# Patterns and factors affecting self-medication practices among patients with dermatophytosis in South India - A case control study

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## Abstract

**Background:** Dermatophytosis is reaching an epidemic-like scenario in India, with antifungal resistance adding to the problem. Self-medication is said to be one of the causes of resistance. Knowledge of self-medication practices is meagre, necessitating this study.

**Aim:** The aim of this study is to ascertain the self-medication behaviour of dermatophytosis patients, identify the factors predicting it, and elucidate the patterns of self-medication followed by dermatophytosis patients.

**Methods:** This study was conducted by recruiting patients with dermatophytosis as cases and patients with other dermatoses as controls. Self-medication frequency, clinicodemographic details, and patterns of self-medication were entered into a predesigned proforma.

**Results:** A total of 171 patients and 207 controls were recruited in the study. The total proportion of patients who self-medicated among all recruited patients was 21.7% (95% CI: 0.1764,0.2619). There was a significant difference in the proportion of those who self-medicate between dermatophytosis patients (36.8%) and other dermatological problems (9.2%), with more self-medication happening among those with dermatophytosis (P< 0.001). Topical antifungal cream was the most common medicine used for self-medication. There was no significant difference in the proportion of those who self-medicated and those who did not, in all four classes of diagnosis, i.e., naïve dermatophytosis, chronic dermatophytosis, chronic and recurrent dermatophytosis, and chronic and relapsed dermatophytosis

**Limitations:** There could be recall bias in the answers of the participants. There was no follow-up to assess outcomes of self-medication.

**Conclusion:** The proportion of dermatophytosis patients who self-medicate is lower than in previous studies from other parts of India. Similar studies from other parts of India may help us confirm and understand the geographical reasons for the differences in proportions across the country.

**Key words:** Antifungal resistance, chronic dermatophytosis, dermatophytosis, self-medication topical steroid abuse

## Introduction

Self-medication is defined by the World Health Organisation (WHO) as "use of pharmaceutical or medicinal products by the consumer to treat self-recognised disorders or symptoms, the intermittent or continued use of a medication previously prescribed by a physician for chronic or recurring disease

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or symptom, or the use of medication recommended by lay sources or health workers not entitled to prescribe medicine."[1] Self-medication can be associated with risks such as unnecessary side effects and microbial drug resistance. However, it can reduce dependence on healthcare systems for minor ailments. There is a need to study the practice, its disadvantages, and a few advantages, and to bring it under regulation at the earliest.

Currently, dermatophytosis is a public health problem in epidemic proportions in the Indian subcontinent.[2] The prevalence of dermatophytosis in India ranges from 36.6% to 78.4%.[3] The number of chronic dermatophytosis, recurrent, and relapsed cases is rising.Steroid misuse, antifungal resistance, inadequate treatment, and hot and humid weather conditions are some of the proposed reasons for this rising trend in the prevalence of difficult-to-treat dermatophytosis.[2] Antifungal resistance of dermatophytes is rising in India.[4] Skin ailments are a common cause of self-medication ( over-the-counter (OTC) medicines). Self-medication is permissible for OTC drugs, but there is no specific OTC drug list in India.[1]

Recent studies have revealed that the use of steroid-based combination creams by Indian patients with dermatophytosis ranges between 42% and 81%.[5] Steroid use is said to result in poor response to antifungal therapy.[6] It is considered to be a main factor in the development of high prevalence of tinea.[7] However, more evidence is needed in this regard, especially on the role of steroid-antifungal combination.[8] Hence, we decided to assess the scope, patterns of self-medication in dermatophytosis patients in South India, and ascertain factors affecting it.

## Methods

The case control study was conducted at the Dermatology OPD of a tertiary care centre in South India, after Institutional Ethics Committee approval. All patients >18 years of age attending the dermatology outpatient department, diagnosed to have dermatophytosis with no other co-existing dermatological problems, by consensus after clinical examination, were included in the study as cases. Patients >18 years having other dermatological diagnoses excluding dermatophytosis were included as controls.

### Aims

The aim of the study was to find out the proportion, pattern, and factors affecting self-medication practices in patients with dermatophytosis visiting a tertiary care hospital in India. The objectives were to determine the proportion of dermatophytosis patients who self-medicated, the nature of drugs used in self-medication, and to identify the factors that predispose to self- medication.

### Sample size calculation

Considering the reported prevalence of dermatophytosis as 37%,[3] with α error as 5% and absolute difference as 8%, the sample size was calculated as 140. By adjusting for a 15% non-response, the final sample size was estimated to be 164.

### Data collection methods

After getting informed consent, demographic details and medical data were entered into a predesigned data collection proforma. The proforma contained questions on educational status, Kuppusamy socioeconomic scale 2019 condition, distance from nearest general practitioner, distance from nearest dermatologist, and other factors which could lead to self-medication. Collected data was entered into the Epicollect software and analysed using SPSS v 2.0 software.

### Definitions[3]

Naïve dermatophytosis was defined as dermatophytosis patients taking treatment for the first time. Chronic dermatophytosis was defined as patients whose infection lasted for more than 6 months with or without recurrence, despite adequate treatment. Recurrent dermatophytosis was a recurrence of infection within 6 weeks of completed treatment. Relapsed dermatophytosis was a recurrence 6-8 weeks after completing treatment.

### Statistical analysis

Categorical data were assessed using frequency and percentage, and the quantitative data were assessed using mean and standard deviation or/ [median and interquartile range]. Normality of the data were assessed using the Kolmogorov-Smirnoff test. Chi-square test was used to assess categorical data such as occupation, socioeconomic status, educational status, address etc. with self-medication practices. Student t-test/Mann-Whitney U test was used for assessing the difference between quantitative data, such as age, number of lesions, distance from nearest general practitioner, etc., according to self-medication practices. A binary logistic regression table was also used to identify factors predictive of self-medication. All tests were done with a significance value of $p < 0.05$.

## Results

A total of 171 dermatophytosis patients and 207 patients with other dermatoses were recruited into the study between June 2023 to March 2024 [Figure 1]. Among the dermatophytosis patients, 127 were female patients and 44 were male patients [Table 1]. Most patients were from an urban background and belonged to a good socioeconomic status. Most of the dermatophytosis patients had a diagnosis of naïve dermatophytosis (n=85,49.7%); others had chronic dermatophytosis (n=32,18.7%), chronic and recurrent dermatophytosis (n=35, 20.4%), and chronic and relapsed dermatophytosis (n=19,11.1%). There was no significant difference in self-medication behaviour among the four diagnoses. More chronic dermatophytosis was found in the no self-medication group of patients than in the self-medication group of dermatophytosis. This could mean that factors other than self-medication play a role in determining when an infection could become chronic, recurrent, or relapsed.

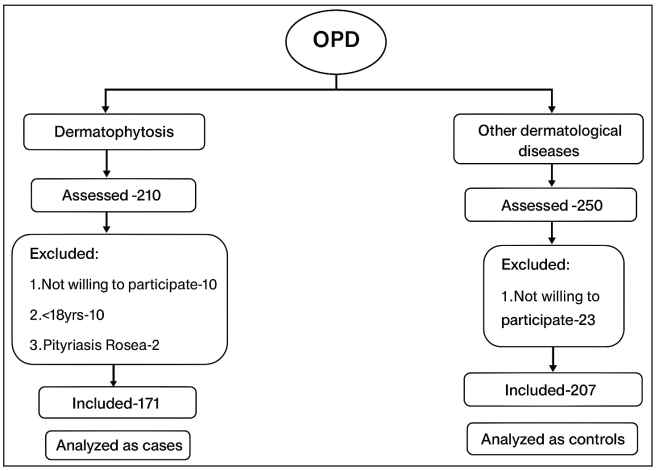


**Figure 1:** Study flow chart.

self-medication was significantly more in dermatophytosis when compared to other dermatological problems ($p < 0.001$) [Table 2], indicating self-medication was significantly more in patients of dermatophytosis when compared to other dermatoses.

Univariate analysis found age, educational status, and self-medication for other diseases to be significantly associated with self-medication behaviour [Table 3]. Logistic regression [Table 4] found age, occupation, educational status, self-medication for other diseases ($p< 0.001$), and diagnosis to be significant independent predictors of self-medication behaviour.

**Patterns of self-medication**

Most patients who self-medicated did so with topical medication (n=55, 87.3%). Few others used both topical and systemic medication (n=7,11.1%), and fewer patients used systemic medication alone (n=1,1.6%). Most patients (n=27, 42.9%) among those who self-medicated with topical agents did not know with what medication they did so, while others

**Table 1: Clinicodemographic details of cases and controls**

| S.No | Variable | Type | Case (n%,) | Control (n%,) |
|---|---|---|---|---|
| 1 | Gender | Female | 127(74.3%) | 124(59.9%) |
| | | Male | 44(25.7%) | 83(40.1%) |
| 2 | Occupation | Agricultural Labourer | 8(4.7%) | 14(6.8%) |
| | | Business | 4(2.3%) | 19(9.2%) |
| | | Housewife | 60(35.1%) | 73(35.3%) |
| | | Manual Labourer | 62(36.3%) | 20(9.7%) |
| | | Professional | 11(6.4%) | 27(13.0%) |
| | | Student | 21(12.3%) | 46(22.2%) |
| | | Others | 5(2.9%) | 8(3.9%) |
| 3 | Location | Rural | 67(39.2%) | 78(37.7%) |
| | | Urban | 104(60.8%) | 129(62.3%) |
| 4 | Educational status | Graduate | 25(14.6%) | 50(24.2%) |
| | | High School | 32(18.7%) | 21(10.1%) |
| | | Illiterate | 26(15.2%) | 44(21.3%) |
| | | Intermediate or diploma (11-12) | 30(17.5%) | 22(10.6%) |
| | | Middle school (6-8) | 33(19.3%) | 18(8.7%) |
| | | Post graduate | 9(5.3%) | 27(13.0%) |
| | | Primary (up to 5) | 16(9.4%) | 25(12.1%) |
| 5 | Socio economic status | I | 68(39.8%) | 7(3.4%) |
| | | II | 69(40.4%) | 39(18.8%) |
| | | III | 17(19.9%) | 114(55.1%) |
| | | IV | 14(8.2%) | 42(20.3%) |
| | | V | 3(1.8%) | 5(2.4%) |
| 6 | Distance from nearest General Practitioner (kilometers) Mean±SD | | 3.82±4.255 | 3.53±3.017 |
| 7 | Distance from nearest Dermatologist (kilometers) Mean±SD | | 7.93±9.153 | 6.24±4.515 |
| 8 | Duration of skin lesions (months) Mean±SD | | 8.37±12.799 | 8.22±22.660 |
| 9 | Self-medicated for other diseases | Yes | 61(35.7%) | 56(27.1%) |
| | | No | 110(64.3%) | 151(72.9%) |

SD: Standard deviation

**Self-medication proportion and factors affecting it**

The total proportion of patients who self-medicated among dermatophytosis and other dermatological problems was 21.7% (95% CI :0.1764, 0.2619). The practice of

**Table 2: Self-medication in dermatophytosis vs. other dermatological problems**

| Diagnosis | | Dermatophytosis (cases) | Others (controls) | Total | p value |
|---|---|---|---|---|---|
| Self-medicated | Yes | 63 (36.8) | 19 (9.2) | 82 (21.7) | <0.001 |
| | No | 108 (63.2) | 188 (90.8) | 296 (78.3) | |
| Total | | 171 (100) | 207 (100) | 378 (100) | |

Chi-square test: There was a statistically significant difference in the self-medication practices between cases and controls. Significance threshold is <0.05

were aware that they used a topical antifungal (n=15, 23.8%) and a topical steroid (n=7,11.1%). Among dermatophytosis patients who self-medicated, only 1.6% used a steroid-antifungal combination. Only 9.5% of the self-medicators among dermatophytosis patients used a fixed combination cream. Among those who self-medicated oral drugs too, most did not know the nature of the medication (n=46, 73%). Others reported using antihistamines (n=12,19%) and antifungals (n=5,7.9%). Most patients got the drugs they used

**Table 3: Factors affecting self-medication behaviour among dermatophytosis patients**

| S.No | Variable | Type | Self-medication Mean ± SD, Median & IQR N, (% within self-medicated) | | p value |
|---|---|---|---|---|---|
| | | | Yes | No | |
| 1 | Age | | 36.24±14.849 | 41.62± 14.029 | <0.001* |
| 2 | Sex | Male | 20 (31.7) | 24(22.2) | 0.169# |
| | | Female | 43(68.3) | 84 (77.8) | |
| 3 | Occupation | Agricultural labourer | 2(3.2) | 6(5.6) | 0.387# |
| | | Manual labourer | 23(36.5) | 39(36.1) | |
| | | Business | 2(3.2) | 2(1.9) | |
| | | Homemaker | 17(27) | 43(39.8) | |
| | | Professional | 6(9.5) | 5(4.6) | |
| | | Student | 11(17.5) | 10(9.3) | |
| | | Others | 2 (3.2) | 3(2.8) | |
| 4 | Address | Rural | 24(38.1) | 43(39.8) | 0.824# |
| | | Urban | 39 (61.9) | 65(60.2) | |
| 5 | SE status | I | 27 (42.9) | 41(38) | 0.691# |
| | | II | 27(42.9) | 42(38.9) | |
| | | III | 5(7.9) | 12(11.1) | |
| | | IV | 3(4.8) | 11(10.2) | |
| | | V | 1(1.6) | 2(1.9) | |
| 6 | Educational status | Graduate | 10(15.9) | 15(13.9) | <0.001* |
| | | High school | 4(6.3) | 28(25.9) | |
| | | illiterate | 13(20.6) | 13 (12) | |
| | | Intermediate or diploma | 17(27) | 13(12) | |
| | | Middle school | 12(19) | 21(19.4) | |
| | | Postgraduate | 2(3.2) | 7(6.5) | |
| | | Primary | 5(7.9) | 11(10.2) | |
| 7 | Distance from nearest GP | | 3, 4 | 3,4 | 0.967! |
| 8 | Distance from nearest dermatologist | | 5,7 | 5,5 | 0.772! |
| 9 | Number of lesions | | 6, 6 | 5,4 | 0.128! |
| 10 | Duration of disease | | 5.5,11 | 4,6 | 0.583! |
| 11 | Self-medicated for other diseases | Yes | 38 | 23 | <0.001 # |
| | | No | 25 | 85 | |
| 12 | Diagnosis | Naïve dermatophytosis | 33 | 52 | 0.593$ |
| | | Chronic dermatophytosis | 11 | 21 | 0.748 $ |
| | | Chronic and recurrent dermatophytosis | 15 | 20 | 0.408 $ |
| | | Chronic and relapsed dermatophytosis | 4 | 15 | 0.130 $ |

Kolmogorov-Smirnov test was used to test for normality. *- Students t test; # Chi square test; $ Z test; ! – Mann-Whitney U test. Significance threshold is <0.05

**Table 4: Logistic regression table of the factors affecting self-medication behaviour**

| S.No | Variable | P value | Adjusted OR | 95% CI for Adj OR | |
|---|---|---|---|---|---|
| | | | | Lower | Upper |
| 1 | Age | 0.03 | | 1.0 | 1.06 |
| 2 | Sex | 0.24 | 1.03 | 0.29 | 1.37 |
| 3 | Occupation | 0.03 | 4.01 | 1.11 | 14.52 |
| 4 | Address | 0.8 | 1.09 | 0.53 | 2.24 |
| 5 | Educational Status | 0.02 | 0.24 | 0.07 | 0.83 |
| 6 | Distance from the nearest GP | 0.72 | 1.01 | 0.92 | 1.11 |
| 7 | Distance from the nearest Dermatologist | 0.41 | 0.98 | 0.94 | 1.02 |
| 8 | SE status | 0.43 | 2.33 | 0.28 | 19.16 |
| 9 | Self-medicated for other diseases | <0.00 | 4.66 | 2.53 | 8.58 |
| 10 | Diagnosis | <0.00 | 0.17 | 0.06 | 0.43 |

Significance threshold is <0.05. CI: Confidence intervals, OR: Odds ratio, GP: General practitioner, SS: Socioeconomic status

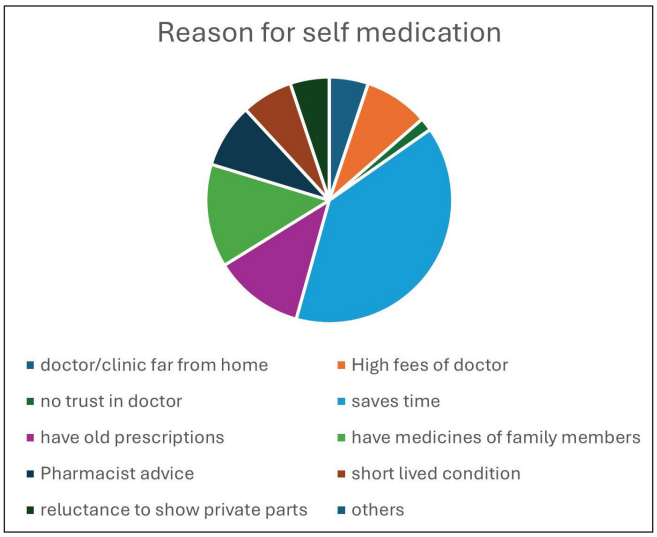


**Figure 2:** Reasons for self-medication.

for self-medication from the pharmacy (n=51,81%); others borrowed from friends or family members (n=7,11.1%). Patients who self-medicated commonly selected brands according to the pharmacist's advice (n=39, 61.9%). Others used products according to the recommendation of peers or family (n=12,19%) or used the drugs given in old prescriptions (n=9,14.3%)

Patients cited time saving (n=23, 36.5%) as the most common reason for self-medication. Other reasons included the use of old prescriptions (n=7,11.1%) and medicines of family members (n=8,12.7%). Itching was the most common symptom resulting in self-medication, with other symptoms being redness and pigmentation. Most patients among the cases who self-medicated reported that they experienced immediate improvement (12.3%); others had immediate improvement followed by worsening (10.5%), worsening (4.7%), and no change (9.4%). Patients self-medicated for a mean of 12.68 days.

Seventeen patients (27%) among those who self-medicated felt that they experienced side effects due to self-medication. Thirty-seven patients (58.7%) felt that they did not, while nine patients (14.3%) reported that they did not know. The percentage of complementary and alternative medicine users (CAMs) was similar in those who self-medicated and those who did not. Many patients in both groups reported that they knew that co-administering modern medicine and CAM medicine can cause adverse effects. Regarding checking for expiry dates, 65.7% of those who do not self-medicate and 50.8% of those who self-medicate said that they always checked the date. As for reading the package inserts, only 15.7% of those who do not self-medicate and 23.8% of those who self-medicate reported that they read the inserts always. Only 10.2% of those who do not self-medicate and 12.7% of those who self-medicate reported that they always understood the material given in the package inserts.

## Discussion

It is estimated that 10-15% of the population will experience dermatophyte infection at some point in their life.[7] The proportion of dermatophytosis varies from region to region. Our results show that self-medication practices also vary from region to region. Self-medication practices, along with other actions of healthcare such as hygiene practices, nutrition, and leisure, are part of self-care, as per the WHO.[8] However, their rationality must be studied and checked. In India, the prevalence of dermatophytosis is increasing at an alarming rate, resulting in an epidemic-like situation with a prevalence ranging from 6.09% to 61.5%.[5] Recent studies have revealed that the use of steroid-based combination creams by Indian patients with dermatophytosis ranges between 42% and 81%.[5] A number of systemic and cutaneous adverse effects are related to the OTC use of topical steroids.[9] Among others, OTC use of steroids results in steroid-modified dermatophytosis and topical steroid-damaged face.[10] Use of steroids has correlated directly with prescriptions by pharmacists.[6]

There was a significant difference in the prevalence of self-medication among patients with dermatophytosis when compared with patients having other dermatoses. This could be because ringworm or jockitch is easily picked up by pharmacists, and antifungals are given OTC by them. Patients, too, could be more likely to consult a pharmacist for ringworm rather than for an unknown skin condition.

In our study, the proportion of study respondents who self-medicated amounted to 21.7%. This is similar to a study from rural Tamil Nadu, where the frequency was 23%.[11] Both these are much lower than those reported from rural Maharashtra (81.5%)[11] and urban Delhi (92.8%)[1]. Self-medication prevalence was as high as 71% in a study conducted in 2011 among patients of coastal Puducherry.[12]

Another study conducted in 2014 found the prevalence of self-medication in urban Puducherry to be 11.9%.[13] This probably reflects the increase in awareness regarding self-medication in Puducherry. A study from Kerala found the prevalence of self-medication in dermatophytosis patients to be 44.9%.[14] The prevalence is as high as 92.5% in a study from Maharashtra.[15] Self-medication has been reported to be more common in urban areas.[11] This was not seen in our study, as there was no significant difference seen in self-medication practices among urban and rural patients, probably because there were a number of pharmacies in rural areas too.

The reasons behind self-medication in a large survey (including lack of time) are very similar to what our patients reported [Figure 2].[16] A study from Togo reported that the proportion of patients who had self-medicated was 66.7%.[17] They found female sex and duration of disease to be predictors of self-medication among other factors. In our study, only age, educational status, and self-medication for other diseases were found to be the predictors of self-medication for current illness. Many studies reported the most common drug used for self-medication to be topical steroids,[8,9,18] but this was not found in our study. Topical antifungals were the most common drug used in self-medication in our study. This was probably because we did not study the practices of self-medication in immunodermatologic conditions specifically. However, even in dermatophytosis patients, the use of steroid self-medication is very low in our study, i.e., 11.1% when compared to other studies (92.9%).[19] Most patients in our study were treatment naïve dermatophytosis patients; most patients in the previous study, too, had a short duration of illness.[19]

It is to be noted from our study that patients with dermatophytosis self-medicated with topical antifungals more than with steroids, although most of the patients did not know which medicines they self-medicated with. This could be due to the increased awareness and care taken by patients and pharmacists in this part of India. However, most patients who reported using self-medication for topical and systemic drugs for their condition did not know the nature of the drug they used. This represents a large knowledge gap that should be addressed with awareness programs.

## Limitations

Our study has some limitations. As it is a questionnaire-based study, the answers of patients are subject to recall bias and reporting bias. As it is a cross-sectional study, the treatment outcomes of patients who self-medicate are not known. Matching was not done for controls, which could introduce bias, like selection bias.

## Conclusion

Despite these limitations, the study shows that self-medication (21.7%), though prevalent, is much lower in our study than in other reports. Larger studies with longer follow-up are needed to look at the outcomes of self-medication, including the study of resistance patterns in patients with dermatophytosis.

**Ethical approval:** The research/study was approved by the Institutional Review Board at the Institute Ethics Committee, Indira Gandhi Medical College and Research Institute, Pondicherry, number No 335/IEC-32/IGMC&RI/PP-33/2021, dated 03.08.2021.

**Declaration of patient consent:** The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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