Original Article

SAFETY PRACTICE AND HEALTH PROBLEM AMONG FISH PROCESSING WORKERS

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ABSTRACT

Background: Fish consumption is growing worldwide due to increased demand for healthier foods and advancements in processing. The fishing industry is a major source of revenue and employment, but various processing activities expose workers to diverse health problems. The study intended to assess health problems and safety practice among fish processing workers.

Methods: This cross-sectional study was conducted on 335 fish processing workers from January 1 to December 31, 2021, using a multistage sampling method. Participants, aged 19 years and above, included both males and females, and the industries were selected purposively in the Chittagong district, a major coastal city in southeastern Bangladesh with a high concentration of fish processing industries. Data were collected through a semi-structured questionnaire and analysed descriptively.

Results: The mean age of participants was 31.19±10.03 years, with the majority (34.6%) aged 20-29 years. Females made up 52.2% of respondents, and 43% had secondary-level education or higher. Musculoskeletal disorders were the most prevalent health problem (65.4%), followed by respiratory (38.5%), gastrointestinal (36.4%), eye (23.6%), and skin problems (20.6%), along with accidental injuries (6.6%). PPE use was inconsistent: 96.1% wore gloves, 93.4% wore rubber boots, 81.8% used masks, 6.3% wore goggles, and 3.3% used earplugs. Significant relationships ($p \leq 0.05$) were observed between health issues and age, gender, marital status, education, work experience, job section, overtime, and weekly working hours. Respiratory and eye problems were significantly associated with mask use.

Conclusion: Fish processing workers are susceptible to various health problems, often due to improper PPE use. To address these issues, strategies must be developed to ensure consistent use of protective equipment and promote safer work practices, thereby improving worker health and well-being.

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INTRODUCTION

Bangladesh, with its extensive wetland regions and rich fishery resources, relies heavily on the fishing industry, a vital sector in its agro-based economy. The fisheries sector significantly contributes to national development by generating employment, ensuring food security, earning foreign revenue, and driving socioeconomic growth[1-3]. Fish accounts for approximately 60% of the total animal protein consumed in Bangladesh, with per capita fish consumption at 62.58 grams, surpassing the daily protein requirement of 60 grams[5]. Globally, Bangladesh ranks third in inland fish production, fifth in aquaculture, and eleventh in marine fish production, highlighting its prominence in the fisheries sector[16]. The fish processing industry is labour-intensive, employing a growing number of workers, with the workforce expanding at an average rate of 4% annually, predominantly in developing countries like Bangladesh[6-8]. However, fish processing is recognized as one of the most hazardous occupations, posing significant health risks. Workers are exposed to numerous occupational hazards, including respiratory issues, skin conditions, ocular problems, and musculoskeletal disorders, often due to high physical demands, repetitive tasks, poor ergonomic practices, and exposure to harmful substances[9,11-13]. Common health issues include redness or swelling of the eyes, cuts, skin burns, infections, and allergic respiratory problems, many of which result from physical, chemical, and biological exposures during fish processing[18-20,22]. Occupational hazards in the

fish processing industry contribute to increased absenteeism, reduced productivity, and adverse physical, mental, and socioeconomic impacts on workers[5,9-10]. Globally, work-related hazards cause approximately 2.78 million deaths annually, with fatalities in the fishing industry exceeding national averages across various countries[21]. Addressing these occupational health issues through improved safety practices can mitigate risks and enhance worker well-being. This study aims to identify safety practices and health problems among fish processing workers, providing a basis for interventions to improve workplace conditions and reduce occupational health risks.

MATERIALS AND METHODS

This cross-sectional study was conducted in the Chittagong district of Bangladesh from January 1 to December 31, 2021, involved 335 male and female workers aged 19 years and above, with a minimum of one year of work experience in two fish processing industries. The study population comprised workers from cutting, receiving, production, and packing sections. Administrative, security, transport, and loader/unloader staff were excluded as their work did not involve fish processing. A sample size of 422 was initially calculated using the standard formula $n=z^2pq/d^2$, with a 95% confidence interval and 10% increase for non-response. However, due to the COVID-19 pandemic, the final sample size was 335, with an average of 15 interviews conducted daily. The location of the industry was selected purposively and subsequent respondents by simple random sampling. Data were collected using a semi-structured questionnaire. The questionnaire covered four parts: socio-demographic characteristics, work-related factors, health problems, and safety practices. Pre-testing was conducted among 12 fish handling workers, leading to necessary adjustments for clarity and appropriateness. Face-to-face interviews were conducted in an isolated room at the study sites, following a structured time schedule. Interviews captured socio-demographic data, work-related factors (e.g., work hours, break time, and overtime), health problems (e.g., respiratory, musculoskeletal, skin, eye, and gastrointestinal issues), and safety practices, including the use of personal protective equipment (PPE). Data were entered into SPSS version 26 for analysis. Each questionnaire was checked daily for completeness, and data clean-up was performed to ensure accuracy.

RESULTS

This study revealed that the majority of participants were female (52.2%). Most workers (34.6%) belonged to the 20-29 age group and followed by (24.8%) aged 30-39 years, and (20.9%) aged 40-49 years and mean age was 31.19±10.03 years. The vast participants (88.1%) identified as Muslim, and (67.8%) of the participants were married, 23.6% were single, and 8.6% were either widowed, divorced, or separated. In terms of education, (43.0%) had completed secondary education or higher, (39.4%) had attained primary education and (17.6%) were illiterate. Monthly income showed that majority (44.2%) of workers earned between 10,000 and 15,000 BDT. The majority workers (51.9%) lived in households with 2-4 members, 32.8% had 5-6 family members, and 15.3% reported having more than 6 members in their households. Smoking was reported by 42.4% of respondents, while the majority were non-smokers. The socio-demographic characteristics are presented in Table 1.

Table 1. Socio-demographic characteristics of fish processing workers

Variable		Frequency (n)	Percentage (%)
Age (Years)	<20	51	15.2%
	20-29	116	34.6%
	30-39	91	27.2%
	40-49	46	13.7%
	≥50	31	9.3%
Gender	Male	160	47.8%
	Female	175	52.2%
Religion	Muslim	310	92.5%
	Hindu	25	7.5%
Education	Illiterate	96	28.7%
	Primary	95	28.4%
	Secondary or above	144	43.0%
Marital Status	Married	199	59.4%
	Single	136	40.6%
Family Size	≤5 members	206	61.5%
	>5 members	129	38.5%
Monthly Income (BDT)	<10,000	306	91.3%
	≥10,000	29	8.7%

Smoking Habit	Smokers	58	17.3%
	Non-smokers/Ex-smokers	277	82.7%

The study also revealed that musculoskeletal disorders were the most common health issues, affecting 65.4% of the respondents. Other significant health problems included respiratory issues (38.5%), gastrointestinal problems (36.4%), eye problems (23.6%), and skin-related symptoms such as itching (20.6%). Additionally, (6.6%) of the workers reported accidental injuries during their job, which are shown in the table 2.

Table 2. Health problems among fish processing workers

Health Problem	Frequency	Percentage
Musculoskeletal disorders	219	65.4
Respiratory problems	129	38.5
Gastrointestinal problems	122	36.4
Eye problems	79	23.6
Skin problems (itching)	69	20.6
Accidental injuries	22	6.6

Respiratory problems were significantly associated with mask usage, indicating the protective role of PPE in mitigating respiratory health issues (Table 3).

Table 3. Association between safety practice and respiratory problem

Traits	Response	Respiratory problem		P value
		No	Yes	
Use of safety goggles	Yes	9(45.0)	11(55.0)	0.376
	No	154(48.9)	161(51.1)	
Use of mask	Yes	143(52.2)	131(47.8)	**0.006**
	No	20(32.8)	41(67.2)	
Use of ear plug	Yes	4(36.5)	7(63.6)	0.407
	No	159(49.1)	165(50.9)	
Use of hand gloves	Yes	157(48.8)	165(51.2)	0.854
	No	6(46.2)	7(53.8)	
Use of rubber boot	Yes	155(49.5)	158(50.5)	0.233
	No	8(36.4)	14(63.6)	

Eye problems were significantly linked to mask use ($p \leq 0.05$), suggesting that even partial PPE adherence can influence the prevalence of occupational health symptoms (Table 4).

Table 4: Association between safety practice and eye problem

Traits	Response	Eye problem		P value
		Yes	No	
Use of safety goggles	**Yes**	2(10.0)	18(90.0)	.140
	No	77(24.4)	238(75.6)	
Use of mask	**Yes**	73(26.6)	201(73.4)	**.005**
	No	6(9.8)	55(90.2)	
Use of ear plug	**Yes**	1(9.1)	10(90.9)	.250
	No	78(24.1)	246(75.9)	
use of hand gloves	**Yes**	78(24.2)	244(75.8)	.169
	No	1(7.7)	12(92.3)	
Use of rubber boot	**Yes**	75(24.0)	238(76.0)	.537
	No	4(18.2)	18(81.8)	

DISCUSSION

This cross-sectional study examined the safety practices and health problems among 335 fish processing workers in Chittagong. The findings were compared with studies conducted in various regions to understand the global and regional context of occupational hazards in this sector. The mean age of respondents was 31.19 years, with most participants (34.6%) aged 20-29 years. Similar trends were noted in Sierra Leone, where 31.7% of respondents were aged 26-35[8]. However, the average age in the current study was higher than that reported in Western India, where most workers were under 25[14]. Gender distribution revealed a slight female majority (52.2%), consistent with studies in Sierra Leone[8], while the Kenyan study found a male predominance in fish harvesting roles[11]. Musculoskeletal disorders were the most common health issues, affecting 65.4% of respondents, consistent with findings from India, where a high prevalence of neck and back pain

among fish processing workers was reported[15]. Respiratory problems (38.5%) were significant, aligning with a study that identified asthma and rhinitis among seafood workers in Greenland[9]. Skin problems (20.6%) were lower compared to the 70% prevalence reported in India, but still highlighted the risks of inadequate PPE use[14]. PPE compliance was mixed: gloves were widely used (96.1%), but safety goggles (6.9%) and earplugs (3.3%) were underutilized, reflecting patterns reported in Tamil Nadu, India[15]. Significant relationships between PPE use and respiratory ($p=0.006$) and eye problems ($p=0.005$) emphasize the protective role of masks.

CONCLUSION

Fish processing workers are exposed to a range of occupational health risks that require immediate attention. Promoting proper use of PPE and implementing workplace safety measures are critical to reducing these health problems and ensuring the well-being of workers in this vital industry.

RECOMMENDATIONS

- Conduct awareness programs to educate workers about the importance of PPE and workplace safety.
- Enforce stricter regulations to ensure the availability and proper use of PPE in fish processing industries.
- Provide regular health check-ups and access to healthcare services for workers.
- Introduce ergonomic training to reduce the prevalence of musculoskeletal disorders.
- Develop policies to limit excessive working hours and ensure adequate rest periods.

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