Original Article

Impact on quality of life and factors associated with relapse in Dermatophytoses

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Abstract

Background Dermatophytosis have a significant impairment in quality of life of the patients. The aim of this study was to evaluate quality of life in patients with dermatophytosis using Dermatology life quality index (DLQI), correlate DLQI with disease characteristics and assess the risk factors for relapse.

Methods This was a cross-sectional observational study based in a tertiary care hospital in central Nepal carried out from September 2020 to February 2021. A detailed clinical profile of each patient was recorded and a Nepali dermatology life quality index (DLQI) questionnaire was used to evaluate quality of life in these patients and was correlated with disease characteristics. A logistic regression analysis was done to assess the predictors of relapse.

Results A total of 128 patients were included in the study. The median age of study population was 26 years. Mean DLQI score was 12.39($\pm$0.55) with no difference in male and female. Most of the patients (45.3%) had very large effect (score 11-20) on the quality of life. The quality of life had positive correlation with the increasing body surface area (p=.007) and itch scale (p=<.001) and negative correlation with the duration of the disease (p=.015). Males were 3.9 times more likely to relapse. There was no statistical association between recurrence and use of steroids, sharing towel, age of patient and duration of disease.

Conclusion Dermatophytosis causes large impact on the quality of life of the patient. Larger body surface area involvement and large itch scale (measured in last 2 days) are associated with higher impairment in quality of life. Males are more likely to have higher rates of relapse.

Key words
Dermatophytes, DLQI, Nepal, risk factors, relapse.

Introduction

The prevalence of the superficial dermatophytosis is estimated to be 20-25% worldwide.[1] Dermatophytoses also known as tinea, are the most common dermatophytosis. In Nepal, the prevalence in community ranges from 11.4% in southern part (terai region)[2] to 0.9% (all fungal infections included) in Northern part (hilly region).[3] Hospital based studies have found the prevalence of dermatophytosis to be around 16%.[4,5] In India, the prevalence is found to range from 36 to 78%.[6] Various factors including wrong treatment, hot humid and congested living conditions are thought to be responsible for current epidemic of the dermatophytosis, especially in Indian subcontinent.[7,8] In recent times, tinea infections have become a menace to the patients and the physicians alike. As the result of recurrence, chronicity, severity and relapse of this once easily treatable condition, the treatment has

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become a challenge to the treating physician and a huge burden to the patients and consequently a compromise in the quality of life.[9-12]

Dermatology life quality index (DLQI) have been used to assess the impairment in quality of life in patients with tinea. The studies from India have shown that dermatophytosis have very large effect in patients life.[10,11] There is paucity of data regarding the impact in quality of life (QoL) in patients suffering from tinea, especially in Nepal. The aim of this study was to find out impact of dermatophytosis in quality of life using DLQI, correlate DLQI with disease characteristics (duration of disease, severity, age, sex, itch, relapse and steroid use) and assess the possible factors contributing to relapse.

Methods

All patients with tinea presenting to the Out Patient Department (OPD) of Civil Service Hospital from September 2020 to February 2021, were included in this cross-sectional study. Patients of less than 18 years of age, involvement of nails only, admitted and emergency patients and non-consenting patients were excluded from the study. Variables studied included Demographic details (age, sex, married status, occupation, and education), use of shared towels, severity of disease, severity of itch, family history of dermatophytosis, body surface area, relapse, use of topical steroids, distribution of lesions, and DLQI. An informed consent was taken from all the participants for the study. A clinical diagnosis of tinea was made by a single observer throughout the study based on clinical presentation.

The effects of dermatophytosis in quality of life of the patients was assessed using a Nepali version of the Dermatology Life Quality Index (DLQI) available from https://www.cardiff.ac.uk/medicine/resources/qu ality-of-life-questionnaires/dermatology-life-quality-index

and was handed to each participant to be filled after clinical assessment. This patient filled questionnaire consisted of 10 questions with four possible answers for each. These questions were based on the following six domains:

(a) physical symptoms and feelings (questions 1 and 2),
(b) daily activities (questions 3 and 4),
(c) leisure (questions 5 and 6),
(d) work/school (questions 7),
(e) personal relationships (questions 8 and 9), and
(f) treatment (question 10).

Each question is scored as "very much" (score 3), "a lot" (score 2), "a little" (score 1), and "not at all" (score 0). DLQI score interpretation and banding was done as follows: (a) No effects on patients life(0-1), (b)Small effect on patients life (2-5), (c) Moderate effect on patients life (6-10), (d) Very large effect on patients life (11-20), (e) Extreme large effect on patients life .

To quantify itching in these patients, a numerical rating scale (NRS) was used. NRS is a patient reported symptom assessment grading of their feelings in a scale marked 0 (no pruritus) to 10 (worst imaginable pruritus). This scale has been validated for use in pruritus assessment and has been banded for easier interpretation.[13,14] A self-designed patient form with all the relevant information was provided to each participant to indicate the maximum itching in last 48 hours.

Severity of the disease was assessed based on body surface area involvement and was categorized as follows: 3% of BSA: mild, 3-10%: moderate, >10%: severe disease.[8] One palm was taken as approximately 1% of BSA.

The occurrence of the disease after a minimum of two months of symptom free period was labeled as recurrence or relapse. Patients' history and previous documented diagnosis (if available) was the basis of such label. Age, sex, family history of dermatophyotsis, marital status, and duration of disease, BSA, use of shared towel and use of topical steroids were analyzed as risk factors /predictors of relapse.

Statistical analysis

The data thus obtained was entered in SPSS version 20 for analysis. The Kolmogorov-Smirnof test was used to find the normality of the distribution. Frequency and percentage of the categorical variables were calculated. The mean or median of the continuous variables and ordinal variables were calculated and compared. The correlation between continuous variables and continuous and dichotomous categorical variables was computed. Logistic regression analysis model for the recurrence of tinea infections was prepared and predictors for recurrence were explored.

The study was approved by the Institutional Review Committee of Civil Service Hospital.

Results

The demographic profile of the study population is summarized in **Table 1, 2**.

Total 128 patients were included in the study among which males were 67.2% and females were 32.8% (Male: Female ratio of 2.05:1). Out of all these patients 63.3% of patients had relapse of tinea. The treatment at the time of visit to OPD was steroid containing cream in 70.3% of cases. The median age of presentation and duration of disease was 26 years and 3 months respectively. The details of numerical variables are summarized in **Table 2**.

Table 1 Demographic profile of the study population.

Variable		N=128	%age
Sex	Male	86	67.2
	Female	42	32.8
Occupation	Student	49	38.3
	Housemaker	17	13.3
	Employed	41	32.0
	Unemployed	21	16.4
Marital status	Married	65	50.8
	Unmarried	63	49.2
Education	1-10	13	10.2
	10-12	47	36.7
	>12	68	53.1
Relapse	Yes	81	63.3
	No	47	36.7
Family history	Yes	17	13.3
	No	111	86.7
Towel sharing	Yes	61	47.7
	No	67	52.3
Treatment with steroid	Yes	90	70.3
	No	38	29.7
Distribution of lesion	Covered parts	80	62.5
	Uncovered+both	48	37.5
Clinical diagnosis	Tinea cruris	25	19.5
	Tinea cruris+corporis	45	35.2
	Extensive	39	30.5
	Others	19	14.8
Severity based on BSA	Mild (<3%)	60	46.9
	Moderate (3-10%)	61	47.7
	Severe (>10%)	7	5.5
Numeric rating scale	Mild (0-3)	19	14.8
	Moderate (4-7)	74	57.8
	Severe (8-10)	35	27.3

Table 2 Disease characteristics of the study population.

Disease Characteristics	Mean±SD	Median (Q1-Q3)
Age (years)	30.29(±0.98)	26(22-35.75)
Duration (months)	6.645(±0.83)	3(2-6)
BSA	4.910(±0.33)	4(2-6)
Total DLQI score	12.39(±0.55)	12(7-17)
NRS	5.91(±0.18)	6(4.25-8)

Table 3 The banding of the DLQI scores and their frequency.

DLQI banding	Frequency (percentage)
Small effect (2-5)	18 (14.1%)
Moderate (6-10)	38 (29.7%)
Very large effect (11-20)	58 (45.3%)
Extremely large (>21)	14 (10.9%)
Total	128 (100)

Table 4 Summary of the DLQI scores in different subdomains and impairment of quality of life in percentage.

DLQI subdomains	Male	Female	Total	Mann-Whitney U test(p-value)
Symptoms and Feeling	3.99 ±0.14 (66.5%)	3.98±0.23 (66.33%)	3.98±0.12 (66.33%)	.948
Daily activities	2.37±0.18 (39.5%)	2.67±0.28 (44.5%)	2.47±0.15 (41.17%)	.403
Leisure	2.31±0.18 (38.5%)	2.26±0.28 (37.67%)	2.29±0.15 (38.17%)	.733
Work and School	1.05±0.11 (35.0%)	1.33±0.20 (44.33%)	1.14±0.10 (38.0%)	.460
Personal relationships	1.29±0.17 (21.5%)	1.28±0.26 (21.33%)	1.29±0.14 (21.5%)	.682
Treatment	1.22±0.11 (40.67%)	1.16±0.17 (38.67%)	1.20±0.09 (40.0%)	.712
Total score	12.24±0.64	12.69±1.05	12.39±0.54	.907

Table 5 Correlation between total DLQI score and other variables (Continuous and categorical).

Correlation variables	Spearman's rho	P value
Total score and Duration	-.214	.015
Total score and BSA	.239	.007
Total score and NRS	.315	<.001
Total score and Age	.033	.71
Total score and Sex	.01	.91
Total score and Relapse	-.019	.83
Total score and Steroid use	.153	.084

DLQI

Almost half of the total patients, 45.3%, had very large effect on their lives due to dermatophytosis, 29.7% had moderate effect and 10.9% had extremely large effect **(Table 3)**. The mean total score of DLQI was 12.39±0.54. The

mean scores in the different domains of DLQI were calculated in both the genders. The highest impairment was seen in symptoms and feeling subdomain, 66.3% for both the genders. Personal relationship subdomain was the least affected due to tinea infection, 21.5%. The comparison of means did not show any significant difference between genders in any subdomain of the DLQI **(Table 4)**.

Correlations of various variables with the total DLQI score

The longer the duration of the disease, the lower the total DLQI score was found. Higher total body surface involvement and the larger numerical rating scale for itching of the last 48

hours were associated with greater impairment of quality of life. Age, sex and the recurrence were not found to alter the DLQI score significantly **(Table 5)**.

Internal consistency and validity

The DLQI questionnaire had a good reliability (Cronbach's Alpha of .829) for the evaluation of this population. The correlation analyses revealed item-total correlation coefficients ranging from 0.34 to 0.64. For the factor analysis to find the dimensionality of DLQI while evaluating dermatophytosis, the Kaiser-Meyer-Oklin test of sample adequacy was .81 and Bartlett's test of sphericity was significant (P<.001). Principal component analysis with varimax rotation obtained two components with Eigen values more than 1 and explaining variance of 51.44%.

Risk factors for relapse

A logistic regression was performed to find the risk factors for the relapse of tinea infections using various categorical and continuous variables. This model was fit for further analysis (Omnibus tests of model coefficients Chi^2=21.0; p=0.013, Hosmer and Lemeshow test of fit chi^2=11.345, p=0.183). The model could explain 20.7% of variation in the relapse cases (Nagelkerke R2) and it correctly classified 74.2% of cases. Males were 3.9 times more likely to relapse. Using steroids, sharing towel, increasing age and increasing duration, though

Table 6 Logistic regression analysis for predicting factors for relapse of tinea infection.

Predictors	Odds ratio	95% Confidence Interval		P value
		Upper	Lower	
Sex(male)	3.882	1.661	9.070	.002
Family history(present)	.510	.148	1.756	.286
Marital status(married)	.880	.254	3.055	.841
Towel use(shared)	1.271	.547	2.956	.577
Steroid use(present)	2.385	.960	5.925	.061
Age	1.023	.966	1.084	.430
Duration	1.060	.992	1.132	.087
BSA	.989	.883	1.107	.844
Total DLQI score	1.008	.941	1.080	.817
Constant	.140			.040

have greater than 1 of Odds of recurrence, the difference was not significant **(Table 6)**.

Discussion

Males were found to more commonly affected by *tinea* (male:female ratio of 2:1), which is seen in most of the studies,[10,11] and female predominance in others,[9] but not at the same ratio as this study. The increased mobility and choice of clothing may be the factors for this difference between genders. Relapse cases constituted 63.3% of our cases. Chronicity, high recurrence and relapse has been seen in many studies recently.

Almost half of the patients (45.3%) in this study reported that the impact of *tinea* in their lives was very large, 29.7% moderately large and 10.7% extremely large effect. This finding was similar to the finding by Rajashekara *et al.*[10] but different to the findings by Narang *et al.*[11] where they found a small effect in 41.3% and extremely large effect in 23.9% of their patients.

The mean DLQI score in the total study population was 12.39±0.54. Similarly high scores were seen by Narang *et al.*[11] (mean DLQI 13.41) and Rajashekhara *et al.*[10] (mean DLQI 12.79) in quality of life studies. This kind of very large QoL impairment have been seen in Atopic dermatitis, Burn scars, Epidermolysis bullosa and Hidradenitis suppuritiva while even

the chronic skin conditions like psoriasis, vitiligo, chronic urticaria have recorded lower (moderate) effect, as reviewed by Barsa *et al.*[16] The acute infective condition like scabies have also found moderate effect (DLQI mean 10.09) in QoL.[21] In studies done in similar population Khadka *et al.*[18] found DLQI score of 10.77 in moderate to severe psoriasis, Agrawal *et al.*[19] found score of 12.63 in cases of patch test negative hand eczema cases and Poudyal *et al.*[20] found median score of 4 in cases of vitiligo. The severity and unpredictability of itching, embarrassment and incomplete clearance despite treatment may be the contributing factors for high scores, which is reflected in high percentage (66.3%) of disability in symptoms and feelings sub-domain. Symptoms and feeling (65%) subdomain was the most profoundly affected in study by Narang *et al.* as well, followed by "daily activities" (46.16%), "leisure" (43.67%), "personal relationships" (39%), and "treatment" (39%), and a modest impact on "work and school" (16%). However our patients had lowest impact on personal relationship subdomain (21.5%). Most of the people in Nepal don't want to talk about sex life and close relations and that may be the reason for lower percentage impairment.

Increasing duration of disease was associated with lesser impairment in quality of life. However the other studies found the opposing findings.[9,22] This finding suggest that the patients

get used to the symptoms or find some medications that reduces their suffering.

Increasing body surface area was associated with significantly higher impairment in Qol as in other studies.[9,22] and higher itching scale in last 48 hours were also associated with increased overall impairment of QoL as found by Patro *et al.*[12] though they had used a different pruritus scale; 5D-pruritus scale. The increased itching in last couple of days could be the reason that patients seek treatment, and itching could be the single most important item deciding the overall quality of life in patients with dermatophytosis.

Recurrent dermatophytosis have been thought to be associated with lot of factors like sharing towels, steroid use though there are no proper studies associating these factors with relapse. Our study showed that these factors were not associated with relapse of the disease contrary to the popular belief. This opens up a new discussion and area of research for factors associated with relapse in future.

Limitation

This is a small hospital based study with small sample size. Exclusion of other chronic disease conditions that could influence the outcome of DLQI were done based on patients' history only. The regression model may not be accurate with this sample size.

Conclusion

There is a very large impairment in Qol in patients with dermatophytosis. The impairment is most severe in symptoms and feelings subdomain. The disability is found to increase with increasing body surface involvement and increasing itch severity, however longer duration of disease had smaller disability. The only

significant predictor of relapse was found to be male sex.

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