

Prevalence of Health Diseases among Bangladeshi Tannery Workers and associated Risk factors with Workplace Investigation

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Abstract

Background: The study aimed to estimate the prevalence of health hazards through analyzing different diseases among tannery workers and to identify risks factors of these diseases in tannery workers in Dhaka, Bangladesh.

Methods: A cross sectional study was conducted from May 2016 to July 2016 on tannery workers of the industrial area Hazaribagh, Dhaka. Data collection was done among 276 tannery workers engaged in different tanneries located at the area. Face to face interview was performed using a questionnaire and skin diseases faced by the workers were identified by trained medical students.

Results: The prevalence of diseases was found as gastrointestinal problem 71.7%, Diarrhea 71.7%, Blood pressure 52.2%, Asthma 49.9%, Eye problem 46.7%. Skin disease prevailed in the following order: Scabies 73.9%, Nail discoloration 69.6%, Urticaria 59.7%, Miliria and folliculities 56.5%. Again negligence of using personal protective equipment named safety boots, gloves and googles have significant influence ($p < 0.001$) on higher prevalence of asthma, eye problems and nail discoloration. Moreover, working areas of pre-tanning and tanning have significant ($P < 0.001$) association with the higher prevalence of scabies and miliria and folliculities.

Conclusion: Prevalence of diseases among the tannery workers are very high and is extremely associated with different working areas of leather processing and the lack of proper PPE (Personal protective equipment) using. The risk factors responsible for these health hazards can be eliminated through improving the overall working condition and ensuring the necessary protective regulatory for the Bangladeshi tannery workers.

Keywords: Tannery workers; Asthma; Personal protective equipment; Occupational dermatitis

Introduction

Leather processing is such an industry where practice of OHAS is very essential, as break of OHAS will create health hazard for workers who are directly involved with production [1]. Developing countries generally have fewer adequately effective occupational health programs and fewer adequately developed and enforced laws and regulations than those in the developed countries [2]. Occupational illness is less likely to be detected in developing countries partly as a result of inadequate occupational health services [3]. Tanneries abuse human right in Bangladesh and tannery workers are suffering from life dangerous diseases [4]. Toxic exposure of chemical in tanneries of Bangladesh is the main reason for health and safety violation [5]. Skin and respiratory diseases are very common health problems among tannery workers due to the hazardous uses of chemicals [6]. These chemicals are potential irritants and sensitizers in workers who are frequently exposed to these for prolonged periods of time [7]. The wastewater of tanneries contains animal flesh, sulfuric acid, chromium and lead, but these are disposed into river or nearby places of the tannery factories in Bangladesh which pollutes environment and affect human health of both tannery workers and neighborhoods [8]. Tannery workers are thus potentially exposed to harmful agents especially with Cr rendering them vulnerable to health problems especially those of respiratory tract and skin [9]. Chromium has potential to bind with skin proteins of tannery workers to produce complex antigens which lead to hypersensitivity. Bangladesh and tannery workers are suffering from life dangerous diseases. Chromium infectivity gets significance for its austere lethal behavior at a lessen concentration [10]. The resulting contact dermatitis could be preliminary condition to the development of bronchial

asthma [11]. The ability of chromium binding with skin proteins may produce complex antigen leading to hypersensitivity [12]. The primary health impacts from chromium are damage to the gastrointestinal, respiratory, and immunological systems, as well as reproductive and developmental problem [13]. In Bangladesh 58% tannery workers suffer from gastrointestinal disease, 31% from skin diseases, 12% from hypertension and 19% from jaundice [14]. An existing skin disorder becoming worse by work activities is also considered as occupational skin diseases [15]. This may be a reason why tannery work is highly associated with occupational dermatitis [16].

The aim of this study are referred as-

Determine health hazard diseases for tannery workers especially on the basis of occupational exposures for different time periods.

Pointing out worker's personal status in using personal protective equipment, different working areas, duration of work and the levels of education.

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Analyzing the risk factors precisely responsible for these health problems and diseases among these tannery workers.

Materials and Methods

Study area

A cross sectional study was conducted from March, 2016 to June, 2016 among 276 tannery workers of Hazaribagh area of Dhaka. The workers who were engaged into the total tannery process like in the stage of pre tanning, tanning and post tanning. Hazaribagh includes 95% of total tanneries of the whole country.

Data collection

Two trained interviewers interviewed each exposed worker. Occupational skin diseases were indicated by a medical student who was trained by a dermatologist. The interviewers explained the questions of the questionnaire to the workers for making it easier to the workers.

Statistical analysis

Statistical analyses were done by using The Statistical Package for Social Sciences (SPSS) version 20. T-test was done for analyzing the association of the risk factors like the lacking of proper using of personal protective equipment, working at different tanning area, educational status, duration of work with the prevalence of different health problems and occupational skin diseases among the tannery workers. The association was considered significant when P was ≤ 0.05 .

Results and Discussion

In this study, the education levels, duration of work, specific areas of working attached with tanning process, utilization of required personal protective equipment (PPE), different health problems and diseases suffered by the tannery workers of Bangladesh and finally responsible risk factors were analyzed and distributed as statistical analysis. Table 1 shows the descriptive characteristics of 276 tannery workers and the status of using personal protective equipment during working. Again the variables in Table 1 includes the educational status of tannery workers, duration of work in tannery which includes three time periods of 0-5 years, 6-10 years and more than 10 years, their working department including pre tanning, tanning and finishing, status of using PPE (Personal protective equipment). Again this table showed that about 40.2% of tannery workers were illiterate, 43.5% of the workers have primary education and 16.3% having secondary education. Majority of workers were found working more than 10 years (52.2%), again 29.2% workers for 0-5 years and 19.6% for 6-10 years.

Among 276 workers, about 50% workers were found working in pre tanning section, 17.4% were in tanning section and 32.6% in finishing section. In case of the use of Personal protective equipment, 26.1% workers were found using gloves, 16.3% of using safety boots and 26% were of using masks during their working period. Again apron was used by only 2.2% tannery workers, googles by 1.1% and no workers was found for using of respirators (Table 1).

According to Table 2, the common health problems among the tannery workers were Asthma (about 50% of workers), Diarrhea (71.7%), Jaundice/typhoid (43.5%), Blood pressure (52.2%), gastrointestinal problems (71%) and Eye problems (46.7%). In case of occupational dermatitis among the tannery workers, the prevalence was found as Scabies (73.9% workers were affected), Nail Discoloration (69.6%), Urticaria (59.7%), Miliria and folliculities (56.6%), Contact Dermatitis (39.13%). Again different occupational skin disease like

Variables	N (%)
Education level	
No education	111 (40.2)
Primary	120 (43.5)
Secondary	45 (16.3)
Higher	0 (0)
Duration of work	
0-5 year	78 (28.2)
6-10 year	54 (19.6)
>10 year	144 (52.2)
Working department	
Pre Tanning	138 (50)
Tanning	48 (17.4)
Finishing	90 (32.6)
Gloves	
Yes	72 (26.1)
No	204 (73.9)
Masks	
Yes	72 (26.1)
No	204 (73.9)
Safety boots	
Yes	45 (16.3)
No	231 (83.7)
Apron	
Yes	6 (2.2)
No	270 (97.8)
Respirators	
Yes	0 (0)
No	276 (100)
Googles	
Yes	3 (1.1)
No	273 (98.9)

Table 1: Descriptive characteristics of tannery workers and status of using Personal Protective Equipment (PPE) (N=276), n represents the number of tannery workers for every specific individual parameter of the analysis and then calculated as percentage with respect to the total numbers of N.

Variables	N (%)
Asthma	138 (49.9)
Diarrhea	198 (71.7)
Jaundice/Typhoid	120 (43.5)
Blood Pressure	144 (52.2)
Gastrointestinal Problem	198 (71.7)
Eye Problem	129 (46.7)
Scabies	204 (73.9)
Nail Discoloration	192 (69.6)
Urticaria	165 (59.7)
Miliria and Folliculities	156 (56.6)
Contact Dermatitis	108 (39.13)
Sores	105 (38.04)
Pruritus	90 (32.61)
Hand Eczema	81 (29.35)
Fungal Infection	75 (27.2)

Table 2: Prevalence of diseases including occupational dermatitis among tannery workers of Bangladesh (N=276), n represents the number of tannery workers for every specific individual parameter of the analysis and then calculated as percentage with respect to the total numbers of N.

Sores, Pruritus, Hand Eczema and Fungal Infection were also found very much prevalent among the tannery workers (Table 2).

The study highlights that most of the tannery workers had

experienced health problems and occupational dermatitis significantly. It also determines the factors which are responsible for these health problems among the tannery workers. Leather manufacturing processes involve many operations, including the use of various chemicals that are detrimental to the health of workers and nearby communities [17]. This analysis of health diseases showed that working in particular area of tannery, improper implication of personal protective equipment uses were significantly associated ($P < 0.001$) with the prevalence of these diseases among the workers (Table 3).

Again educational levels, duration of working of tannery workers were not found significantly responsible for these health problems. Among these diseases, Asthma was found significantly associated with the missing of using safety boots ($P < 0.001$). Also, improper implication of this personal protective equipment has a great significance for Nail Discoloration among the workers ($P = 0.0014$). The analysis of skin diseases was performed by a medical student trained by an experienced dermatologist which has helped a lot to determine that working in the area of pre tanning and tanning was extremely associated with the prevalence of skin diseases of Scabies and Miliria and Foliculities ($P < 0.001$ in case of both skin diseases). Skin exposure to chemicals has been shown to play a role in initial immunologic sensitization [18]. Chromate allergy is frequently observed in tannery workers [16]. Further, eye problem was found extremely higher for those workers who didn't use goggles ($P < 0.001$). The ability of chromium binding with skin proteins may produce complex antigen leading to hypersensitivity [12]. Hazaribagh area has a high incidence of a number of health problems. In this area the peoples are frequently suffering from abdominal skin ulcer, scabies, discomfort/gastritis, peptic ulcer, lung diseases, respiratory diseases, dermatitis, nasal ulcer/loss of smelling capacity, red eye/other eye illness, running nose, erosion and discoloration of teeth, asthma, puffines of face and oedema, diarrhoeal disease, high fever, conjunctivitis, urinary tract infection, jaundice, hypertension etc.

Conclusion

The study showed a high prevalence of health threat diseases and dermatitis among the tannery workers in Bangladesh. The prevalence of this disease was found as greatly higher for those workers who didn't make the proper utilization of use of different required personal protective equipment during their period of work. Again the unhygienic conditions, improper chemical handling, worst wastewater discharged system are greatly responsible for further health problems among tannery workers. Advanced research need to be done on the occupational hazards for Bangladeshi tannery among tannery and thus

the authority must take the adequate steps to eliminate the risk factors associated with it.

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Diseases	Associated Factors of Workers in Tannery	Significance (P Value)
Scabies	Working in pre tanning area	<0.001
	Working in tanning area	<0.001
Nail discoloration	No use of safety boots	0.014
Miliria and Foliculities	Working in pre tanning area	<0.001
	Working in tanning area	<0.001
Asthma	No use of safety boots	<0.001
Eye problem	No use of goggles	<0.001

Table 3: Significance of factors associated with the health problems and dermatitis for tannery workers.