



OCCUPATIONAL HEALTH PROBLEMS AND SAFETY PRACTICES AMONG POWER STATION WORKERS

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ABSTRACT

Background: Occupational health is multifactorial. The health of an individual can be affected through interaction with social, physical, environmental, as well as behavioral factors. In power stations, different groups of employees are exposed to different working sectors. Hazards, accidents and ill management in power plants have a big impact on health that may reduce productivity. So extend of occupational health problems and safety practices among power station workers are a big concern now days. **Methods:** A cross-sectional descriptive study was conducted to investigate occupational health problems and safety practices among 390 power station workers. Data were collected by face-to-face interviews using a semi-structured questionnaire. **Result:** All 390 respondents were male, with most aged between 31 and 40 years. Majority (69%) of the respondents were found to have injuries. More than half (55.6%) had head and finger injury, nearly one third (27.90%) leg injury, (27.70 %) had back injury, (23.60%) had skin injury. More than half (60.30%) of respondents had skin allergy, (44.90%) had eye irritation, and (51.50%) felt fatigue. In the chi-square test, there might be a significant ($p < 0.05$) association between sociodemographic characteristics and health problems of the respondents. A maximum (45.72%) of workers regularly use PPE, but a major part (34.80%) sometimes use PPE and the remaining part (19.47%) don't use PPE, where no one uses a safety net. **Conclusion:** The present study highlights the presence of health problems, particularly skin allergy, eye irritation, and injury to body parts. While significant portion of workers reported using personal protective equipment (PPE). Notably, none of the workers reported using safety nets, indicating a critical gap in safety practice adherence.

KEYWORDS: Health problem, Injury of body parts, Personal protective equipment (PPE).

INTRODUCTION

Health is a complex concept influenced by various factors, including exposures, behaviours, characteristics, and environments, that shape health outcomes, collectively known as the determinants of health. Occupational health ensures the well-being of workers, preventing work-related injuries and illnesses. It involves risk assessment, safety measures, and promoting a healthy work environment for optimal productivity and employee satisfaction.^[1] Occupational health problems encompass physical, mental, and ergonomic issues

stemming from work. Prevention through proper training, regulations, and supportive workplace culture is vital for employee welfare and productivity.^[2]

Occupational health is the preservation and advancement of workers' health via the avoidance and management of occupational illnesses, accidents, and circumstances that endanger workers' health and safety at work.^[3] Workplace injuries are now a top priority for many organizations. Workplace accidents can result in both minor and serious injuries and would face financial loss

or death. Workplace accidents have grown to be a significant issue for a firm in the cutthroat work climate of today.^[4] Occupational health and safety practices investigate strategies for safeguarding workers' well-being. It examines risk assessment, training, regulatory compliance, and their impact. Studies on occupational health and safety practice have a history of clustering in specific areas, focusing on policy and practice, social and individual characteristics, events and incidents of injuries or accidents, management control, and labor relations.^[2] Power stations play a critical role in generating electricity to meet the growing energy demands of society. However, the nature of work in power stations exposes employees to various occupational health problems and safety hazards.

Hazards, accidents and ill management in thermal power plants have a big impact on business, whether it's due to reduced productivity, lost sales, lower staff morale, or even closure. To prevent and/or mitigate workplace injuries, hazards, accidents and to improve productivity, it is needed to establish safety practice in the entire management system. Use of safety signs is one of the ways for controlling hazards in the work environment. Safety signs are widely used to effectively control workplace hazards.^[5]

MATERIALS AND METHODS

Study Design: The study was based on a cross-sectional study to identify occupational health problems and to determine safety practices among power station workers.

Sample selection: 390 power station workers (18 years of age or above) were selected conveniently who had at least 6 months of working experience. They worked in various sections of the plant.

Study place: The study was conducted at the Ashuganj power station. Ashuganj is the upazila of Brahmanbaria district in the division of Chittagong in Bangladesh.

Data collection technique: Data collection was done by face-to-face interviews with the power station workers who fulfilled the selection criteria. An interview was conducted using a semi-structured questionnaire. The questionnaire consists of questions on sociodemographic characteristics, occupational health problems and safety practice-related issues.

Data management and analysis: After data collection, the collected data were checked, verified, coded, post-coded, recorded, and then entered into the computer. For the final analysis, only fully completed data was entered into the computer. The analysis was done by SPSS (Statistical Package for Social Science) software.

Ethical Considerations: Informed written consent was obtained from each participant. Ethical approval was obtained from the Institutional Review Board (IRB) of the National Institute of Preventive and Social Medicine (NIPSOM) in Mohakhali, Dhaka, 1212, Bangladesh.

RESULTS

All (390) the study participants were male, and nearly half (46.4%) were aged 31–40 years, and most (78.2%) had less than 20 years of work experience. The highest proportion (36.2%) had a higher secondary or diploma education.

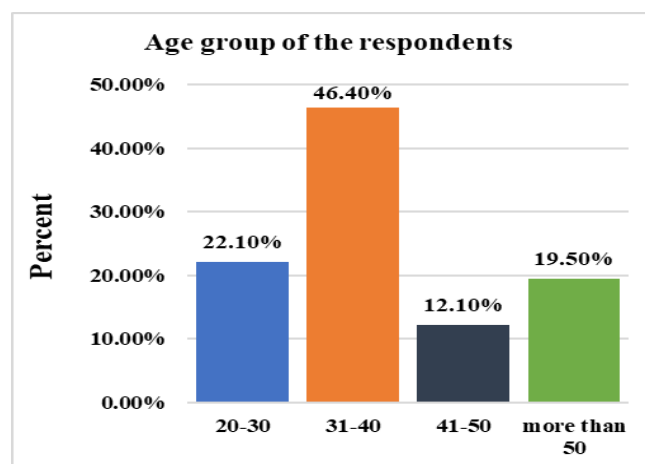


Figure 1 shows the distribution of the respondents by their age.

The figure 2 shows the distribution of the type of injury. Among 390 respondents, 16.6% had major injuries (causing one or more workday losses), while 63.3% had minor injuries (causing less than one workday loss).

Table 1: Distribution of the respondents by injury of body parts.

Injury of body parts	Yes	No
Head	29 (7.40%)	361 (92.60%)
Arm	62 (15.90%)	328 (84.10%)
Leg	109 (27.90%)	281 (72.10%)
Nose	20 (5.10%)	370 (94.90%)
Eye	50 (12.80%)	340 (87.20%)
Hand & Finger	217 (55.6%)	173 (44.4%)
Shoulder	41 (10.50%)	349 (89.50%)
Chest	23 (5.90%)	367 (94.10%)
Back	108 (27.70%)	282 (72.30%)
Skin	92 (23.60%)	298 (76.40%)

Among 390 respondents, the most reported injuries were to the hand and fingers (55.6%), leg (27.9%), back (27.7%), skin (23.6%), arm (15.9%), eye (12.8%), shoulder (10.5%), head (7.4%), and nose (5.1%).

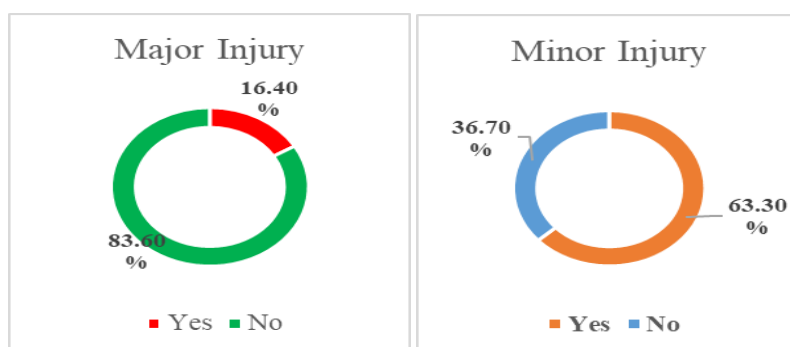


Figure 2: Distribution of the respondents according to the major & minor injuries

while 63.3% had minor injuries (causing less than one workday loss).

Table 2: Distribution of the respondents by health problems. [n=390]

Problems	Yes	No
Skin allergy	235 (60.30%)	155 (39.70%)
Eye irritation	175 (44.90%)	215 (55.10%)
Weakness	122 (31.29%)	268 (68.71%)
Fatigue	201 (51.50%)	189 (48.50%)
Shortness of breath	62(15.90%)	328 (84.10%)
Nasal irritation	95 (24.40%)	295 (75.60%)
Cough	68 (17.40%)	322 (82.60%)
Wheezing	15 (3.80%)	375(96.20%)

Table 2 shows, more than half 60.3% of the respondents had skin allergy, 44.9% had eye irritation, 31.29% felt weakness, more than half (51.5%) of the respondents felt fatigue, 15.9% felt shortness of breath, 24.4% felt nasal irritation, 17.4% felt cough, 3.8% felt wheezing.

Association of age and work experience with injury and health problems

Workers of 31-40 years of age group and less than 20 years of work experience group were more prone to injury and health problems. Specially who had between 31- 40 years of age were significant with (22.8%) hand & finger injury, (10.5%) leg injury, (26.7%) skin allergy,

(19.7%) eye irritation. Who had less than 20 years of work experience were significant with (44.4%) skin allergy, (29.5%) eye irritation, (39.9%) fatigue.

Table 3 shows details of the respondents according to their use of personal protective equipment (PPE). Among 390 workers, 95.6% used safety boots, 57.95% used aprons, and 49.0% used dust masks. Workers who used PPE sometimes included leather gloves (55.9%), eye goggles (54.6%), safety belts (53.3%), rubber gloves (47.95%), protective insulating clothes (45.1%), and gas masks (40.8%).

Table 3: Distribution of the respondents according to their uses of personal protective equipment (PPE) [n=390]

Type of PPE	Yes	No	Sometimes
Apron	226 (57.95%)	94 (24.10%)	70 (17.95%)
Safety boot	373 (95.60%)	0 (0.0%)	17 (4.40%)
Safety helmet	305 (78.20%)	0 (0.0%)	85 (21.80%)
Safety belt	94 (24.10%)	88 (22.60%)	208 (53.30%)
Safety net	0 (0.0%)	390 (100%)	0 (0.0%)
Rubber gloves	181 (46.41%)	22(5.64%)	187 (47.95%)
Leather gloves	157 (40.30%)	15 (3.80%)	218 (55.90%)
Protective insulating cloths	165 (42.30%)	49 (12.60%)	176 (45.10%)
Ear plug	240 (61.50%)	8 (2.10%)	142 (36.40%)
Dust mask	191 (49.00%)	45 (11.50%)	154 (39.50%)
Gas mask	39 (10.00%)	192 (49.20%)	159 (40.80%)
Eye googles	169 (43.30%)	8 (2.10%)	213 (54.60%)

DISCUSSION

In this study, most of the workers were between the ages of 31 and 40. A related research study^[3] was conducted

in India, where there was a total of 100 workers; Most of the workers were between 41 and 60 years old.

In this study, among 390 respondents, 55.60% had hand & finger injury, 15.20% had arm injury, 27.90% had leg injury, 12.80% eye injury, 10.50% (41) had shoulder injury, 27.70(108) had back injury and 23.60% (92) had skin injury.

A related study³ was conducted in India, where total 59 workers, 10 (16.949%) had Hand finger injury, 5 (8.474%) had arm injury, 9 (15.254%) had leg injury, 1 (1.695%) had nose injury, 2 (3.390%) had eye injury, 12 (20.339%) had head injury, 8 (13.560%) had shoulder injury, 1 (1.695%) had chest injury, 9 (15.254%) had back injury, 2 (3.390%) had skin injury. Another similar research study⁶ was conducted in the USA, where shows 17.8% had back and trunk injury, 14.3% had hand and finger injury, 9.9% had head injury, 8.3% had injury in upper extremities, including arm, forearm, and elbow, 8.2% had neck and shoulder injury, and 8.0% had knee injury.

So, it was observed that in the present study, the percentage of injuries to body parts was higher than in previous similar studies.

In this study, among 390 workers, 60.3% had skin allergy, 44.9% had eye irritation, 13.3% had weakness, 51.5% had fatigue, 15.9% felt shortness of breath, 24.4% had nasal irritation, 17.4% had cough, and 15.8% had wheezing.

A related research study³ was conducted in India, where among 59 respondents, 10.16% (6) had skin allergy, 3.38% (2) had eye irritation, 35.59% (21) had weakness and fatigue, 22.03% (13) felt shortness of breath, and 16.94% (10) had nasal irritation.

So, it was observed that in the present study, the percentage of health problems was greater than in previous similar studies.

In this study, it was found that PPE was available for all employees. Among them, more than half (57.9%) of respondents used aprons, and 17.9% sometimes used aprons. Most of them (95.6%) used safety boots, and 4.4% sometimes used safety boots. 78.2% used safety helmets, and 21.8% sometimes used safety helmets. 24.1% reported using safety belts, and 53.3% sometimes used safety belts. 46.4% of respondents used rubber gloves, and 47.9% sometimes used rubber gloves. 40.3% of respondents used leather gloves, and 55.9% sometimes used leather gloves. 42.3% of respondents used protective insulating clothes, and 45.1% sometimes used protective insulating clothes. 61.5% of respondents used ear plugs, and 36.4% sometimes used ear plugs. 49.0% of respondents used dust masks, and 39.5% sometimes used dust masks. 10.0% of respondents used gas masks, and 15.9% sometimes used gas masks. 43.3% used eye goggles, and 54.6% sometimes used eye goggles.

Another similar study was conducted in Thailand^[7], where among the 379 respondents, 95.0% always, 3.4% sometimes, 1.6% never used a safety hat, 48.0% always, 51.2% sometimes, and 0.8% never used an ear plug, 49.6%always, 49.6%sometimes, and 0.8%never used safety glass or Impact goggle, 72.8% always, 26.4% sometimes, and 0.8% never used safety dust mask or Chemical protective mask, 95.0% always, 3.4% sometimes, 1.6% never used safety Shoes, 78.1% always, 21.1% sometimes, and 0.8% never used knitting thread gloves, 52.5% always, 44.9% sometimes, and 2.6% never used safety belt, 67.8% always, 29.0% sometimes, and 3.2% never used face shield, 64.1% always, 32.5% sometimes, and 3.4% never used heat resistant gloves.

So, it was observed that significant numbers of workers were using personal protective equipment (PPE).

CONCLUSION

All the participants of this study were male and they had faced a variety of health problems, such as hand & finger injury, leg injury, back injury, skin injury, skin allergy, eye irritation, weakness and fatigue etc. Personal protective equipment was available at the study place and a remarkable number of workers used PPE for their protection. This study advances discussion on occupational health issues in power plants, highlighting the necessity for sustained efforts to promote a safe and healthy workplace.

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LIMITATIONS

Due to the workers' busy schedules, fear of losing job, bad weather and heavy rainfall- data collection procedure was so much challenging. This study was in a single power station, so it would not be generalized.

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