Knowledge, Attitudes, and Practices of Filipino Medical Interns on the Management of Superficial Cutaneous Mycoses: A Cross-sectional Study

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ABSTRACT

Background. Superficial mycoses are one of the most common skin conditions encountered in the outpatient clinics, causing significant morbidity amongst patients. Since these are highly prevalent diseases of the skin, the general practitioner should be able to manage uncomplicated cases, with no need for evaluation by a specialist.

Objectives. The study aimed to determine the knowledge, attitudes, and practices of Filipino medical interns on the management of superficial cutaneous mycoses using a self-administered questionnaire. This may help identify possible gaps in knowledge, as well as obstacles these future clinicians may encounter when managing superficial mycoses. This in turn may assist in the development or improvement of dermatology training among medical students and continuing medical education programs amongst non-dermatologist physicians.

Methods. This is a descriptive cross-sectional study among medical interns of the Philippine General Hospital to investigate their knowledge, attitudes, and practices regarding the management of superficial mycoses. Eligible participants were asked to complete an online self-administered survey questionnaire which assessed their capacity to recognize and manage uncomplicated superficial mycoses, and determined their attitudes regarding dermatology training in medical school.

Results. The study included 170 medical interns, with majority having only 1-4 weeks of cumulative duration of dermatology training in medical school. Many of the participants (67.1%) had inadequate overall knowledge scores, but this was not significantly associated with their cumulative duration of dermatology training, as well as with their frequency of encounters with superficial mycosis patients. Most deem dermatology training (92.4%) and learning about the management of superficial mycoses (91.2%) during medical school very important. Majority are interested in attending more courses or training in the subject. Recommendations to improve medical school training on superficial mycoses include more practical approach in dermatology modules, integration of dermatology electives in medical school, and longer duration of dermatology modules/rotations during medical school.

Conclusion. While knowledge scores of medical interns were not significantly associated with the duration of their dermatology training during medical school as well as their encounters with patients with superficial mycoses, it is shown that they have low confidence scores regarding management of superficial mycoses. They deem that learning more about this disease and dermatology in general is vital to their medical education and are desirous of more training in this subject. Recommendations to improve medical school training on superficial mycoses include dermatology modules, rotations or electives in medical school. Additionally, better training during medical school, and formulation of clinical practice guidelines specific to cutaneous mycoses were recommended to improve healthcare delivery for patients with such diseases.

Keywords: superficial mycoses, dermatomycoses, medical interns, dermatology, diagnosis, management

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INTRODUCTION

Superficial mycoses refer to the fungal infection of the keratinized tissues including skin, hair, and nails. They are the most common fungal infections in humans, affecting 20-25% of the world's population. They are also one of the most frequent causes of referrals from general practitioners or other specialties to dermatologists.[1] They cause significant morbidity – patients suffer severe itching, sleep disturbance, stigmatization, and even depression.[2] This results in decreased quality of life and disruption of daily activities, as well as psychosocial effects such as low self-esteem, embarrassment, and social withdrawal.[3] There is also a significant economic burden brought about by the healthcare costs related to the diagnosis and treatment of these skin infections.[4]

There is also a rise in difficult to treat superficial fungal infections, that is, recurrent and clinically unresponsive infections. Reasons for this include patient factors, environment, family history, as well as irrational usage of topical steroids and treatment from non-dermatologists.[5] With the high prevalence of superficial cutaneous mycoses, its significant physical and socioeconomic burden, as well as its protean clinical nature leading to misdiagnosis, it is imperative that clinicians, both dermatologists and non-dermatologists alike, are familiar with the diagnosis and management of this disease.[6]

It was suggested in a retrospective study by Dantas et al. in a tertiary hospital in Brazil that non-dermatologist doctors have difficulty diagnosing and managing common dermatoses or are not confident in doing so.[7] Another study by Alotaibi et al. assessing primary care physicians' (PCP) expertise of common dermatological conditions showed that PCPs agreed that there was a need for dermatological courses and rotations, citing lack of training as a primary obstacle in managing common dermatoses.[8] Furthermore, cutaneous mycoses can easily be confused with other mimickers, even amongst trained dermatologists, leading to misdiagnosis and incorrect management. This highlights the need for continued medical education on dermatophyte infections and bedside diagnostic techniques.[6] In the World Health Organization's Fungal Priority Pathogens List to Guide Research, Development and Public Health Action, part of their strategies to increase clinical surveillance of fungal diseases is to improve knowledge and education regarding clinical presentation and risk factors of fungal infections. They recommended that knowledge on fungal infections should be mainstreamed beyond specialized training programs, and incorporated into medical and public health training.[9] This emphasizes the importance of improving dermatologic training during medical school, and providing PCPs with the resources needed to diagnose and treat the most common skin disorders seen in the primary care setting through regular training courses and continuing medical education (CME) hours.[10]

Superficial mycoses are commonly encountered in both outpatient clinics and inpatient setting, especially in the hot, tropical climate of the Philippines. In the Philippine General Hospital (PGH) Dermatology Out-Patient Clinic, it remains in the top twenty most encountered dermatoses each year. This study aimed to produce baseline data on knowledge and attitudes of Filipino medical interns regarding the diagnosis and management of superficial cutaneous mycoses. Medical interns are being trained to make an accurate clinical evaluation and arrive at a sound management plan, especially for common diseases that they will encounter in their future clinical practice, regardless of specialty chosen. Analyzing data from this study may help identify possible gaps in knowledge, as well as obstacles in the diagnosis and management these future clinicians may encounter. This in turn may assist in the development or improvement of dermatology training amongst medical students and continuing medical education programs amongst non-dermatologist physicians.

METHODS

Study Design

The single-center, observational, cross-sectional, descriptive, and analytic study among medical interns of the Philippine General Hospital (PGH) was conducted from November 3-22, 2023.

Setting and Participants

Participants were recruited using convenience sampling method. All medical interns of PGH were sent the link for the online survey questionnaire (Google form) via e-mail and the messaging application Telegram. The participants could answer the survey in their own time and without help from the investigators or another party, to decrease risk of non-response and potential researcher bias. Those with informed consent and were able to complete the survey were included. Those who were not be able to complete the survey or did not have consent were not included.

Sample Size Calculation

The minimum required sample is 167. This was based on the study by Al-Zahrani et al. which reported that 69.5% of physicians had insufficient knowledge on dermatologic disorders.[10] This was computed with a population ceiling of 343 medical interns in PGH at the time of the study, margin of error of 5% and confidence level of 95% in Epi Info 7.0.

Development of the Survey Questionnaire

The self-administered questionnaire was based on a review of reference books, journals, and guidelines on the management of superficial mycoses. The questions were written in English. The questionnaire was divided into the following sections: 1) participant's demographic profile, 2) experience with superficial mycoses, 3) knowledge of and perceived knowledge on the clinical presentation, diagnosis,

and management of superficial mycoses, 4) attitudes regarding dermatology training in medical school, 5) perceived challenges, 6) desired training and education, and 7) recommendations for improvement in quality of training and healthcare delivery. Answer formats included yes/no, 3- and 5-point Likert-scales, multiple choice, and free text.

Knowledge was evaluated through a "knowledge score", computed by assigning one point for each correct answer to multiple choice items on knowledge concerning superficial mycoses, divided into questions on correct identification of superficial cutaneous mycoses based on clinical photos, questions on diagnosis, and questions on treatment. A score of at least 70% was adequate knowledge, and a score of less than 70% was considered inadequate knowledge. Participants were also asked to rate their confidence and level of comfort in diagnosing and treating superficial cutaneous mycoses in a Likert scale. Attitude was evaluated using Likert scales on willingness to attend trainings/lectures and the importance of knowledge on superficial cutaneous mycoses in their future practice. Internal consistency of the questionnaire was measured using Cronbach's alpha, with a resulting value of 0.79, which indicates adequate internal consistency.

Face validation was done to assess dependability of the survey questions. This was done by three board-certified dermatologists who checked the questionnaire for the intended topic of survey and determined whether the questions are correct and relevant to the topic, and if they are appropriate and comprehensible for the intended population.

Statistical Analysis

The data from the Google form responses were used for analysis. Descriptive data were generated - means and standard deviations for quantitative normal data, median with interquartile range for quantitative non-normal data, and frequencies and percentages for qualitative data. Chi-square test was done to test association between duration of dermatology training and adequacy of knowledge. Fisher's exact test was done to test association between frequency of patients with cutaneous mycoses encountered and adequacy of knowledge. Analysis was done using Stata 14.

RESULTS

Sociodemographic characteristics of the survey population

Out of over 300 medical interns in PGH who were invited, 170 participated in the study. Out of the 170 interns, 47.6% were males and 52.4% were females. Over half (56.5%) were 21-25 years of age. The medical interns who were included in the study came from different medical schools across the country but most (47.1%) came from the University of the Philippines College of Medicine (UPCM). Other characteristics are shown in Table 1.

Experience with Superficial Mycoses

Majority of the participants had a cumulative duration of rotation/courses/training in dermatology during medical school in between 1 and 4 weeks, with the median of 1-2 weeks duration, with 44.1% of the participants thinking that the knowledge learned during medical school in managing patients with superficial mycoses is inadequate. Most of them (84.7%) have rarely or only occasionally encountered patients with superficial mycoses. Only 22.9% of them have observed a potassium hydroxide (KOH) mount being done, and even less (14.7%) have performed or assisted in doing one. Their most utilized references for superficial mycoses are medical books, information from senior experienced colleagues, and medical websites/other online platforms.

Knowledge on the Diagnosis and Treatment of Superficial Mycoses

For their overall knowledge scores, only 32.9% had adequate knowledge in the 20-point multiple choice questions about diagnosis and management of superficial mycoses (Figure 1). There was no statistically significant association between the duration of their dermatology training in medical school and their adequacy of knowledge. There was also no statistically significant association between frequency of encounters with superficial mycosis patients and their adequacy of knowledge. Breaking down the scores to diagnosis and treatment, participants had lower scores for the treatment questions, with 8.2% having adequate knowledge scores, compared to the 52.4% having adequate knowledge on diagnosis questions (Figure 2).

When asked on their level of confidence, most of them are not at all confident, or only slightly confident on the diagnosis and treatment of superficial mycoses (Figure 3).

Attitudes and Practices

Assessing their attitudes on training revealed that most deem dermatology training (92.4%) and learning about the management of superficial mycoses (91.2%) during medical school very important. With regard to training, 80.6% of the participants were definitely interested in attending more courses or training in dermatology in general, and 81.2% were definitely interested in attending more courses or training specifically on management of superficial mycoses.

Possible challenges they may encounter in the management of superficial mycoses were also identified and included: 1) poor patient compliance; 2) lack of confidence in diagnosing superficial mycoses; 3) lack of confidence in prescribing antifungal medications; 4) cost of medication; and 5) cost of appropriate diagnostic testing.

Their most preferred training modality were dermatology modules or rotations during medical school (94.7%); others include seminars (40.6%) and conferences (42.4%). Their most preferred sources of information were guidebooks or manuals (77.6%) and clinical practices guidelines (61.8%).

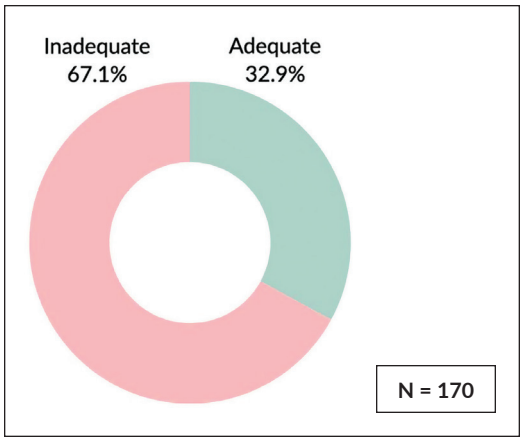

Figure 1. Overall adequacy of knowledge on diagnosis and management of superficial mycoses amongst medical interns.

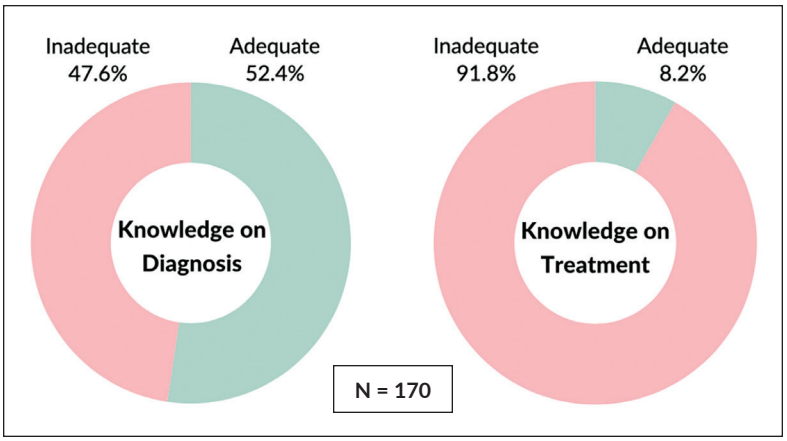

Figure 2. Adequacy of knowledge broken down into diagnosis scores and treatment scores.

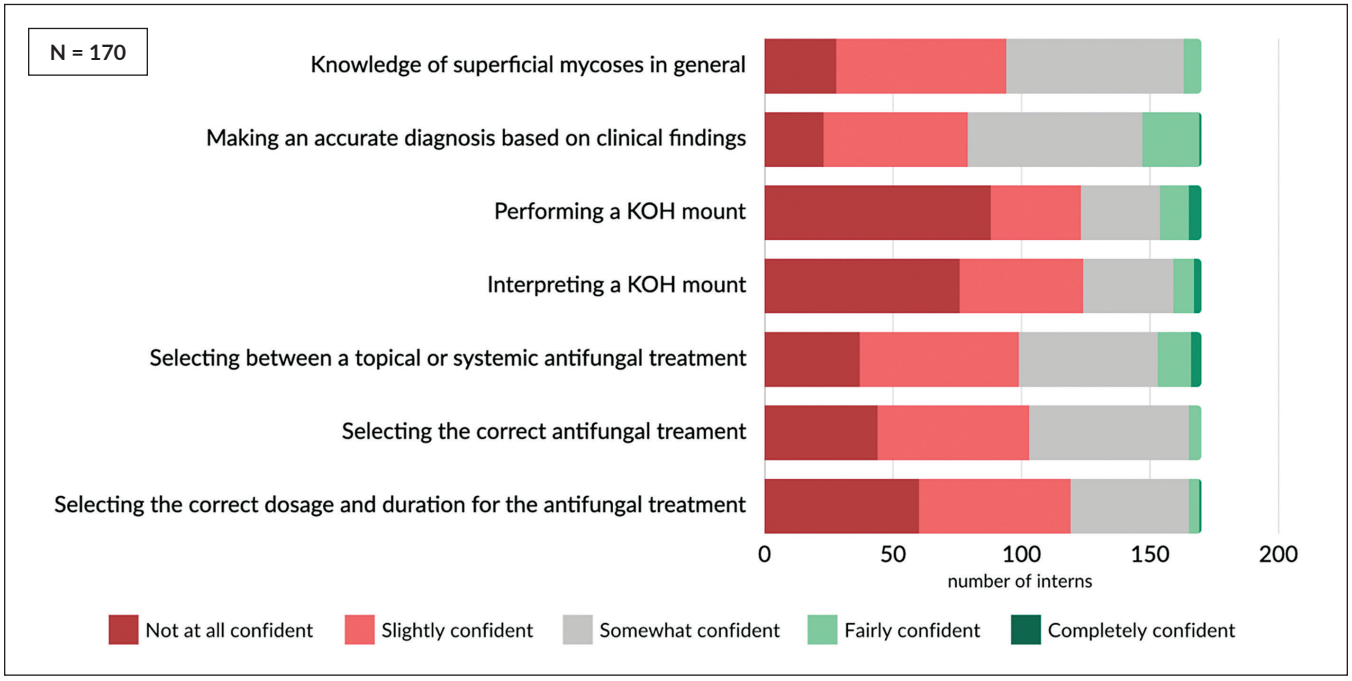

Figure 3. Level of confidence of medical interns in diagnosis and managing superficial mycoses.

The participants' top recommendations to improve medical school training on superficial mycoses include: 1) more practical approach in dermatology modules/rotations (seeing actual patients, small group discussions, wet clinics); 2) integration of dermatology electives in medical school; and 3) longer duration of dermatology modules/rotations during medical school. Most of the participants (77.6%) think that the best or ideal approach to manage superficial mycoses is that any non-dermatologist physician should manage these cases, with dermatology referral if necessary. Their top recommendations for better healthcare delivery in cases of superficial mycoses include: 1) more training opportunities and better training during medical school; 2) circulating practical guidebooks/manuals for management of superficial mycoses; and 3) formulation of clinical practice guidelines specific to superficial mycoses.

DISCUSSION

Management of Superficial Mycoses in the Primary Care Setting

Superficial mycoses accounts for a high number of dermatology consultation requests by non-dermatologists in hospitalized patients, and are one of the most frequent causes

of referrals in the outpatient clinics to dermatologists. Such referrals may have long processes and long waiting times, and may cause delay in treatment, and increased physical, psychological, and socioeconomic burden on the patients. Since these are highly prevalent diseases of the skin, the general practitioner should be able to manage uncomplicated cases, with no need for evaluation by a specialist.[1] This is reflected in our study, with the majority of medical interns agreeing that non-dermatologists should be able to manage superficial mycoses, with dermatology referral only if necessary.

Table 1. Sociodemographic Characteristics of the Survey Population

Variable	n (%)
Age (years), Mean (±SD)	26 (±2)
21-25 years	96 (56.5)
26-30 years	69 (40.6)
31-35 years	5 (2.9)
Sex	
Male	81 (47.6)
Female	89 (52.4)
Medical School	
Adventist University of the Philippines College of Medicine	1 (0.6)
Angeles University Foundation	1 (0.6)
Bicol University College of Medicine	4 (2.4)
Cebu Doctors' University	3 (1.8)
Cebu Institute of Medicine	1 (0.6)
Central Philippine University College of Medicine	1 (0.6)
Centro Escolar University	2 (1.2)
Chinese General Hospital Colleges	1 (0.6)
Davao Medical School Foundation, Inc.	2 (1.2)
De La Salle Medical and Health Sciences Institute	3 (1.8)
Doña Remedios Trinidad Romualdez Medical Foundation	2 (1.2)
Far Eastern University - Nicanor Reyes Medical Foundation	4 (2.4)
Jose Maria College Foundation, Inc.	1 (0.6)
Lyceum-Northwestern University	1 (0.6)
Manila Central University	3 (1.8)
Mariano Marcos State University	1 (0.6)
Matias H. Aznar Memorial College of Medicine, Inc.	1 (0.6)
Metropolitan Medical Center	2 (1.2)
Mindanao State University College of Medicine	2 (1.2)
Our Lady of Fatima University	5 (2.9)
Pamantasan ng Lungsod ng Maynila	6 (3.5)
Saint Louis University	1 (0.6)
Saint Paul University Philippines	1 (0.6)
San Beda College of Medicine	5 (2.9)
Silliman University Medical School	2 (1.2)
Southwestern University - PHINMA	1 (0.6)
University of Cebu School of Medicine	2 (1.2)
University Of Northern Philippines	1 (0.6)
University of Perpetual Help Rizal JONELTA Foundation School of Medicine	1 (0.6)
University of Santo Tomas Faculty of Medicine and Surgery	10 (5.9)
University of St. La Salle	2 (1.2)
University of the East Ramon Magsaysay Memorial Medical Center College of Medicine	13 (7.6)
University of the Philippines College of Medicine	80 (47.1)
UV Gullas College of Medicine	1 (0.6)
West Visayas State University College of Medicine	3 (1.8)

Variable	n (%)
Area of Interest	
Internal Medicine	71 (41.8)
General Practice	39 (22.9)
Emergency Medicine	38 (22.4)
General Surgery	36 (21.2)
Family and Community Medicine	34 (20.0)
Obstetrics and Gynecology	32 (18.8)
Dermatology	28 (16.5)
Otorhinolaryngology	25 (14.7)
Urology	24 (14.1)
Ophthalmology	23 (13.5)
Plastic Surgery	17 (10.0)
Anesthesiology	16 (9.4)
Neurology	16 (9.4)
Orthopedic Surgery	16 (9.4)
Radiology	16 (9.4)
Thoracocardiovascular Surgery	16 (9.4)
Neurosurgery	14 (8.2)
Trauma Surgery	12 (7.1)
Rehabilitation Medicine	11 (6.5)
Psychiatry	9 (5.3)
Place of Future Practice	
NCR	123 (72.4)
CAR	7 (4.1)
Region I	75 (44.1)
Region II	25 (14.7)
Region III	22 (12.9)
Region IV	33 (19.4)
Region V	28 (16.5)
Region VI	23 (13.5)
Region VII	16 (9.4)
Region VIII	9 (5.3)
Region IX	6 (3.5)
Region X	12 (7.1)
Region XI	8 (4.7)
Region XII	2 (1.2)
Region XIII	1 (0.6)
BARMM	6 (3.5)

Several factors that might affect their approach to the management of superficial mycoses were identified, including poor patient compliance, lack of confidence in diagnosing superficial mycoses and prescribing antifungal medications, cost of appropriate diagnostic testing and medications. These obstacles, especially the lack of confidence in the diagnosis and treatment, might stem from lack of training, as well as the lack of or unawareness of guidelines and educational materials, as they rely mostly on medical books and senior colleagues. Currently, there are no local guidelines specific to and solely dedicated to the management and treatment of superficial mycoses. Formulation of such guidelines can be vital to the primary care physicians, especially those in far-flung areas without access to specialists, as superficial mycoses are commonly encountered in the general population.

Dermatology Training in Medical School

When it comes to training, several studies have identified lack of it as a primary obstacle in managing common dermatoses. Despite the high prevalence of superficial mycoses and other common dermatoses seen in the primary care setting, dermatology curriculum in medical schools in the Philippines remain inconsistent. This is reflected in the study, where many of the medical interns only had cumulative dermatology modules/rotations between only 1-4 weeks, while 18% have no dermatology modules/rotations at all.

The study by Al-Zahrani et al. in 2017 revealed that more than two-thirds of PCPs included in the study had insufficient knowledge regarding common dermatological disorders, and that attending training courses was significantly associated with sufficient knowledge. Lack of guidelines, training, and educational materials were cited as common obstacles in the management of common dermatological disorders. The difficulty in managing common skin disorders may reflect the curricular time in medical school devoted to dermatology, which was not taught as adequately as other areas.[10] In our study, similarly, 67.1% of the respondents had inadequate knowledge on common superficial mycoses. This was more so for the treatment, with 91.8% of the participants having inadequate knowledge on treatment. Focusing on specific items, many of the participants had difficulty in identifying the superficial mycoses amongst clinical photographs of closely resembling dermatoses. This demonstrates how superficial mycoses can be easily mistaken for other common dermatoses. Many of the participants also had low scores in the treatment questions, specifically on first-line treatments for dermatophytosis and superficial yeast infections such as cutaneous candidiasis and pityriasis versicolor. Such information on first-line therapies of common superficial mycoses should be included in their training in medical school and should be made readily accessible in local clinical practice guidelines.

Despite the lack of a significant association between the duration of dermatology training in medical school and the knowledge scores, based on knowledge scores alone, and most of the participants being not confident or only slightly confident when it comes to the recognition, diagnosis and treatment of common superficial mycoses, we can surmise that more training is needed for medical students regarding the management of such common dermatoses. This is further elucidated by their recommendations of having dermatology electives, and longer duration of modules/rotations in dermatology.

Medical Education during the COVID-19 Pandemic

While not part of the survey, it is a fact that the batch of medical interns recruited in the study are those that went through the clinical parts of their medical school during the height of the COVID-19 pandemic. This pandemic led to significant changes and disruptions to medical education. In a survey done in 2021 amongst medical students in their pre-clinical or clinical years, they reported overall significant negative impact of the pandemic on their undergraduate training.[11] In the UP College of Medicine, all year levels, including medical interns, resorted to online platforms, without them seeing dermatologic cases in person. As both a visual and tactile field, seeing patients and their skin lesions in person is vital in learning dermatology. This might have had an effect on why most participants had inadequate knowledge scores in the survey, and the low confidence scores regarding the diagnosis and management of superficial mycoses. Further studies are needed to know for certain.

Limitations

This study does have significant limitations which could affect generalizability of the study results. First, the study was done in a single hospital. While the medical interns included in the study came from different medical schools across the country, majority still is from the UP College of Medicine, which incorporates dermatology modules and rotations in their curriculum. Additionally, only 170 medical interns participated out of the 343 who were invited to answer the survey. This is quite small compared to the thousands of medical interns across the country. The non-response amongst the interns and the small sample size could further affect generalizability of results. Another limitation is that this study only included the diagnosis and management of superficial mycoses.

Recommendations for Future Studies

In order to generalize the results, larger studies including more medical interns across more institutions should be done. A thorough review of the medical school curriculum in the Philippines with regard to dermatology training may be done so that inadequacies and inconsistencies may be further studied and addressed. Other common dermatoses may also be included in future studies to analyze dermatology knowledge in general amongst medical interns or primary care physicians.

CONCLUSION

In summary, around two-thirds of the medical interns who participated in the study had insufficient knowledge on the diagnosis and treatment of common superficial mycoses. Specific topics in which medical interns had difficulty in were identified; more interns had inadequate knowledge scores specifically on treatment of superficial mycoses. In the study, knowledge scores were not significantly associated with the duration of their dermatology training during medical school as well as their encounters with patients with superficial mycoses. Despite this statistically insignificant association, it was shown in the study that the medical interns have low confidence scores regarding superficial mycoses. They deem that training in superficial mycoses and dermatology in general was vital to their medical school education and were desirous of more training in dermatology in medical school. Their preferred sources of information as well as possible challenges that they may encounter in the management of superficial mycoses were identified. Recommendations for improving medical school training on superficial mycoses included dermatology modules, rotations or elective in medical school; and recommendations for better healthcare delivery in cases of cutaneous mycoses included better training during medical school and formulation of clinical practice guidelines specific to cutaneous mycoses.

Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

All authors declared no conflicts of interest.

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