

Original Article

# Modified dermatology life quality index in patients with nail disorders

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## ABSTRACT

**Background:** Skin diseases impact lives physiologically, socially and psychologically compromising quality of life (QoL). Nails are important epidermal appendages and their disorders contribute to a decrease in QoL. Hence, it is imperative to assess their impact.

**Objectives:** To study the modified DLQI in patients with nail disorders.

**Materials & Methods:** A single-centre, questionnaire based cross-sectional study was conducted at a tertiary care outpatient department over 18 months. Patients with diagnosed nail disorders in the age group of 18-60 years, of either sex, were included in the study and administered a pre-validated questionnaire (designed based on the Dermatology Life Quality Index (DLQI) questionnaire and validated by a departmental pilot study). Based on the responses marked, the total score was calculated, and patients were categorised into specific band groups, namely, 0-1 = No effect on QoL, 2-5 = small effect, 6-10 = moderate effect, 11-20 very large effect and 21-30 = extremely large effect. Data were analysed using the Statistical Package for the Social Sciences version 22.2 and correlated with the clinicodemographic profile.

**Results:** A total of 200 patients completed the study. Onychomycosis was the most common presentation (52.5%), followed by acute paronychia (23.5%) and nail psoriasis (18%). Higher modified DLQI scores were found in females with fingernail involvement, students and housewives. The number of nails affected and the duration of nail disorders followed an inverted bell-shaped pattern, with higher modified DLQI scores observed at both the lower and higher extremes. Overall, the impact of nail disorders showed a moderate effect on mean modified DLQI with a mean (range) of 6.9 (6-10).

**Conclusion:** Nail disorders, having a prolonged disease and treatment course had a moderate effect on the modified DLQI.

**Keywords:** Quality of life, Dermatology life quality index, Nail disorders, Onychomycosis

## INTRODUCTION

Quality of life (QoL), as defined by the World Health Organization, encompasses an individual's perceptions of their life position, considering personal goals and standards within their cultural context.<sup>[1]</sup> Clinical practice often prioritizes physical health, yet mental and social well-being, though equally vital, are often overlooked. Dermatological conditions, including nail disorders, can significantly impact an individual's self-esteem, functionality and social interactions, further underscoring the relevance of QoL assessment in dermatology.<sup>[2,3]</sup>

Nail disorders, comprising around 10% of dermatologic cases, involve various pathologies affecting the nail unit, with

onychomycosis and nail psoriasis being the most prevalent.<sup>[4]</sup> Nail disorders can also occur in many other dermatological conditions, for example, alopecia areata, atopic eczema, pityriasis rubra pilaris, or it can be seen as a manifestation of many systemic illnesses such as chronic lung disease, chronic renal disease, chronic ischemic heart disease, liver cirrhosis, malnutrition and can also be secondary to drugs.<sup>[5,6]</sup> Although past research has focused on individual nail conditions, few studies encompass the broad spectrum of nail disorders and their cumulative impact on QoL.<sup>[4]</sup>

The dermatology life quality index (DLQI) is a simple, validated 10-item questionnaire used to assess the QoL

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impact of dermatological conditions.<sup>[7]</sup> The modified DLQI applied here allows for a nuanced understanding of QoL in nail disorders, acknowledging both psychological and functional effects. Given the psychosocial and professional disruptions caused by nail conditions, this study aims to quantify their impact on patients' QoL and evaluate how it varies based on clinical and demographic factors.

## MATERIAL AND METHODS

The study was conducted as a single-centre, questionnaire based cross-sectional study over 18 months, at a tertiary care hospital. Consenting patients of age group 18–60 years, presenting with nail disorders to the dermatology outpatient department were included in the study.

Sample size was estimated with a confidence level of 95%, margin of error of  $\pm 7.5\%$ , and drop out rate of 15%. Convenience sampling was done and the study included outpatient with clinically diagnosed nail disorders, aged 18–60 years of either sex, attending the dermatology outpatient department and willing to participate in the survey. Exclusion criteria encompassed children under 17 years of age and elderly individuals above 60 years.

The clinicodemographic profile of the participants was documented. The questionnaire was designed for this study, on the lines of DLQI [Annexure 1]. Permission was taken from the owners regarding the modification. Participants were instructed to choose the most appropriate response describing the impact of the nail disorder on their QoL in the past 1 week. Based on the response marked, each question was given a score of zero to three, with zero assigned to 'not at all', 'no' or 'not relevant'; one assigned to 'a little'; two assigned to 'a lot'; and three assigned to 'very much'. The total score was calculated (min 0–max 30), and patients were categorised into specific band groups, namely, 0–1 = no effect on patient's life, 2–5 = small effect, 6–10 = moderate effect, 11–20 = very large effect and 21–30 = extremely large effect. Data obtained were analysed using the Statistical Package for the Social (SPSS) 22.2 and correlated with the clinicodemographic profile.

## RESULTS

A total of 200 patients with nail disorders belonging to the age group 18–60 years were included in the study. The majority of the study subjects belonged to the age group 51–60 years, and there were a greater number of males, 115 (57.5%), as compared to 85 female patients (42.5%). The demographic profile of the patients as per educational qualification and profession was recorded and is depicted in Figures 1 and 2.

A large variation in the duration of nail disorder was found in the patients ranging from 01 month to 120 months with a mean of 21.8 months. Patients had a range of involvement of nails varying from 01 nail to all 20 nails involved, with a mean of 3.1 nails. Onycholysis was the commonest encountered nail change (seen in 67.5% of patients),

along with other changes such as nail dystrophy, nail plate thickening, subungual hyperkeratosis and melanonychia. Onychomycosis was the most common diagnosis in the study patients. The distribution of nail disorders is given in Table 1. The patient scored each of the 10 questions of the modified DLQI questionnaire, and the mean score for each question, and the total score for each patient, was calculated. The mean modified DLQI score was  $6.9 \pm 5.5$  against the maximum score of 30 [Table 2]. The highest value of mean response was found for question 2 which assessed the level of embarrassment/self-consciousness due to the nail condition ( $1.6 \pm 1.1$ ) [Table 2]. The highest mean modified DLQI was observed in the age group 21–30 years, which is  $9.5 \pm 4.0$  [Figure 3]. The total score showed statistically significant variation with age group ( $p < 0.001$ ). On comparing the modified DLQI variation between sexes, females were found to have higher scores than males (7.5 and 6.4, respectively). However, the difference was not statistically significant ( $p = 0.18$ ). Statistically significant variation was noted in mean modified DLQI scores as per the duration of illness, number of nails involved, and the profession of the patients, as depicted in Table 3. However, the variation based on the educational qualifications of the patients was not statistically significant ( $p = 0.052$ ).

Patients with fingernail involvement showed higher mean modified DLQI scores than patients with only toenail involvement (7.2 and 6.1, respectively). However, in patients with both finger and toe nails involved, a modified DLQI score of 7.5 was obtained, which was higher than each score. However, the difference was not statistically significant. Mean modified DLQI score showed variation with different nail conditions. The highest mean total score was found for paronychia (8.5) as compared to the overall mean score (6.9) [Table 4].

The final modified DLQI score obtained was calculated for each patient and grouped in the bands laid out, as shown in Figure 4. Various clinical cases and their modified DLQI scores are depicted in Figures 5-7.

## DISCUSSION

Nail disorders contribute to nearly 10% of dermatologic consultations, substantially impacting patients' QoL, especially through interference with daily function and cosmetic appearance.<sup>[8]</sup> In this study, we observed that onychomycosis was the most prevalent disorder, aligning with findings by Baran.<sup>[9]</sup> Onychomycosis and paronychia significantly impacted QoL, as indicated by their highly modified DLQI scores.

The study's findings of a moderate DLQI impact, with a mean score of  $6.9 \pm 5.5$ , parallels results of Reich and Szepletowski, who documented moderate QoL impairment in nail disorder patients.<sup>[2]</sup> Specifically, conditions such as acute paronychia, ingrown toenails and nail psoriasis, which induce pain and functional disruption, recorded higher scores, reflecting

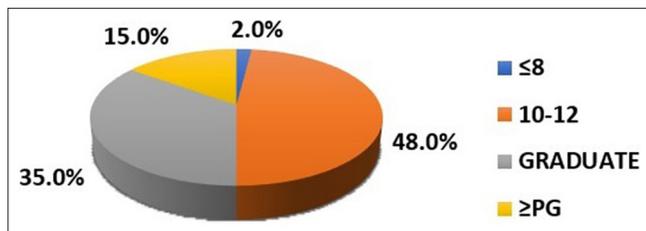


Figure 1: Distribution of cases as per educational qualification.

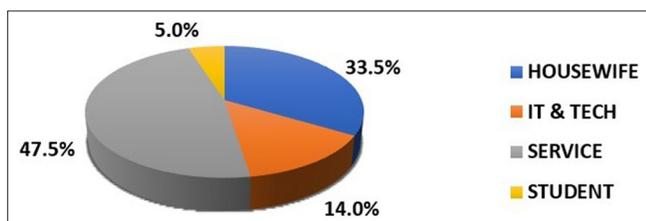


Figure 2: Distribution of cases as per profession.

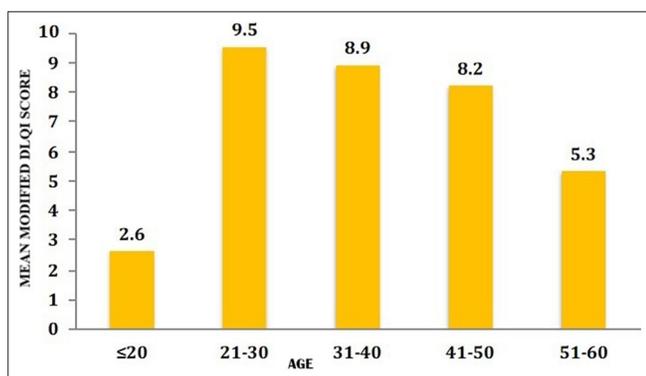


Figure 3: Modified DLQI score variation with age.

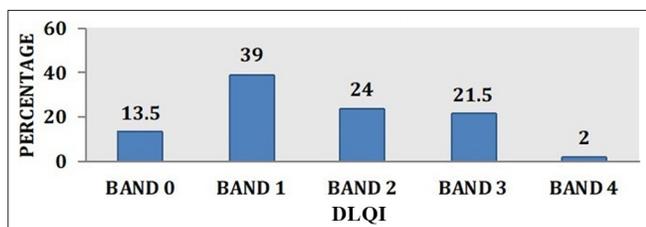


Figure 4: Distribution of cases as per modified DLQI band.

the acute effects on daily activities similar to the study by Belyayeva *et al.*<sup>[10]</sup>

Furthermore, demographic factors influenced QoL with younger age groups (particularly 21–30 years) reporting higher modified DLQI scores than older groups. This finding contrasts with studies that observed greater QoL impact in older patients, suggesting that younger individuals may face more social and professional pressures.<sup>[10,11]</sup> Gender also influenced QoL scores, with females recording higher scores than males (7.5 vs. 6.4), potentially due to heightened cosmetic



Figure 5: Nail psoriasis affecting all fingernails, modified DLQI score: 12.



Figure 6: Onychomycosis of thumb nail, modified DLQI score: 13.

Table 1: Distribution of nail disorders diagnosed at presentation in the outpatient department.

Disease	Number of patients	%
Onychomycosis	105	52.5
Paronychia	47	23.5
Ingrown toenail	41	20.5
Nail psoriasis	36	18
Idiopathic	4	2
Trachyonychia	4	2
Total	200	100

concerns and cultural factors surrounding appearance, which has been noted similarly by previous studies.

**Table 2:** Mean modified DLQI scores for all the questions.

Questionnaire	Min	Max	Mean	SD
Q1: How itchy, sore, painful or stinging have your nails been?	0	3	1.1	1.0
Q2: How embarrassed or self-conscious have you been because of your nails?	0	3	1.6	1.1
Q3: How much have your nails interfered with you going shopping or looking after your home or garden?	0	3	0.9	1.0
Q4: How much have your nails influenced the clothes you wear?	0	3	0.4	0.8
Q5: How much have your nails affected any social or leisure activities?	0	3	0.5	0.9
Q6: How much have your nails made it difficult for you to do any sport?	0	3	0.5	0.9
Q7: Have your nails prevented you from working or studying?	0	3	1.0	1.4
Q8: How much have your nails created problems with your partner or any of your close friends or relatives?	0	3	0.5	0.8
Q9: How much have your nails caused any sexual difficulties?	0	3	0.2	0.6
Q10: How much of a problem has the treatment for your nails been?	0	3	0.2	0.6
Total score	0	30	6.9	5.5

SD: Standard deviation

**Table 3:** Summary of modified DLQI scores as per study group parameters.

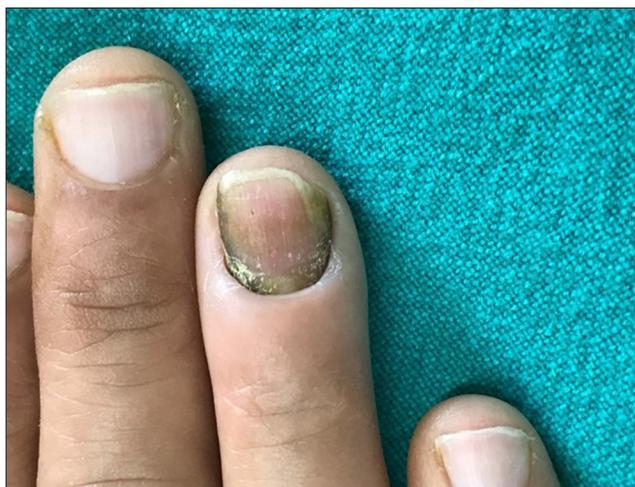
Parameters	Total score (mean±SD)	P-value	
Education	≤8 <sup>th</sup> standard	3±0	0.052
	10–12 standard	6.1±4.6	
	graduate	7.1±5.4	
	≥Postgraduate	9±7.6	
Duration (months)	1–2	8.1±7.3	0.001*
	3–5	5.7±4.3	
	6–12	5.4±4.3	
	12–24	8.7±1.3	
	24–60	9.8±4.8	
	>60	9.8±9.1	
Number of nails	1–5	6.7±5.3	<0.001*
	6–10	3.1±2.2	
	>10	14±5.3	
Profession	Housewife	7.2±4.6	0.001*
	Information Technology/ Technology	4.6±3.1	
	service industry	6.5±6.6	
	Student	11.7±0.5	
Total	6.9±5.6		

\*Significant at 5% level of significance ( $P<0.05$ ), SD: Standard deviation

Students and housewives had notably higher DLQI scores, attributable to the impact of nail disorders on academic and household tasks, respectively, while those in professional sectors reported lower scores, indicating less functional disruption in such roles. Interestingly, an inverted bell shaped pattern emerged regarding the number of nails involved and DLQI impact; higher scores occurred at both ends of the spectrum (1–5 nails and >10 nails), with a dip

**Table 4:** Average total modified DLQI of cases according to diseases.

Nail disorder	Mean total score
Onychomycosis	6.4±5.2
Paronychia	8.5±4.1
Ingrown toenail	7.6±6.9
Nail psoriasis	7.1±6.6
Idiopathic	3.0±0.0
Trachyonychia	4.0±0.0

**Figure 7:** Chronic Paronychia of right ring finger, modified DLQI score: 9.

when 6–10 nails were affected. This could imply an adaptive tolerance when a moderate number of nails are impacted, while extensive involvement exacerbates distress, as seen in the previous studies.<sup>[12,13]</sup> In patients with only fingernail involvement, higher modified DLQI scores were reported as, fingernails often play a crucial role in daily activities.

However, the score was even more when both fingers and toenails were affected.

This study emphasises the importance of using tools like the modified DLQI to assess the broader psychosocial and functional impact of nail disorders, particularly given their chronic and often visually apparent nature. By incorporating both quantitative and demographic insights, the modified DLQI can facilitate targeted interventions, addressing both medical and psychosocial aspects of nail disorders. Future research could validate these findings in larger, multi-centric cohorts.

## CONCLUSION

Nail disorders are an important and understudied cause of impact on QoL of the patients. DLQI is a useful tool for assessment of QoL impact of a range of dermatological conditions. The use of a pre-validated modified DLQI questionnaire for application to nail disorders is unique. Considering the moderate impact of nail disorders on QoL, the usefulness and economic pliability of chronic and prolonged treatment choices for nail disorders can be concurred.

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