

# Quality of Life and Cost of Illness in Patients with Hand Dermatitis: A Cross-sectional Study

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## ABSTRACT

**Introduction:** The high incidence, severity, and chronicity of hand dermatitis can lead to a massive impact on the Quality of Life (QoL). Despite its medical and socioeconomic importance, there is a paucity of data that addresses the cost-of-illness, economic factors, and its effect on the QoL in patients with hand dermatitis.

**Aim:** To estimate the Dermatology Life Quality Index (DLQI) and cost-of-illness in patients with hand dermatitis.

**Materials and Methods:** This cross-sectional study was conducted in the Outpatient Department (OPD) of Dermatology at RL Jalappa Hospital and Research Centre, Kolar, Karnataka, India. The duration of the study was four months, from September 2022 to December 2022. A total of 82 subjects with the skin condition of hand dermatitis. The QoL (DLQI questionnaire) and cost-of-illness were estimated. The economic burden of hand dermatitis was measured by its direct and indirect costs. Statistical analysis was carried out using the Statistical Package for Social Sciences (SPSS) version 22.0 and the comparison was done using t-test and Analysis of Variance (ANOVA) test.

**Results:** The mean age of the study participants was 39.76±13.30 years. Eczema was the most common hand dermatitis, seen in 47 (57.3%) patients followed by psoriasis. A total of 82 patients (34 males and 48 females). The average total cost of the illness was Indian Rupee (INR) 5725.29 per individual among all patients, with indirect costs catering to 63.75% of total costs. The average total cost of the illness was INR 6105.03 and INR 5456.31 per individual among male and female patients, with indirect costs (INR 3976.76) catering to 65.14% in males and (INR 3418.75) catering to 62.66% of total costs among females. DLQI revealed social embarrassment had a very much impact seen in 36 participants (43%) followed by disturbances in social and leisure activities seen in 23 participants (28%).

**Conclusion:** Hand dermatitis is distressing to the patient, which can lead to poor QoL. Cost of illness studies shed light on elements, that contribute to high expenses associated with this frequently devastating condition, aiding in its treatment or prevention.

**Keywords:** Eczema, Psoriasis, Skin condition

## INTRODUCTION

Hand dermatitis is caused by many separate factors or a combination of factors. It may be a result of endogenous conditions or exogenous causes [1]. Hand dermatitis includes conditions like eczema, palmar psoriasis, palmoplantar keratoderma, fungal and bacterial infections and parasitic infections like crusted and nodular variants of scabies, etc., [1]. Early onset and extensive involvement of the disease is associated with poor prognosis. Endogenous causes of hand dermatitis [2]. Atopic dermatitis, discoid eczema, pompholyx, palmoplantar pustulosis, hyperkeratotic eczema. Exogenous causes of hand dermatitis [2] Irritant contact dermatitis, Allergic Contact Dermatitis (ACD), systemic allergen, viz., drugs and metals, dissemination from a focus, infective dermatitis involving the hands and feet. Morphological patterns of hand eczema [2] pompholyx, hyperkeratotic palmar eczema, fingertip eczema, ring eczema, housewives' eczema, apron eczema, discoid eczema. Occupational hand dermatitis, by its nomenclature, is caused, provoked, or exacerbated by exposures in the workplace setting. Commonly identified irritants at the workplace include water, detergents, cleansers, soaps, solvents, degreasers, oils, lubricants, coolants, unidentified chemicals [3].

Contact dermatitis is very common among healthcare workers, who are required to perform frequent hand disinfection and therefore, are repeatedly exposed to irritants in hand hygiene products. With diligent hand disinfection reinforced during Coronavirus Disease-2019 (COVID-19), there is an increased prevalence of contact dermatitis [4,5]. Contact dermatitis from hand hygiene products

is an important barrier to compliance with hand hygiene [6]. Hand dermatitis is disabling and distressing to patients and may have a negative impact on their QoL. It emphasises the need for a detailed evaluation of the DLQI and cost-of-illness as there is a paucity of literature [7,8]. Healthcare professionals, mechanics, beauticians are at higher risk of developing symptoms [9]. Risk factors for hand dermatitis include the use of latex gloves, chemical exposure, and frequent handwashing [10]. It can disturb the daily activities and hamper them which can force them to take sick leave, which may also result in a change of occupation [8,11]. Cost-of-illness is influenced by occupation, gender, sick leaves, and severity of disease. There is a paucity of information, addressing the cost of sickness and economic variables in chronic hand dermatitis despite its enormous medical and economical importance. Therefore, it is crucial to assess the QoL, taking into account subscales to determine the psychosocial effects of the illness. As there can be sociocultural differences as well, the present study was undertaken to estimate the DLQI and cost-of-illness in patients with hand dermatitis.

## MATERIALS AND METHODS

This cross-sectional study was conducted in the Outpatient Department (OPD) of Dermatology at RL Jalappa Hospital and Research Centre, Kolar, Karnataka, India. The duration of the study was four months, from September 2022 to December 2022. The Institutional Ethical Committee had approved the study (DMC/KLR/IEC/411/2022-23). Written informed consent was obtained.

**Inclusion criteria:** All the patients with hand dermatitis, who were willing to participate were included in the study.

**Exclusion criteria:** Patients who were not willing to give consent were excluded from the study.

**Sample size calculation:** Sample size was estimated based on DLQI score  $8.18 \pm 3.4$  as reported in the study by Kataria V et al., considering a precision of 0.75 in the estimate of mean DLQI score with a variance estimate of  $\sigma = 3.4$ , with confidence interval 95%. The sample size was 82 subjects with the disease condition [12].

## Study Procedure

The detailed case history was taken for all patients about their hand dermatitis, including the symptoms, duration of the disease, aggravating and relieving factors, occupation, loss of wages, medication history and recurrence. Direct cost was defined for the present study as expense occurred to procure the medications, transportation cost, and indirect cost includes loss of wages due to the illness or loss of wages due to visits to the hospital. The cost of the illness and dermatology life quality questionnaire was estimated. DLQI questionnaire was given to all patients and the score was calculated. It contains 10 questions each with four response categories from 0 (not at all) to 3 (very much) in which the questions covered symptoms and feelings, leisure, daily activities, work and school, personal relationships, and treatment. The maximum score was 30 and a score of less than six indicates small or no effect on the patient's life. The total score sum of all 10 questions was calculated [13,14].

## STATISTICAL ANALYSIS

Statistical analysis was carried out using the SPSS version 22.0 and the comparison was done using t-test and ANOVA test.

## RESULTS

Total number of patients involved in the present study was 82, out of which 34 were males and 48 were females. The mean age of all the patients in the study was  $39.76 \pm 13.30$  years [Table/Fig-1].

Age group (in years)	Male	Female	Total
10-20	2	0	2
21-30	8	12	20
31-40	8	17	25
41-50	11	9	20
51-60	3	6	9
61-70	0	3	3
71-80	2	1	3
Mean age	39.26	40.1	$39.76 \pm 13.30$

[Table/Fig-1]: Age distribution of study participants (N=82).

Occupation of the patients in the present study was housewives 41 (50%), factory workers 15 (18.29%), masons 8 (9.87%), farmer 8 (9.87%) [Table/Fig-2].

Occupation	Frequency (n)	Percentage (%)
Butcher	1	1.2
Driver	2	2.4
Electrician	1	1.2
Farmer	8	9.8
Factory worker	15	18.3
House wife	41	50.0
Mason	8	9.8
Student	2	2.4
Tailor	1	1.2
Vegetable vendor	3	3.7
Total	82	100.0

[Table/Fig-2]: Occupation of the study participants (N=82).

Eczema was seen in 45 (54.87%) cases, psoriasis 25 (30.48%), palmoplantar keratoderma 5 (6.09%), scabies 2 (2.43%), atopic dermatitis 5 (6.09%) cases. DLQI revealed social embarrassment was the most common, seen among 75 patients followed by social and leisure activities in 71 patients [Table/Fig-3]. It was observed that, 22 (26.8%) participants visited Dermatology OPD, had higher DLQI scores indicating that, the illness is affecting the participants very much [Table/Fig-4].

The average total cost of the illness was INR 5725.29 (1,358-10,000) per individual among all patients with indirect costs catering to 63.75% of total costs. The average total cost of the illness was INR 6105.03 (2,440-9,830) per individual among male patients with indirect costs (INR 3976.76) catering to 65.14% of total costs. The average total cost of the illness was INR 5456.31 (1,358-10,000) per individual among female patients with indirect costs (INR 3418.75) catering to 62.66% of total costs [Table/Fig-5]. Females had higher DLQI scores, when compared to males however, this difference was not statistically significant [Table/Fig-6]. It was observed that, 60 years and above had higher scores of DLQI when compared to other groups however, this difference was not statistically significant [Table/Fig-7]. Male patients had higher costs of prescribed and non prescribed drugs, when compared to females however, this difference was not statistically significant [Table/Fig-8,9]. Males had higher loss of wages, when compared to females however, this difference was not statistically significant [Table/Fig-10].

## DISCUSSION

The total number of patients involved in the present study was 82, out of which 34 were males and 48 were females. Most of the females were involved in household work 41 (50%), and males 15 (18.29%) were factory workers. A similar study by Kataria V et al., found that, the majority of the females with hand eczema were engaged in household work (72.8%) and males in unskilled work, such as a mason, laborer, farmer, factory worker, etc., [12]. In an epidemiological study, females were found to be more frequently affected by hand eczema [15]. Irritant contact dermatitis to be seen in 65 females and 48 males [16]. In addition, Kataria V et al., found irritant contact dermatitis was significantly more in females 13 (23.6%) as compared, to males 1 (2.2%) ( $p=0.002$ ) [12]. Meding B and Swanbeck G studied 1238 people with hand eczema between 1982 and 1983 and discovered that, 36% of them had irritating dermatitis, 16% had allergic dermatitis, 16% had atopic dermatitis, 6% had pompholyx, 3% had hyperkeratotic dermatitis, 2% had nummular eczema, and 21% had unclassified eczema. For allergic dermatitis (5.4) and irritant dermatitis (2.4), the female:male ratio was greatest [17].

The average total cost-of-illness and indirect costs such as, lost wages were observed to be higher in male patients than female patients which indicates the general pattern of higher wages for men over women. However, average cost of non prescribed drugs, was higher for female patients. Further, it was observed during the course of study, that the female patients were resorting to over-the-counter medication instead of regular visit to the clinics and getting a prescription. The duration of treatment was one major factor contributing to such behaviour among female patients. According to an Indian study done with 46 patients, more than four episodes per year of hand eczema i.e., the increasing frequency was affecting the patients' QoL [18]. Costs associated with chronic hand eczema are not only by disease severity but also, by relation between hand eczema and work [19]. In a study done in Germany, they found that, more than 50% of cases of hand eczema were due to work-related chronic hand eczema [20].

A study by Agner T et al., found a positive connection between Hand Eczema Severity Index (HECSI) and age indicating that, hand eczema may become more severe in later age groups, although, QoL

Questions	Not at all (0)			A little (1)			A lot (2)			Very much (3)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Itchy sore painful	8	4	12	12	20	32	8	12	20	6	12	18
Social embarrassment	1	6	7	5	12	17	12	10	22	16	20	36
Interference with daily activities	4	18	22	20	10	30	6	15	21	4	5	9
Influence on clothes wearing	33	45	78	1	1	2	0	0	0	0	0	0
Social or leisure activities related	8	3	11	10	11	21	7	20	27	9	14	23
Difficulty in sport	32	46	78	0	2	2	2	0	2	0	0	0
Prevention from studying or working	28	24	52	3	20	23	1	2	3	2	2	4
Problems with close friends, relatives partner	5	15	20	13	10	23	12	20	32	4	3	7
Sexual difficulties	34	48	82	0	0	0	0	0	0	0	0	0
Problem because of treatment	14	17	31	18	29	47	2	2	4	0	0	0

**[Table/Fig-3]:** Distribution of DLQI subscales for the study population.

Parameter	Effect	Frequency (n)	Percentage (%)
DLQI	No effect	1	1.2
	Small effect	3	3.7
	Moderate effect	56	68.3
	Very large effect	22	26.8
	Total	82	100.0

**[Table/Fig-4]:** Dermatology Life Quality Index (DLQI)- frequency of DLQI for study population.

Gender	Direct cost (range) (INR)			Indirect cost (lost wages) (range)	Total cost (range) (INR)
	Transportation cost	Cost of prescribed drugs	Cost of non prescribed drugs (OTC)		
Male (n=34)	979.74 (200-3000)	682.06 (250-1500)	466.47 (90-790)	3976.76 (800-7600)	6105.03 (2440-9830)
Female (n=48)	920.83 (140-3000)	598.75 (210-1500)	517.98 (90-850)	3418.75 (500-7400)	5456.31 (1358-10000)

**[Table/Fig-5]:** Resource use and distribution of total cost in last four months on gender basis.

Parameter	Gender	Frequency (n)	Mean±SD	p-value
DLQI	Male	34	8.7±2.8	0.22
	Female	48	9.3±2.1	

**[Table/Fig-6]:** Association between DLQI and gender (N=82). t-test was used

Age (in years)	Frequency (n)	Mean±SD	p-value
<30	22	9.0±2.8	0.9
31-60	54	9.1±2.3	
60 years and above	6	9.1±2.9	

**[Table/Fig-7]:** Association between DLQI and age (N=82). ANOVA was used

Parameter	Gender	Frequency (n)	Mean	SD	p-value
Cost of prescribed drugs	Male	49	9.2041	2.23588	0.9
	Female	33	8.9697	2.84479	

**[Table/Fig-8]:** Association between DLQI and cost of prescribed drugs (N=82). t-test

Parameter	Gender	Frequency (n)	Mean	SD	p-value
Cost of non prescribed drugs	Male	40	9.1250	2.73803	0.9
	Female	42	9.0952	2.25031	

**[Table/Fig-9]:** Association between DLQI and cost of non prescribed drugs (N=82). t-test

was unaffected by age [21]. In another study, younger participants with Anemia of Chronic Disease (ACD) reported substantially worse QoL, when compared to older age groups, although, no association

Parameter	Gender	N	Mean	SD	p-value
Lost wages	Male	38	9.4211	2.34384	0.2
	Female	44	8.8409	2.59645	

**[Table/Fig-10]:** Association between DLQI and lost wages. t-test

between QoL and age was detected in a cohort of patients with occupational hand eczema [22,23]. A similar finding was also found in the present study, where the authors found no significant difference in the mean QoL score across different age groups. Although, females experienced less severe hand eczema than males, QoL was affected similarly in Agner T et al., study [21]. A previous study, utilising the Short Form 36 (SF-36) questionnaire found that, health-related QoL was worse for females with hand eczema than for males, in the mental health dimension, although, no sex-related differences were seen with the DLQI, which is consistent with the authors current findings [24]. Another research in ACD patients using the Skindex-16 questionnaire to evaluate QoL revealed no statistically significant sex-related variations in QoL ratings, despite the fact that, females reported a higher level of emotional discomfort [25]. This finding is in accordance with the present study.

In a study done by Kataria V et al., the average direct cost of disease was INR 2,746.25 and the average indirect cost was INR 4911.73, total cost was INR 13,783.41 per person per year (p=0.040, 0.021) [12]. Cortesi PA et al., calculated direct (such as drug treatment and travel) and indirect (such as loss of work) mean costs/patient/month to assess the cost of sickness in patients with severe chronic hand eczema, who were unresponsive to usual therapy with topical powerful corticosteroids [26]. Overall, calculated mean costs came out to be 418.3 C/patient/month, and according to a study by Diepgen TL et al., on the cost of disease in workers with occupational hand eczema, the condition results in the average direct cost of disease was INR 2,746.25 and the average indirect cost was INR 4911.73, total INR 13,783.41 per person per year (p-value=0.040, p-value=0.021) [20]. These studies are important because they shed light on the elements that contribute to the high expenses associated with this frequently devastating condition, aiding in its treatment or prevention.

### Limitation(s)

As the present study was a hospital-based study, it doesn't represent the whole population, so, the findings cannot be generalised.

### CONCLUSION(S)

Hand dermatitis is one of the most distressing conditions to the patient, which can lead to poor QoL. Cost-of-illness determination pinpoints and quantifies the estimated financial cost of the overall burden of a certain condition. Early diagnosis and quicker treatment will shorten the home stays in case of patients, who are working thereby, reducing the loss of wages.

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