

ORIGINAL ARTICLE

Knowledge of dermatophytosis among medical officers at the primary care level in Sri Lanka

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Abstract

Background: Chronic and recurrent Dermatophytosis has become a significant health problem in Sri Lanka. Widespread usage of steroids, inadequate doses, and durations of antifungals are contributing significantly to this problem. This scenario questions the adequacy of knowledge in primary care physicians in the management of dermatophytosis.

Objectives: The study was planned to identify the level of understanding and knowledge on dermatophytosis and its management among medical officers at the primary care level.

Methods: A total of 482 medical officers completed the questionnaire, which consisted of five domains containing five statements each (a total of 25 items).

Results: The median knowledge score was 14 (IQR 5), and the mean score was 13.28 ± 4.34 out of a maximum of 25. A score of more than 20/25 was achieved by 3.1 %, and scores below 10/25 were observed in 15.5%. The percentage of correct responses for questions assessing clinical features, management, and oral antifungal therapy was below 50%.

Conclusion: This study shows inadequate knowledge of dermatophytosis at the primary care level. Education of medical officers on proper management of dermatophytosis should be taken as a priority to overcome recalcitrant dermatophytosis in Sri Lanka.

Keywords: dermatophytosis; primary care physicians; knowledge assessment; tinea infections; Sri Lanka

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Introduction

Dermatophyte infection is a common skin problem in dermatology practice.¹ Recently, this has posed quite a challenge to dermatologists, with increased incidence, low therapeutic response, and frequent relapse.² This epidemic-like scenario of dermatophytosis is observed to be a common problem in Southeast Asia.^{3,4} The causes for this recalcitrant dermatophytosis are multifactorial. Resistance to commonly used antifungal drugs has been reported.⁵ The commonest organism causing dermatophyte infection has changed from *Trichophyton rubrum* to *Trichophyton mentagrophytes*, which is known to be a more virulent species.⁶ In addition, modifiable factors such as intermittent and sub-therapeutic doses of oral antifungal drugs and inadvertent use of topical steroids are contributing in a significant way to this epidemic-like scenario of dermatophytosis.^{7,8}

A multi-center study in Sri Lanka has revealed that 58.8% of the patients diagnosed with dermatophytosis at dermatology clinics were earlier treated with topical steroids.⁹ It is assumed that the figure could be even more, as it is difficult to retrieve earlier records of medication in the clinical setup. The fact that 80.3 % of these available prescriptions for topical steroids were from general practitioners and hospital outpatient departments questions the basic knowledge on the management of dermatophytosis at the primary care level. As such, education of medical officers on the correct management of tinea infections is identified as a key factor in overcoming this problem of recalcitrant dermatophytosis. Hence, this study was planned to identify the level of understanding and knowledge on dermatophytosis and its management among medical officers at the primary care level.

Methods

A newly developed questionnaire in English, with five multiple-choice questions, was used to assess the level of understanding of dermatophytosis in medical officers (Annexure 1). Content validity was assessed by review from three consultant dermatologists, and a pilot study involving 15 medical officers was conducted to identify ambiguous questions. These responses were excluded from the final analysis. Ethical clearance was obtained from the Ethical Review Committee of the Sri Lanka Medical Association. Informed consent was obtained from the participants digitally.

The questionnaire was distributed via email to 500 members of the Government Medical Officers' Association selected through convenience sampling. The questionnaire aimed to assess the basic knowledge of dermatophytosis and its management by primary care physicians. The questionnaire consisted of five domains containing five statements each (a total of 25 items). Each item was answered as "true", "false", or "don't know". The option of "don't know" was included to minimize responding without proper knowledge. All the questions were marked as mandatory to prevent missing data. Each correct response was awarded one mark (maximum score 25); incorrect and "don't know" responses were scored as zero.

Question 1 checked background knowledge on dermatophytosis; question 2 covered the clinical features; question 3 covered practice points in management; question 4 covered oral antifungal drugs; and question 5 covered the emergence of recalcitrant dermatophytosis and actions to be taken when managing such cases. For descriptive purposes, total scores were categorized into predefined ranges based on author-determined cut-off values. Data were analyzed using descriptive statistics, including frequencies, percentages, means, medians, standard deviations, and interquartile ranges.

Results

Of the 500 medical officers invited to participate, 482 completed the questionnaire (response rate 96.4%). The distribution of the study sample according to the geographic area of workplace is depicted in Figure 1.

In this sample, 48 (10%) had work experience in a dermatology unit. Work experience was less than five years in 43.2%. Only 21.92% have stated that they are not confident in managing tinea infections in the primary care setting, while 44.47% were confident, and 33.61% were not sure. (Table 1)

The correct answer rate for each stem was analyzed, and the percentage of correct responses for each question is shown in Table 2.

The question that tested the knowledge on the existence of recalcitrant dermatophytosis and actions that should be taken showed the highest overall score of 73.4%. However, the two questions that assessed knowledge on management of dermatophytosis and antifungal drugs scored the lowest, 39.5% and 35.5%, respectively.

Then the correct answer percentage for three individual questions, which are thought to be essential practice points in the management of dermatophytosis, was analyzed separately.

A total of 193 out of 482 (40%) disagreed that a topical steroid is indicated in the early management of dermatophytosis. Only 20.1% disagreed with fluconazole as the most effective treatment for tinea infections. Only a significantly low number of respondents (2.9%) agreed that the treatment duration of dermatophytosis with oral antifungals has to be 2 weeks or more. These three questions assessing major practice points were in the lowest four correct answer percentages out of all questions.

The distribution of knowledge scores among the 482 participants is shown in Table 3. The median knowledge score was 14 (IQR 5) out of a maximum score of 25, and the mean score was 13.28 ± 4.34 . Nearly half of the respondents (47.3%) scored between 15 and 19, indicating a moderate level of knowledge. A further 34.1% scored between 10 and 14, reflecting a relatively low level of knowledge. Only 3.1% of participants achieved scores of 20 or more, indicating good knowledge, while 15.5% scored below 10, suggesting poor knowledge. Overall, the score distribution indicates that the majority of respondents had low to moderate levels of knowledge regarding dermatophytosis and its management.

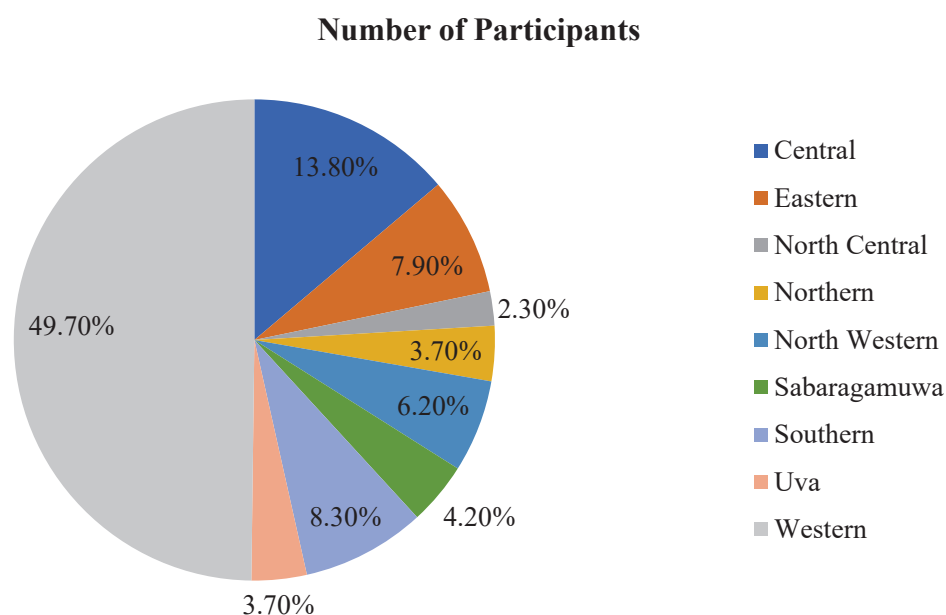


Figure 1. Geographic location of the workplace of respondents.

Table 1. Demographic characteristics of study participants (n = 482)

Variable	Category	n (%)
Work experience	< 5 years	208 (43.2%)
	≥ 5 years	274 (56.8%)
Previous work experience in a dermatology unit	Yes	48 (10.0%)
	No	434 (90.0%)
Confidence in managing tinea infections	Confident	214 (44.47%)
	Not confident	106 (21.92%)
	Not sure	162 (33.61%)

Table 2. Percentage of correct answers in different questions (n = 482)

Question Number	Knowledge Domain	N	Percentage of correct answers
1	Background knowledge of dermatophytosis	312	64.7%
2	Clinical features	233	48.4%
3	Practice points in management	190	39.5%
4	Oral antifungal drugs	171	35.5%
5	Recalcitrant disease and management action	354	73.4%

Table 3. Distribution of knowledge scores among participants (maximum score = 25)

Score range	Interpretation	n (%)
<10	Poor knowledge	75 (15.5%)
10–14	Low knowledge	164 (34.1%)
15–19	Moderate knowledge	228 (47.3%)
≥20	Good knowledge	15 (3.1%)

Mean score $\pm$ SD: 13.28 $\pm$ 4.34

Median score (IQR): 14 (5)

Total participants: 482

Discussion

Improper management practices, such as using topical steroids and subtherapeutic doses of oral antifungals, are considered major factors leading to the problem of recalcitrant dermatophytosis.⁶⁻⁸ This questions the adequacy of knowledge in medical officers in this area. However, in this study, only 21.92% have stated that they are not confident in managing tinea infections. This discrepancy between self-reported confidence and knowledge scores may indicate a potential gap between perceived competence and objective knowledge.

Overall, this study shows that the knowledge in the management of dermatophytosis at the primary care level is not adequate. Only 3.1% of participants achieved scores ≥ 20 , indicating good knowledge. In addition, the correct answer rates of below 50% in the questions related to clinical features and management further support this finding. These findings reinforce

the need for continuing medical education, which has been identified as a key factor in overcoming the problem of recalcitrant dermatophytosis in previous studies.⁶⁻⁸ Further, the fact that 43.2% of the respondents have less than 5 years' experience questions the adequacy of the knowledge gained in this area at the undergraduate level.

Analysis of the individual responses shows inadequate knowledge in some key areas of management of dermatophytosis. The knowledge score distribution in this study suggests that the overall level of understanding of dermatophytosis among the surveyed medical officers is suboptimal. The mean knowledge score was 13.28 $\pm$ 4.34 out of a maximum possible score of 25, with only 3.1% of respondents achieving scores above 20, indicating that a relatively small proportion demonstrated a high level of knowledge. The standard deviation of 4.34 indicates a considerable variability in knowledge levels among participants, highlighting

that while some medical officers have a moderate understanding, a substantial portion remains significantly under-informed. Although nearly half of the participants scored within the moderate range, a substantial proportion fell within the low or poor knowledge categories. These findings support the observation that important aspects of dermatophytosis management, particularly those related to appropriate antifungal use and avoidance of topical steroids, may not be adequately understood at the primary care level. This highlights the importance of targeted continuing medical education and updated clinical guidance to improve knowledge and management practices related to dermatophytosis in primary care settings.

The use of topical steroids is known to cause reduced cell-mediated immunity and reduced fungal elimination, leading to poor therapeutic response and recurrences.⁸ In the recent publication of the Indian Association of Dermatologists, Venerologists and Leprologists on the consensus on management of glabrous tinea, it is stated that steroids are not recommended at any point in the management, not even to reduce inflammation in the initial stage.¹⁰ This is very important in the current context of low therapeutic response to oral antifungals in dermatophytosis. Nevertheless, in this study, only 40% respondents marked that topical steroids are not indicated in tinea infections.

Only a minority agreed that the oral antifungals are needed for two weeks or more in managing tinea infections. Although 1- 2 weeks of oral itraconazole or terbinafine were used in the past, the recent recommendations are for 2 weeks or more of these drugs.¹⁰ Even longer durations of oral antifungals are used in treating recalcitrant disease. This finding shows that the medical officers are not updated on the recent recommended practice methods, which might lead to partial cure rates and increased spread within the households.

The recommended first-line treatment for dermatophyte infections is either terbinafine or itraconazole.¹⁰ There is a scarcity of data supporting the effectiveness of fluconazole in tinea infections. However, an online survey that looked at the practice methods of general practitioners revealed that 62% of them are using fluconazole 150 per week as the first-line treatment in dermatophytosis.¹¹ Similarly, in this study, 64.1% agreed that fluconazole is the most effective drug in the management of dermatophytosis.

This may explain the widespread usage of fluconazole as the first-line therapy for dermatophytosis at primary care level which may contribute to suboptimal treatment responses and persistence of infection.

Overall, this study points towards a major pitfall in the continuous medical education in Sri Lanka. Inadequate knowledge of a disease that is highly prevalent in the community and lack of awareness of the situation may cause detrimental outcomes. As such, relevant authorities of all sectors should work together to narrow this gap in knowledge. One limitation of this study is that it does not reflect the island-wide picture, as the majority (49.7%) is from Western Province. This also raises the possibility that the actual picture could be gloomier, as health care professionals in Western Province have easy access to educational activities when compared to those in the peripheries. We admit that there is a possibility of a discrepancy in marking the multiple-choice questions and the practices adopted in treating patients. However, the findings in this study should be taken as a matter of concern, and dermatologists should take the lead in educating the medical officers at the primary care level on diagnosis and proper management of dermatophytosis. This will help to prevent recalcitrant dermatophytosis from becoming a major public health problem in Sri Lanka.

Limitations

This study has several limitations that should be considered when interpreting the findings. The study utilized a convenience sampling method, which may limit the generalizability of the findings to the wider population. In addition, a considerable proportion of respondents were from the Western Province, which may limit the generalizability of the findings to other regions of the country. Second, the assessment of knowledge was based on a self-administered questionnaire, and the responses may not necessarily reflect the actual clinical practices of the participants. Finally, the questionnaire consisted of a limited number of items, which may not comprehensively capture all aspects of knowledge related to the diagnosis and management of dermatophytosis. Despite these limitations, the study provides useful insights into potential knowledge gaps in the management of dermatophytosis at the primary care level.

Conclusion

The study suggests gaps in knowledge among surveyed primary care medical officers. Improper

practices backed by a lack of knowledge may be contributing to low therapeutic response, recurrence, and drug resistance in dermatophytosis. This study highlights the importance of continuous medical education for primary care physicians in overcoming the problem of recalcitrant dermatophytosis in Sri Lanka. The key points gathered from this, as areas of least knowledge can act as guidance when planning out educational activities.

Ethics statement

Ethical clearance was obtained from the Ethics Committee of the Sri Lanka Medical Association. The questionnaires were distributed via email, and informed consent was obtained digitally. Participants were required to click “I agree” before accessing the questionnaire. The study participants were kept anonymous to maintain medical confidentiality.

Data Availability Statement

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

Authors' contributions

NM was responsible for all aspects of the study, including conceptualization, study design, data collection, data analysis, manuscript drafting, and final approval of the manuscript. PK and SE were responsible for the comprehensive editing and finalization of the manuscript.

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Annexure 1.

A Questionnaire-Based Assessment of Knowledge on Dermatophytosis and Its Management in Primary Care Physicians

Please mark True (T), False (F), and don't know (D) for the following questions.

1. Regarding tinea infections (dermatophytosis),
 - a. Is caused by fungi that grow in keratin layers
 - b. May affect skin, hair, and nail
 - c. Transmitted only by contact from infected humans and animals
 - d. Infective spores in scales are viable only for 2 weeks in the environment.
 - e. Transmission is encouraged in a hot, humid environment.
2. Which of the following is true or false regarding dermatophytosis?
 - a. Dermatophyte infections caused by animal species show less inflammatory changes.
 - b. Will not show the typical ring appearance when treated with steroids.
 - c. Early treatment of inflammatory tinea capitis (kerion) will prevent scarring alopecia.
 - d. Pityriasis rosea is a differential diagnosis.
 - e. Hair may easily come out when plucked, in tinea affecting the beard area.
3. Regarding management of dermatophytosis
 - a. Steroid – antifungal combination is very useful in the initial stages of management.
 - b. Tinea capitis is an indication for systemic antifungals.
 - c. Dermatophyte infections affecting nails can be effectively managed with topical antifungal treatments.
 - d. There is no need to continue topical treatment after clinical cure.
 - e. Systemic antifungals should be given for at least 2 weeks or more in effective management of tinea infections.
4. Regarding oral antifungals
 - a. Fluconazole is the most effective drug in the management of tinea infections.
 - b. Terbinafine is considered to be safe if a systemic antifungal is indicated in pregnancy.
 - c. Itraconazole has fewer drug interactions.
 - d. Itraconazole can increase hepatic transaminases.
 - e. Griseofulvin is the most effective treatment in managing tinea capitis.
5. Regarding dermatophyte infections,
 - a. There is an increasing trend of infections that are not responding to standard treatment.
 - b. Topical steroid usage may decrease fungal clearance.
 - c. A source of infection should be traced when tinea infections are recurrent.
 - d. Shorter durations of antifungals can give rise to drug resistance.
 - e. Skin scrapings for microscopy and culture are useful in patients who are not responding to treatment.