

**ORIGINAL ARTICLE**DOI: <https://doi.org/10.3329/mediscope.v12i2.84135>**Drug Prescribing Pattern for Patients with Dermatophytosis in The Southern Region of Bangladesh: A Cross-sectional Study*****SD Haque¹, SS Salam², PS Biswas³, S Sen⁴, MH Neion⁵****Abstract**

Background and objective: Dermatophytosis or tinea infection is one of the most commonly encountered diseases in day-to-day clinical practice. Appropriate use of drugs is essential in dermatophytosis to reduce morbidity and the associated financial burden to the sufferers. This study aims to analyze the pattern of drug prescription in dermatophytosis in the Southern region of Bangladesh. **Methods:** A cross-sectional study was conducted from July 2024 to December 2024 in the outpatient department (OPD) of skin and venereal diseases (Skin & VD) at Gazi Medical College Hospital (GMCH), Khulna, and three private practice chambers in Khulna, Narail and Gopalganj districts. A total of 370 patients of all age groups and both genders were included in the study. Data regarding demographics, clinical features, pharmacotherapy, and prescribing indicators were recorded and analyzed. **Results:** Among the total 370 dermatophytosis cases, there were 174 males and 196 females. The majority of the respondents belonged to the age groups of 16-30 years and 31-40 years, each consisting of 121 (32.7%) patients. Tinea corporis (28.6%) was the prominent clinical type of single-site infection. Among single topical agents, the most commonly prescribed drug was Luliconazole (29.5%). Itraconazole (55.1%) was the most commonly used oral formulation. Analysis of the 370 prescriptions also showed that the average number of drugs prescribed per encounter was 3.74, and the average number of antifungals prescribed per encounter was 2.06. **Conclusion:** This study provides key information regarding the drug utilization pattern in the treatment of dermatophytosis. Appropriate steps should be taken to develop a rational and uniform treatment guideline to minimize the disease burden in society.

Keywords: Drugs, Prescription pattern, Dermatophytosis.

Introduction

The distribution of skin diseases such as dermatophytosis varies across countries as well as regions within a country.¹ Dermatophyte organisms infecting humans worldwide account for 2% of total outpatient department (OPD) appointments, with a diverse prevalence and epidemiology.² Treatment methods are similar across the globe, and current antifungal drugs can provide effective treatment for the majority of dermatophytosis manifestations.³

Dermatophytosis, or ringworm, or tinea infection, is a fungal disease that affects superficial keratinized structures like skin, hair, and nails. It affects people of all ages and genders.⁴ Dermatophytes from the Microsporum, Trichophyton, and Epidermophyton groups cause this infection. Dermatophytosis

generally leads to superficial fungal infections, although it can also lead to deeper and more invasive lesions in certain situations. Patients generally come to dermatological outpatient facilities with red scaly plaques with an annular appearance.⁵ Symptoms frequently appear four to fourteen days after exposure, affecting numerous parts of the body. Inflammation promotes colonization and may produce vesicles in the affected area.⁴

Tinea infections are classified according to their anatomic location, viz. Tinea capitis (scalp), Tinea barbae (beard area), Tinea corporis (skin other than bearded area, scalp, groin, hands, or feet), Tinea cruris (groin, perineum, and perineal areas), Tinea pedis (feet), Tinea manuum (hands) and Tinea unguium (nails).⁶

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The suggested practices for treating tinea infections are frequently changed. The market currently provides a vast array of topical Antifungal Agents (AFA) for treatment in the form of creams, gels, lotions, soaps, etc. Progress is also being made with alternative antifungal medications. A revised set of guidelines should be established for the management of tinea infections.⁷

Dermatophytosis's recurrence rate, medication response, primary causative organism, and illness presentation have all changed recently. The population's immunodeficiency conditions (HIV/AIDS, diabetes mellitus, and systemic steroid usage), excessive use of topical preparations containing steroids, irrational use of antifungals, and poor socioeconomic status have all been implicated as contributing factors. The effective treatment of dermatophytosis cases depends on the appropriate use of antifungal medications, which also helps to minimize side effects and problems.⁸

The effective use of medications, which is a crucial component of the prescription, is necessary for the therapy to be successful. One of the foundations of pharmacotherapy is the examination of a prescription pattern. In addition to cost analysis, this will assist prescribers in providing patients and society with logical and economical medical care. Prescriptions for drugs thus represent a genuinely important point of contact between patients and their healthcare professionals. As a result, there have been requests for their sensible application.⁷

The proper medications should be prescribed for the right patient in the right dosage for a suitable amount of time at a fair price to ensure rational drug use. The World Health Organization states that rational drug usage aids in the creation of standard treatment guidelines, the prevention of drug abuse, the adoption of a necessary medication list, and the identification of prescriptions that are not reasonable.⁹

Research on drug prescription patterns may assist practitioners in staying up to date with the latest trends and, eventually, provide better patient care to individuals as a result of the emergence of novel antifungals and a wider range of clinical presentations of dermatophytosis.¹⁰ The data regarding the pattern of drugs used for dermatophytosis in Bangladesh, particularly in the Khulna region, are minimal. Considering these facts, the present study aims to assess the drug use pattern for dermatophytosis in the Southern region of the country.

Materials and methods

Selection of patients

This cross-sectional study was conducted from July 2024 to December 2024 on 370 patients affected with dermatophytosis visiting the OPD of skin and venereal diseases Skin & VD at GMCH, Khulna, and three private practice chambers in Khulna, Narail and Gopalganj districts. The study subjects were selected by a consecutive type of non-probability sampling. All patients of either sex and all age groups diagnosed with dermatophytosis (both old and new cases) who were willing to participate in the study were included. Patients having other coexisting skin diseases like eczema, superficial bacterial infection, etc., were excluded from the study.

Sample size calculation

Sample size calculation:

To determine the sample size of the cross-sectional study, the following formula was used:

$$n = z^2 pq / d^2$$

Here, n = Desired sample size

z = Standard normal deviation, set at 1.96, corresponding with a 95% confidence interval.

P = Prevalence; according to a previous study, the prevalence of dermatophytosis was 38.8%.¹¹

$$q = (100 - p) = (100 - 38.8) = 61.2$$

d = Allowable error, set at 5%

$$\text{So, } n = \{(1.96)^2 \times 38.8 \times 61.2\} \div (5)^2 = 364.9 \approx 370$$

Total sample size = 370

Ethical consideration

Ethical clearance was obtained from the Institutional Ethical Review Board (IERB) of Gazi Medical College before the start of the study. The aims and objectives of the study were explained to the patients in an easily understandable local language, and informed consent was taken from each patient. It was assured that all information and records would be kept confidential. Patients who did not consent to participate in the study were assured of being given the same quality of care.

Data collection

After getting proper consent, data were collected by face-to-face conversation based on the questionnaire and the doctor's prescription form. The data collection form contained patients' demographic information, clinical types of dermatophytosis, and types of antifungal agents used for treatment.

Data analysis

All filled-up forms were verified after data collection. The data were analyzed with a computer using LibreOffice Calc Spreadsheet (version 25.2 for Windows) and Jamovi Open Statistical Software (version 2.6.26 for Windows). Quantitative data were expressed by mean \pm standard deviation (SD); qualitative data were expressed by frequency tables and graphs.

Results

This study was conducted on 370 patients who were clinically diagnosed with dermatophytosis. Their demographic characteristics are presented in Table 01.

Among the study subjects, 174 (47.0%) were male and 196 (53.0%) were female. The mean age of the patients was 33.4 ± 15.7 years. The majority of the respondents belonged to the age groups of 16-30 years and 31-40 years, each consisting of 121 (32.7%) patients. Among the study subjects, 197 (53.2%) came from rural areas and 173 (46.8%) came from urban areas. Also, most of the patients [223 (60.3%)] came from middle-class families.

Table 01: Demographic characteristics of the study subjects

Demographic characteristics	Patients (n = 370)
Gender	
Male	174 (47.0%)
Female	196 (53.0%)
Age group (in years)	33.4 ± 15.7 *
Less than 16	45 (12.2%)
16-30	121 (32.7%)
31-45	121 (32.7%)
46-60	67 (18.1%)
More than 60	16 (4.3%)
Locality	
Rural	197 (53.2%)
Urban	173 (46.8%)
Socioeconomic condition	
Lower class	119 (32.2%)
Middle class	223 (60.3%)
Upper class	28 (7.6%)

Figure 01 depicts the clinical types of dermatophytosis. The majority [125 (33.8%)] of the cases were affected with infection in multiple sites of their body. Among the patients suffering from single-site infection, *T. corporis* was the most prevalent [106(28.6%)], followed by *T. cruris* [82 (22.2%)]. The rest of the clinical types were: *T. pedis* [14 (3.8%)], *T. capitis* [15 (4.1%)], *T. unguium* [11 (3.0%)], *T. faciei* [9 (2.4%)], and *T. manuum* [8 (2.2%)].

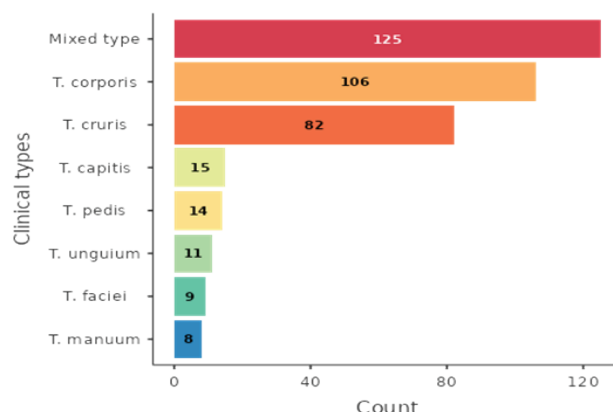


Figure 01: Clinical types of dermatophytosis

Table 02 shows the mixed types of clinical infection that were evident in 125 patients. Among them, 107 (85.6%) had (*T. corporis* + *T. cruris*) infection.

Table 02: Mixed types of clinical infection

Mixed clinical types	Frequency (%) [n=125]
<i>T. corporis</i> + <i>T. cruris</i>	107 (85.6%)
<i>T. corporis</i> + <i>T. faciei</i>	11 (8.8%)
<i>T. corporis</i> + <i>T. pedis</i>	7 (5.6%)

Table 03 shows the topical antifungal drugs prescribed for the treatment of dermatophytosis. Luliconazole was the most used antifungal agent in the prescriptions [109 (29.5%)], followed by oxiconazole in 84 (22.7%) prescriptions. Also, there were 19 (5.1%) patients who received a combination of topical antifungals.

Table 03: Topical antifungal agents used in the prescriptions

Topical antifungal drugs	Frequency (%)
Combination drugs	19 (5.1%)
Sertaconazole	51 (13.8%)
Luliconazole	109 (29.5%)
Oxiconazole	84 (22.7%)
Econazole	27 (7.3%)
Naftifine	13 (3.5%)
Amorolfine	8 (2.2%)
Ciclopirox	15 (4.1%)
Clotrimazole	18 (4.9%)
Miconazole	26 (7.0%)

Among the 19 patients who were prescribed a combination of topical antifungals, 9 (47.4%) received Naftifine + Luliconazole combination. This and other combination antifungals are shown below in Table 04.

Table 04: Topical combination antifungal agents used in the prescriptions

Topical combination antifungals	Frequency (%) [n=19]
Naftifine + Luliconazole	9 (47.4%)
Oxiconazole + Amorolfine	2 (10.5%)
Luliconazole + Amorolfine	5 (26.3%)
Luliconazole + Naftifine	2 (10.5%)
Sertaconazole + Amorolfine	1 (5.3%)

Table 05 shows the percentage of systemic antifungals prescribed to the patients. Itraconazole was used in more than half of the cases [204 (55.1%)]. Terbinafine was used in 85 (23.0%) of cases. A few patients received a combination of systemic agents [6 (1.6%); they all received (Terbinafine + Itraconazole) combination]. Only 4 (1.1%) patients did not receive any systemic drug.

Table 05: Systemic antifungal agents used in the prescriptions

Systemic antifungal drugs	Frequency (%)
No systemic drug	4 (1.1%)
Itraconazole	204 (55.1%)
Terbinafine	85 (23.0%)
Fluconazole	71 (19.2%)
Combination therapy (Terbinafine + Itraconazole)	6 (1.6%)

Figure 02 shows the percentage of antibiotics prescribed to the patients. (Cefuroxime + Clavulanic acid) combination was the most frequently used [87 (23.5%)] agent, followed closely by (Cefpodoxime + Clavulanic acid) combination [86 (23.3%)]. Other prescribed antibiotics were: Flucloxacillin [26 (7.0%)], Cefixime [29 (7.8%)], Cephadrine [23 (6.2%)], Cefadroxil [10 (2.7%)], and Azithromycin [9 (2.4%)]. More than a quarter of the patients [100 (27.0%)] did not get any antibiotic.

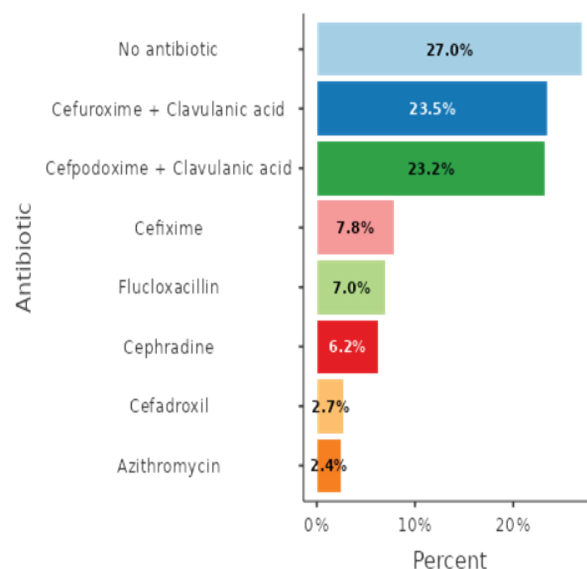


Figure 02: Type of antibiotics used in the prescriptions

The types of antihistamines prescribed to the patients are shown in Table 06. Hydroxyzine was the most commonly used antihistamine [120 (32.4%)], followed by Rupatadine [99 (26.8%)]. Only 8 (2.2%) patients did not receive any antihistamine.

Table 06: Type of antihistamines prescribed

Antihistamines	Frequency (%)
No antihistamine	8 (2.2%)
Fexofenadine	15 (4.1%)
Desloratadine	87 (23.5%)
Rupatadine	99 (26.8%)
Hydroxyzine	120 (32.4%)
Ebastine	29 (7.8%)
Bilastine	12 (3.2%)

Analysis of the 370 prescriptions showed that average number of drugs prescribed per encounter was 3.74, average number of antifungals prescribed per encounter was 2.06, average number of systemic antifungals prescribed per encounter was 1.01, average number of topical antifungals prescribed per encounter was 1.05, and 12% of the prescribed drugs were enlisted in the National List of Essential Medicines (NLEM) of Bangladesh. Also, no drug was prescribed in injectable form, and the generic names of the drugs were not used in any of the prescriptions (Table 07).

Table 07: Details on World Health Organization (WHO) prescribing indicators

Prescribing indicators	Values
The average number of drugs prescribed per encounter	3.74
The average number of antifungals prescribed per encounter	2.06
The average number of systemic antifungal drugs prescribed per encounter	1.01
The average number of topical antifungal drugs prescribed per encounter	1.05
The percentage of encounters with injections	Nil
The percentage of drugs prescribed by generic name	Nil
The percentage of drugs prescribed from the NLEM*	12%

*NLEM = National List of Essential Medicines of Bangladesh (2016)

Discussion

Being one of the most prevalent cutaneous illnesses, dermatophytosis is found throughout the world.¹² Dermatophytosis can occasionally be difficult to diagnose based solely on clinical features because the clinical presentation can resemble a variety of different skin disorders. Furthermore, because dermatophytosis frequently presents atypically in immunocompromised patients, diagnosing it is more challenging.¹³

This cross-sectional study was conducted on 370 patients affected with dermatophytosis visiting the outpatient department (OPD) of Skin & VD at GMCH, Khulna, and three private practice chambers in Khulna, Narail and Gopalganj districts. Females were found to be affected more (53.0%) with dermatophytosis than males (47.0%). This differs from the findings of other re-searchers from different countries that showed a male preponderance.¹⁴⁻¹⁶ Most of the patients in the present study were in the age group of 16-30 and 31-45 years (32.7% in each group). This finding is in accordance with the results of another study in Bangladesh.¹¹

The majority (33.8%) of the cases were affected with infection in multiple sites of their body. Among the patients suffering from single-site infection, *T. corporis* was the most prevalent (28.6%), followed by *T. cruris* (22.2%). Similar to this, some other researchers also found that the most common fungal infection was *T. corporis*.^{15,17} Although other studies done in India and Iraq reported the maximum number of infections in the groin (*T. cruris*).^{14,16}

Among the topical antifungals prescribed for the treatment of dermatophytosis, Luliconazole was the most used drug [109 (29.5%)], followed by Oxiconazole in 84 (22.7%) prescriptions. In a study conducted in India, Luliconazole (23.94%) was the most frequently prescribed topical anti-fungal agent, followed by Ketoconazole (15.7%).¹⁸ Another earlier study showed clotrimazole and terbinafine as the most commonly prescribed single topical agents (29%).² In the present study, 19 patients were prescribed a combination of topical antifungals. Among them, 9 (47.4%) received a combination of Naftifine and Luliconazole. Kushwaha et al. reported the use of Sertaconazole and Ketoconazole in 29.3% cases, followed by Sertaconazole and Clotrimazole in 28.17% cases.⁴ Koshley et al. found the combination of Sertaconazole and Ketoconazole to be the most commonly used topical polytherapy.¹⁹

In the present study, Itraconazole was the most frequently used (55.1%) systemic antifungal agent, followed by Terbinafine (23.0% of cases). A few patients (1.6%) received a combination of systemic agents; they all received (Terbinafine + Itraconazole) combination. Only 1.1% of patients did not receive any systemic drug. According to the study conducted by Koshley et al. regarding treatment patterns, frequently prescribed systemic drugs in tinea cases were oral fluconazole in 31.75% cases, followed by itraconazole in combination with Fluconazole.¹⁹ In another study by Deb et al.²⁰, the most commonly prescribed systemic antifungal was Terbinafine (64.81%), which is almost similar to our study findings. In another study conducted by Barawade et al.²¹, a combination of two or more drugs was not used for dermatophytosis, but other studies, like Gopimohan et al., Kushwaha et al., show the use of different combinations of drugs for dermatophytosis.^{4,22} Itraconazole and Luliconazole were the most effective antifungals in the current situation, according to a recently published article from West Bengal, India, which highlights the shifting pattern of antifungal drug sensitivity in dermatophytosis.²³

Regarding the use of antibiotics, the present study shows that, combination of Cefuroxime and Clavulanic acid was the most frequently used (23.5%) agent, followed closely by Cefpodoxime and Clavulanic acid combination in 23.3% of patients; whereas Azithromycin was the least frequently used antibiotic (2.4%). A study conducted in India also reported the use of Azithromycin in 1.94% of patients.⁵

Patients with dermatophytosis require antihistamines to manage associated symptoms like itching. In the present study, Hydroxyzine was the most commonly used

antihistamine (32.4%), followed by Rupatadine (26.8%). Only 2.2% of patients did not receive any antihistamine. In their study, Koshley et al. reported that Cetirizine was the commonest (66.43%) in the sedative type and Fexofenadine was the commonest in the non-sedative type of antihistamine (5.76%).¹⁹ Similarly, another study's findings showed that, most common antihistamine was Cetirizine, which was prescribed in 77.4% of prescriptions, followed by Hydroxyzine in 21% of participants.⁵

In the present study, analysis of the 370 prescriptions showed that the average number of drugs prescribed per encounter was 3.74. Bansal et al. reported that the average number of drugs per encounter was 3.68.²⁴ Gopimohan et al.'s study showed that the average number of drugs per encounter was 3.12.²² This shows that the prescription was near rational concerning polypharmacy. Polypharmacy causes bad outcomes like increased drug–drug interactions, increased adverse effects, decreased compliance of the patients, and increased the cost of the treatment.²¹

This study found that the average number of antifungals prescribed per encounter was 2.06. The average number of systemic antifungal and topical antifungal drugs prescribed per encounter was 1.01 and 1.05, respectively. In their study, Kushwaha et al. reported that the average number of antifungals prescribed per encounter is 3.14, the average number of systemic and topical antifungal drugs prescribed per encounter was 1.76 and 1.84, respectively.⁴

In the current study, 12% of the prescribed drugs were enlisted in the NLEM of Bangladesh. No drug was prescribed in injectable form, and the generic names of the drugs were not used in any of the prescriptions. Another study conducted by Bagchi et al.¹⁸ also reported that no injection was prescribed for dermatophytosis, and the percentage of drugs prescribed from NLEM (2015) of India²⁵ was 9.42. It is imperative that prescribers take these concerns into account, and the reference materials are updated by the concerned authority to reflect the evolving drug sensitivity patterns of microorganisms.

Conclusion and recommendations

The full recovery of dermatophytosis patients and the mitigation of treatment-related problems and adverse events depend heavily on the rational use of antifungal medications.

Furthermore, although tinea infections may not result in mortality, they can raise morbidity, disease burden, and negatively impact quality of life. We believe that our study provides key information regarding the drug

utilization pattern for dermatophytosis in the context of Bangladesh. We recommend a periodic update of the management guidelines by the concerned authority according to the sensitivity pattern of the causative organisms. At the same time, the public should be informed about the dangers of self-medication for fungal infections; instead, they should be urged to seek medical attention as soon as possible.

Conflicts of interest: None declared.

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