

Original Article

Pattern of occupational skin diseases among construction workers in Dhaka city

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Abstract

Globally, occupational risks have been classed as the tenth leading cause of morbidity and mortality and occupational skin diseases are important problem in the construction industries. The current study was conducted to see the prevalence and pattern of skin diseases among construction workers in Dhaka city. This cross sectional observational study was conducted in the Department of Dermatology and Venereology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh from July 2013 to June 2014. Four hundred workers were randomly enrolled from 20 construction areas of Dhaka city. History were taken, physical examination and laboratory tests were done to see the presence and pattern of skin diseases. Among 400 workers only 23.0% uses protective measure and 59.5% has been suffered with at least one form of skin disease. Among them different dermatoses were found in following percentages i.e. irritant contact dermatitis (ICD) (28.15%), allergic contact dermatitis (ACD) (9.24 %), acne (14.29%), seborrheic dermatitis (10.92%), burn/scald (5.46%), accidental injury (7.14%), scabies (23.53%), fungal infection (dermatophytosis/pityriasis versicolor/candidiasis) (23.53%), palmoplantar keratoderma (13.87%), lichen simplex chronicus (3.78%), pyoderma (4.20%) and urticaria (2.52 %). Construction workers in Dhaka city bear a great burden of skin diseases, among which contact dermatitis is the most common and other skin diseases include fungal infection, scabies and acne. These occupational skin diseases may be prevented by providing improved work place, protective means, health education, adequate health services and improving professional skills.

Key words : Occupational dermatoses, construction workers, contact dermatitis

Introduction

The construction industry is one of the world's major industries. It is an essential contributor to the process of development.¹ In Bangladesh, construction sector is a rapidly enlarging but still unorganized sector. Being an unorganized sector the workforce is at risk of developing safety and health related hazards at work. Occupational dermatoses (OCD), defined as a skin disease that would not have occurred if the patient had not been doing the work of that occupation' is one of the frequent occupational diseases.² Occupational skin diseases represent approximately 40% of all occupational illnesses; different percentages from one country to another are determined by the extent and the type of industrialization and also by the knowledge and experience of the physicians.³ OCD is a significant occupational hazard in some jobs, like the construction industry. In the construction industry, various categories of workers are involved such as masons, helpers, fitters, supervisors, carpenters and painters. The common irritants at construction site are cement, chalk, fly ash, hydrochloric and hydrofluoric acids, fiberglass and rock wool, chromate, cobalt, epoxy resin, rubber, leather gloves, adhesives (phenol or urea formaldehyde resins), wood preservatives and polyurethane resins.⁴ Among workers who contact with cement regularly, occupational dermatoses, especially contact dermatitis, has been one of the most frequently reported disorders for many years.³ Skin contact with cement and other construction materials has been associated with irritant contact dermatitis, which ranges from cement burns to cumulative irritant contact dermatitis. Cement burns causes an acute ulceration⁵ most frequently seen in new and untrained cement workers. In non-sensitized workers who are exposed to cement on a regular basis, cumulative irritant contact dermatitis may result.⁶ In addition to irritant contact dermatitis, the exposure to other allergens in cement is a significant cause of occupational allergic contact dermatitis. The most important allergens in cement are soluble hexavalent chromium (chromate) compounds.⁷ In addition to soluble hexavalent chromium, other metals such as nickel, cobalt and also ingredients of the gloves such as rubber chemicals, latex, epoxy resins and preservatives are well-known allergens for

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the cement workers. Reported prevalence of allergic contact dermatitis to chromate among this population usually is more than 10%.⁸ Concrete, which is widely used in masonry, floor laying and other occupations, is a mix of portland cement (calcium, silica, iron, and alumina), sand, aggregate, and water. Fly ash, gypsum, and blast-furnace slag may be added to produce blended-cement products. Contact with wet concrete can cause both irritant and allergic contact dermatitis. Irritant dermatitis, which can be acute or chronic, is caused by the concrete's alkaline and abrasive properties. Irritant dermatitis can also be caused by solvents, soaps, asphalt, dust, fiberglass, abrasives and mechanical trauma or friction.⁸

Diagnosis and management of occupational dermatoses (OCD) is often inadequate. It is more poorly addressed in resource limited countries, like Bangladesh. Dhaka City has emerged as a fast growing mega city in recent years. It began with a manageable population of 2.2 million in 1975 which has been reached to 14.5 million in 2012.⁹ No city in the world has experienced such a high growth rate in population during this period. During 2000-2015 it is expected to grow at a 3.6% annual growth rate and reach a total population of 21.1 million in 2015. This will put it in 4th position on the list of the world's megacities.¹⁰ A Huge number of workers are employed in its construction sectors. The skin contact to cement or its mixtures or other construction materials can therefore be a major health problem in this group. The precise incidence and prevalence of dermatoses are unknown among the Bangladeshi construction workers. The prevalence and severity of occupational dermatoses in construction workers with regular exposure to cement and other related materials was also unknown in Dhaka. The current study was conducted to see the prevalence and pattern of dermatoses among construction workers.

Methods

Randomly 400 construction workers were selected from 20 construction areas situated at Jatrabari, Demra, Kuril, Badda, Mirpur, Aftabnagar, Uttara and Mohammedpur in Dhaka. Prior to the commencement of this study, the research protocol was approved by the ethical committee of BSMMU, Dhaka. The aims and objectives of the study along with its procedure, risks and benefits of this study were explained to the respondents in easily understandable local language and then written consent was taken from them. It was assured that all information and records would be kept confidential and the procedure will be helpful for the researcher in evaluating the spectrum of occupational dermatoses among the construction workers of Dhaka city. After a complete

physical examination, data were recorded in a pre-designed structured questionnaire, providing a detailed job condition, personal and past dermatological history and the length of employment in the current job position. The duration of exposure was calculated as years in occupation. The history of atopic symptoms, both personal and familial, was also recorded. In addition, the subjects were asked about their personal work habits, use of protective gloves and the type of gloves used. We performed clinical examination with magnifying glass and woods lamp where needed. All collected data were checked and rechecked for omissions, inconsistencies and improbabilities. Data analysis were performed by Statistical Package for Social Science (SPSS), version-17. Prevalence, percentage, mean and median were calculated.

Results

Mean age of the patients is 40.85 years ranging from 15-65 years, 13.5% were from age <18, 76.5% from age 18-45 years and 10.0% from age group of >45 years. Among them 81.75% were male and 18.25% were female. Average daily working time is 11 hours, 23.75% of workers work for 8 hours, 44.25% work 8-12 hours and 32.0% work > 12 hours in a shift. Working duration in the construction industry was 16.0% workers for <1 year, 61.75% workers for 1-5 years, 22.25% for >5 years and mean duration was 4.9 years. Only 23.0% use any form protective measure. (Table - I)

Table I : Distribution of demographics of the workers

Variables	Frequency	Percentage
Age (years)		
<18	54	13.5
18-45	306	76.5
>45	40	10
Working hours per day		
8	95	23.75
8-12	177	44.25
>12	128	32
Duration of work (Year/s)		
<1	64	16
1-5	247	61.75
>5	89	22.25
Protective measures (Boot, Gloves, Apron/jacket, Googles and Sufficient water)		
Available or used	92	23
Not available or not used	308	77

All working fields are dirty or unhealthy and 3.50% of workers involved in wet works or washing, 20.75% in brick/stone works, 30.75% in cement works, 11.50% in metal work/welding, 15.25% in tar/pitch works, 8.00% in wood works and 10.25% in sand/mud works. (Table-II)

Table -II : Types of works in construction industry

Type of work	Frequency	Percentage
Wet work/washing	14	3.50
Brick/stone work	83	20.75
Cement work	123	30.75
Metal work/welding	46	11.50
Tar/pitch work	61	15.25
Wood work	32	8.00
Sand/mud work	41	10.25
Total	400	100.0

Among all construction workers 59.5% have at least one form of skin disease and rest of the workers were not found to have any skin disease. (Table-III)

Table - III : Prevalence of skin disease among construction workers (n=400)

Skin disease	Frequency	Percentage
Present	238	59.5
Absent	162	40.5
Total	400	100.0.0

Out of all skin diseases, 89 (37.39%) patients were suffering from contact dermatitis, among which 28.15% was irritant contact dermatitis (ICD) and 9.24% allergic contact dermatitis (ACD). Other skin diseases were acne (14.29%), seborrheic dermatitis (10.92%), burn/scald (5.46%), accidental injury (7.14%), scabies (23.53%), fungal infection (Dermatophytosis/pityriasis versicolor/candidiasis) (23.53%), palmoplantar keratoderma (13.87%), lichen simplex chronicus (3.78%), pyoderma (4.20%), photodermatitis (2.52%) and urticaria (2.52 %) (Table -IV).

Table IV: Distribution of skin diseases among construction workers (n=238)

Name of skin diseases	Frequency	Percentage
Irritant contact dermatitis	67	28.15
Allergic contact dermatitis	22	9.24
Contact dermatitis	89	37.39
Acne	34	14.29
Seborrheic dermatitis	26	10.92
Burn/scald	13	5.46
Accidental injury	17	7.14
Scabies	56	23.53
Fungal infection	56	23.53
Palmoplantar keratoderma or frictional callosities	33	13.87

Multiple responses

Contact dermatitis was mostly distributed on exposed areas including hands (85.4%), legs (30.3%) and other uncovered areas (7.9%). Covered areas were affected in 14.6 % cases (Table-V).

Table V: Distribution of sites of contact dermatitis (n=89)

Site/site s	Frequency (%)
Exposed areas	76 (85.4)
Hands	53 (59.6)
Legs	27 (30.3)
Other uncovered areas	7 (7.9)
Covered areas	13 (14.6)

Multiple responses

Discussion

Rapid urbanization and industrialization have imposed a huge load of construction works worldwide, which creates different social, cultural and health impact. The mean age of workers with in the construction industry is relatively

high; it is 40.85 years which is close to similar study by Bock et al¹¹(39 years) but quite apart from Shah & Tewari¹² (25.83±9.89 years) and Conde'-Salazar et al¹³ (45 years). The average duration of working in the construction of the workers was 4.9 years and the mean daily working hours was found to be 11 hours.

Scarcity of water, limited availability of cleaning facilities and climatic conditions hasten the development of dermatitis in construction workers.¹⁴⁻¹⁵ In the current study among four hundred construction workers 59.5% of have at least one form of skin disease. Most of the workers were involved in cement works followed by brick/stone works, tar/pitch works, metal work/welding, sand/mud works, wood work and wet works. These factors may contribute in the high rate of contact dermatitis here (37.39%), which is compareable with such previous studies.¹⁵⁻¹⁷ Among them irritant contact dermatitis (ICD) (28.15%), allergic contact dermatitis (ACD) (9.24 %), acne (14.29%), seborrheic dermatitis (10.92%), burn/scald (5.46%), accidental injury (7.14%), scabies (23.53%), fungal infection (Dermatophytosis/pityriasis versicolor/candidiasis) (23.53%), palmoplantar keratoderma or frictional callosities (13.87%), lichen simplex chronicus (3.78%), pyoderma (4.20%), photo dermatitis (2.52%) and urticaria (2.52 %). Contact dermatitis is the most common skin disease and mostly occurs on exposed part (legs and hands), which support previous study in Germany by Bock et al.¹¹ On the other hand in an Indian study by Shah and Tewari most common skin disease is callosities (19.6%),¹² which is found in 13.87% workers.

In such an industry where different chemical and metallic substances are commonly handled protective measures like gloves, shoes, jacket is very important. In the current study only 23.0% workers had opportunity to use any form protective measure and all working fields were dirty or unhealthy. The prolonged exposure to construction materials for years without almost no protective measures may be cause of this high rate of contact dermatitis. Scabies and fungal infection also found in a higher rate among workers, these may be due to dirty, unhealthy, hot humid working areas and residence.

The construction industries in Bangladesh consists of a group of less skilled workers who start the occupation without previous training; this situation facilitates the emergence of occupational dermatitis. More over in this study almost all workers are belong to low socio-economics class, they have limited excess to health care, lack of sufficient health education. All these factors produce a cumulative affects to their health specially skin

health. So, construction workers in Dhaka city bear huge loads of skin diseases which can be prevented by providing improved work place, protective means, health education, adequate health services and improving professional skills.

References

1. Kulkarni GK, Construction Industry : More Needs to be Done, IJOEM 2007; 11 (1): 1-2.
2. Mathias CGT. Contact dermatitis and workers compensation: Criteria for establishing occupational causation and aggravation. J Am Acad Dermatol 1989;20:842-8.
3. Denton CR, Keeran RG, Birmingham DJ. The chromium content of cement and its significance in cement dermatitis. J. Invest Dermatol 1954; 23: 189-92.
4. Rycroft RJG. Occupational contact dermatitis. In: Rycroft RJG, Menne T, Frosch PJ, editors. Textbook of contact dermatitis. 2nd ed. Springer-Verlag: Berlin; 1995; 555-80.
5. G:\Doc\zaigirdar sir\pp-BSMMU\acement wrkr.htm - ft2Mc-Geown G. Cement burns of the hand. contact Dermatitis 1984; 10: 246.
6. Coenraads PJ, Nater JP, Jansen HA, Lantinga H. Prevalence of eczema and other dermatoses of the hands and forearms in construction workers in the Netherlands. Clin Exp Dermatol 1984; 9: 149-58.
7. Calnan CD. Cement dermatitis. J Occup Med 1960; 2: 15-22.
8. Liden C, Bruze M, Menne T. Metals. In: Frosch PJ, Menne T, Lepoittevin, editors. Contact Dermatitis. 4th ed. Germany: Springer; 2006: 537-68.
9. United Nations (1998) World Urbanization Prospects: The 1996 Revision. New York: United Nations.
10. World Urbanization Prospects: The 1999 Revision. New York: United Nations.
11. Bock M, Schmidt A, Bruckner T, Diepgen TL. Occupational skin disease in the construction industry. Br J Dermatol. 2003;149:1165-71.
12. Shah RK and Tiwari RR. Occupational skin problems. Indian J Dermatol. 2010; 55(4): 348-351.
13. Conde'-Salazar L, Guimaraens D, Villegas C et al. Occupational allergic contact dermatitis in construction workers. Contact Dermatitis 1995; 33: 226-30.

14. Tiwary G, Gangopadhyay PK. A review on the occupational health and social security of unorganized workers in the construction industry. *Indian J Occup Environ Med* 011;15:18-24.
15. Stevenson CJ. Occupational diseases of skin. In: Raffle PA, Adams PH, Baxter PJ, Lee WR, editors. *Hunter's Diseases of Occupations*. 8 th ed. London: Edward Arnold; 1994: 691-719.
16. Bock M, Schmidt A, Bruckner T, Diepgen TL. Developments in chromate allergy in the German construction industry. *Hautarzt*. 2004;55:460-4.
17. Uter W, Ruhl R, Pfahlberg A, Geier J, Schnuch A, Gefeller O. Contact allergy in construction workers: results of a multifactorial analysis. *Ann Occup Hyg*. 2004;48:21-7.
18. Yamamoto O, Nishio D, Tokui N. Six cases of occupational skin diseases caused by cement: considerations from the aspect of occupational dermatology. *J UOEH*. 2001;23:169-8.