

Mental Health and Quality of Life in Chronic and Recurrent vs First-Episode Dermatophytosis: A Cross-Sectional Study

Психическое здоровье и качество жизни при хронической и рецидивирующей дерматофитии в сравнении с впервые выявленным эпизодом: поперечное исследование

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Original research

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ABSTRACT

BACKGROUND: Chronic and recurrent dermatophytosis (CRD) might affect mental health morbidity as well as the quality of life of patients, although it has not been conclusively proven.

AIM: To study the quality of life and mental health burden in patients with CRD as compared to those presenting with first-episode superficial dermatophytic infection (SDI).

METHODS: The study included patients aged over 18 years with CRD or with first-episode SDI. Quality of life was assessed using the Dermatology Life Quality Index (DLQI), mental health morbidity — using the 12-item General Health Questionnaire (GHQ12) and the Hospital Anxiety and Depression Scale (HADS) defined as the HADS-A (anxiety) and the HADS-D (depression).

RESULTS: A total of 166 patients were examined: 104 with CRD and 62 with first-episode SDI. CRD patients had significantly poorer quality of life, especially in the “extremely large score category” as compared with SDI. The DLQI domains of “symptoms and feelings” and “daily activities” were the worst affected (in all cases $p < 0.05$). In multivariate logistic regression analysis, body surface area involvement and HADS-A emerged as significant predictors of CRD.

CONCLUSION: CRD patients had greater deterioration in mental health (HADS-A) as compared to patients with first-episode superficial dermatophytosis.

АННОТАЦИЯ

ВВЕДЕНИЕ: Несмотря на отсутствие исчерпывающих доказательств, существует предположение, что хронические и рецидивирующие дерматофитии (ХРД) ассоциированы с повышенным риском психических расстройств и снижением качества жизни.

ЦЕЛЬ: Проанализировать качество жизни и бремя психических расстройств у пациентов с ХРД в сравнении с пациентами, у которых впервые выявлена поверхностная дерматофития (ПД).

МЕТОДЫ: В исследование были включены пациенты старше 18 лет с ХРД или впервые выявленной ПД. Психическое состояние оценивали с использованием 12-пунктового «Опросника общего здоровья» (12-item General Health Questionnaire, GHQ12) и «Госпитальной шкалы тревоги и депрессии» (Hospital Anxiety Depression Scale, HADS), которая включает подшкалы тревоги (HADS-A) и депрессии (HADS-D). Качество жизни измеряли с помощью опросника «Дерматологический индекс качества жизни» (Dermatology Life Quality Index, DLQI).

РЕЗУЛЬТАТЫ: Было обследовано 166 пациентов: 104 — с ХРД и 62 — с впервые выявленной ПД. У пациентов с ХРД отмечалось статистически значимое снижение показателей психического благополучия и качества жизни по сравнению с пациентами с ПД. Особенно выраженные различия были у пациентов, набравших чрезвычайно высокие баллы по DLQI, что отражает наиболее тяжелое влияние заболевания на их повседневную жизнь ($p < 0,05$). Наибольшие межгрупповые различия зафиксированы в доменах «симптомы и эмоциональное состояние» и «повседневная деятельность». По результатам многомерного логистического регрессионного анализа значимыми предикторами ХРД были площадь поражения кожи (в процентах от общей площади поверхности тела) и показатель тревоги по подшкале HADS-A.

ЗАКЛЮЧЕНИЕ: У пациентов с ХРД наблюдались более высокие уровни психологического стресса и тревожности, а также более выраженное ухудшение качества жизни по сравнению с пациентами со впервые выявленной ПД.

Keywords: *chronic and recurrent dermatophytosis; superficial dermatophytosis; quality of life; mental health*

Ключевые слова: *хроническая и рецидивирующая дерматофития; поверхностная дерматофития; качество жизни; психическое здоровье*

INTRODUCTION

Superficial fungal infections of the skin, hair, and nails by dermatophytes are among the most common infective dermatoses seen in humans, with an estimated prevalence of 37–78% in India [1].

In the Indian subcontinent, the incidence of chronic and recurrent dermatophytosis (CRD) is around 65% and 35% respectively [2], and it has risen to epidemic proportions over the years [3]. Most cases of dermatophytosis have turned into a therapeutic challenge due to various host, environmental, and etiological agent factors such as immunocompromised state, atopy, diabetes, change in host dressing habits, such as tight clothing and occlusive footwear, topical steroid abuse, high temperature and relative humidity, atypical presentations, change in dermatophyte strains and emergence of resistant strains [4, 5].

In the present scenario, CRD has posed a significant burden on patients (especially when they pay for their dermatophytosis treatment themselves with no insurance coverage). Even after treatment, CRD has a huge mental health impact on patients, as persistent and severe pruritus (cutaneous itching), extreme distress in their routine activities, especially social life and sexual activities, and also occupational health issues [6]. Since CRD runs a chronic course, it might have a significant impact on patients' mental

well-being, and stress can adversely affect the patients' immunity, which could further impair the rate of recovery from the chronic infection [7]. Thus, it is important to address the mental health and quality of life of patients along with the recommended antifungal treatment.

Only a few studies [8, 9] have drawn attention to assessing mental health and quality of life in patients with CRD using the Dermatology Life Quality Index (DLQI) [10], the 12-item General Health Questionnaire (GHQ12) [11, 12], and the Hospital Anxiety and Depression Scale (HADS) [13, 14]. Since only a few studies [15] have been conducted in North India in this area and to our best knowledge, no studies have evaluated quality of life and mental health in patients with CRD in comparison with SDI (using DLQI, HADS, and GHQ12).

Hence, we aimed to study the quality of life and mental health burden in patients with CRD as compared to those presenting with first-episode superficial dermatophytic infection (SDI).

METHODS

Study design

A cross-sectional study was conducted. Patient record forms were used to obtain sociodemographic data (sex, age, education, marital and socioeconomic status), medical history and predisposing factors.

Setting

This study was conducted from July to December 2022 in the outpatient departments (OPDs) of dermatology and psychiatry at the Dr. Ram Manohar Lohia Institute of Medical Sciences (Lucknow, India).

Eligibility criteria

Inclusion criteria

Patients aged over 18 years presenting with CRD or first episode of SDI.

All study participants presenting with itchy annular lesions underwent cutaneous examination. The clinical diagnosis of dermatophytosis was based on clinical history (history of itchy, red lesions over the groin region, face, etc.) and cutaneous examination (annular lesions with erythematous raised borders and central clearing). In doubtful cases, a microscopic examination of the potassium hydroxide mount of scrapings from lesions was performed. Disease severity was measured by body surface area (BSA) involvement based on the “rule of nines” and itch severity on a scale of 1 to 10 using the Visual Analog Scale (VAS) [13].

We defined first-episode dermatophytosis as an infection in a treatment-naive patient with a duration of less than 6 weeks. When patients suffered from dermatophytosis for more than 6 months, with or without recurrence, despite being adequately treated, it was termed chronic dermatophytosis. Adequately treated was defined as having received a tablet of terbinafine 250 mg once a day for 4 weeks and/or a tablet of fluconazole 150 mg once a week for at least 8 weeks and/or a capsule of itraconazole 100 mg twice a day for at least 2 weeks. Recurrence of the disease (lesions) within 6 weeks after completion of treatment was defined as recurrent dermatophytosis [14].

Exclusion criteria

Patients with concomitant illnesses such as cardiovascular disease, hepatic disease, renal disease, and central nervous system disease, previously diagnosed psychiatric illnesses (which were identified using medical records and medical history), other dermatological conditions that could influence their quality of life, and those who had suffered a recent serious life event were excluded from the study.

Sample size

The required sample size was not calculated when planning the study.

Data collection methods

The enrolled patients were assessed for the DLQI [8], the GHQ12 [10], and the HADS [11, 12] questionnaires. DLQI was used for quality of life assessment, and the overall level of mental health distress was assessed using GHQ12 and HADS scores. HADS was used to differentiate between anxiety (HADS-A) and depression (HADS-D).

DLQI comprised 10 questions related to symptoms, feelings, daily activities, leisure, work, school, personal relationships, and treatment (in relation to participants’ perception over the last week). Questions were scored from 0 to 3, and the final score ranges from 0 (no impact on quality of life) to 30 (maximum impairment). The cutoff score for DLQI is considered to be ≥ 2 [9].

The GHQ12 consists of 12 items and assesses the severity of mental problems over the past few weeks using a 4-point Likert-type scale (from 0 to 3). The final score ranges from 0 to 36, with higher scores indicating poorer mental health. The cut-off score is considered to be ≥ 4 [12].

The HADS comprises questions (items) related to mental health, which are scored using a 4-point Likert scale (range 0–3). It comprises 14 questions, with 7 related to anxiety (HADS-A) and 7 to depression (HADS-D). The total score is the sum of the 14 items range from 0 to 21, with the threshold value for each subscale being ≥ 11 [11].

Survey administration

All these psychometric tools were self-assessment forms which were completed in Hindi or English according to patient convenience after written informed consent was obtained in the dermatology and psychiatry OPDs.

The authors conducted the adaptation of the questionnaires into the local language (Hindi) themselves, which was not validated. The three questionnaires were handed over to the patients at once by the researcher (questions were explained in the local language to them) and they filled them in a separate room in the presence of a doctor (in the outpatient department). Patients were free to clarify any doubts regarding the questionnaires, and illiterate patients ($n=10$) were helped by an attendant to complete the questionnaires.

All authors discussed the procedures as a research team before performing the sample survey. The assisting doctor received prior training from the researcher on conducting the survey, including questionnaire details and a demonstration. The physicians participating in the survey did not receive any additional training beyond this.

Statistical analysis

Statistical analysis was carried out using R version 4.3.2. Continuous variables were summarized as median (Me) and interquartile range (Q1; Q3). Comparison between the two groups (CRD and SDI) was done using the Wilcoxon rank-sum test for continuous variables and the chi-square test for categorical variables. A p -value <0.05 was considered statistically significant.

Univariate analysis was performed for all relevant clinical and demographic variables (age, sex, socioeconomic status, marital status, occupation, education, family history of dermatophytosis, atopy, frequency of bathing, change of undergarments, sharing of clothes, clothes washed separately, tight clothing, and BSA, number of sites, clinical type, morphology of lesions, inflammation, seasonal exacerbation, DLQI score, GHQ12 score, HADS-A score, HADS-D score) to assess their association with the outcome variable (CRD). Variables with a p -value <0.05 in the univariate analysis were considered for inclusion in the multivariate model to ensure that potential confounders were not overlooked. For the multivariate analysis, a binary logistic regression model was used with CRD as the outcome variable. A stepwise selection algorithm was employed. The entry and removal criteria were based on significance levels (typically $p<0.05$ for entry and $p>0.10$ for removal), and the model fit was assessed using the Akaike Information Criterion (AIC) and/or McFadden's pseudo R^2 . This value was calculated using R software with the `pscl` library. The analysis is presented in terms of estimated coefficients, standard errors, Z-values, p -values, and odds ratios (ORs) with 95% confidence intervals (CI).

Ethical considerations

The study was conducted after approval by the Ethics Committee of the Dr. Ram Manohar Lohia Institute of Medical Sciences (Lucknow, India). Date of approval by the ethics committee: 14/06/22. Protocol Number: IEC 10/22. Reference No. of protocol: RC 356/RMLIMS/2022. Patients were included in the study after providing written informed consent.

All study participants were asked to complete the questionnaire papers in a separate room in the OPD and patient data were kept confidential. Several measures were implemented throughout the survey to ensure anonymity and confidentiality. Anonymity measures included the collection of no personally identifiable information (e.g., names, addresses, or contact details).

Responses were aggregated for analysis, preventing individual identification. Confidentiality measures, such as all survey data, were stored in a secure, protected database that was accessible only to authorized researchers. Participants were informed that their responses would be kept strictly confidential and used solely for research purposes.

RESULTS

Participant flow

After screening over six months, 250 patients attending the dermatology OPD were diagnosed with dermatophytosis. All of them were over 18 years of age. Of these, 69 patients were excluded due to the presence of concomitant illnesses (cardiovascular illness, hepatic, renal, and central nervous system diseases, previously diagnosed psychiatric illnesses, other dermatological conditions). Out of these patients, 15 patients refused to provide written consent and were excluded. Finally, 166 patients completed the full survey after consent: 104 patients with CRD and 62 with SDI.

Patient characteristics

The CRD group showed a significantly older and more often married demographic with less frequent use of tight clothing compared to the SDI group (Table 1). Other variables did not show statistically significant differences.

Clinical variables of the patients in the CRD and SDI groups were summarized in Table 2. The majority of patients had 0–5% BSA involvement and multiple anatomical sites involved in both groups, and there were significant differences between the groups. Overall, tinea cruris (code 1F28.3, International Classification of Diseases 11th Revision) was the predominant presentation, followed by tinea corporis in single-site disease as well as in multiple-site disease in both groups. Classical lesion morphology had a higher proportion, with significant differences between groups. Inflammation among participants in both groups was equally observed. Seasonal exacerbation among participants in both groups was equally affected.

Main findings

Patients with CRD reported significantly higher impairment in quality of life, greater psychological distress, and higher levels of anxiety compared to those with SDI (Table 3). In the domains of DLQI, significant differences were noted in the “symptoms and feelings” domain, with higher median scores in the CRD group compared to the

Table 1. Demographic variables of study participants

Variables	CRD, n=104	SDI, n=62	p-value
Age, Me (Q1; Q3)	32 (25; 41)	27.5 (21; 34)	0.011
Sex, n (%)			
Male	76 (73.1)	49 (79.0)	0.389
Female	28 (26.9)	13 (21.0)	
Marital status, n (%)			
Married	72 (69.2)	32 (51.6)	0.023
Unmarried	32 (30.8)	30 (48.4)	
Occupation*, n (%)			
Field worker	8 (7.7)	4 (6.5)	0.516
Outdoor occupation	8 (7.9)	8 (12.9)	
Indoor occupation	59 (56.7)	39 (62.9)	
Housewife	23 (22.1)	8 (12.9)	
Unemployed/Retired	6 (5.8)	3 (4.8)	
Socio-economic status**, n (%)			
Upper	2 (1.9)	3 (4.8)	0.566
Middle	75 (72.1)	43 (69.4)	
Lower	27 (26.0)	16 (25.8)	
Education, n (%)			
Graduate and above	40 (38.5)	27 (43.5)	0.133
High school and Intermediate	37 (35.6)	27 (43.5)	
Junior school and below	27 (26.0)	8 (12.9)	
Family history of dermatophytosis***, n (%)	44 (42.3)	18 (29.0)	0.087
Atopy, n (%)	29 (85.6)	13 (21.0)	0.321
Frequency of bathing, n (%)			
Daily	85 (81.7)	57 (91.9)	0.070
Less frequently	19 (18.3)	5 (8.1)	
Change of undergarments, n (%)			
Daily	79 (76.0)	54 (87.1)	0.082
Less frequently	25 (24.0)	8 (12.9)	
Sharing of clothes, n (%)			
Absent	68 (65.4)	34 (54.8)	0.176
Present	36 (34.6)	28 (45.2)	
Clothes washed separately, n (%)			
Yes	71 (68.2)	37 (59.7)	0.261
No; together with family member	33 (31.8)	25 (40.3)	
Tight clothing, n (%)			
No	59 (56.7)	22 (35.5)	0.008
Yes	45 (43.3)	40 (64.5)	

Note: *Field worker: farmer, forest worker, pesticide worker, security guard; Outdoor occupation: washer man, mechanic, carpenter, labourer, food seller, security guard; Indoor occupation: shopkeeper, student, clerk, businessman, officer worker, ward boy, salesman, teacher, advocate, driver, accountant, pharmacist; **Kuppuswamy socio-economic status scale based on education status, occupation and per capita family income per month; middle class includes upper middle and lower middle; lower class includes upper lower and lower; ***History of similar dermatophytosis in family members (close contacts) of the patient. CRD — chronic and recurrent dermatophytosis; SDI — superficial dermatophytic infection. Significant p-value is highlighted in bold.

Table 2. Clinical variables of study participants

Variables	CRD, n=104	SDI, n=62	p-value
BSA, n (%)			
0 to 5%	62 (59.6)	57 (91.9)	<0.001 (df=2)
5 to 10%	31 (29.8)	4 (6.5)	
>10%	11 (10.6)	1 (1.6)	
Number of sites, n (%)			
Single	10 (9.6)	17 (27.4)	0.002
Multiple	94 (90.4)	45 (72.6)	
Clinical type, n (%)			
Classical	25 (24.0)	28 (45.2)	0.009
Mixed	79 (76.0)	34 (54.8)	
Classical, n (%)			
T. corporis	8 (32)	8 (28.58)	0.977 (df=3)
T. pedis	2 (8)	2 (7.14)	
T. cruris	14 (56)	18 (64.28)	
T. faciei	1 (4)	0	
Mixed, n (%)			
T. corporis + T. cruris	40 (50.64)	22 (64.70)	0.685 (df=7)
T. corporis + T. cruris+ T. faciei	22 (27.85)	4 (11.77)	
T. corporis + T. faciei	5 (6.33)	5 (14.70)	
T. corporis + T. pedis	2 (2.54)	0	
T. corporis + T. cruris + T. pedis	4 (5.06)	0	
Extensive Tinea	1 (1.26)	0	
T. cruris + T. faciei	4 (5.06)	3 (8.83)	
T. corporis + T. cruris + T. faciei + T. pedis	1 (1.26)	0	
Morphology of lesion, n (%)			
Classical	47 (45.2)	42 (67.7)	0.001 (df=2)
Atypical*	29 (27.9)	14 (22.6)	
Combination	28 (26.9)	6 (9.7)	
Inflammation, n (%)			
Inflammatory	70 (67.3)	43 (69.4)	0.784
Non-inflammatory/Dry	34 (32.7)	19 (30.6)	
Seasonal exacerbation, n (%)			
None	30 (28.8)	27 (43.5)	0.167 (df=3)
Summer	56 (53.8)	30 (48.4)	
Winter	11 (10.6)	3 (4.8)	
Monsoon	7 (6.7)	2 (3.2)	

Note: *papulosquamous, eczematous, pustular, lichenoid. BSA — body surface area; CRD — chronic and recurrent dermatophytosis; SDI — superficial dermatophytic infection. Significant p-value is highlighted in bold.

SDI group. In the multivariate logistic regression analysis included age, marital status, clinical type, BSA involved, tight clothing, number of affected sites, lesion morphology, DLQI score, GHQ12 score, HADS-A score (anxiety) and HADS-D score (depression). We found that patients' BSA and HADS-A score whereas DLQI, GHQ12, and HADS-D scores were not associated with CRD (Table 4).

DISCUSSION

On conducting multivariate logistic regression, only BSA and HADS-A scores were statistically significant predictors of CRD. In various previous studies, BSA involvement emerged as a significant predictor of CRD compared to SDI [15, 18–20]. CRD patients have higher odds of suffering from anxiety in concordance with the study by Das et al. [17]. Our study showed a higher HADS-A score, suggesting the need to investigate more about the health-related discomfort and dissatisfaction experienced by patients with CRD (as it is one of the most common skin conditions). It implies that in CRD, mental health morbidity is negatively affected, i.e., chronicity and recurrence are related to anxiety. Addressing the mental health aspect of this disease through such detailed studies and thorough patient counseling can go a long way toward risk factor prevention as well as treatment compliance in such patients. A brief review of the previously conducted studies regarding mental health in chronic dermatophytosis in India has been compiled in Table S1 in the Supplementary.

In a cross-sectional study by Narang et al. [15], 196 patients with first-episode, chronic, and recurrent dermatophytosis were recruited. The median DLQI for SDI and chronic and recurrent dermatophytosis was 13, 13 and 11.5 among the three groups (the differences were insignificant). Although the median DLQI in the present study was slightly higher for the CRD group (Me=15) as compared to the SDI group (Me=12), the difference was not found to be statistically significant. Most of the previous cross-sectional studies have calculated the mean DLQI (Table S1 in the Supplementary). Except for the studies by Das et al. [17] and Shivani et al. [24] where the mean CRD DLQI was 21.4 and 15.98, DLQI in most studies ranged from 12.12 to 14.28 [18–23] which is lower than the DLQI of our study CRD group. In almost all the previous studies, the main questionnaire items most influenced by the disease were “symptoms and feelings”, followed by “daily activities” (Table S1 in the Supplementary). In previous studies, age was noted [15], involvement of >10% BSA [15, 17, 20, 21],

Table 3. Comparative analysis of DLQI, GHQ12 and HADS scores between study groups

Variables	CRD, n=104	SDI, n=62	p-value
DLQI			
DLQI score, Me (Q1; Q3)	15 (9.8; 20)	12 (7.2; 16)	0.020
Domains of DLQI, Me (Q1; Q3)			
Symptoms & Feeling (0–6)	5 (3; 6)	3 (2; 4.75)	<0.001
Daily Activities (0–6)	3 (1; 4)	2 (1; 4)	0.057
Leisure (0–6)	2 (1; 4)	2 (1; 3)	0.135
Work & School (0–3)	3 (0; 3)	1 (0; 3)	0.310
Personal Relationships (0–6)	1.5 (0; 4)	1 (0; 3)	0.239
Treatment (0–3)	1 (0; 2)	1 (0; 2)	0.082
Categories of DLQI score, n (%)			
Extremely large (21–30)	24 (23.1)	6 (9.7)	0.331 (df=4)
Very large (11–20)	48 (46.2)	31 (50)	
Moderate (6–10)	22 (19.4)	12 (21.2)	
Small (2–5)	10 (9.6)	12 (19.4)	
No effect (0–1)	0	1 (1.6)	
GHQ12 score			
GHQ12 score, Me (Q1; Q3)	15 (10; 19)	11 (7.2; 16.5)	0.011
Categories of GHQ12, n (%)			
≥4	97 (93.3)	56 (90.3)	0.700
<4	7 (6.7)	6 (9.7)	
HADS			
HADS-A			
HADS-A score, Me (Q1; Q3)	7 (4; 11)	6 (2; 8)	0.016
Categories of HADS-A score, n (%)			
Abnormal (11–21)	27 (26.0)	8 (12.9)	0.063 (df=2)
Borderline abnormal (8–10)	23 (22.1)	11 (17.7)	
Normal (0–7)	54 (51.9)	43 (69.4)	
HADS-D			
HADS-D score, Me (Q1; Q3)	7 (4; 9)	6 (2; 9)	0.210
Categories of HADS-D score, n (%)			
Abnormal (11–21)	18 (17.3)	7 (11.3)	0.549 (df=2)
Borderline abnormal (8–10)	26 (25.0)	18 (29.0)	
Normal (0–7)	60 (57.7)	37 (59.7)	

Note: DLQI — Dermatology Life Quality Index; GHQ12 — 12-item General Health Questionnaire; HADS — Hospital Anxiety Depression Scale. Significant p-value is highlighted in bold.

Table 4. Logistic regression to assess the association of CRD with study variables

Variables	Estimate (β)	Std. Error	Z-value	p-value	OR (Exp (β))	Lower 95% CI	Upper 95% CI
(Intercept)	-2.090	1.169	-1.787	0.073	0.12	0.01	1.17
Age	0.029	0.023	1.246	0.212	1.03	0.98	1.08
Marital status	0.033	0.493	0.068	0.945	1.03	0.39	2.76
Tight clothing	-0.512	0.432	-1.185	0.236	0.60	0.25	1.39
BSA	1.389	0.503	2.760	0.005	4.01	1.62	11.91
Number of sites	0.319	0.537	0.595	0.552	1.38	0.48	4.04
Clinical type	0.024	0.046	0.537	0.591	1.03	0.94	1.12
Morphology of lesion	0.090	0.060	1.493	0.135	1.09	0.98	1.24
DLQI score	0.0176	0.035	0.496	0.619	1.02	0.95	1.09
GHQ12 score	0.0172	0.036	0.479	0.631	1.02	0.95	1.09
HADS-D score	-0.0603	0.065	-0.923	0.356	0.94	0.83	1.07
HADS-A score	0.1376	0.061	2.248	0.024	1.15	1.02	1.30

Note: BSA — Body Surface Area; CI — Confidence Interval; DLQI — Dermatology Life Quality Index; GHQ12 — 12-item General Health Questionnaire; HADS-D/A — Hospital Anxiety Depression Score (Depression/Anxiety).

Clinical type category: classical, mixed. Morphology of Lesion category: classical, atypical, combination. Statistics of the multivariate model: Null deviance: 219.38 (df=165). Residual deviance: 177.40 (df=154); Akaike Information Criterion (AIC): 201.4; McFadden R²=0.1913; McFadden R²=0.15–0.4 is considered a good fit in logistic regression. Significant p-value is highlighted in bold.

>2 affected sites [17, 18, 20, 21], gender, education, and socioeconomic status [18] were associated with a significantly worsened DLQI. The DLQI score in our study was not significant; hence, we did not assess the factors influencing DLQI.

GHQ12 was studied in three previous studies so far in relation to chronic and recurrent dermatophytosis [15, 23, 24]. In both the studies by Anushree et al. and Narang et al. the GHQ12 cutoff score was set at 12 to assess mental health distress, whereas the cutoff was two and four in the studies by Saini et al. and ours, respectively. In the study by Narang et al. GHQ12 was found to have a significant correlation with DLQI, although it didn't show any significant difference between the SDI and CRD groups under this study. The mean GHQ12 was lower in the study by Saini et al. [24] as well as Anushree et al. [23] compared with the present study.

The study was limited by a possible selection bias (all patients were recruited from a tertiary care center). Also, the site of the dermatophytic infection (subtypes of tinea based on site) was not individually assessed for correlation with the HADS, DLQI, and GHQ12. The adapted questionnaires in the local language (Hindi) were not validated. In this study, the required sample size was not precalculated. However, a previously published article [16]

reported that the mean and standard deviation of DLQI ($\mu \pm \sigma$) score was 10.01±5.01 in 328 patients. Using the Cohen's sample size calculation:

$$n = \frac{Z_{1-\alpha/2}^2 \sigma^2}{d^2},$$

where $Z_{1-\alpha/2}=1.96$ at a 5% significance level, $\sigma=5.01$, and d (margin of error) was set at 5.2% of the mean DLQI score, the required sample size was calculated to be 250 patients.

The study had a varied patient profile. As it was a tertiary care center, patient coverage included distant areas of North India (with patients referred from other hospitals). Hence, the results of the study are applicable to a larger population.

CONCLUSION

Chronic and recurrent dermatophytosis was associated with deteriorated mental health in patients. HADS-A showed significant differences between CRD and SDI. On multivariate logistic regression, HADS-A showed significantly elevated anxiety levels and a more pronounced decline in quality of life among the CRD group. The disease variable, i.e., BSA, was seen to be associated with the CRD group. Hence, a multidisciplinary approach involving counselling by psychiatrists along with treatment by a dermatologist is required in the management of CRD patients.

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Supplementary data

Supplementary material to this article can be found in the online version by doi:

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