

HEALTH SEEKING BEHAVIOR AND COST OF CARE OF CHRONIC DERMATOPHYTOSIS: A HOSPITAL-BASED CROSS-SECTIONAL STUDY

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ABSTRACT

Recent trend in onslaught of chronic and recurrent dermatophytosis not amenable to conventional dose and duration of antifungal agents has been observed in Nepal and India. The major factor implicated behind this surge is use of over-the-counter fixed drug combination containing topical steroids. This study aimed to examine the health seeking behavior, pattern of drug use and cost of care of chronic dermatophytosis in Nepalese population. Ninety-one patients with the diagnosis of chronic dermatophytosis of skin willing to participate in the study were recruited in a hospital-based, cross-sectional study. Information regarding demographic profile, health seeking behavior and cost incurred in the treatment of their dermatophytosis were recorded in a preset proforma. Mean age of study population was 30.49±13.50 years with M:F ratio of 2.25:1. Mean duration of illness was 20.68±6.44 months, with groin as the initial site of involvement in nearly half of cases. Commonest diagnoses were extensive dermatophytosis, followed by tinea cruris et corporis and tinea cruris. Nearly three-fourth of patients reported seeking advice from local pharmacy and two-third reported using steroid containing topical agents for their skin problem. On an average, patients spent NPR 6,488.70 in a six months period and 3.03% of their income in the treatment of chronic dermatophytosis. This study highlighted the tendency of patients to seek advice from pharmacy dispensers, use of topical steroid containing agents in chronic dermatophytosis and substantial financial burden borne by patients in the treatment of the condition.

KEYWORDS

Chronic dermatophytosis, cost, economic burden, health seeking behavior

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DOI: <https://doi.org/10.3126/nmcj.v22i3.32656>

INTRODUCTION

Dermatophytosis is a common superficial fungal infection of keratinized tissue caused by dermatophytes which belong to the genera *Trichophyton*, *Microsporum* and *Epidermophyton* and encompasses infections of skin, hair and nails.¹ Cutaneous fungal infections account for majority of visits to the dermatology clinic. Annual Health Report for the fiscal year 2016/17 reported fungal infections to be one among top ten reasons for overall out-patient consultations with frequency of 1.5% of total out-patient visits.² Prevalence of fungal infections in Nepal was reported to be 1% in a community based study to 17.3% in a hospital based study.^{3,4}

Chronic dermatophytosis is the term coined for dermatophytosis occurring for more than six months to one year, with or without recurrence, in spite of being adequately treated. Recurrent dermatophytosis is defined as recurrence of lesions within few weeks (less than six weeks) after completion of treatment.⁵ In recent years, there has been an emergence of chronic and recurrent dermatophytosis in high volumes in our clinics as has been reported from studies in India.⁶⁻¹⁰ The present situation in India has been implicated mostly to overuse of easily available, inexpensive fixed drug combination (FDC) topical agents (steroid, anti-fungal and anti-bacterial) which can be purchased over-the-counter without doctor's prescription.¹⁰ The situation is no different in Nepal.^{11,12}

Present scenario is such that the textbook recommended dosage and duration of antifungal treatment for the said infection is largely ineffective.⁸ Dermatologists throughout the country encounter many such cases of dermatophytosis which are not responding to conventional dosage and duration of treatment with frustration in the patient and the treating physician. Patients are spending their hard earned money in various treatments, initially for the purchase of multiple over-the-counter topical FDC and later visiting numerous physicians and dermatologists due to the recalcitrant nature of infection. The magnitude of problem is such that chronic and recurrent dermatophytosis can be considered a preventable public health problem with significant financial burden to the patient and country's economy. The present study thus aims to quantify the magnitude of problem in Nepal by assessing the health seeking behavior and cost of care of treatment in chronic dermatophytosis.

MATERIALS AND METHODS

This was a cross-sectional, descriptive, hospital-based study carried out at the Department of Dermatology and Venereology, Nepal Medical College Teaching Hospital during a study period of 12 months (December 2018 to November 2019). Ethical clearance was obtained from Institutional Review Committee, Nepal Medical College.

The inclusion criteria were as follows: patients of any age and sex with the diagnosis of chronic dermatophytosis of skin (dermatophytosis of at least six months duration), with persistent and progressive lesions or recurrent lesions (lesions recurring within six weeks of stopping standard treatment for the type of dermatophytosis)¹³ and those who have undergone any form of treatment, procedure or investigation for dermatophytosis for which the patient had to pay himself/herself.

Patients not willing to participate in the study and those with tinea capitis or onychomycosis only were excluded from the study. After obtaining informed, written consent from the study participants, information regarding demographic profile (age, gender, educational status, occupation and financial dependence), health seeking behavior (nature of medication taken, medication obtained from and visit to dermatologist) and cost of care (direct costs, indirect costs and monthly income) were taken. Direct costs included travel, lodging, food, paper work, investigations, drugs, hospitalization, other modalities of treatment, etc. and indirect costs included loss of earnings of caregivers, loss of earnings of patients, increased household expenditure etc.

Data was entered and analyzed using SPSS version 16. Quantitative data was interpreted in terms of percentage and averages. Qualitative data was represented in numbers and percentage.

RESULTS

Ninety-one patients fulfilling the inclusion criteria were enrolled in the study. The mean age was 30.49±13.50 years (Range: one to sixty seven years) with 63 males and 28 females (M:F ratio: 2.25:1). Majority belonged to 19 – 28 years age group (41.76%) [Fig. 1]. Majority of patients have had secondary or higher secondary education (63.74%). Most of the study population comprised of students (26.37%) and majority responded as being financially independent (56.04%).

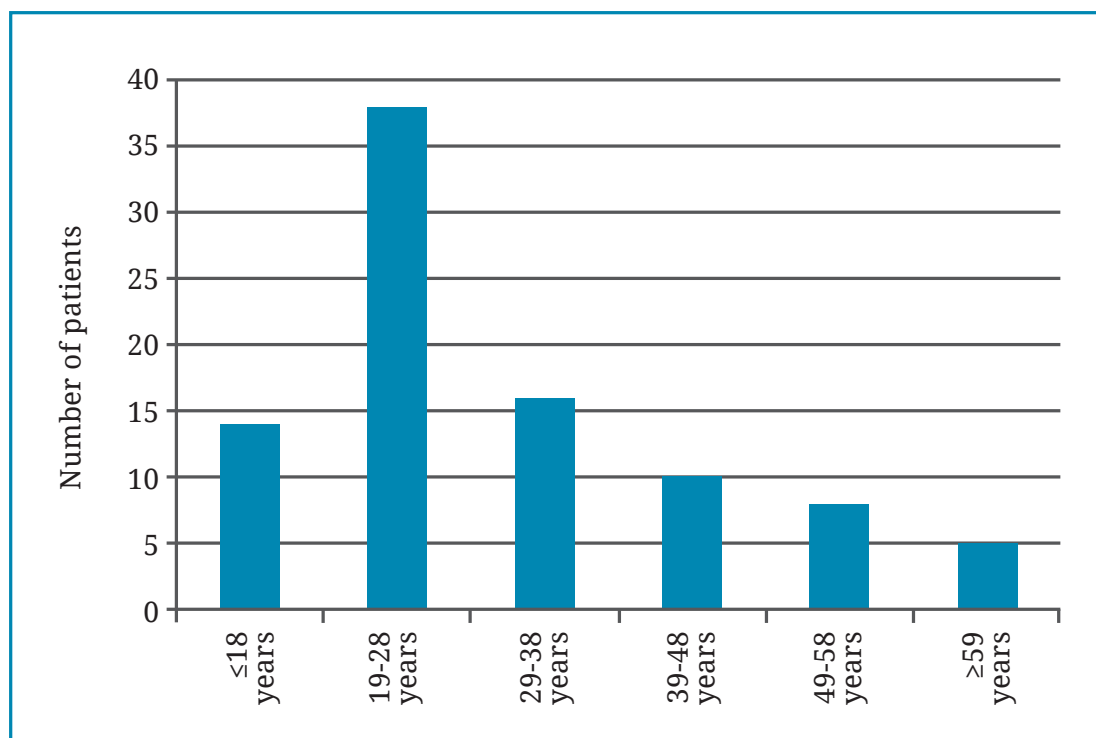


Fig. 1: Age distribution of study population

Mean duration of illness was 20.68±6.44 months (Range: six months to five years). Nearly half of recruited patients had groin as their initial site of involvement (50.55%) [Table 1]. At the time of presentation, 25 patients had single site involvement (27.48%), 33 had two anatomical sites involved (36.26%) and 33 had

three or more anatomical sites involved by the condition (36.26%).

Majority of patients recalled summer as the season of disease onset (65.93%), more than one-third had a positive family history (36.26%) and 16 had history of similar lesions

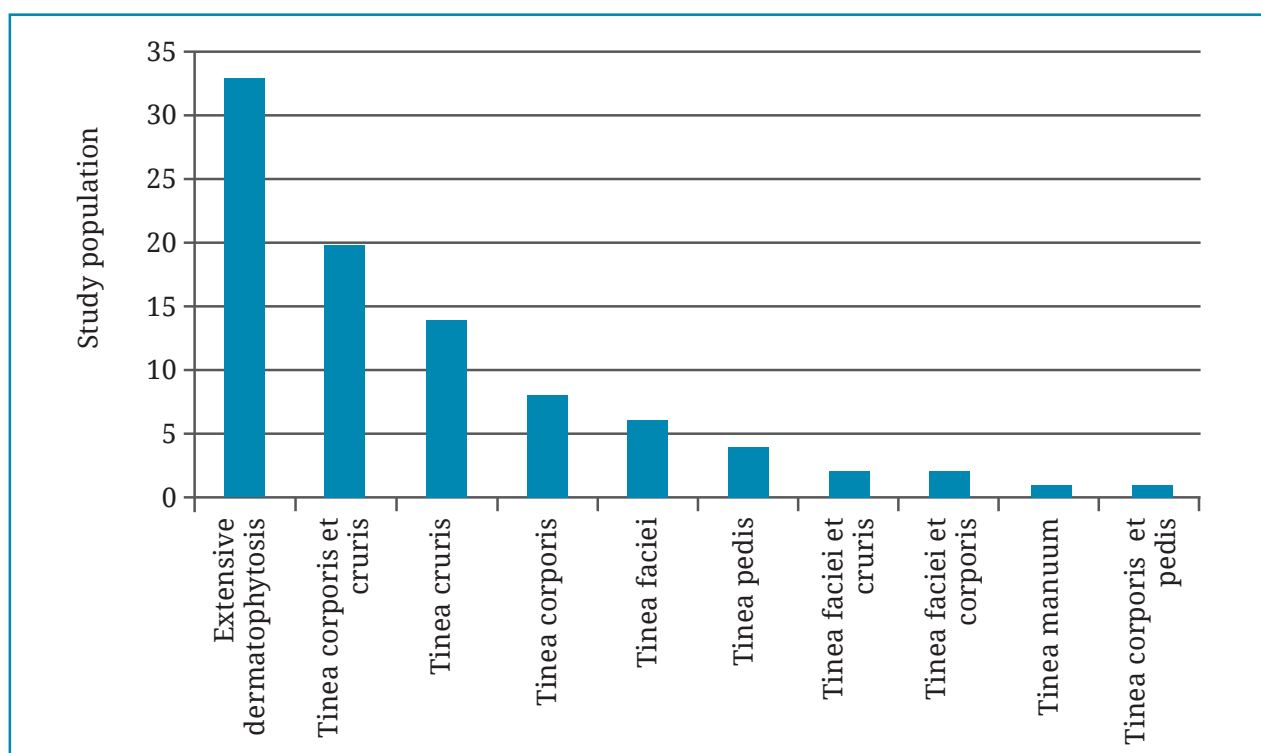


Fig. 2: Clinical diagnosis in study population

Table 1: Initial site of involvement

Initial site of involvement	n	%
Face	6	6.59%
Trunk	9	9.89%
Upper limbs	6	6.59%
Lower limbs	14	15.38%
Palms and soles	5	5.49%
Axilla	1	1.10%
Inframmary area	3	3.30%
Waist	1	1.10%
Groin	46	50.55%
Total	91	100.00%

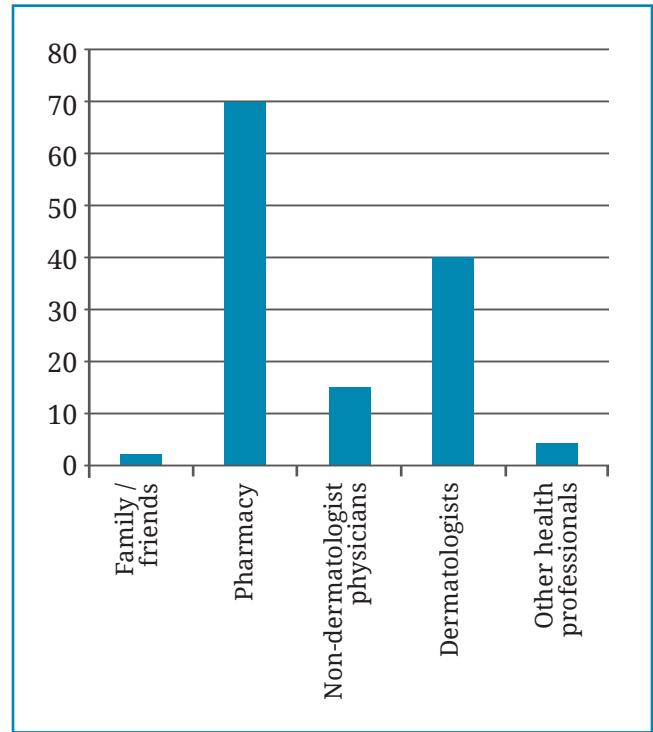


Fig. 3: Advice for treatment of dermatophytosis sought by patients

Table 2: Number of visits to the doctor for treatment of dermatophytosis

Number of visits to doctor	n	%
0	42	46.15%
1 -5	42	46.15%
6 - 10	5	5.49%
10 - 15	2	2.21%
Total	91	100.00%

in their spouse (17.58%). Nineteen patients responded as having similar condition in non-familial contacts (20.88%), the contacts being roommate (6.59%), work colleague or friend (6.59%), guest (6.59%) and neighbor (1.10%). Sixty-two patients (68.13%) reported persistent and progressive disease whereas rest of the study population reported recurrent disease.

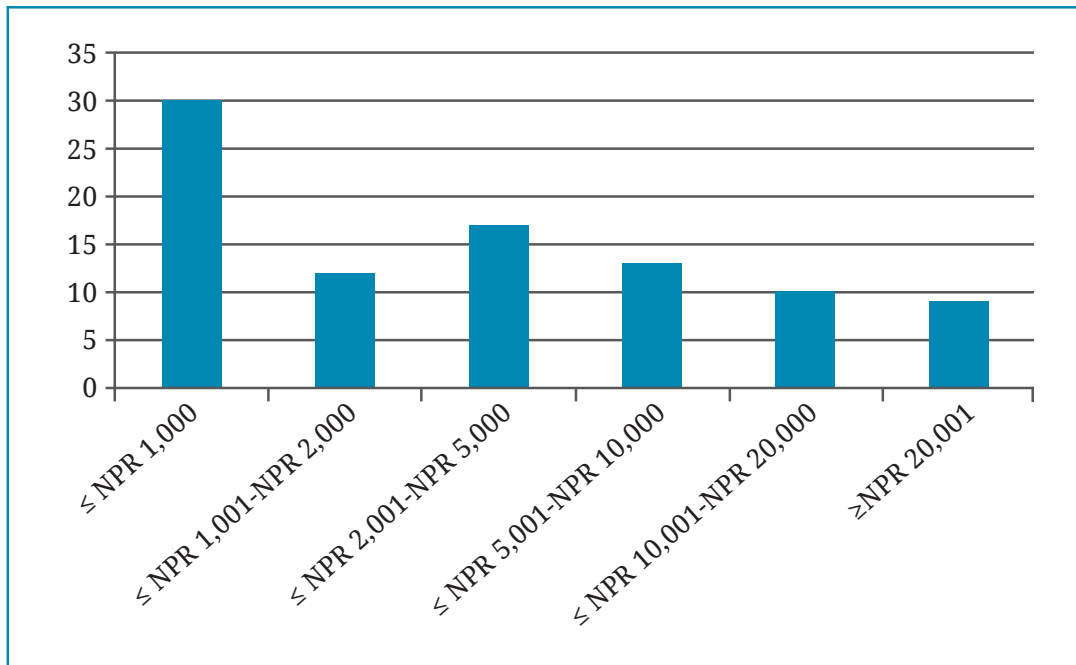


Fig. 4: Total cost in last six months for treatment of chronic dermatophytosis

Fifty-eight patients had body surface area less than 10% involved by the disease (63.73%). Only five individuals had body surface area involvement of more than 30% (5.49%). Three patients each had co-existing tinea capitis or onychomycosis (3.29%). Majority received the clinical diagnosis of extensive dermatophytosis as defined by three or more anatomic sites involvement (36.26%), followed by tinea cruris et corporis (21.98%) and tinea cruris (15.38%) [Fig. 2].

Forty-two patients had not visited any doctor for their skin condition (46.15%) [Table 2]. Seventy patients reported seeking advice and purchasing medication from local community pharmacy (76.92%) and 40 patients claimed as having visited dermatologist at least once for their problem (43.95%) [Fig. 3]. Mean duration of illness prior to seeking advice from a dermatologist was 17.63 ± 6.48 months (Range: one week to five years). Fifty-four patients reported using both topical and oral medications (59.34%) and 35 patients reported using topical medication only (38.46%). Thirty individuals could not recall the name of oral medication used (32.96%). Nineteen had received itraconazole (20.88%), ten had received fluconazole (10.99%) and five had received terbinafine (5.49%) for their dermatophytosis. Topical anti-fungals were used by 24 patients

(26.37%), topical agents containing steroid were used by 63 patients (69.23%) and 22 patients could not recall the topical agent used for the condition (24.17%).

The study population reported mean direct expense of NPR 5,339.50 (median: NPR 2,050.00, interquartile range: NPR 640.00 to NPR 6,000.00) over the period of last six months for the treatment of dermatophytosis. Mean indirect expense reported was NPR 927.50 (median: NPR 0.00, interquartile range: NPR 0.00 to NPR 0.00). Only 15 patients responded as having incurred indirect cost due to the skin condition. In these 15 patients, mean indirect cost was calculated to be NPR 5,626.70 (median: NPR 3,500.00, interquartile range: NPR 800.00 to NPR 7,000.00). Mean total cost for treatment of chronic dermatophytosis was calculated to be NPR 6,488.70 (median: NPR 2,300.00, interquartile range: NPR 650.00 to NPR 7,700.00) for the period of six months [Fig. 4]. Mean monthly household income was calculated to be NPR 45,489.00 (median NPR 30,000.00, interquartile range: NPR 25,000.00 to NPR 50,000.00). Percentage of six months income spent on the treatment of dermatophytosis resulted in the mean value of 3.03% (median: 1.50%, interquartile range: 0.309% to 4.13%) [Fig. 5].

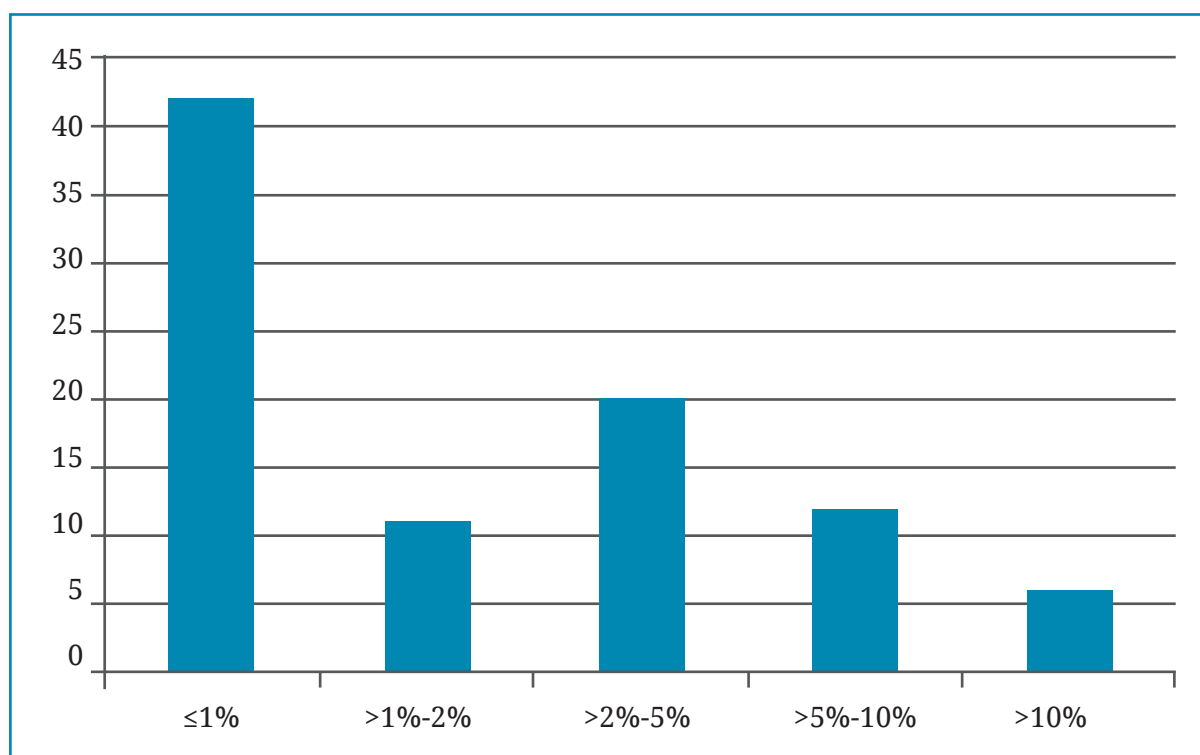


Fig. 5: Percentage of six months income spent on treatment of chronic dermatophytosis

DISCUSSION

Chronic and recurrent dermatophytosis contributed to about 5-10% of all cases in the dermatology clinic in a tertiary referral center in North India.⁶ In a study by Vineetha *et al*,¹⁴ 68.00% of superficial dermatophytosis were chronic. Similarly, 91.30% of study cohort of superficial dermatophytosis was reported to be having chronic or recurrent disease by Narang *et al*.¹⁵ The chronicity of dermatophytic infections has been implicated to host, environmental, agent and pharmacological factors. Hot and humid environment in the tropical and sub-tropical regions favors dermatophyte acquisition and maintenance. Nearly 90% of chronic dermatophytic infection has been attributed to *Trichophyton rubrum* infection.¹⁶ In the Nepalese context, fungal culture in dermatophytosis yielded common isolates to be *T. rubrum*, *T. mentagrophytes* and *T. verrucosum* though studies exploring organisms implicated specifically in chronic dermatophytosis from Nepal are lacking.¹⁷⁻²⁰

Observations from 91 patients of chronic dermatophytosis in the present study showed mean age to be 30.49 years which is in concordance with previous studies on chronic dermatophytosis by Sentamilselvi *et al*²¹ and Singh *et al*²² (35.40 years and 28.60 years respectively). Of note, these studies have defined chronic dermatophytosis as that lasting for more than one year and three months respectively. Similarly, males outnumbered females by more than two times in the present and well as previous studies in dermatophytosis.^{15,21,22} With regard to educational status, only 13 individuals (14.28%) reported as having graduate or postgraduate education which is lower than that reported by Narang *et al* (27.00%).¹⁵

Groin was the initial site of involvement in present study (50.55%) which is similar to the result in the study by Sentamilselvi *et al* (46.90%).²¹ Due to the chronicity and recalcitrant nature of infection, involvement of more than one anatomical site in majority of patients is not unusual and so is the common diagnosis of extensive dermatophytosis. Positive family history in chronic dermatophytosis (36.26%) was in concordance with the study by Vineetha *et al* (28.00%).¹⁴ Higher percentage reported persistent and progressive disease in the present study (68.13%) compared to the study by Sentamilselvi *et al* (45.30%).²¹

Higher proportion of patients with more than

10% body surface area involvement in the present study (36.27%) as compared to the study by Narang *et al*¹⁵ (1.50%) may be due to inclusion of treatment naïve cases by the latter. We observed co-existing tinea capitis or onychomycosis in less number of patients (3.29%) as compared to tinea capitis (15.70%) and tinea unguium (15.70%) in the study by Sentamilselvi *et al*.²¹ This could be due to patients with isolated tinea capitis or onychomycosis being excluded from the present study.

With respect to health seeking behavior, findings in the present study (76.92%) is in concordance with those reported by Narang *et al*¹⁵ (72.90%) in terms of seeking advice from local pharmacy for their skin condition. In a study done in Nepal in 2001 by Agrawalla *et al*,¹⁷ majority of patients suffering from dermatophytosis had used medication prior to recruitment in the study (71.00%) which included topical antifungal agents (40.80%), native medicines (32.40%) and topical steroids (14.00%). A change in trend over one and a half decade could be observed as topical steroids (30.10%) and topical steroids with antifungal agents (30.20%) were used by majority of individuals in a study on dermatophytosis done by Poudyal and Joshi²³ in 2016 which is in concordance with our study. This doesn't come as a surprise, as the general trend is to access the nearest pharmacy for any health related issues by the public, more so for skin related problems which mostly consider trivial to make a visit to the specialist. Additionally, ongoing trend of more patients using FDC containing topical steroid as compared to topical antifungal for dermatophytosis attests to the fact that inadvertent use of topical steroid containing FDC has possibly led to the current surge in cases of chronic and recurrent dermatophytosis.

To the best of our knowledge, there are no previous studies exploring cost of care of chronic or recurrent dermatophytosis. Such studies are mostly done in chronic dermatoses like psoriasis and atopic eczema requiring long term management. As this is a recent trend for majority of cases of dermatophytosis to run a chronic course, the observations from this study regarding considerable expenses borne by our patients in the treatment of seemingly easy-to-treat dermatophytosis only a couple of years back with topical antifungals and weekly fluconazole for four to six weeks is alarming.

This study presents preliminary data on chronic dermatophytosis prevailing in our country

and its financial implications so that medical fraternity and policy makers can take necessary steps forward in fighting the challenge it is presenting. Future studies could include larger sample size, multicenter recruitment of study patients, evaluation of risk factors, fungal isolates implicated and exploration of clinical and mycological sensitivity of organisms in chronic dermatophytosis among others.

Limitations of our study include cross-sectional design, inability to validate the instruments to measure costs, estimation of costs and income based on information by the patient without inspecting receipts and pay slips, possibility

of recall bias and possibility of lack of understanding of the concept of indirect costs by the patients resulting in majority reporting no indirect costs.

In conclusion, the present study quantified the magnitude of problem caused by chronic dermatophytosis. Groin was the commonest site of initial involvement and majority had extensive dermatophytosis at presentation. Majority had visited local pharmacy for advice regarding their condition and used topical steroid containing FDC. The study also outlined the financial burden posed by chronic dermatophytosis in our study population.

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