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Original Article

Health Hazards and Health Seeking Behaviors among Tannery Workers Residing at Tannery Industrial Area

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Abstract

Background: *The leather industry and its products have a substantial impact on the economy of Bangladesh and have been recognized as a highly significant sector. Nevertheless, tannery poses potential risks to workers due to exposure to harmful chemicals and pollutants linked with tannery activities. The objective of this study was to evaluate the health hazards and healthcare-seeking behavior experienced by tannery workers residing in close proximity to the tannery area.*

Materials and methods: *This cross-sectional study was carried out among tannery workers residing in the vicinity of the tannery industrial area in Hemayetpur, Savar, Dhaka. A total of 402 participants were conveniently interviewed in person using a pre-tested semi-structured questionnaire from January to December 2023.*

Results: *The majority of participants were male (88%) predominantly young adults aged 20-30. In terms of employment, 34.6% worked in machinery-related tasks, with 66.4% having done so for 3-8 years. Self-reported health issues included joint pain (49.0%), frequent fever (33.3%), allergies (43.0%), chronic headaches (35.8%), itching (35.8%), rashes (19.9%), and coughing (35.8%). Statistically significant associations were found between these health problems and the duration of stay, department of work, and gender ($p<0.005$). The study also found that 70% of workers used personal protective equipment (PPE), mainly masks, and 61% received formal safety training. Regarding health-seeking behavior, 89.3% relied on allopathic medicine, with pharmacists being the main healthcare provider (89.3%). Furthermore, primary healthcare services (93.5%) were more commonly sought than specialized care.*

Conclusion: *Policymakers and public health professionals can utilize these insights to develop strategies aimed at mitigating environmental hazards, enhancing healthcare facilities and promoting preventive measures.*

Key words: Health hazards; health seeking behavior; Residents; Tannery residential area.

INTRODUCTION

The tanning industry in Bangladesh has been an important part of the industrial sector for over sixty years, contributing significantly to the country's economy with a 3-4% growth rate. Bangladesh, like other developing countries, is currently vulnerable to the issues posed by industrial pollution, notably in areas such as Savar and Dhaka.[1] The tannery business was established in Narayanganj, Bangladesh, in the 1940. Later, the venue was shifted to Dhaka's Hazaribagh district. Following Bangladesh's independence in 1971, disused industrial sites were sold through a haphazard and uneven auction process.[2] In 1965, Dhaka had a total of 30 tanneries. Between 2010 and 2017, the number of tanneries increased from 206 to 220, with

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the majority located in Hazaribagh. Before moving to Savar in mid-2017, there were around 220 functioning tanneries in Hazaribagh. The Hazaribagh region of Dhaka was recognized for its high population and largely residential character.[3] The tanneries were shifted to the Savar tannery industrial area in Dhaka in 2017 with the goal of protecting the population of the Hazaribagh region and the environment, notably the Buriganga River, from the detrimental effects of tannery pollution. 155 tanneries were shifted to the Tannery Industrial Area in Savar.[4]

Globally, the tannery industry is often viewed deleteriously due to its harmful environmental effects. Strict environmental regulations in countries like the United States, Germany, and the United Kingdom have prompted many of these industrialized nations to shift their tannery operations to developing countries around the world.[5] The leather industry in Bangladesh is considered extremely hazardous due to the frequent use of hazardous chemicals. Tanneries produce substantial amounts of both solid and liquid waste, which causes environmental degradation.[6] In the past, tanneries in Hazaribagh discharged untreated hazardous waste into the Buriganga River, causing severe damage to a large, densely populated area. The recurrence of such practices poses a significant threat to the rural communities near Savar, potentially creating a disastrous situation. The Hazaribagh tanneries were estimated to release 21,600 cubic meters of liquid waste and 88 tons of solid waste daily. This jeopardized the livelihoods of around 100,000 people, raising widespread concerns about an imminent ecological disaster.[7] Tannery workers are at heightened risk of health issues, commonly suffering from respiratory, dermatological, ocular, and musculoskeletal disorders.[8] The diverse range of chemicals, equipment, and processes used in the tanning industry presents numerous occupational hazards and serious risks to workers, particularly in countries with weak law enforcement. Common issues in the leather manufacturing sector include inadequate safety protocols, poor expertise, insufficient training, and a lack of awareness about potential risks.[9]

Living near tanneries exposes residents to unique health issues due to environmental factors and socioeconomic challenges. Their hardships are compounded by low socioeconomic status, limited educational opportunities, and inadequate healthcare-seeking behaviors. Research on the health risks faced by individuals living near tannery zones has been limited. This study aimed to explore the health problems encountered by these residents and identify strategies to encourage better healthcare-seeking behaviors. The findings provided valuable insights into the specific health concerns affecting these communities and the factors influencing their use of healthcare services. By examining these elements, the study seeks to identify the challenges faced by residents and support strategies to improve their well-being.

MATERIALS AND METHODS

This cross-sectional study aimed to ascertain health hazards and healthcare-seeking behaviors among 402 tannery workers living near the tannery area. The research was conducted in the purposively selected vicinity of the Bangladesh Small and Cottage Industry Corporation (BSCIC) Tannery Industrial Estate in Hemayetpur, Savar Upazila, Dhaka. The study included all tannery workers, male and female, who were at least 18 years old, resided in the area around the tannery estate, and gave written, informed consent. A convenience sample was used to choose the participants. During the study period from January to December 2023, respondents were interviewed using a pre-tested semi-structured questionnaire in face-to-face sessions. The questionnaire included items on socio-demographic characteristics, self-reported health issues, health-seeking behaviors, and safety practices and training. Data analysis was conducted using IBM SPSS version 27. Descriptive statistics, including mean, standard deviation, and percentage, were calculated for continuous variables among the participants. The chi-square test was employed to assess significance, with a p-value of <0.05 considered significant at a 95% confidence interval. The results were displayed in tables and charts. Confidentiality was upheld throughout the study, and informed written consent was obtained from each participant. Ethical approval was granted by the Institutional Review Board (IRB) of the National Institute of Preventive and Social Medicine in Dhaka 1212, Bangladesh (Reference: NIPSOM/IRB/2023/06).

RESULTS

Among the 402 respondents, 88% were male and 12% were female, with most being young adults aged 20-30 years. The mean age was 34.3 years (±11.3 years). A majority of the respondents (78.6%) were married, and 99.3% identified as Muslim. In terms of educational attainment, 38.5% had completed primary education, 32.8% had reached secondary education, and 20.4% were illiterate. Most families consisted of fewer than five members (85.3%). The mean income of the respondents was 15,238 Taka, with the majority (68.4%) earning between 10,000 and 20,000 Taka. More than half of the participants lived in brick-built houses (67.7%) for 3-8 years (67.2%). Regarding employment, 34.6% were involved in machinery-related tasks for 3-8 years (66.4%). Additionally, 63.2% of the respondents were smokers (Table I).

Different self-reported health problems included joint pain (49.0%), chronic headache (35.8%) and skin-related problems such as itching (35.8%), allergy (43.0%) and rash (19.9%). Cough (35.8%), phlegm with cough (20.1%), wheezy chest sounds during breathing (5.0%) and breathing difficulty (8.2%) also contributed to the self-reported health problems (Table II).

Table III elucidates the availability of health facilities, with 34.3% of participants confirming their presence, while 65.7% reported a lack of such facilities. Additionally, only 13.7%

recognized the existence of healthcare centers, indicating a substantial deficit in healthcare accessibility for the majority (86.3%) of respondents. Furthermore, only 10.7% of participants had access to MBBS doctors, while 89.3% relied on pharmacists for their healthcare needs.Concerning the availability of investigation facilities in healthcare centers, only 12.2% of participants confirmed their presence, while the majority (87.8%) reported a lack of such resources. Additionally, 93.5% of respondents utilized primary care services, while only 6.5% indicated access to specialized care. Furthermore, just 7.2% of participants acknowledged the presence of government health facilities, with 92.8% indicating their absence. This highlights limited access to government-operated healthcare resources within the community.

The majority of participants (89.3%) relied on allopathic treatments, while a smaller yet significant portion (10.7%) chose alternative modalities, including homeopathy and traditional remedies (Figure 1). Notably, 70% of participants reported having access to Personal Protective Equipment (PPE) (Figure 2), whereas 30% indicated a lack of access, highlighting potential vulnerabilities in protective measures. Of those with access to PPE, 62% received it from their factory or provided it themselves (Figure 3).

Masks were the most commonly used form of protection, with 66.7% of participants wearing them. Gloves were the second most utilized protective gear, used by 38.1% of respondents. Other types of Personal Protective Equipment (PPE) included caps (10.2%), aprons (8.7%) and goggles (9.7%), reflecting a variety of protective measures adopted within the community (Table IV).

Table V interprets that certain health problems show statistically significant gender-based differences. For example, joint pain was reported by 41.3% of males compared to 7.7% of females (p=0.021), itching affected 29.9% of males versus 6.0% of females (p=0.029), abdominal discomfort was noted in 6.5% of males compared to 2.2% of females (p=0.009) and chronic headaches were reported by 29.6% of males against 6.2% of females (p=0.012). Although conditions such as cough, phlegm with cough and breathing difficulties show notable differences, they do not reach statistical significance.For instance, skin rash was reported in 3.5% of participants residing for less than 3 years, 13.2% for 3-8 years, and 3.2% for more than 8 years (p=0.015). Chronic headache prevalence was 10.2% in those residing for less than 3 years, 21.1% for 3-8 years, and 4.5% for more than 8 years (p=0.022). Abdominal discomfort was reported in 1.0% of those residing for less than 3 years, 6.2% for 3-8 years and 1.5% for more than 8 years (p=0.055), indicating statistically significant variations. Notably, the frequency of frequent fever varied significantly across departments, with rates of 8.7% in tanning, 3.7% in pre-tanning, 9.5% in finishing and 11.4% in machine operation (p=0.003).

Table I Socio-demographic characteristics of the respondents (n=402)

Characteristics		Frequency (n)	Percent (%)
Gender	Male	354	88.1
	Female	48	11.9
Age (In years)	<20	40	9.9
	20-30	146	36.3
	30-40	100	24.9
	40-50	77	19.2
	>50	39	9.7
Marital status	Married	316	78.6
	Single	86	21.4
Education	Illiterate/signature only	82	20.4
	Primary	144	35.8
	Secondary	132	32.8
	Higher secondary and above	44	10.9
Family member	<5	343	85.3
	≥5	59	14.7
Monthly income (Taka)	<10000	85	21.1
	10000-20000	275	68.4
	>20000	42	10.5
Housing condition	Brick built	272	67.7
	Non brick built	130	32.3
Lengthofstay	<3 years	97	24.1
	3-8years	270	67.2
	>8 years	35	8.7
Working department	Tanning	79	19.7
	Pre-tanning	83	20.6
	Finishing	101	25.1
	Machinery	139	34.6
Duration of works	<3 years	124	30.8
	3-8years	267	66.4
	>8 years	11	2.7
Working hours	<10	331	82.3
	10-12	62	15.4
	>12	9	2.2
Smoking status	Yes	148	36.8
	No	254	63.2

Table II Self-reported health problems in last 6 months (n=402)

	Frequency (n)	Percent (%)
Presence of health problems (n=402)		
Yes	340	84.6
No	62	15.4
Health problems (n=340)		
Diarrhoea	06	1.5
Conjunctivitis	05	1.2
Joint pain	197	49.0
Skin rash	80	19.9
Itching	144	35.8
Lossof smell	12	3.0
Abdominal discomfort	35	8.7

	Frequency (n)	Percent (%)
Chronic headache	144	35.8
Allergy	173	43.0
Frequent fever	134	33.3
Jaundice	14	3.5
Nail rotten problem	02	0.5
Cough	144	35.8
Phlegm with cough	81	20.1
Wheeze during breathing	20	5.0
Breathing difficulty	33	8.2

*Multiple responses

Table III Health seeking behaviors (n=402)

Attributes	Responses	Frequency (n)	Percent (%)
Availability of health facilities in the area	Yes	138	34.3
	No	264	65.7
Availability of health care centers to provide health care in the area	Yes	55	13.7
	No	347	86.3
Type of available health care providers	MBBS	43	10.7
	Doctor Pharmacist	359	89.3
Availability of investigation facilities in the health care centers	Yes	49	12.2
	No	353	87.8
Type of health services provided in health centers	Primary	376	93.5
	care Specialized care	26	6.5
Availability of government health facility	Yes	29	7.2
	No	373	92.8
Availability of vaccination facility	Yes	278	69.2
	No	124	30.8

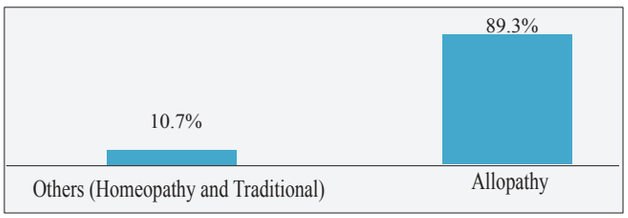

Figure 1 Type of treatment usually take while being sick

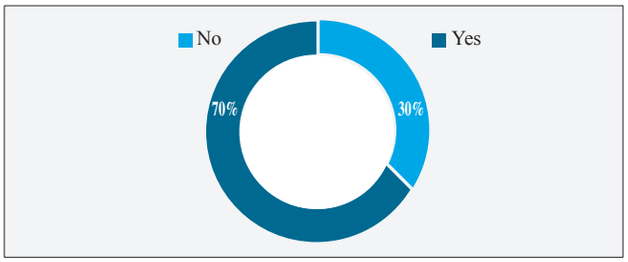

Figure 2 Use of PPE

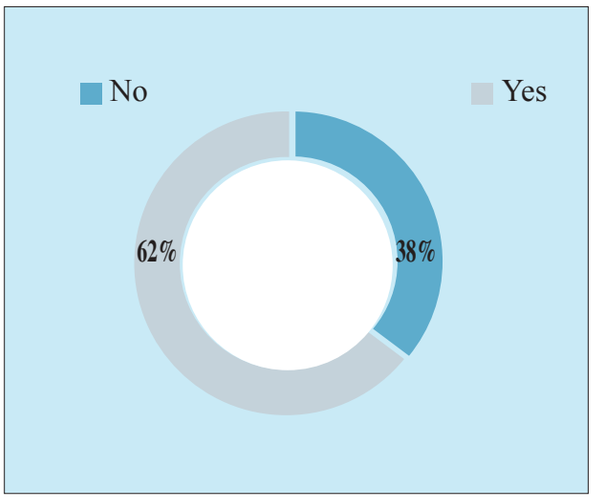

Figure 3 Source of PPE

Table IV Distribution of the participants according to type of PPE

Type of PPE	Frequency (n)	Percent (%)
Mask	268	66.7
Gloves	153	38.1
Cap	41	10.2
Apron	35	8.7
Goggles	39	9.7

Table V(a) Association between gender and variety of self-reported health problems

Health problems	Gender		p value
	Male n (%)	Female n (%)	
Diarrhoea	6 (1.5)	0 (0.0)	0.363
Conjunctivitis	5 (1.2)	0 (0.0)	0.407
Joint pain	166 (41.3)	31(7.7)	*0.021
Skinrash	69 (17.2)	11(2.7)	0.577
Itching	120 (29.9)	24(6.0)	*0.029
Loss of smell	11(2.7)	1 (0.2)	0.696
Abdominal discomfort	26(6.5)	9 (2.2)	*0.009
Chronic headache	119(29.6)	25(6.2)	*0.012
Allergy	148 (36.8)	25(6.2)	0.177
Frequent fever	118(29.4)	16(4.0)	1.000
Jaundice	10(2.5)	4 (1.0)	*0.051
Nail rotten problem	2 (0.5)	0 (0.0)	0.602
Cough	131 (32.6)	13(3.2)	0.178
Phlegm with cough	75 (18.7)	6 (1.5)	0.159
Wheeze during breathing	19(4.7)	1 (0.2)	0.326
Breathing difficulty	29(7.2)	4 (1.0)	0.973

*Statistically significant value.

TableV(b) Association between duration of works and variety of self-reported health problems

Health problems	Duration of works			p value
	<3 years	3-8 years	>8 years	
	n (%)	n (%)	n (%)	
Diarrhoea	1 (0.2)	4 (1.0)	1 (0.2)	0.747
Conjunctivitis	2 (0.5)	3 (0.7)	0 (0.0)	0.604
Joint pain	41 (10.2)	138 (34.3)	18(4.5)	0.313
Skin rash	14(3.5)	53 (13.2)	13(3.2)	*0.015
Itching	31(7.7)	99 (24.6)	14(3.5)	0.613
Loss of smell	3 (0.7)	6 (1.5)	3 (0.7)	0.115
Abdominal discomfort	4 (1.0)	25(6.2)	6 (1.5)	*0.055
Chronic headache	41 (10.2)	85 (21.1)	18(4.5)	*0.022
Allergy	33(8.2)	126 (31.3)	14(3.5)	0.091
Frequent fever	34(8.5)	86 (21.4)	14(3.5)	0.578
Jaundice	4 (1.0)	9 (2.2)	1 (0.2)	0.915
Nail rotten problem	0 (0.0)	2 (0.5)	0 (0.0)	0.612
Cough	32(8.0)	100 (24.9)	12(3.0)	0.760
Phlegm with cough	19(4.7)	54 (13.4)	8 (2.0)	0.913
Wheeze during breathing	6 (1.5)	10(2.5)	4 (1.0)	0.116
Breathing difficulty	9 (2.2)	19(4.7)	5 (1.2)	0.308

*Statistically significant value

Table V(c) Association between working department and variety of self-reported health problems

Health problems	Working department				p value
	Tanning	Pre-tanning	Finishing	Machinery	
	n (%)	n (%)	n (%)	n (%)	
Diarrhoea	2 (0.5)	0 (0.0)	1 (0.2)	3 (0.7)	0.488
Conjunctivitis	1 (0.2)	1 (0.2)	2 (0.5)	1 (0.2)	0.859
Joint pain	45(11.2)	40 (10.0)	42 (10.4)	70 (17.4)	0.226
Skinrash	22(5.5)	14(3.5)	15(3.7)	29(7.2)	0.151
Itching	36(9.0)	26(6.5)	28(7.0)	54 (13.4)	0.059
Loss of smell	4 (1.0)	3 (0.7)	3 (0.7)	2 (0.5)	0.486
Abdominal discomfort	8 (2.0)	6 (1.5)	11(2.7)	10(2.5)	0.697
Chronic headache	34(8.5)	24(6.0)	38(9.5)	48(11.9)	0.289
Allergy	41 (10.2)	32(8.0)	42 (10.4)	58 (14.4)	0.335
Frequent fever	35(8.7)	15(3.7)	38(9.5)	46(11.4)	*0.003
Jaundice	2 (0.5)	2 (0.5)	5 (1.2)	5 (1.2)	0.765
Nail rotten problem	1 (0.2)	0 (0.0)	0 (0.0)	1 (0.2)	0.572
Cough	30(7.5)	28(7.0)	34(8.5)	52 (12.9)	0.879
Phlegm with cough	15(3.7)	16(4.0)	21(5.2)	29(7.2)	0.981
Wheeze during breathing	5 (1.2)	2 (0.5)	6 (1.5)	7 (1.7)	0.645
Breathing difficulty	6 (1.5)	5 (1.2)	8 (2.0)	14(3.5)	0.749

*Statistically significant value.

DISCUSSION

In this study, a significant portion of the sample, 36.3%, consisted of individuals aged 20 to 30 years. Similarly, another study found that the majority of tannery workers (45.5%) were young adults aged 18 to 30, which aligns with the findings of the current research.[6]The findings revealed a considerable over-representation of males, with 88.1%. A comparable survey was conducted among 316 respondents, of whom 290 were males and 26 were women, indicating the same male majority.[10] According to an assessment on education, (43%) had completed primary education, which was identical to the current study.[11] Approximately (68%) of the participants had an income of 10,000 to 20,000 Taka.[10]

A significant proportion (34.6%) of the sample worked with machines, indicating that the tannery business is significantly reliant on machinery. A study evaluated the current findings by revealing that 57.5% worked by operating a machine.[12] A majority (66.4%) stated an employment duration of 3-8 years. A study found that (38%) of the total respondents, or a maximum of 337, had worked for six to 10 years.[13,14] The majority of workers (82.3%) reported working less than 10 hours a day. Another study found that the minimum working hours were 8.86 hours (82.5%), while the maximum was 13 hours (17.5%), which is consistent with the findings of the current study.[1] A significant number (84.6%) reported various health concerns within the recent six months. It was also receded by a study that found (63.3%) ill.[10]

In the current study, the prevalence of health issues included joint pain (49.0%), chronic headaches (35.8%), and skin-related conditions such as rashes (19.9%) and itching (35.8%). Gastrointestinal issues were reported by 8.5% of respondents, with specific occurrences of diarrhea at 1.5% and abdominal discomfort at 8.7%, which supports the findings of this study.[10]Health hazards were further compounded by symptoms such as cough (35.8%), phlegm with cough (20.1%), wheezing during breathing (5.0%), and difficulty breathing (8.2%). Another study found that productive cough and upper respiratory tract infections were reported at a rate of 15.3%. Additionally, 31% of tannery workers indicated having phlegm, which is somewhat comparable to the findings of the current study. Moreover, 89.3% of the population relied on allopathic therapies.[12]

Further, study found that out of the 200 employees who had illnesses, 161 of them sought medical help and went to different treatment facilities concurrently.[10]Only 7.2% of interviewees reported the presence of government health facilities, while 92.8% stated that such facilities were absent. In contrast, immunization facilities were more prevalent, with 69.2% of respondents acknowledging their availability. Regarding safety practices, 70% of participants reported using PPE. Notably, 62.2% of interviewees indicated that they obtained PPE from their factory. Masks were the most commonly used form of protection, utilized by 66.7% of participants. A previous study indicated that the majority of employees (57.6%) used PPE and followed safety precautions at work, which supports the findings of the current study.[13]Residence showed a notable association with health hazards. Tannery workers living in Hemayetpur for less than

five years were more likely to experience health issues (p=0.028), which is consistent with the findings of the current study.[5]

The findings indicated a significant relationship between the employment department and the occurrence of specific self-reported health problems. The rates were 8.7% in the tanning department, 3.7% in the pre-tanning department, 9.5% in the finishing department and 11.4% in the machine operation department (p=0.003). Another study also found a significant association between the working department and health hazards, particularly among those using machinery and handling chemicals (p=0.004).[1] Additionally, an investigation examined the link between work departments and the incidence of health ailments, revealing a significant association (p<0.001) between the occurrences of these disorders among workers.[15]

CONCLUSION

Leather is extensively used worldwide for the production of high-quality goods, with workers playing a crucial role in the development of the leather industry. This study highlights concerns regarding health hazards and safety practices within leather businesses. Health-seeking behaviors and safety practices vary due to the lack of health facilities in the residential areas surrounding the tannery estate. The well-being of workers is vital for the economic productivity of the workplace and for promoting positive socio-economic conditions for their families. Numerous factors influence the health issues faced by workers, and identifying these factors is essential for healthcare providers to improve monitoring and care.

RECOMMENDATIONS

Implementing periodic health education programs for employees and residents to enhance knowledge of health hazards. Enforcing strict safety protocols for tannery workers and establishing accessible healthcare facilities in the vicinity of the tannery area to meet community needs.

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DISCLOSURE

Both the authors declared no competing interest.

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