



## Cutaneous dermatophytosis: A problem deeper than we perceive – A cross sectional prospective study on quality of life in 385 patients

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### ARTICLE INFO

#### Keywords:

Dermatology life quality index  
Dermatophytosis  
Quality of life  
Tinea

### ABSTRACT

**Background:** The number of patients affected with dermatophytosis constitutes a large proportion in dermatology out patient setup. The impact of disease is not only limited to skin, but also affects the personal and social life of these patients. Dermatology life quality index has often been used to assess the impact of a dermatosis on patients' lives, but this data is meager in context of dermatophytosis.

**Objectives:** To study the quality of life of patients affected with cutaneous dermatophytosis using Dermatology life quality index (DLQI) and to study the association of DLQI with age, sex, socio-economic status (SES), duration of disease, body surface area (BSA) involved and number of relapses in the disease course.

**Methods:** The study was undertaken for a period of nine months. A total of 385 patients aged 18 or more were enrolled having clinically and microscopically proven dermatophytosis of skin, and were distributed the DLQI questionnaire to answer. Basic demographic details, socioeconomic status, body surface area and number of relapses were also recorded, and the data was assessed for correlation with DLQI.

**Results:** Two hundred and ninety (75.3%) patients reported to have a large or extremely large impact on life due to tinea. Statistically significant association of DLQI was found with duration of illness ( $p = 0.005$ ), number of relapses ( $p = 0.003$ ) and socioeconomic class ( $p = 0.027$ ).

**Conclusion:** The impact of cutaneous dermatophytosis as reflected by DLQI scores is huge and deserves attention not only in terms of the effect it has on skin, but also the personal, social, and financial burden caused there of.

### 1. Introduction

Dermatophytosis has turned into a notoriously troublesome condition of late, both for the patient, as well as for the treating dermatologist. Multiple recurrences, refractoriness to treatment, widespread involvement of body parts, have all led to a situation rightly being called as 'dermatophyte menace'.<sup>1</sup> Whether the unscrupulous use of topical corticosteroid is to be blamed, or is there a real surge of resistant dermatophyte strains, or perhaps there are other factors playing sinisterly to create the current worsening picture, it cannot be claimed for sure as of now. Nevertheless, the overall scenario is worrisome.

A patient with dermatophytosis has trouble not only limited to the diseased skin, but also has disturbed personal and social life, as well as an increased socioeconomic burden. Dermatology life quality index (DLQI) is a reliable scale to measure the extent to which a dermatosis

affects the daily life of a patient.<sup>2,3</sup> It has been used in a number of skin conditions such as psoriasis, acne, vitiligo and has aided in therapeutic decisions too.<sup>3,4</sup> But paradoxically, there is a dearth of this information with respect to dermatophytosis. We aim to fill this lacuna with the current study.

### 2. Materials and methods

The study was conducted for a period of nine months from August 2018 to May 2019 at a tertiary care institute in northern India. Institutional ethical clearance and permission to use DLQI from concerned authority was obtained. The inclusion criteria were: patients ageing 18 years or more with evidence of cutaneous dermatophytosis clinically and demonstration of septate branched hyphae on microscopic examination of potassium hydroxide (KOH) mounts from lesional skin

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scrapings. Patients who were not willing to participate in the study, or those with underlying chronic illness, immunosuppression, pregnant, lactating, or less than 18 years of age were excluded from the study.

Written informed consent was taken from all the enrolled patients and the basic demographic details (age, gender, occupation, per capita income) were recorded. A DLQI self-administered questionnaire in English or Hindi was distributed to the participants which contained 10 questions, each to be answered with one out of four available options and scored from zero to three. Help from a counsellor was provided to patients wherever required. The total score of DLQI ranged from zero to thirty.

Socioeconomic categorization was based upon revised B. G. Prasad scale for the year 2018 as given by Pandey et al.<sup>5</sup> Body surface area (BSA) was calculated as per Wallace rule of nines. BSA was classified into three subgroups (<10%, 10%–30% and >30%). Total number of relapses during the disease course was also recorded (<5, 6–10, 11–20; more than 20 relapses was taken as persistent disease). Working definitions of reinfection, relapse and persistent infection were designed for the study. Reinfection was defined as the occurrence of dermatophytosis, after an infection-free interval of four to six weeks in a patient who has been cured clinically. Relapse was defined as re-occurrence of the disease in less than four weeks after completion of standard treatment. Persistent infection was defined as the disease which was never completely clinically cured, or where the patient recorded more than 20 relapses during the course of his illness.

Data was entered onto MS Excel and statistical analysis was carried out using SPSS v24.0 software. For socio-economic status (SES), the category of ‘unclassified’ was reserved for the subjects unaware of their family income, and were excluded from the statistical analysis. DLQI scores were compared with age, sex, SES, BSA involvement, number of relapses during disease course, and duration of illness, for any association using chi-square test, assuming  $p < 0.05$  to be significant.

### 3. Results

Three hundred and eighty five consecutive patients of cutaneous dermatophyte infection were enrolled in the study. The demographic details and the values of the independent variables of the study subjects are mentioned in Table 1. Out of 385 patients, maximum belonged to the age group of 18–40 years ( $n = 315, 81.8\%$ ). Details of SES as graded into three groups for assessing the correlation with DLQI is shown in Table 1. Majority of these patients (297, 77.14%) had <10% BSA involvement and 16 (4.16%) patients had >30% of affected BSA.

Most of these patients were affected for a period of 0–3 months (134, 34.8%) and 39 patients (10.1%) had the disease for more than 24 months. Relapses were common and 51 (13.24%) experienced persistent disease. The site most commonly involved was groin (tinea cruris) with 342 (88.83%) affected patients. Similarly, 298 (77.40%) patients had tinea corporis, 84 (21.82%) had tinea faciei, six (1.56%) had tinea manuum and five (1.3%) had tinea pedis.

Two hundred and ninety (75.32%) patients reported to have very large or extremely large impact on life due to their disease, as reflected in their DLQI score (Table 2). Chi-square statistics of the independent variables with DLQI showed significant correlation of DLQI with duration of illness ( $p = 0.005$ ), number of relapses ( $p = 0.003$ ) and SES ( $p = 0.027$ ). Quality of life was generally more affected in patients with prolonged illness, with larger number of relapses and patients falling under category 3 (social classes 4 and 5) of BG Prasad scale for socio-economic categorization. DLQI was not affected by age and sex in our study ( $p$  values 0.745 and 0.48 respectively). Association with BSA was also found to be insignificant with  $p$  value as 0.142.

### 4. Discussion

DLQI has found use in a number of skin conditions. From acne and vitiligo where it provides an estimate of the burden of the disease, to

**Table 1**

Classification of independent variables and results of chi-square tests with different bandings of DLQI.

Independent Variable	Classification used in project	n (%)	p-value of chi square test with Banded DLQI
Age group (years)	18–40	315 (81.82)	0.745
	40–60	64 (16.62)	
	>60	6 (1.56)	
Gender	Male	295 (76.62)	0.48
	Female	90 (23.38)	
Socio-economic Status	1. Rs.3287/month or above Class I and II	157 (40.78)	0.027*
	1. Rs.1972-3286/month Class III	66 (17.14)	
	1. Rs.1971/month or below Class IV and V	145 (37.66)	
	1. Unclassified	18 (4.68)	
		18 (4.68)	
Body Surface Area involved	<10%	299 (77.66)	0.142
	10–30%	72 (18.7)	
	>30%	14 (3.64)	
Duration of Illness	0–3 months	134 (34.81)	0.005*
	4–6 months	85 (22.08)	
	7–12 months	89 (23.12)	
	13–24 months	38 (9.87)	
	>24 months	39 (10.13)	
Number of Relapses during course of Disease	0–5	220 (57.14)	0.003*
	6–10	55 (14.29)	
	11–20	59 (15.32)	
	>20 (or continuous)	51 (13.25)	

**Table 2**

Distribution of DLQI scores.

Dependent Variable	Classification Used	n (%)
Banding of DLQI score	0-1: No effect on quality of life	0 (0)
	2-5: Small effect	37 (9.61)
	6-10: Moderate effect	58 (15.06)
	11-20: Very large effect	219 (56.9)
	21-30: Extremely large effect	71 (18.4)

psoriasis where it also helps in guiding the treatment plan, DLQI is an formidable tool for a treating dermatologist, and as such it has been used extensively to assess dermatological diseases.<sup>2,3</sup> Given the increasingly large number of dermatophytic infections in our setup, it is surprising to find such meager data in this context. The current scenario is such that a significant number of new cases encountered in our clinics are affected with dermatophytosis.<sup>1</sup> Add to it the relapsing, remitting and chronic transformation of the disease, there seems no end to the suffering caused.<sup>1</sup> Recent evidence shows upsurge of the *Trichophyton mentagrophyte* as the causative organism, that could partly explain the changing trend of the disease.<sup>6</sup> Reduced responsiveness to the first-line antifungal drugs only worsens the situation.<sup>7,8</sup> The various attributes of recurrent and chronic dermatophytosis such as clinico-epidemiological patterns and associated risk factors have been sought for in a few

studies.<sup>9,10</sup> Also, the condition is associated with significant itch thereby affecting DLQI as has been demonstrated by Verma et al. in their cross-sectional study.<sup>11</sup> Nevertheless, we are yet to objectify the impact it exerts on the patients. Our study aimed to assess the extent to which the patients' lives are affected by dermatophytic infections of skin.

Consistent with the finding of other studies, most of these patients were young adults, with groin being the most commonly affected site.<sup>12,13</sup> Male to female ratio was similar as found in previous studies in patients affected with tinea.<sup>7,8,12</sup> Only up to 25% of the total patients were females and this forms an area of concern about wherefrom do they fulfil their healthcare needs, as there is no such huge difference in the predilection of dermatophytosis to affect an individual gender.

As the hospital caters to the needs of patients belonging to various surrounding regions and of different economical strata, there was an even distribution of patients from all social classes, thereby suggesting the external validity of the study in the general population. More than 75% of the patients reported a large or extremely large impact on life due to the disease as ascertained by a DLQI score of more than 11, which appears to be a disturbing figure owing to the rising concern towards overall patient satisfaction.

The DLQI scores, and thus the impact on life quality, were found to be similar across the various age groups and for both genders. Contrary to the general belief, we did not find any significant association of larger BSA involvement with DLQI. The distress caused by the disease was not necessarily less for those with less extensive disease. This again emphasises how we tend to underestimate the disease burden in terms of quality of life. Duration of the disease however, significantly affected DLQI, as was also found by Patro et al.<sup>13</sup> Illness that persisted for longer period of time tended to have a larger impact on life quality than that with a shorter course. It was also found to be associated with the number of relapses. Those with fewer relapses had lower DLQI scores than those with recurring disease and multiple relapses. Frequent relapses could also lead to increased financial burden in terms of treatment sought and lost work hours that could greatly hamper life quality. Moreover, poorer sections of the society seem to have larger scores than those with higher per capita income. This study states that there is a significant association between SES and DLQI but nature of this association as a predictor needs further research. The two variables, number of relapses and socioeconomic status, do not seem to have been assessed for association with DLQI in dermatophytosis in few of the previously conducted studies, and were found to be positively associated with higher DLQI scores in the present study.<sup>12-14</sup>

Patients who could not read or write and those who were also affected with any other dermatoses were not included in the study and this could be considered as a limitation of the study. Further studies with a cohort study design would help in better assessing the association and predictor nature of SES and number of relapses. The inclusion of other parameters as educational status of the patient, along with the questionnaire being administered by an interviewer, could overcome a bias, if at all present, in assessing SES, and provide a clearer picture. Also, future studies probably in collaboration with other departments such as Psychiatry may be undertaken to add further to our knowledge. Nevertheless, the present study objectifies and adds to the current knowledge about the huge burden of cutaneous dermatophytosis on patients' lives and other previously untouched aspects, and indicates the need to address these unresolved concerns at the utmost priority.

#### Sources of funding

This research did not receive any specific grant from funding

agencies in the public, commercial, or not-for-profit sectors.

#### Declaration of interest

None.

#### Author contribution

Prakriti Shukla: Concepts, Design, Definition of intellectual Content, Literature search, Clinical studies, Data acquisition, Data analysis, Statistical analysis, Manuscript preparation, Manuscript editing, Manuscript review, Guarantor. Parul Verma: Concepts, Design, Definition of intellectual Content, Literature search, Clinical studies, Data acquisition, Data analysis, Statistical analysis, Manuscript preparation, Manuscript editing, Manuscript review, Guarantor. Swastika Suvirya: Design, Definition of intellectual Content, Literature search, Clinical studies, Data acquisition, Data analysis, Manuscript preparation, Manuscript editing, Manuscript review, Guarantor. Sucheta Pathania: Literature search, Clinical studies, Data acquisition, Data analysis, Statistical analysis, Manuscript preparation, Manuscript editing, Manuscript review. Dhruv Kapoor: Literature search, Clinical studies, Data acquisition, Data analysis, Manuscript preparation, Manuscript editing, Manuscript review.

#### Acknowledgements

None.

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