

# Impact of Dermatological Diseases on the Quality of Life of Children and Adolescents

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## Abstract

**Background:** Dermatological disorders pose a substantial health burden in the world with the skin treatments being the 4<sup>th</sup> largest cause of non-fatal diseases. In childhood, these ailments have a significant effect on the quality of life of the children in the most crucial stages of development. However, only a few studies have established the linkage of these two factors among the people in South Asia.

**Objective:** To assess how dermatological diseases affect the quality of life in children and adolescents based on a validated tool Children Dermatology Life Quality Index (CDLQI) and what factors are related to a higher degree of impairment.

**Methods:** The study was carried out as a cross-sectional study at Punjab Rangers Teaching Hospital Lahore, Pakistan between 1<sup>st</sup> April - 30<sup>th</sup> April 2024. Total 122 children and adolescents between 4-16 years of age with dermatological conditions were selected. The CDLQI questionnaire that is seen as a good measurement of the quality of life was also used in Urdu. Statistical methods involved descriptive statistics, the chi-square and the independent sample t-tests.

**Results:** CDLQI score average 14.2 was used where a higher point means a greater impact on life quality; therefore above 12 points are considered a very large effect. 80.4 per cent of the respondents reported moderate effects and above, which are extremely large. The most common (42.6%) disorder was eczema that had the highest mean CDLQI score (15.8 ± 5.2). The group of middle childhood (6-10 years) also exhibited a high degree of impairment (mean CDLQI: 15.2 ± 6.9) than other age groups ( $p = 0.042$ ). There were no significant gender variations ( $p = 0.676$ ). The type of disease was moderately related to the categories of CDLQI ( $p = 0.004$ ).

**Conclusion:** Dermatological illness negatively affects the quality of life in children particularly suffering from eczema and the period of middle childhood being the most dangerous variables. These results underscore the need of regular quality-of-life evaluation and age-related comprehensive interventions in the practice of pediatric dermatology.

**Keywords:** Dermatological diseases, quality of life, children and adolescents, pediatric dermatology.

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## Introduction

The skin is the largest organ accounting to about one twelfth of the total body weight and it serves as the major boundary between the exterior and the interior environment. Dermatological conditions are a major health burden in the world. According to The Global Burden of Disease Project, skin diseases as the 4<sup>th</sup> leading cause of

non-fatal diseases in terms of disease burden in the world.<sup>1</sup> Dermatological conditions encompass a wide spectrum of disorders affecting the skin, ranging from acute infective conditions to chronic inflammatory diseases.<sup>2</sup> Dermatological diseases are especially common and influential in children and adolescents. In pediatrics, skin conditions presenting in childhood account almost one third of

all outpatient visits in dermatological and pediatrics clinics across the world. The distribution of skin pathologies in children is also geographically different where ecological conditions, hereditary factors and hygienic standards influence the particularities of the manifestation of pathologies.<sup>3</sup> The most common types of skin conditions in children are eczema, scabies, tinea, various inflammatory processes, and acne vulgaris.<sup>4</sup> Children and adolescents have distinct issues when managing dermatological diseases as opposed to the adult patients. Skin diseases are visible, which means they may create a serious interference in the development and social interaction of children and can limit their leisure activities. In a nut shell, skin diseases may cause severe multidimensional interference in the development and social conditions of a child including physical comfort, emotional well-being, social relationships, and learning ability.<sup>5</sup> Quality of life assessment in pediatric dermatology has become an accepted part of the process of comprehensive care of the patients. The concept of quality of life covers the influence of the illness on physical, psychological and social grounds, giving a wider picture of the disease burden than a single clinical severity.<sup>6</sup> Studies across different populations have consistently demonstrated significant quality of life impairment in patients with various dermatological conditions.<sup>7</sup> Children Dermatology Life Quality Index (CDLQI) is the commonly used tool to assess how skin disease in children (4-16 years old) affects quality of life and this instrument was initially designed and validated in 1995.<sup>13,14</sup> The CDLQI is a 10-item instrument that has six domains; symptoms and feelings, leisure activities, school and holidays, personal relationships, sleep, and treatment burden. The instrument has been tested across the different cultures and languages thus it makes it a valid tool when conducting an international study.

Although the influence of dermatological illnesses on the quality of life of adults has been investigated in detail with the help of questionnaires, such as the Dermatology Life Quality Index (DLQI), a substantial research deficit involving pediatric-age forms of research exists.<sup>8</sup> The majority of all previous investigations looked at popula-

tions in adulthood or combined different age groups with no particular examination given to the pediatric results. Moreover, there is scanty evidence on the comparative influence of various dermatological diseases on the quality of life of children especially in South Asia.<sup>9</sup>

Clinicians will focus on the clinical severity in terms of which intervention is to be used on a pediatric patient instead of quality-of-life evaluation. Limited research has been done on determination of quality of life in Pakistani population suffering from dermatological diseases, with some studies showing significant impairment considering different skin diseases.<sup>10</sup>

Children are a vulnerable group of population in whom the quality of life is rarely considered during their regular care. The calculation of CDLQI can provide us with an underrated picture of the burden that the dermatological diseases impose on the children and their families. The goal of this study would be to gain a better idea of exactly how different conditions affecting the skin may specifically affect patients of different age groups making up the pediatric population so that a more specific and patient focused intervention can be created to help them in addition to the clinical care.

Additionally, the definition of the quality-of-life burden in pediatric dermatology is also necessary to form health care policies, prioritization of treatment, and formulate age-specific interventions.

The Aims of this study were to evaluate how dermatological diseases affect the quality of life of children and adolescents according to the validated Children Dermatology Life Quality Index (CDLQI), which skin disorder causes the greatest degree of damage to the quality of life and at which age group the quality of life is most impaired.

## Methods

This cross-sectional study was conducted at Outpatient Dermatology Department of Punjab Rangers Teaching Hospital, a Tertiary Care Hospital in Lahore, Pakistan, within one month, from 1<sup>st</sup> April 2024 to 30<sup>th</sup> April 2024 after approval from ethical committee, Punjab Teaching Rangers Hospital

(Ethical Committee/IRB, REF No. 46/2024). Sample size was calculated considering the CDLQI score of  $15.55 \pm 7.23$  in pediatric patient with dermatological conditions from a previous study (11), providing  $\pm 1.3$ -point precision at 95% confidence interval. Formula which was used to calculate sample size was.  $n = (Z\alpha/2)^2 \times \frac{\sigma^2}{E^2}$ ,  $n = 3.84 \times 52.27 / 1.69$ ,  $n = 200.72 / 1.69$ ,  $n = 118.8$ ,  $n \approx 119=120$ .  $n = 120$  (sample size),  $Z\alpha/2 = 1.96$  (critical value for 95% confidence),  $\sigma = 7.23$  (CDLQI standard deviation),  $E = 1.3$  (precision in CDLQI points): 122 patients were enrolled for this study.

#### *Inclusion Criteria*

Children and adolescents aged 4 to 16 years (CDLQI applicable range), diagnosed with dermatological disease having disease duration of more than 1 week and ability to understand and respond to questionnaire items (with parental assistance if needed). Written informed consent from parents/guardians.

#### *Exclusion Criteria*

Children less than 4 years of age (below CDLQI applicable age). Dermatological disease with less than 1 week duration. Children with cognitive impairment preventing questionnaire completion. Refusal of consent by parents/guardians.

Children's Dermatology Life Quality Index (CDLQI): The CDLQI is a validated, dermatology-specific quality of life questionnaire designed specifically for children aged 4-16 years. The questionnaire consists of 10 questions covering six domains.<sup>12,13,14</sup> Symptoms and feelings (Questions 1-2): Itchiness, soreness, pain, and embarrassment. Leisure (Questions 4-6): Impact on playing, swimming, sports, and other activities. School and holidays (Question 7): Effect on school attendance and activities. Personal relationships (Questions 3, 8): Impact on friendships and reactions from others. Sleep (Question 9): Sleep disturbance. Treatment (Question 10): Treatment-related problems.

Scoring System: Each question is scored on a 4-point scale: 0 = Not at all, 1 = A little, 2 = Quite a lot, 3 = Very much. The total CDLQI score ranges from 0 to 30, with higher scores indicating greater

impairment of quality of life and vice versa. Score Interpretation: 0-1: No effect on quality of life, 2-6: Small effect on quality of life. 7-12: Moderate effect on quality of life, 13-18: Very large effect on quality of life, 19-30: Extremely large effect on quality of life. CDLQI questionnaire was communicated in Urdu (local language) after translation to keep in line with the prevalent culture and understanding. The process of the questionnaire administration was *age-adapted*: in the case of younger children (4-7 years), all the items of the CDLQI were presented verbally to the respondents by trained research assistants and the answers were recorded with active participation of parents to make the answers clearer. Children and teenagers (8-16 years) were able to self-administer, but there was still research staff on hand to give clarification where needed.

Data Collection Procedure: Demographic data was obtained after a written consent was signed by parents/guardians and a verbal consent was received by the children that consisted of: Age and gender of the child, nature and duration of dermatological condition and previous history of received treatments. Individually, each child was allowed to conduct a CDLQI survey questionnaire in a comfortable conducive environment in the dermatological clinic. It took about 10-15 minutes per head for the administration of the questionnaire.

Statistical Analysis of data was carried out with the help of SPSS statistics version 25. All the variables were computed using descriptive statistics. Categorical variables were reported as percentages and frequencies and continuous variables as means  $\pm$  standard deviation. Chi-square analysis was used to check relationships between categorical variables (gender, age-groups, type of diseases) and CDLQI score categories. Comparison of mean CDLQI scores between groups was assessed by independent sample t-tests. Significance values were taken as  $p < 0.05$  and 95 percent confidence levels where necessary.

The research done has followed the declaration of Helsinki. Ethical approval to conduct the study was issued by the local Institutional Review Board of Punjab Rangers Teaching Hospital. All parents/

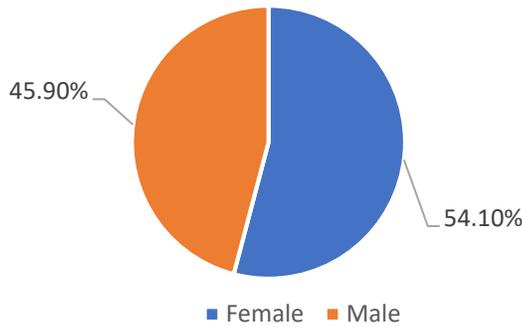
guardians were recruited through written informed consent, whereas verbal consent was received by children aged 8 years or older. All the participants were provided confidentiality throughout the study.

**Results**

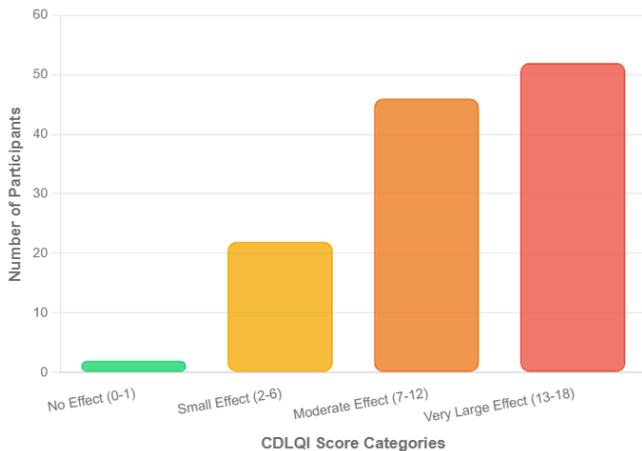
The study involved 122 children and adolescents with dermatological diseases of whom 66 were females and 56 were males. The mean age was 8.5 ± 3.2 years (Figure 1).

**CDLQI Score Distribution:** The mean CDLQI score was 14.2 ± 6.8, indicating a “very large effect” on quality of life for the majority of participants. The distribution of CDLQI categories was: No effect

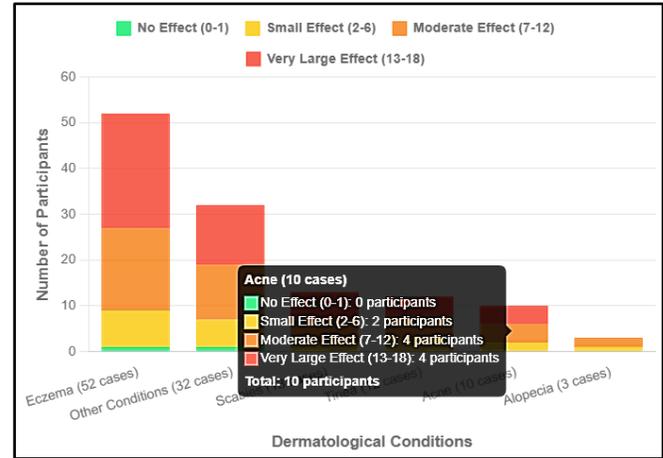
(0-1): 2 participants (1.6%), Small effect (2-6): 22 participants (18.0%), Moderate effect (7-12): 46 participants (37.7%), Very large effect (13-18): 52 participants (42.6%) (Figure 2).



**Figure 1:** Distribution of study participants by gender (n=122). Females comprised 54.1% of the study population while male are 45.9%.



**Figure 2:** Distribution of Children's Dermatology Life Quality Index (CDLQI) score categories among study participants (n=122). The majority of participants (42.6%) experienced a very large effect on their quality of life.



**Figure 3:** Distribution of dermatological conditions and their impact on quality of life measured by CDLQI categories. Eczema was the most prevalent condition, affecting 42.6% of participants.

**Disease-specific CDLQI Impact:** The most prevalent condition that impairs the quality of life was eczema which affected 52 participants (42.6%) and had a mean CDLQI of 15.8 5.2. These were followed by scabies and tinea infections (13 and 12 participants each, 10.7 and 9.8 percent respectively) (Figure 3).

**Statistical Analysis:** Chi-square analysis revealed significant associations between disease type and CDLQI categories ( $\chi^2 = 15.43$ ,  $p = 0.004$ ) (Table 1).

**Gender Analysis:** Although the study involved more females (54.1%) than males (45.9%), no significant difference between mean CDLQI scores was found amongst the genders (females: 14.0 +/- 6.5 vs males; 14.5 +/- 7.2;  $t = -0.42$ ,  $p = 0.676$ ) (Table 2).

But in case of “very large effect” specifically, the percentage of individuals having a very large effect was higher among males (46.4%) compared to that of females (39.4%), but this difference was not statistically significant ( $x^2 = 1.23$ ,  $p = 0.267$ ).

**Age Group Analysis:** The most affected age-group was middle childhood (6-10 years), where 50

**Table 1:** Distribution of Dermatological Conditions and CDLQI Impact.

Disease	CDLQI Score Categories				Total (n=122)	Mean CDLQI Score $\pm$ SD
	No Effect (0-1)	Small Effect (2-6)	Moderate Effect (7-12)	Very Large Effect (13-18)		
<b>Eczema</b>	1 (0.8%)	9 (7.4%)	26 (21.3%)	16 (13.1%)	52 (42.6%)	15.8 $\pm$ 5.2
<b>Scabies</b>	0 (0.0%)	0 (0.0%)	2 (1.6%)	11 (9.0%)	13 (10.7%)	16.2 $\pm$ 3.8
<b>Tinea Infections</b>	0 (0.0%)	0 (0.0%)	3 (2.5%)	9 (7.4%)	12 (9.8%)	15.9 $\pm$ 4.1
<b>Acne Vulgaris</b>	0 (0.0%)	2 (1.6%)	3 (2.5%)	5 (4.1%)	10 (8.2%)	14.3 $\pm$ 6.2
<b>Alopecia Areata</b>	0 (0.0%)	1 (0.8%)	2 (1.6%)	0 (0.0%)	3 (2.5%)	8.7 $\pm$ 3.5
<b>Other Conditions*</b>	1 (0.8%)	10 (8.2%)	10 (8.2%)	11 (9.0%)	32 (26.2%)	12.4 $\pm$ 7.3
<b>Total</b>	<b>2 (1.6%)</b>	<b>22 (18.0%)</b>	<b>46 (37.7%)</b>	<b>52 (42.6%)</b>	<b>122 (100%)</b>	<b>14.2 <math>\pm</math> 6.8</b>

**Table 2:** CDLQI Impact by Gender.

CDLQI Categories	Gender			p-value*
	Male (n=56)	Female (n=66)	Total (n=122)	
<b>No Effect (0-1)</b>	1 (1.8%)	1 (1.5%)	2 (1.6%)	
<b>Small Effect (2-6)</b>	9 (16.1%)	13 (19.7%)	22 (18.0%)	
<b>Moderate Effect (7-12)</b>	20 (35.7%)	26 (39.4%)	46 (37.7%)	0.267
<b>Very Large Effect (13-18)</b>	26 (46.4%)	26 (39.4%)	52 (42.6%)	
<b>Mean CDLQI Score <math>\pm</math> SD</b>	14.5 $\pm$ 7.2	14.0 $\pm$ 6.5	14.2 $\pm$ 6.8	0.676**

\*Chi-square test for association between gender and CDLQI categories

\*\*Independent sample t-test for difference in mean CDLQI scores between genders

**Table 3:** Distribution of Dermatological Conditions and CDLQI Impact.

Age Group	CDLQI Score Categories				Total	Mean CDLQI $\pm$ SD
	No Effect (0-1)	Small Effect (2-6)	Moderate Effect (7-12)	Very Large Effect (13-18)		
<b>Early Childhood (4-5 years)</b>	0 (0.0%)	2 (1.6%)	2 (1.6%)	1 (0.8%)	5 (4.1%)	12.8 $\pm$ 6.1
<b>Middle Childhood (6-10 years)</b>	2 (1.6%)	9 (7.4%)	16 (13.1%)	23 (18.9%)	50 (41.0%)	15.2 $\pm$ 6.9
<b>Early Adolescence (11-16 years)</b>	0 (0.0%)	6 (4.9%)	15 (12.3%)	14 (11.5%)	35 (28.7%)	13.7 $\pm$ 6.4
<b>Late Childhood (2-5 years) *</b>	0 (0.0%)	5 (4.1%)	13 (10.7%)	14 (11.5%)	32 (26.2%)	14.1 $\pm$ 6.8
<b>Total</b>	<b>2 (1.6%)</b>	<b>22 (18.0%)</b>	<b>46 (37.7%)</b>	<b>52 (42.6%)</b>	<b>122 (100%)</b>	<b>14.2 <math>\pm</math> 6.8</b>

\*Other conditions include vitiligo, psoriasis, urticaria, viral warts, and other miscellaneous dermatological conditions.

Statistical Analysis: Chi-square test revealed significant association between disease type and CDLQI categories ( $\chi^2 = 15.43$ ,  $df = 15$ ,  $p = 0.004$ ).

participants (41.0%) demonstrated a large degree of quality-of-life impairment (Table 3). The mean CDLQI scores by age group were: Early childhood (4-5 years):  $12.8 \pm 6.1$ , Middle childhood (6-10 years):  $15.2 \pm 6.9$ , Early adolescence (11-16 years):  $13.7 \pm 6.4$ .

The notable result ( $p = 0.042$ ) indicates that age does make a difference - in fact, the participants of the middle childhood group differed significantly in their CDLQI scores ( $p = 0.038$ ) in comparison to the participants of the early childhood group. This implies that existence of skin conditions influences quality of life depending on developmental stage. ANOVA revealed significant differences between age groups ( $F = 2.84$ ,  $p = 0.042$ ).

### Discussion

This research provides detail insight to the effects of dermatological illnesses on quality of life of children and adolescents in a South Asian population, which is significantly impaired, with more than 80% of the respondents reporting moderate to very large impacts on their everyday living. We identified eczema as the most frequent condition with severe quality of life impairment and is consistent with international literature on pediatric dermatology. Recent meta-analysis of 77 studies by *Olsen et al*, (2016) confirmed the status of eczema as one of the most significant conditions that affect the quality of life of children.<sup>15</sup> This chronic recurring characteristic of eczema with persistent itching, sleep disturbance and visible lesions have a significant impact on everyday activities and can explain its predominance. In contrast to the acute conditions, eczema demands continuous adaptations in the leisure activities including various sports activities and social interactions.

Exposed body parts like face and hands can have visible lesions that can affect the self-perception and peer interaction during critical developmental stages. Infectious diseases like scabies and tinea have also showed a significant decrease the quality of life, presumably because of the social stigma and impairment in daily life activities. Scabies especially has an impact on sleep quality, since it causes itching at night and may cause school abs-

enteeism and social isolation as it is a contagious infection. Acne vulgaris also had pronounced adverse effects, particularly in adolescents where peer acceptance and self-image take the center stage and appearance related issues are significantly relevant.

Our result on middle childhood vulnerability is a new addition to the literature on pediatric dermatology since not many studies explicitly investigate association between age and quality of life trends among pediatric population. This increased vulnerability is attributable to the theory of developmental psychology. The Middle childhood (6-10 years) is a critical stage in learning social skills, forming peer relationships and acquiring educational knowledge. It is an age group where children become more aware of physical variations and social comparisons and have lesser coping strategies as compared to older adolescents. They also feel uncomfortable due to observable skin conditions yet they are not emotionally mature enough to deal with such feelings effectively. Moreover, the regularity of school attendance and being in groups increases the social disruptive nature of skin conditions and therefore, can result in bullying, excluding from leisure activities and disruption in education for the child.

In our study, relative impairment was noted at early childhood, perhaps because there was less self-awareness of appearance and more parental intervention in symptom control, but with such a small sample ( $n=5$ ) it would be premature to draw firm conclusions.

Moderate impairment was observed during early adolescence, and it was presumed that formation of coping strategies could partially compensate appearance-related concerns. These results are in line with the research conducted in 2022 that indicated that children with allergic skin diseases experience specific difficulties in the school life.<sup>16</sup> However, there was no great difference between the quality-of-life impairment between genders as shown in some adult dermatology related literature. This shows that there is no significant difference between boys and girls regarding dermatological conditions falling under the age group of

pediatrics. Though males had marginally higher proportions in the very large effect category, this was not statistically significant and might be due to some variation in help seeking behavior or in reporting of symptoms and not necessarily in the actual burden of the disease. The clinical implication of this absence of gender disparity is significant because it implies that healthcare professionals must treat quality of life assessment with equal concerns in both pediatric male and female patients instead of assuming the differences between males and females. This is unlike some literature on dermatology in adults which indicates that there is gender-specific effects.

In our study a significant impact on quality of life is observed that aligns unequivocally with research showcasing that there is a well-established relationship between chronic skin diseases and emotional disturbances which can manifest as depression, anxiety and social boycott.<sup>17</sup>

The presence of South Asian population's context is a very cardinal addition to this research due to the fact that cultural attitudes towards skin diseases might not be the same with Western populations. Skin conditions can be highly stigmatized within cultures where purity, marriageability, and social acceptance are among the emphasized concepts. This cultural context can be attributed to the large quality of life impacts that we have seen in our study. Among Bangladeshi patients residing in the UK, recent studies have shown cultural trends of influence on quality of life, with family involvement and social perceptions having important roles.<sup>18</sup> Sociodemographic factors such as age, gender, and social status have been proven to show significantly high impact on both the prevalence and effects of skin diseases among the adolescents.<sup>19</sup>

The developmental differences that are evident suggest the necessity of developing relevant age-appropriate interventions. Middle childhood patients could be supported with specific attention to the area of peer relationships and school-related issues, whereas adolescent patients might need a more specialized approach in countering the struggle with the appearance related issues.

Our results are consistent with the international literature by *Finlay et al*, which showed that dermatological conditions affect quality of life differently depending on disease type. Like with *Skin-dex-17*, our CDLQI showed statistically significant correlations between the type of skin disease and the burden of quality of life ( $p = 0.004$ ). These two studies define conditions such as psoriasis and vitiligo as the ones with greater psychosocial impact, which confirms the necessity of dermatological-specific quality of life scales and justify the argument that even the cases with only minor clinical conditions can significantly affect emotional and social well-being.<sup>20</sup>

There are a number of limitations in this work. This cross-sectional design offers only a snapshot at a single point in time and thus, preventing the assessment of how quality of life changes or responds to treatments over time. Additionally, this study used a single tertiary care hospital in Lahore to recruit; therefore, it's findings cannot be generalized to primary care or rural environments. Moreover, no systematic measures of key confounding variables such as socioeconomic status, comorbidities and treatment history were conducted. Therefore, for future a longitudinal study should be conducted that uses community-based, multi centric sampling methods where confounding variables are systematically evaluated using validated tools to increase the external validity.

## Conclusion

The research confirms that dermatological illnesses significantly reduce the quality of life of children and adolescents with eczema and middle childhood being the most susceptible. The fact that there are no gender disparities means that the skin conditions impact both boys and girls in the pediatric years. These results underscore the idea that medical professionals need to go beyond clinical severity measurement and implement the quality-of-life assessment on regular basis by using validated measures, such as CDLQI. An integrated, multifaceted approach is imperative that combines psychosocial assistance, patient education, family counseling along with medical intervention. The acknowledgment of dermatological dis-

eases as complex conditions impacting daily functioning, social interactions and general well-being is needful to enhance the provision of pediatric dermatological care especially in populations of South Asia.

**Ethical Approval:** The Ethical Committee, Punjab Teaching Rangers Hospital Lahore approved this study vide No. Ethical Committee/IRB Ref No.46/2024.

**Conflict of Interest:** There was no conflict of interest to be declared by any author.

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#### Author's Contribution

**NS:** Conception & design, acquisition of data, drafting of article, analysis & interpretation, critical revision of the article, final approval of the version to be published.

**AS:** Conception & design, acquisition of data, analysis & interpretation, final approval of the version to be published.

**NUSE:** Conception & design, acquisition of data, drafting of article, analysis & interpretation.

**TA:** Drafting of article, analysis & interpretation.

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