

Original Article

# Occupational Dermatoses

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## ABSTRACT

**Introduction:** Occupational dermatosis is defined as any pathological condition of the skin for which job exposure can be shown to be a major direct or contributory factor. The commonest occupational dermatosis is a work-related contact dermatitis. The aim of the study was to find the pattern and diagnosis of occupational dermatosis in our community as no such study has been carried out in Nepal.

**Materials and Methods:** This was a prospective study of 70 ambulatory patients with work-related dermatoses presented to the Dermatology Department of Kist medical. Data on socio-demographic characteristics, on lifestyle and temporal factor, the type of contact dermatitis, location and etiological factors were gathered through a structured questionnaire.

**Results:** More females (n=39; 60%) cases were affected by contact dermatitis compared to men (n=31; 40%), without a significant difference (p=0.5). Most of our patients belonged to the age group of 20-39 years accounting to 38 cases (54%). The mean age of patients was 34 years old (16 – 70 year), with 49 (70%) of them living in urban area and 21 (30%) living in rural area, (p<0.05). Regarding the dermatological diagnosis the most common occupational disease was irritant contact dermatitis (n=29; 41.4%), allergic dermatitis (n=19; 27.1%), dermatophytosis (n=13; 18.6 %), photoallergic (n=6; 8.6%) and miscellaneous in 3 (4.3%) cases.

**Conclusions:** Irritant contact dermatitis is more common than allergic contact dermatitis. Occupational dermatitis can cause significant morbidity and most cases are encountered in the younger age group. Therefore use of protective clothes, gloves should be advised to those vulnerable occupations.

**Keywords:** Allergy; Contact; Dermatitis; Dermatoses; Irritant; Occupational

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## INTRODUCTION

Occupational skin diseases are one of the most important emerging risks related to the exposure to, and extensive use of, chemicals. As the largest organ of the body, the skin is exposed to chemical, physical and biological risk factors. Occupational dermatoses (OD) can be defined as: “Any abnormality of the skin induced or aggravated by the work environment”.<sup>1</sup> Occupational dermatoses can be also defined as: “A pathological condition of the skin for which occupational exposure can be shown to be a major causal or contributory factor”.<sup>2</sup> However, because there is no scientific method to measure the consequences and level of the body’s exposures to risks via dermal contact, no dermal exposure standards are set. This increases the importance of recognizing risk factors and developing methods of assessing and controlling them.

The most common work related dermatosis is contact dermatitis reported to be 12.9 per 100,000 workers.<sup>1</sup> Occupational contact dermatitis is most often localized to the hands.<sup>3</sup> and employees in wet work are at increased risk of this disease.<sup>4,5</sup>

Occupational skin diseases affect workers of all ages in a wide variety of work settings such as; hairdressing, medical, dental, veterinary, agriculture, cleaning, printing, painting, construction, food preparation and catering, etc.<sup>6</sup> In general, only a very small percentage of people exposed to a particular chemical will develop an allergy to it. Because allergic reactions are not concentration-dependent, the dermatitis commonly involves not only the site of primary contact, but also distant sites where small amounts have been accidentally transferred, e.g. by the fingertips. Thick

skin is relatively resistant to contact dermatitis, whereas thin skin is much more susceptible. It is therefore possible for a contact allergy to a substance in contact with the hands to present first as an eyelid dermatitis, or penile dermatitis, and later on produce hand dermatitis. An allergy to rubber gloves may present with dermatitis on the flexor wrist, with later involvement of the dorsa of the hand.

In the Western world, about 90% of OD are contact dermatitis (CD).<sup>7,8</sup> Its frequency is increasing due to contact with new products. In the work area, irritative contact dermatitis (ICD) is more frequent than allergic contact dermatitis (ACD), with a 4:1 ratio.<sup>9</sup>

Cement burns usually occur as a result of kneeling in wet cement, or getting cement down into work boots. Symptoms may be delayed a couple of hours. Initially, the skin is a dusky red and extremely painful, followed by deep necrotic ulcers.<sup>10,11</sup> Although rare, the consequences are incapacitating, and it is imperative that cement workers avoid kneeling in cement, and remove contaminated clothing or boots immediately.

In the cleaning sector, ICD is common because of humidity and soaps and detergents that contain fatty acids and alkalis.<sup>12</sup> Cleaning products and gloves made out of rubber are the sensitizing agents. Enzymatic detergents rarely cause CD.<sup>13</sup>

**Clinical Diagnosis:** It is important to consider the following aspects in the diagnosis and establishment of appropriate medical conducts to treat confirmed or suspected cases of OD. Clinical symptoms; history of occupational exposure, observing the concurrence between the onset of symptoms and the start of exposure, as well as the localization of lesions in areas exposed to suspected agents; Improvement with work withdrawal and aggravation upon return to work.

**Laboratory Diagnosis:** Laboratory exams may contribute to the diagnosis of OD; however, none of these resources can substitute a good anamnesis, a careful physical examination, and knowledge on the part of the professional individual about the main substances present in the work environment and the risks they offer. The patch test is the main laboratory resource which allows the differentiation between ICD and ACD.<sup>14</sup> Patch tests are performed with the application of standardized substances in the patient's upper back. The results are interpreted after 48 and 96 hours.<sup>15,16</sup> This test must be performed to confirm the clinical diagnosis, to know the prevalence of sensitizing agents and for medical-legal reasons. A positive patch test is only relevant in the event of a causal relationship between the positive substances and the CD. The aim of the study was to find the pattern and diagnosis of occupational dermatosis in our community as no such study has been carried out in Nepal.

## MATERIAL AND METHODS

This is a prospective study of 70 ambulatory patients with work-related dermatoses presented to the Dermatology Department of Kist medical college from January 2015 to December 2016. Permission was obtained from institutional review committee to conduct the study. Data on socio-demographic characteristics, variables related to lifestyle and to the temporal factor, the type of contact dermatitis, location and etiological factors were gathered through a structured questionnaire. The data were collected and

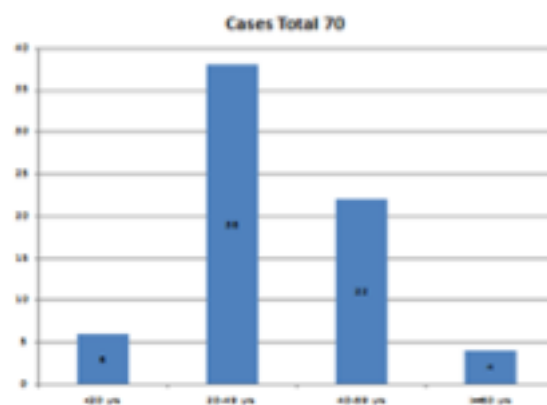


Figure 1: Bar diagram showing age group distribution of the patients.

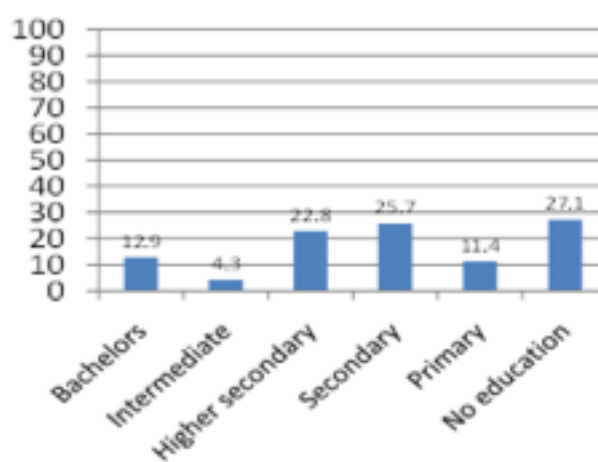


Figure 2: Bar diagram showing education level of the patients.

entered in Microsoft excel, and was analyzed using SPSS version 11. Comparison between proportions was done by the chi-square test and corrected chi-square test when needed. The comparison between group means was done using student's t-test. The results were considered significant when p value is < 0.05.

## RESULTS

A total of 70 cases were included in the study. Among them, 39 (55.7%) patients were female compared to 31 (44.2%) male patients ( $p=0.5$ ). The male to female ratio was 1.25:1. Most of our patients belonged to the age group of 20-39 years ( $n=38$ ; 54.2%) followed by age group 40-59 years ( $n=22$ ; 31.4%). (fig. 1) Most of the patients ( $n=51$ ; 73%) were literate and only (19) 27 % of the patients were illiterate (fig. 2).

Regarding the occupation most patients were construction workers 17(24.28%), followed by housekeeping 13(18.57) hospital staff 12 (17.14%). (fig. 3) Depending upon exposure to various materials, building materials 16.8 (24%), housekeeping 13 (18%), industrial workers and mechanics 11 (15%), hospital exposure 12 (17%) and cosmetics 6 (8.5%) were the most frequent causative factors (fig. 3).

Among the patients with dermatoses, most affected area was hand ( $n=55$ ; 78.6%) followed by 8 (11.4%) with affected hands (fig.

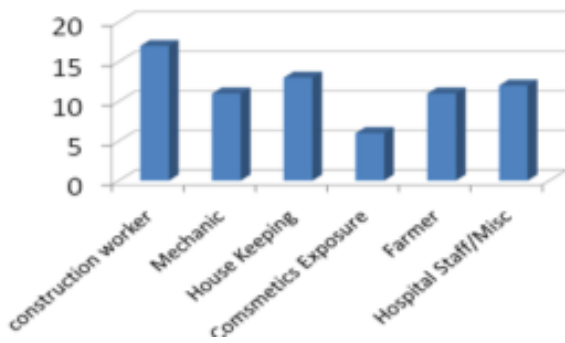


Figure 3: Bar diagram showing occupations of the patients.

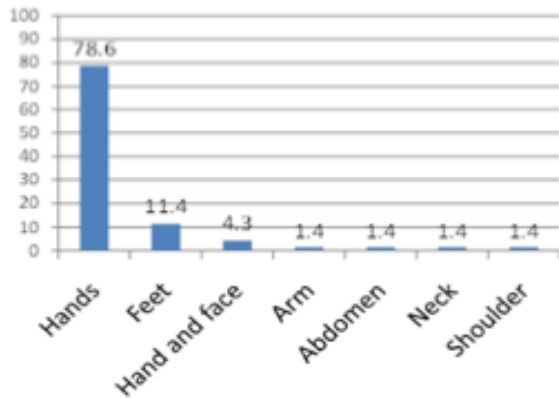


Figure 4: Bar diagram showing distribution of the lesions

4). Regarding the dermatological diagnosis the most common occupational disease was irritant contact dermatitis in 29 (41.4%) patients, allergic dermatitis in 19 (27.1%) patients and dermatophytosis in 13 (18.6 %) patients (fig. 5).

Depending upon their profession, some of the patient’s skin remained wet. The patients who had to do wet work for more than 2 hours daily had a higher incidence of ICD (n=45; 30%) than the patients who worked for less than 2 hours (n= 21; 64.3%) but it was not statistically significant(  $p < 0.05$ ; fig. 6).

**DISCUSSION**

This cross sectional study was carried out to determine the most prevalent occupational skin problems among the different occupations, and to elucidate the personal and occupational risk factors associated with the detected skin problems. Socio-demographic characteristics of the studied groups had no significant difference regarding age, gender, residence, education, marital status, smoking habits and family history.

In several countries the prevalence increases with age especially among males, and tends to decrease after the age of 50 years.<sup>17</sup> More affected by contact dermatitis were females with 39 (55.7%) cases compared to men with 31 (44.2%) of total cases without a significant difference,  $p=0.5$ . Female to male ratio was 1.25:1. Other studies also showed similar finding with increased frequency of contact dermatitis among females than in males. Most of these females were of occupational groups exposed extensively to wet.<sup>18,19</sup>

Among females, practicing domestic activities; increased rate of

dermatoses was seen in the age of 40 years. Studies suggest that the age and sex, by themselves, are not risk factors for contact dermatitis, but may become in association with exposure to different professional and household activities.<sup>20</sup> The mean age of patients was 29 years old (range 20 – 39), with 49 (70%) of them living in urban area and 21 (30%) living in rural area,  $p < 0.05$ . Occupational dermatoses were reported to be significantly more frequent among the younger age and explained by low seniority, poor job training and disregard for the use of protective measures.<sup>19,21</sup>

Illiterate workers were at a higher risk of occupational dermatoses than literate, but without significant difference between them. It may be due to awareness of hazardous materials and taking care of their skin.<sup>22,23</sup>

The most common occupational disease was irritant contact dermatitis 29 (41.4%), followed by allergic dermatitis 19 (27.1%). These results correlated with some studies<sup>24,25</sup> and but were discordant with others.<sup>22</sup> According to a cross sectional observational study done in Dhaka 32, ICD (28.15%), ACD (9.24%) and fungal infection (23.53%) was observed in construction workers in Dhaka city.

The most common site affected were hands 55(78.6%), followed by feet in 8 (11.4%) of the patients. The irritant type of eczema is more frequent than the allergic type. This agrees with other reports.<sup>23-25</sup> The allergic and irritant lesions are mainly located on the hands (52%). The location on hand appears to be the most frequent site among professional contact dermatitis at both women and men. Other location was face which was diffuse in construction workers and particularly on eyelids in textile workers

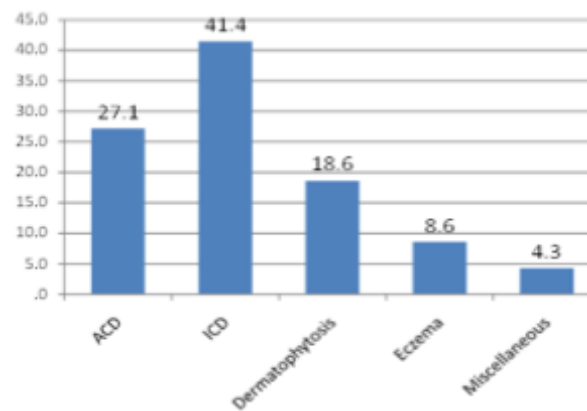


Figure 5: Bar diagram showing different disease conditions and its prevalence

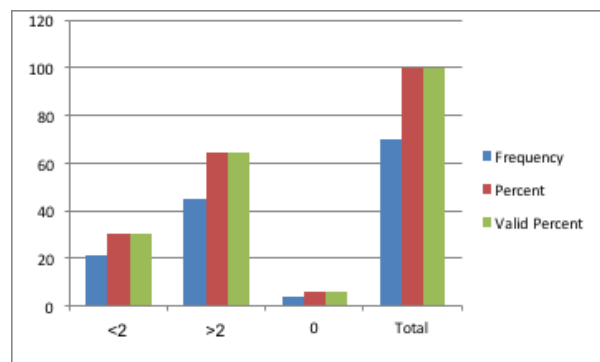


Figure 6: Bar diagram showing relation of ICD/ACD with the exposure of the patient with water. (<2 hours and > 2 hours)

which was in minority group.

Most common symptom was scaling in 51.4%(36) followed by erythema 41.4%(29), itching 27.1%(19), fissuring 20%(14) and hyperkeratosis 15.7%(11) and most of the patients came in the chronic state of eczema.

According to another study done in Nepal<sup>23</sup>, the most common site of lesion was palm (62.8%) followed by tip of the fingers in 39.0% patients. The most common sign of the lesion was erythema which was seen in 59.1% followed by scaling seen in 51.8 % patients. Depending on the time of the year, most of cases were reported during the spring 40% (28) - summer 32% (23) period, in which the risk of contact with the various allergens is significantly increased.

Regarding the occupation; most patients were construction workers 17(24.28%), followed by housekeeping 13 (18.57%) hospital staffs 12 (17.14%). Those working as mechanic and farmers were in equal number 11(15.71%) and few were beauticians 6 (8.5%) with exposure to chemicals. Skin in contact with cement has been associated with irritant cement contact dermatitis and allergic cement contact dermatitis.<sup>24</sup> A previous study in Taiwan showed that 16.5% of male and 7.2% of female cement workers developed chromium hypersensitivity as a result of cement exposure.<sup>25</sup>

Those workers who work more than 2 hours daily at wet work

had higher risk of skin disease than those who work less than ½ hour per day, but the difference was not significant (t-test). In accordance to these results, wet work was not found to be an independent risk factor for occupational dermatoses.<sup>26</sup>

Depending upon exposure to various materials, building materials 16.8 (24%), housekeeping 13 (18%), industrial workers and mechanics 11 (15%) were the common causes. In contrast to our study, a study in Greece,<sup>32</sup> the highest prevalence rates were noted among hairdressers (30%), cooks (29.5%), car industry workers (of mechanical injury: 15%), construction workers (of contact urticaria: 29.5%) and industrial cleaning workers (of chemical burns: 13%).

## CONCLUSIONS

Contact dermatitis is still frequent occupational dermatoses in our patient population. Irritant contact dermatitis is more common than allergic contact dermatitis. Occupational dermatitis can cause significant morbidity and most cases are encountered in the younger age group. The general and individual measures of prevention and protection are needed for the management of the disease.



Figure 1: pompholyx in hotel worker. (Permission was obtained from patient to display photo image)



Figure 2: irritant contact dermatitis in industrial worker. (Permission was obtained from patient to display photo image)



Figure 3: Irritant contact dermatitis with infection in construction worker. (Permission was obtained from patient to display photo image)

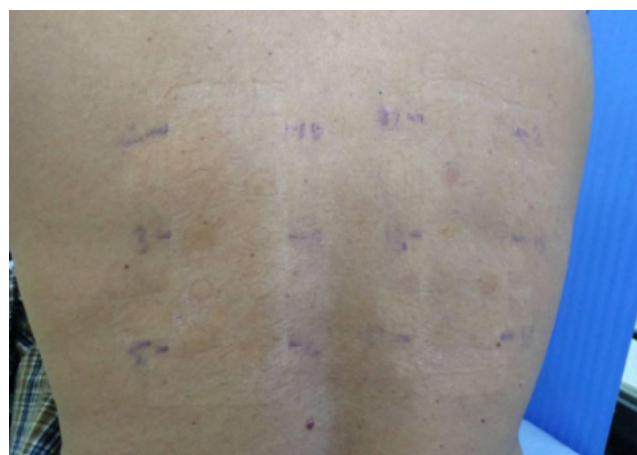


Figure 4: Patch test in a patient with suspected occupational dermatoses. (Permission was obtained from patient to display photo image)



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