1590/1413-81232015204.00722014> PMID:25923631
- ILO. Bangladesh labor act. International Labor Organization; 2006. Available at: <https://www.ilo.org/media/43266/download> (Accessed: 16 May 2023).
- ILO. Improving working conditions in the ready-made garment sector programme. International Labor Organization; 2022. Available at: <https://www.ilo.org/publications/improving-working-conditions-ready-made-garment-sector-programme> (Accessed: 16 May 2023).
- Global People Strategist. Employee rights in Bangladesh. Global People Strategist; 2022. Available at: <https://www.globalpeoplestrategist.com/employee-rights-in-bangladesh/> (Accessed: 16 May 2023).
- Olalekan BM, Folajimi AA, Abidemi FM, Adagbor PU. Perceived influence on safety practices on job satisfaction among dock workers at Lagos Sea Port. *Islamic Univ Multidiscip J.* 2019;6(4):41-6.
- Chowdhury AM. Employee's rights at workplace in Bangladesh. *Jural Acuity;* 2022. Available at: <https://irglobal.com/article/employees-rights-at-workplace-in-bangladesh/> (Accessed: 16 May 2023).
- Iqbal KS, Zakaria NMG, Hossain KA. Identifying and analysing underlying problems of shipbuilding industries in Bangladesh. *J Mech Eng.* 2011;41(2):147-58. <https://doi.org/10.3329/jme.v41i2.7509>
- Caruso CC. Possible broad impacts of long work hours. *Ind Health.* 2006;44(4):531-6. <https://doi.org/10.2486/indhealth.44.531> PMID:17085913
- Papadopoulos G, Georgiadou P, Papazoglou C, Michaliou K. Occupational and public health and safety in a changing work environment: An integrated approach for risk assessment and prevention. *Saf Sci.* 2010;48(8):943-9. <https://doi.org/10.1016/j.ssci.2009.11.002>
- Goncalves A, Dutra A, Mussi CC. Occupational risks and health and safety management strategies in the port sector: A systematic literature review. *Saf Sci.* 2025; 184:106767. <https://doi.org/10.1016/j.ssci.2024.106767>
- Cresswell JW, Guetterman TC. *Educational research: Planning, conducting, and evaluating quantitative and qualitative research.* Pearson; 2018.
- Adade-Boateng AO, Fugar FDK, Adinyira E. Framework to improve the attitudes of construction workers towards safety helmets. *J Constr Dev Ctries.* 2021;26(2):65-86. <https://doi.org/10.21315/jcdc2021.26.2.4>
- Eurostat. Causes and circumstances of accidents at work in the EU. Office for Official Publications of the European Communities; 2009.
- Rangamani S, Obalesha KB, Gaitonde R. Health issues of sanitation workers in a town in Karnataka: Findings from a lay health-monitoring study. *Natl Med J India.* 2015;28(2):70-3.
- Cezar-Vaz MR, Rocha LP, Bonow CA, Da Silva MRS, Vaz JC, Cardoso LS. Risk perception and occupational accidents: A study of gas station workers in Southern Brazil. *Int J Environ Res Public Health.* 2012;9(7):2362-77. <https://doi.org/10.3390/ijerph9072362> PMID:22851948 PMCID:PMC3407909
- Barkhordari A, Malmir B, Malakoutikhah M. An analysis of individual and social factors affecting occupational accidents. *Saf Health Work.* 2019;10(2):205-12. <https://doi.org/10.1016/j.shaw.2019.01.002> PMID:31297283 PMCID:PMC6598796
- Unsar S, Sut N. General assessment of the occupational accidents that occurred in Turkey between the years 2000 and 2005. *Saf Sci.* 2009;47(5):614-9. <https://doi.org/10.1016/j.ssci.2008.08.001>
- Bhola S. Awareness of life insurance among sample customers. *Indian Streams Res J.* 2014;4(7).
- Ahmed T, Sipra H, Zahir M, Ahmad A, Ahmed M. Consumer perception and behavior toward water supply, demand, water tariff, water quality, and willingness-to-pay: A cross sectional study. *Water Resour Manag.* 2022;36(4):1339-54. <https://doi.org/10.1007/s11269-022-03085-5>
- Venkataraman A, Bassis CM, Beck JM, et al. Application of a neutral community model to assess structuring of the human lung microbiome. *mBio.* 2015;6(1):e02284-14. <https://doi.org/10.1128/mBio.02284-14> PMID:25604788 PMCID:PMC4324308

APPENDIX A

[This study is designed for educational purposes only, collected data shall not be disclosed under any circumstance]

Table A1. An interview schedule on occupational safety and health risk of seaport workers in Mongla, Bagerhat

| Date: | Schedule no: |
|---|--------------|
| Section A. Personal information of the respondent | |
| 1.1 Age (year): _____ | |
| 1.2 Gender: 1. Male 2. Female | |
| 1.3 Religion: 1. Islam 2. Santana 3. Christianity 4. Others (specify) | |
| 1.4 Marital status: 1. Unmarried 2. Married 3. Divorced 4. Widowed | |
| 1.5 Year of schooling: _____ | |
| In case of close-ended question, please mark with a Tick (✓) Sign | |
| Section B. Household information of the respondent | |
| 2.1 Family type: 1. Nuclear 2. Extended 3. Others | |
| 2.2 Number of family members: _____ | |
| 2.3 Head of the family: | |
| 2.4 Living arrangement: 1. With parents 2. With spouse 3. Alone 4. Others _____ | |
| 2.5 Type Of house: 1. Kaccha 2. Pukka 3. Semi-Pukka | |
| 2.6 Owner of the house: 1. Owner 2. Rented 3. Rent free | |
| 2.7 Spouse occupation: | |
| 2.8 Spouse year of schooling: _____ | |
| 2.9 Do you have any children? 1. Yes 2. No | |
| 2.9.1 If yes, mention how many children do you have: _____ | |
| In case of close-ended question, please mark with a Tick (✓) Sign | |
| Section C. Working condition of the respondents | |
| 3.1 Occupation of head of the family: 1. Worker 2. NGO 3. Business 4. Others (specify) | |
| 3.2 Duration of employment: _____ (in years) | |
| 3.3 Working hour: _____ | |
| 3.4 Nature of payment: 1. Daily 2. Weekly 3. Monthly 4. Only accommodation/food | |
| 3.4 Monthly income (head): _____ (in BDT) | |
| 3.5 Number of earning members in family (specify): _____ | |
| 3.6 Total monthly income of the family: _____ (in BDT) | |
| 3.7 Monthly family expenditure: _____ (in BDT) | |
| 3.8 Do you have any saving's? 1. Yes 2. No | |
| 3.8.1 If yes, how much? _____ (in BDT) | |
| 3.11 Have you taken any loan? 1. Yes 2. No | |
| 3.11.1 If yes, how much? _____ (in BDT) | |
| 3.16 Do you have any fixed bank deposit? 1. Yes 2. No | |
| 3.16.1 If yes, what is the current market value of your deposit? _____ (in BDT) | |
| 3.17 Do you have any unmovable assets? 1. Yes 2. No | |
| 3.17.1 If yes, what is the current market value of your unmovable asset? _____ (in BDT) | |
| 3.18 Do you have any movable assets? 1. Yes 2. No | |
| 3.18.1 If yes, what is the current market value of your movable asset? _____ (in BDT) | |
| In case of close-ended question, please mark with a Tick (✓) Sign | |
| Section D. Occupational safety of the respondents | |
| 4.1 Do you wear helmet when working? 1. Yes 2. No | |
| 4.2 Do you wear safety glasses when working? 1. Yes 2. No | |
| 4.3 Do you wear safety dress when working? 1. Yes 2. No | |
| 4.4 Do you wear face mask and hand gloves when working? 1. Yes 2. No | |
| 4.5 Do you wear shoes when working? 1. Yes 2. No | |
| 4.5 Does the organization use engineering controls like ventilation systems to prevent workplace injuries? 1. Yes 2. No | |
| 4.6 Does the organization maintain alarms and fire extinguishers? 1. Yes 2. No | |
| 4.7 Are all workplace injuries and illnesses reported and investigated? 1. Yes 2. No | |
| 4.8 Does the machinery/working equipment check regularly? 1. Yes 2. No | |
| 4.9 Is your workplace friendly? (a) Strongly agree (b) Agree (c) Neutral (d) Disagree (e) Strongly disagree | |
| In case of close-ended question, please mark with a Tick (✓) Sign | |
| Section E. Information about health problems & health care-seeking of respondent | |
| 5.1 Do you have proper sanitation facility? 1. Yes 2. No | |
| 5.2 Do you suffer from any type of health problems? 1. Yes 2. No | |
| 5.2.1 If yes, what kind of health problem? 1. Fever-All type 2. Gastrointestinal illness 3. Aches & Pain 4. Respiratory Illness 5. Skin/eye/ENT related illnesses 6. Waterborne illness | |
| 5.3 Duration of illness: _____ (in days) | |
| 5.4 Care-seeking: 1. Traditional 2. Modern | |
| 5.5 Care giver: 1. Self-care 2. Traditional 3. Allopath 4. Homeopathy .5. Pharmacy/drug store 6. Traditional medicine (Kabirizi/Ayurveda) | |
| 5.6 Cost of treatment: _____ (in BDT) | |
| 5.7 Do you have any life insurance? 1. Yes 2. No | |
| 5.7.1 If yes, how much (in a year)? _____ (in BDT) | |
| 5.8 In case of major medical emergency what is the source of financial support? 1. Savings 2. Property 3. Life insurance | |
| In case of close-ended question, please mark with a Tick (✓) Sign | |

Table A1 (Continued).

Section F. Challenges faced by the respondents

6.1 Do you face water supply problems in your area? 1. Yes 2. No

6.2 Do you face electricity problems in your area? 1. Yes 2. No

6.3 Do you face transport problems in your area? 1. Yes 2. No

6.4 Do Knowledge about hand washing before taking meal? 1. Yes 2. No

6.5 Did you seek economic help from any organization? 1. Yes 2. No

6.5.1 If yes, from where? 1. NGO 2. GO

6.6 Do you feel socially secure? 1. Yes 2. No

6.7 Do you feel financially secure? 1. Yes 2. No

6.8 How happy are you with your present lifestyle? 1. Very much 2. Somewhat 3. Not at all

6.9 What are the social problems in your locality?

6.10 How could these problems be solved?/Any suggestion?

In case of close-ended question, please mark with a Tick (✓) Sign
