

## Research Article

# A Study to Assess the Clinical Symptoms and Associated Risk Factors of Occupational Contact Dermatitis among Leather Shoe Production Industry Workers

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**Abstract:** Occupational contact dermatitis (OCD) is one of the most common occupational skin diseases. Occupational contact dermatitis has been observed to have a high risk of occurrence among the blue collar workers at workplace. Occupational contact dermatitis regularly causes high levels of worker morbidity. The incidence rate was confirmed cases was 20.5 per 100,000 workers. The 1-year period prevalence rate was 34.5 per 100,000. Hence a study is aimed to assess the clinical symptoms and associated risk factors of occupational contact dermatitis among leather shoe production industry workers. **METHODS:** A descriptive research design was used in this study. The total study sample was 100 workers who work in leather shoe production industry. The sample were selected using purposive random sampling. Modified Nordic Occupational Skin Questionnaire NOSQ-2002 checklist to assess the clinical symptoms and self-structured questionnaire was used to assess the associated risk factors of Occupational Contact Dermatitis. **RESULT:** The study concludes that most of them have redness frequently 48(48%), dry skin frequently (40%), burning frequently 50(50%), sometimes they have blisters 39(39%), most of them have itching sometimes 67(67%), majority of them have pain/aching sometimes 59(59%). The major risk factors that cause occupational contact dermatitis (OCD). Contact with leather is 20%, no protective gloves used is 20%, working hours is greater than 8 hours is 18%, contact with adhesives/glues is 16%, contact with liquid soaps, shampoos is 14%, frequency of hand washing is less than 5 times per day is 12%.

**Keywords:** Clinical symptoms, Associated risk factors, Occupational contact dermatitis, Leather shoe production industry workers.

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## INTRODUCTION:

Occupational contact dermatitis (OCD) is one of the most common occupational skin diseases. Occupational contact dermatitis has been observed to have a high risk of occurrence among blue collar workers at workplace. Contact dermatitis is considered to be occupational if it is the direct consequence of a cutaneous contact with the materials used in the work place. However, although the number of cases and costs of occupational contact dermatitis are increasing, there are few occupational population based on epidemiological studies (Diepgen, T. L. 2012).

Contact dermatitis is an important health issue in occupations that involve mostly manual work, is generally associated with prolonged or frequent contact with allergens or irritants. Furthermore, exposure to certain metal working tools and contact with dermatitis causing chemicals such as low sulphide unhairing agents, formic acid, chromium sulphate, magnesium

oxide, fungicides and gloves made up of latex are known to be risk factors for contact dermatitis (Diepgen, T. L., & Coenraads, P. J. 1999).

Employees with the highest risk of development contact dermatitis are those working in the healthcare, hairdressing, car repair, leather manufacture, and shoe manufacturing industries. Nevertheless, studies on shoe manufacturing industry have only been undertaken among registered patients (Nielsen, N. H., & Menné, T. 1992). Shoe manufacturing workers are exposed daily to an extensive range of potential physical and chemical occupational hazards. Shoe manufacturing in India is one of the industrial sectors that were shown sustained growth amongst the newly industrialized countries (Cvetkovski, R. S. *et al.*, 2005).

Shoe manufacturing industries workers has job to be carried out is assembling out the parts of the shoe. Procedures in shoe making takes five important steps: making of uppers, making of bottom stock, assembling

of uppers and bottom stock shaping and leveling finishing of shoes. Craftsmen are exposed to a mixture of solvents in adhesives for binding and for cleaning purposes. In shoe making, adhesives are particularly harmful if they are applied by uncovered hands and removed by rubbing hands jointly as it is finished by shoe makers. This augments absorption of the solvent like toluene along with other prospective irritants and allergens in the adhesives (Diepgen, T. L., & Coenraads, P. J. 1999).

Some occupations are associated with a higher risk of developing occupational contact dermatitis than others, depending upon the nature of exposure in the workplace. It has been proposed that occupations may be classified as exceedingly high-risk, having an incidence of at least 70 cases per 100,000 workers and high-risk, between 30-70 cases per 100,000 workers. The ranking of various high-risk occupations may vary between reporting centers and also between countries, depending upon a range of factors, including specific working conditions. Some of the most common causes of contact dermatitis are poison ivy, nickel used in cell phones, jewelry, belt buckles, cosmetics, adhesives, fragrances, latex, and cement (Schwensen, J. F. *et al.*, 2014).

Occupational contact dermatitis regularly causes high levels of worker morbidity; however, this is often not reflected in available statistics. The incidence rate was confirmed cases was 20.5 per 100,000 workers. The 1-year period prevalence rate was 34.5 per 100,000. The prevalence of contact dermatitis is usually seen between 10 and 40%, in general. Workers are often exposed to cleaning materials, like detergents, latex, and adhesives and through and frequent hand washing. The use of alcohol gel, contact with allergens, and the occlusive effect of gloves also lead to contact dermatitis. A study demonstrated that using latex gloves can predispose to the developments of contact dermatitis among healthcare workers (Nicholson, P.J. 2010).

Danish studies in the (1990s) reported a lifetime prevalence of hand dermatitis of 17% and already in adolescents aged between 12 and 16 years the prevalence was 7%. In Gothenburg, Sweden, the point prevalence of hand dermatitis among individuals aged between 20 and 65 years was 5.4 % and 1- year prevalence 10.6%. On the basis of a review of original articles from the last 30 years, a point prevalence of hand dermatitis of 4% was determined. whilst a 1 – year prevalence of 2% was given for acute contact allergic dermatitis of the hand. According to this review, the 1- year prevalence of hand dermatitis in general was approximately 10%. In a patient collective of the Information Network of dermatological clinics (IVDK), hand dermatitis accounted on average for approximately a third of all forms of contact dermatitis of 6% (Nielsen, N. H., & Menné, T. 1992). Thus, the 1-

year prevalence of 7% determined by the German health survey appears to demonstrate relatively stable development over the decades. Allergic contact dermatitis is undoubtedly a widespread disease with an incidence similar to that of diabetes (Febriana, S. A. *et al.*, 2014).

The objective of the current study was, therefore to investigate the occurrence and risk factors associated with the occurrences of occupational-related contact dermatitis among the leather shoe production factory employees. An investigation of clinical symptoms and associated risk factors for occupational-induced dermatitis is imperative to understand the etiology of disease and inform better preventive strategies.

### **Objectives:**

- To assess the demographic variables of the study participants working in the leather shoe production industry at Ranipet.
- To assess the clinical signs of occupational contact dermatitis of the study participants working in the leather shoe production industry at Ranipet.
- To assess the associated risk factors of occupational contact dermatitis of the study participants working in the leather shoe production industry at Ranipet.

### **MATERIALS AND METHODS:**

The research design selected for the study is descriptive research design. This study is conducted in GTFC limited at Ranipet. The sample for the study is who all are working in the leather shoe production industry at Ranipet who fulfill the inclusion criteria. The total study samples will be 100 workers who work in leather shoe production industry. A sample of 100 workers who are all working in leather shoe production industry at Ranipet who fulfill the inclusion criteria will be selected using purposive random sampling. The main study was conducted at GTFC private limited at Ranipet. After obtaining formal permission from the administrative officer, data collection was started. After an introduction and rapport with the industry workers, the purpose of the study was explained to the study participants. Socio-demographic variables were collected from the study participants & checklist is given to assess the clinical symptoms of occupational contact dermatitis and then started assessing the associated risk factors of occupational contact dermatitis by using MODIFIED NORDIC OCCUPATIONAL SKIN QUESTIONNAIRE NOSQ-2002 to the workers who participated the study (Susitaival, P. *et al.*, 2003). The assessment was done for 25 workers per day on 4 consecutive days. Thus, the data collection was done. The collected data was tabulated and analyzed using frequency distribution and percentage distribution for the collected demographic variables, clinical symptoms of occupational contact

dermatitis and at last the associated risk factors of occupational contact dermatitis. The statistical method used is descriptive statistics.

## RESULT:

The study results concludes that majority of them are at the age group of 30-39 31(31%), most of them are females 55(55%), most of them are married (65%), majority of them are non-smoker 75(75%), majority of them were non-alcoholic 76(76%), most of them were consuming light diet 55(55%), most of them are living in rented house 66(66%), most of them have good sleep 53(53%), most of them have working experience more than 10 years 60(60%), most of them take bath only once in a day 59(59%).

The study results concludes that most of them have redness frequently 48(48%), majority of them have dry skin frequently (40%), most of them have burning frequently 50(50%), not frequently but sometimes they have blisters 39(39%), most of them have itching sometimes 67(67%), majority of them have no itchy wheals that is urticaria 49(49%), also majority of them have no fissures 70(70%), majority of them have pain/aching sometimes 59(59%).

The study results concludes that the some were working in machine maintenance department for

prolonged period 25(25%), some have contact with handling oils/grease 37(37%), contact with soap, liquid soap, shampoos or any alcohol based sanitizers 59(59%), contact with certain materials or chemicals in your work 20(20%), contact with materials, contact with leather products like leather shoes, sole materials 85(85%), contact with glues/adhesives used to stick the soles of the leather shoes 65(65%), contact with chemical agents/solvents 25(25%), contact with polyester fibers 10(10%), contact with metal tools 35(35%), used protective gloves during your work 17(17%), allergic conjunctivitis 27(27%), childhood eczema 38(38%), asthma 20(20%), skin symptoms has been caused by skin contact with rubber gloves 10(10%), eczema skin symptoms improve when you are away from your normal work 20(20%), working hours per day is greater than 8 hours for most of the people 75(75%), hand washing frequency per day is less than 5 times 50(50%), pairs of hand gloves used per day only one pair is 10(10%), hours of gloves used per day is just less than 2 hours 10(10%), personal history of allergy or hypersensitivity reactions 35(35%).

The study results concludes that localization of the clinical symptoms of occupational contact dermatitis in hands/wrists is 73(73%), in forearms is 69(69%), in face/neck is 25%, in trunk is 10% and in lower extremities is 19.

**Table-I:** Presentation of frequency and percentage distribution of clinical symptoms of occupational contact dermatitis in employees working in leather shoe production factory.

S.NO	CLINICAL SYMPTOMS	FREQUENCY	PERCENTAGE
1.	Redness		
	Never/almost never	12	12%
	Sometimes	40	40%
2.	Frequently	48	48%
	Dry skin		
	Never/almost never	21	21%
3.	Sometimes	39	39%
	Frequently	40	40%
	Burning		
4.	Never/almost never	17	17%
	Sometimes	33	33%
	Frequently	50	50%
5.	Blisters		
	Never/almost never	28	28%
	Sometimes	39	39%
6.	Frequently	33	33%
	Itching		
	Never/almost never	10	10%
7.	Sometimes	67	67%
	Frequently	23	23%
	Itchy wheals		
8.	Never/almost never	49	49%
	Sometimes	21	21%
	Frequently	30	30%
9.	Fissures		
	Never/almost never	70	70%
	Sometimes	19	19%
10.	Frequently	11	11%
	Aching/Pain		
	Never/almost never	37	37%
11.	Sometimes	59	59%
	Frequently	4	4%

**Table-II:** Presentation of frequency and percentage distribution of associated risk factors of occupational contact dermatitis in employees working in leather shoe production factory.

S.NO	ASSOCIATED RISK FACTORS	FREQUENCY	PERCENTAGE
1.	Prolonged period of work in department of machine maintenance or service.		
	Yes	25	25%
	No	75	75%
2.	Contact with or experience in handling oils that has been used in machine.		
	Yes	37	37%
	No	63	63%
3.	Contact with soap, liquid soap, shampoos or any alcohol based sanitizers.		
	Yes	59	59%
	No	41	41%
4.	Contact with certain materials, chemicals or anything else in your work.		
	Yes	20	20%
	No	80	80%
5.	Contact with leather products like leather shoes, sole materials etc.		
	Yes		
	No	85	85%
6.	Contact with glues/adhesives used to stick the stoles of the leather shoes.	15	15%
	Yes		
	No	65	65%
	Contact with any cleaning agents/solvents.	35	35%
7.	Yes		
	No	25	25%
	Contact with polyester fibers.	75	75%
8.	Yes		
	No	10	10%
	Contact with metal tools.	90	90%
9.	Yes		
	No	35	35%
10.	Used protective gloves during your work.	65	65%
	Yes		
	No	17	17%
	Allergic conjunctivitis.	83	83%
11.	Yes		
	No	27	27%
	Childhood eczema.	73	73%
12.	Yes		
	No	38	38%
	Asthma.	62	62%
13.	Yes		
	No	20	20%
	A skin symptom has been caused by skin contact with rubber gloves.	80	80%
14.	Yes		
	No		
	Eczema skin symptoms improve when you are away from your normal work. (example. Weekend or longer periods)	10	10%
		90	90%
15.	Yes		
	No		
	Working hours or duration of work per day.		
	< 8 hours	20	20%
	>8 hours	80	80%
16.	Hand washing frequency per day.		
	<5 times	25	25%
	6-10 times	75	75%
17.	>10 times		
	Pairs of hand gloves used per day.		
	<1 pair	50	50%
	1-5 pairs	45	45%
	>10 pairs	5	5%
18.	No gloves used	10	10%

	Hours of hand gloves used per day.	7	7%
	<2 hours/day	0	0%
	2-6 hours/day	83	83%
19.	>6 hours/day		
	No gloves used	10	10%
	Personal history of allergy or hypersensitivity reactions.	7	7%
	Yes	0	0%
	No	83	83%
20.			
		35	35%
		65	65%

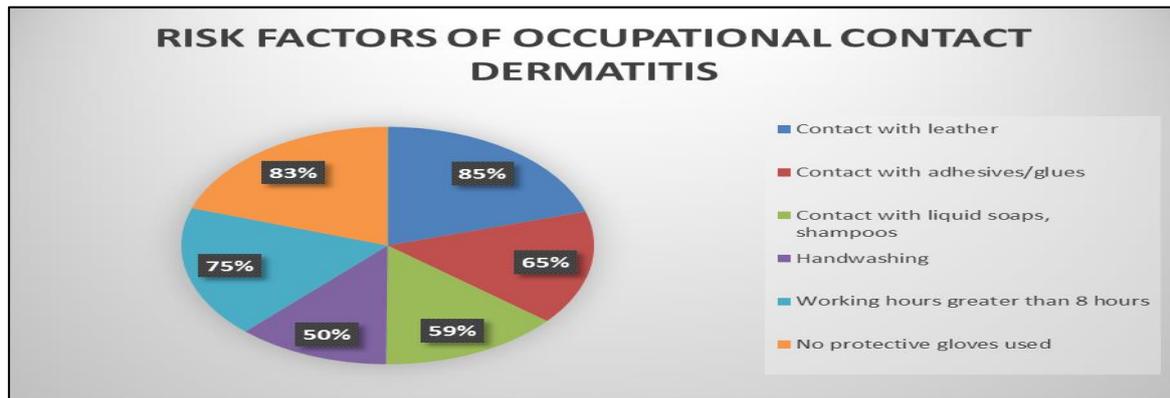


Figure-I

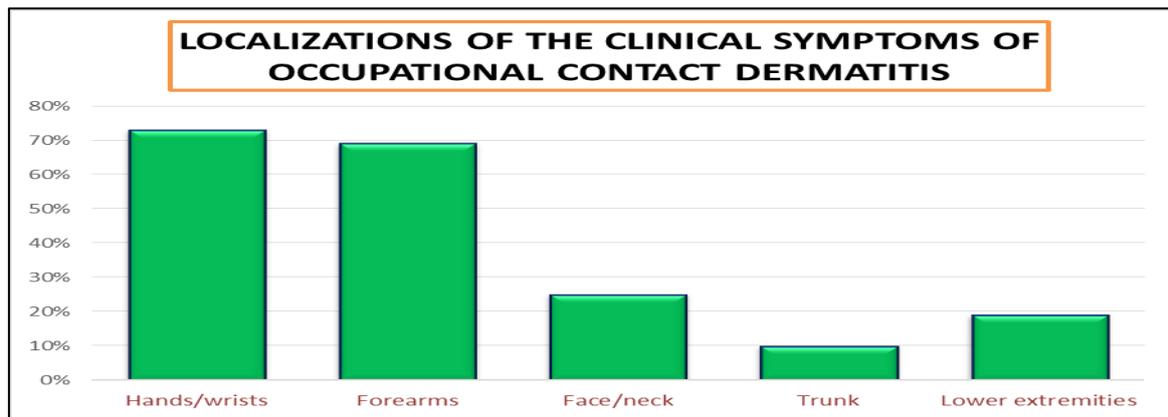


FIGURE-II

## DISCUSSION:

**Table 2** shows the frequency and percentage distribution of clinical symptoms of occupational contact dermatitis in employees working in leather shoe production industry workers.

The present study was supported by a cross-sectional study conducted by Tesfaye Hambisa Mekonnen, *et al.*, on Self-report occupational-related contact dermatitis: prevalence and risk factors among healthcare workers in Gondar town, Northwest Ethiopia in 2018. The highest symptoms indicated was redness, 28.5% and followed by burning, 17.3%. The hand is the most commonly affected body sites, 22%.

Most of them have redness frequently 48(48%), majority of them have dry skin frequently 40(40%), most of them have burning frequently 50(50%), not frequently but sometimes they have blisters 39(39%), most of them have itching sometimes 67(67%), majority of them have no itchy wheals that is urticaria 49(49%), also majority of them have no fissures 70(70%), majority of them have pain/aching sometimes 59(59%).

**Table 3** shows the frequency and percentage distribution of associated risk factors of occupational contact dermatitis in employees working in leather shoe production industry workers.

The present study was supported by the cross-sectional study conducted by Yu-Xin Chen, *et al.*, on Prevalence and Risk factors of Contact dermatitis (CD) among clothing manufacturing employees in Beijing in 2016. It was demonstrated that contact with leather and feather materials were exogenous risk factors and strong predictors of CD in the multivariate analysis. The employees were exposed to leather materials containing dyes and resin agents, and exposed to feather materials while tailoring down garments. In general, contact with leather is already considered to be a risk factor for CD, which is very similar to our results; furthermore, we also found clothing employees were exposed to feathers, and this may have been a potential allergen inducing CD, something that has not previously been much reported. It was indicated that another exogenous risk factor for CD was the type of work, which was strongly associated with presence of CD in the multivariate analysis. Disease risk prediction among sewers and ironing workers was 2 to 7 times more likely to experience CD than among managers, especially, there was a stronger association with ironing workers. A speculative reason for this could be that sewers and ironing workers endure greater exposure to work materials than managers. It was found that ironing workers are repeatedly exposed to hot and humid conditions, which cause and aggravate dermatitis. Older age was a potential risk factor in clothing employees

Shows that the some were working in machine maintenance department for prolonged period 25(25%), some have contact with handling oils/grease 37(37%), contact with soap, liquid soap, shampoos or any alcohol based sanitizers 59(59%), contact with certain materials or chemicals in your work 20(20%), contact with leather products like leather shoes, sole materials 85(85%), contact with glues/adhesives used to stick the soles of the leather shoes 65(65%), contact with chemical agents/solvents 25(25%), contact with polyester fibers 10(10%), contact with metal tools 35(35%), used protective gloves during your work 17(17%), allergic conjunctivitis 27(27%), childhood eczema 38(38%), asthma 20(20%), skin symptoms has been caused by skin contact with rubber gloves 10(10%), eczema skin symptoms improve when you are away from your normal work 20(20%), working hours per day is greater than 8 hours for most of the people 75(75%), hand washing frequency per day is less than 5 times 50(50%), pairs of hand gloves used per day only one pair is 10(10%), hours of gloves used per day is just less than 2 hours 10(10%), personal history of allergy or hypersensitivity reactions 35(35%).

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