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Prescribing Pattern of Antifungal Drugs in a Tertiary Care Teaching Hospital in Western India

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Abstract

Fungal infections are prevalent in a tropical country like India. Pharmacotherapy of fungal disease has been revolutionized by the introduction of relatively less toxic oral drugs, combination therapy, and new formulations of older agents. However, data regarding antifungal drug usage patterns in India must be more present. Hence, this study was planned to study the prescribing pattern and to compare the cost of antifungal drugs in patients attending a tertiary care teaching hospital. It was a cross-sectional, observational study carried out at GCS Hospital, Ahmedabad, from April 2021 to Sept 2021. Prescriptions of 130 patients were collected and analyzed using Microsoft Excel version 2013. A total of 213 antifungal drugs were prescribed to 130 patients. Most patients, 81 (62.3%) were from the 18-40 age group. Combined antifungal treatment (Oral + Topical) was prescribed in 77(59.2%). The most common class of antifungal drugs was imidazole 107(50.23%), and clotrimazole was the most familiar drug. The most common indication for antifungal therapy was tinea cruris (45.38%). An average of 3.75 drugs were prescribed per prescription, of which 1.63 were antifungal drugs. Combined treatment of oral and topical antifungal drugs was common in dermatological practice. However, the cost of the treatment can be reduced by prescribing generic drugs.

Keywords: Antifungal Drugs; Cost Comparison; Prescribing Pattern

Introduction

Fungal infections are very common in tropical countries like India due to hot and humid weather, lack of hygiene awareness, etc. These infections range from superficial skin infections to systemic diseases.[1] Common antifungal drugs available in Indian markets are imidazole, triazole, allylamine, hydroxypyridone, antimetabolite, etc.[2] Because of the high safety profile of triazoles, they are extensively used nowadays.[3] However, data regarding antifungal drug usage patterns in India is particularly lacking.

Fungal infections usually occur in an immunocompromised state (critically ill, advanced age, use of immunosuppressive drugs) or due to opportunistic exposure to the fungus. Superficial fungal infections are not that serious but are associated with

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a significant decrease in quality of life and social stigma. In addition, they can be very uncomfortable, contagious, or may become invasive.[4] Invasive fungal infections are more associated with considerable morbidity and mortality. Therefore, appropriate antifungal drugs are very important to treat the condition and prevent the complications of fungal infections.[5]

Vast varieties of systemic and topical antifungal drugs are available in the market. Amphotericin B, fluconazole, itraconazole, capsofungin, griseofulvin and terbinafine are commonly used systemic antifungal drugs in India. Antifungal drugs like clotrimazole, ketoconazole, miconazole, terbinafine, ciclopirox, luliconazole, and eberconazole are available in topical preparations.[6]

Antifungal drugs are commonly prescribed for cutaneous fungal infections, ear fungal infections, gynecological conditions, and systemic infections like candidiasis.[7] Among these antifungal drugs are most commonly prescribed in dermatological conditions as combination therapy of systemic and topical antifungal agents.[5] Antifungal drugs are available in various dosage forms like tablets, capsules, injections, creams, lotions, powder, shampoo, ear drops, etc.[1]

Fixed-Dose Combinations of antifungal drugs with antimicrobials, corticosteroids, and local anesthetic drugs are also prescribed in some conditions.[8] Prescribing the branded antifungal drug is very common in most clinics. However, expensive brand drugs may increase the patients' financial burden because most fungal infections are chronic and require long-term treatment regimens.[7] Hence this study aims to evaluate the prescription pattern of antifungal drugs in various departments of a tertiary care teaching hospital.

Methods

An observational cross-sectional study was conducted at GCS Hospital from April 2021 to September 2021. Patients of any gender over 18 years of age coming to the outpatient department or admitted to the hospital were enrolled in the study. Data were collected from various departments (Dermatology, obstetrics, gynecology, medicine, and otorhinolaryngology) of the hospital daily. Data collection was done only after obtaining informed consent from the patient.

The necessary data were collected from the patients, including the age, gender, diagnosis, dosage, route of administration, name of the drug, dosage form, and cost of the antifungal drug. Before starting the study, ethical approval was obtained from the institutional ethics committee.

Data were analyzed using descriptive statistics. The frequency with percentage was used to summarize the patient's demographic details, indications, and prescribing pattern of antifungal drugs. Analysis of the data was carried out by using Microsoft Excel version 2013 and SPSS. A per-day cost comparison was analyzed by the Kruskal Wallis test

Results and Discussion

In our study, a total of 130 patients were enrolled. It has been found that in our study 62% of the patients from the age group of 18-40 years which is similar to the results of the study on prescribing patterns of antifungal drugs in dermatology conducted by Naaz et al. where they had 71% of patients in the age group of 21-40 years.[5] It may be due to adults being more conscious about their skincare. (Table 1)

Table 1. Demographic Data of the Study Participant

Characteristics	n (%)
Age (in years)	
18-40	81 (62.3%)
41-60	29 (22.3%)
>60	20 (15.4%)
Total	130
Sex	
Female	74 (57.00%)
Male	56 (43.00%)
Total	130

Table 2. Details on Prescribing Indicators

Indicators	Number
The total number of prescriptions analysed	130
Total number of drugs prescribed	488
Total number of antifungal drugs prescribed	213
Total number of concomitant drugs prescribed	275
The average number of drugs prescribed per prescription	3.75
The average number of antifungal drugs prescribed per prescription	1.63
The average number of oral antifungal drugs prescribed per prescription	0.73
The average number of injectable antifungal drugs prescribed per prescription	0.04
The average number of topical antifungal drugs prescribed per prescription	0.81
The average number of antihistaminic drugs prescribed per prescription	0.78
Percentage of antifungal drugs with fixed-dose combinations	14/213(6.57%)
Percentage of antifungal drugs prescribed by generic name	10/213(7.69%)
Percentage of antifungal drugs prescribed from WHO EML*	96/213(45.07%)
Percentage of antifungal drugs prescribed from NLEM**	87/213(40.84%)

* WHO model list of essential medicines, 22nd List, 2021

** National list of essential medicines, India, 3rd edition 2015

Table 3. Per day Cost Comparison between Single, Oral + Topical, and FDCs Antifungal Drugs

Antifungal drug treatment modalities	Median Cost (INR)	Kruskal Wallis Test value	P-value (Kruskal Wallis test)	Post hoc test (for comparison within groups)	P-value (post hoc test)
1. Single	15.8			Single and Oral + Topical	0.002
2. Oral+ Topical	33.9	12.79	0.002	Single and FDCs	0.004
3. FDCs	39.8			Oral+Topical and FDCs	0.356

Regarding prescribing indicators, as shown in Table 2, the 130 prescriptions contained 488 drugs. Out of these, 213 drugs were antifungal. The most common concomitant drugs were antihistaminic drugs. The average number of drugs per prescription was 3.75 and the average number of antifungal drugs per prescription was 1.63. The percentage of antifungal medicines prescribed by brand name was 92.31%. The percentage of antifungal drugs prescribed from the WHO Essential Medicine List and National List of Essential Medicine was 45.07% and 40.84%, respectively.

As mentioned in Table 3, the Kruskal Wallis test was applied to check the median cost comparison between single antifungal drugs, the combination of oral and topical antifungal drugs, and FDCs having antifungal drugs. In addition, a post hoc test was applied to check the statistically significant difference in the per-day cost within these three groups.

The P-value for the Kruskal Wallis test was 0.002, suggesting a statistically significant difference in median cost between these three groups. The post hoc test indicates a statistically significant difference in per day cost between single antifungal drugs and oral+topical antifungal drug treatment (P-value 0.002). There was also a statistically significant difference in per day cost between single antifungal drugs and FDCs (P-value 0.004). But the difference in per day cost between oral+topical antifungal drug treatment and FDCs was not statistically significant (P-value 0.356).

Medicine prescribing has a vital role in the health care system. Time-to-time evaluation of prescriptions is very much important for proper drug utilization, checking the cost burden of the treatment, and patient compliance.[5] The prescription reflects the overall attitude of the prescribing physicians along with their knowledge of the disease process and the pharmaco-therapeutic approach for the disease or condition.[9] The present study assessed the antifungal drug prescribing pattern and antifungal drug utilization trends in various departments at a tertiary care hospital in Ahmedabad.

In this study average number of drugs per prescription was 3.75. Bansal et al conducted a study in which an average of 3.68 drugs were prescribed per prescription.[3] A study on drug utilization patterns in the dermatology outpatient department conducted by Patil et al. showed an average of 3.27 drugs per prescription.[9] Polypharmacy promotes undesirable drug interactions and irrational drug prescribing, increasing the incidence of side effects and economic burden to patients. So, this was the point of our concern and we wanted to check on it.

We found that the average number of antifungal drugs prescribed per prescription was 1.63, and the average number of topical antifungal drugs prescribed per prescription was 0.81 in this study. In another study on the prescription pattern of antifungal drugs in dermatology conducted by Parvathy G at al. average of 2 antifungal drugs were prescribed per prescription, out of which 1.10 were topical antifungal drugs.[10]

Antihistaminics were the most commonly prescribed concomitant drugs in this study. The most probable reason for the maximum use of antihistaminic drugs could be due to itching associated with many fungal infections.[11] Generic drug prescription is considered the most rational and economical method of prescribing.[5] But here, most of the drugs were prescribed by brand name. (92.31%).

This study observed the usage pattern of antifungals, and the results found that most antifungal drugs were prescribed topically than orally. This is because topical drugs have the least side effects and easy application. In our study, 59% of patients received combined topical and oral antifungal drug treatment (Figure 1).

A study on the prescription pattern of antifungal drugs in dermatology conducted by Parvathy G et al. showed that 79.6% of patients received combined treatment of topical and oral antifungal drugs10. Most fungal infections can be managed with topical therapy alone; however, in an attempt to increase the cure rate, topical and systemic (oral) medications are often combined

Our study documented that creams were the most common dosage forms compared to other dosage forms (Figure 2). This was similar to the study's results on prescribing patterns of antifungal drugs in dermatology conducted by Naaz R et al.[5]

Moreover, most commonly prescribed antifungal drug was clotrimazole (30.05%) followed by itraconazole (21.13%). (Figure 3). A study on drug utilization patterns and cost-utility analysis of antifungal drugs conducted by Ali M et al. also reported Clotrimazole as the most commonly prescribed antifungal drug.[12]. Similar studies on prescribing patterns of antifungal medications conducted by Al Balushi et al. and Manohar M et al. fluconazole was the most commonly prescribed antifungal drug followed by nystatin.[13,14] This result difference is due to resistance development to older antifungal drugs like fluconazole.[15,16]

Tinea cruris was the common and seen in 45.38% of the patients followed by tinea corporis, which was seen in 23.85% of the patients. (Figure 4). A study on drug prescribing patterns of antifungal drugs for local fungal infections conducted by Bansal et al. also reported a similar observation as tinea cruris (41.50%) followed by tinea corporis (38.20%) as the most common fungal disease.[3]

Antifungal drugs were also prescribed to prevent fungal infections in covid-19 infected patients. An observational study on antifungal prophylaxis for prevention of COVID-19-associated pulmonary aspergillosis in critically ill patients conducted by Hatzl et al. showed that antifungal prophylaxis was associated with significantly reduced Covid-19-associated fungal infection incidence.[17]

This study prescribed a fixed-dose combination of antifungal drugs with corticosteroids and antibiotics. The most probable reason for using corticosteroids could be due to inflammation associated with some fungal infections.[18] (Figure 1). Superficial fungal infections are among general practitioners' most commonly managed skin problems. Although evidence shows combination antifungal/corticosteroid topicals are more expensive and less effective than single-agent antifungals, practitioners continue prescribing combination agents.

Per day cost comparison of single antifungal drug therapy with combined therapy of oral + topical antifungal drugs and with FDCs having antifungal drug showed statistically significant difference. But there was no statistically significant difference in per day cost of combined therapy of oral + topical antifungal drugs and FDCs having antifungal drugs. The higher cost of antifungal drugs was observed due to the use of combined therapy of oral + topical antifungal drugs, FDCs having antifungal drugs, newer antifungal drugs like itraconazole, and eberconazole, and also due to most of the drugs were prescribed by brand name.[19,20] However, we did not analyze the rationality of the antifungal drugs.

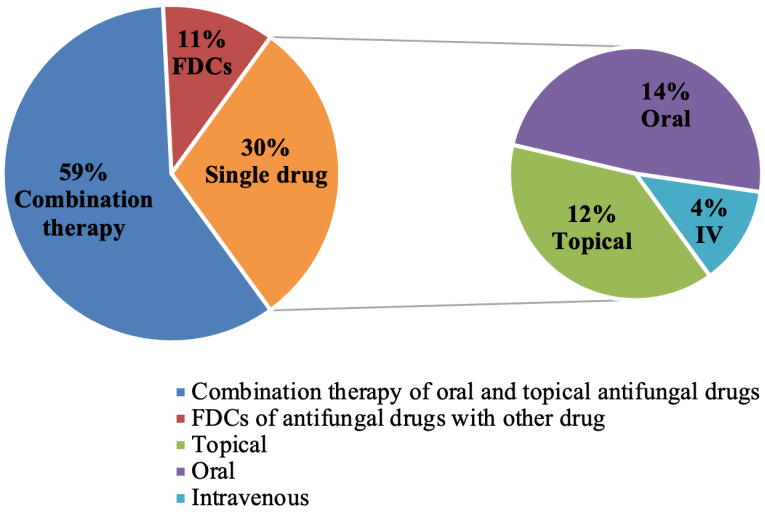

Figure 1. Antifungal Treatment Modalities

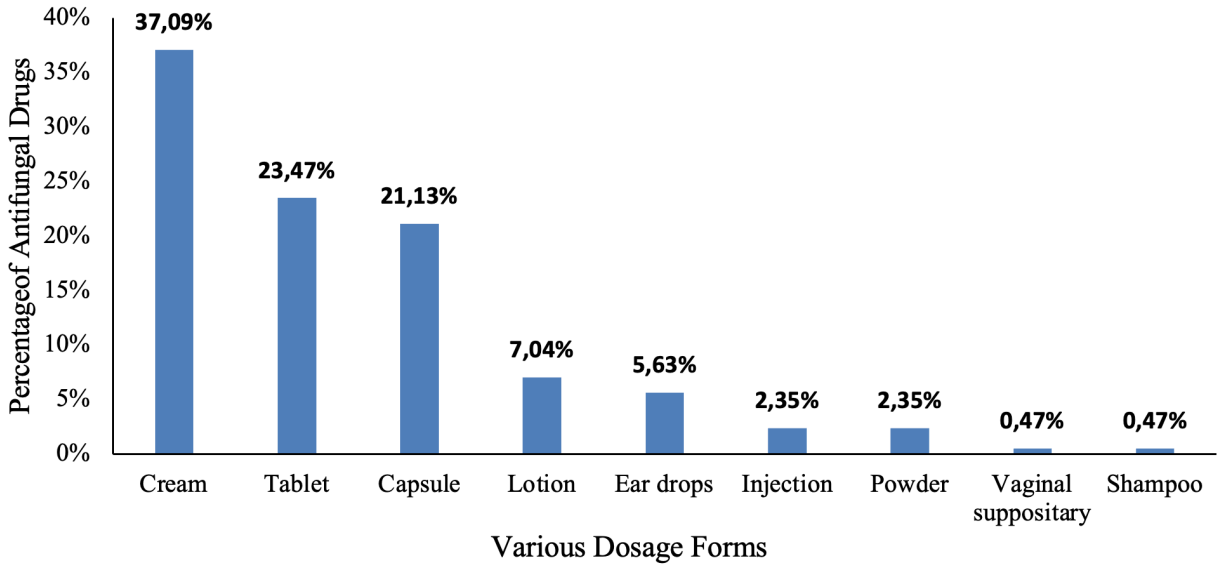

Figure 2. Dosage Forms of Antifungal Drugs Prescribed during the Study

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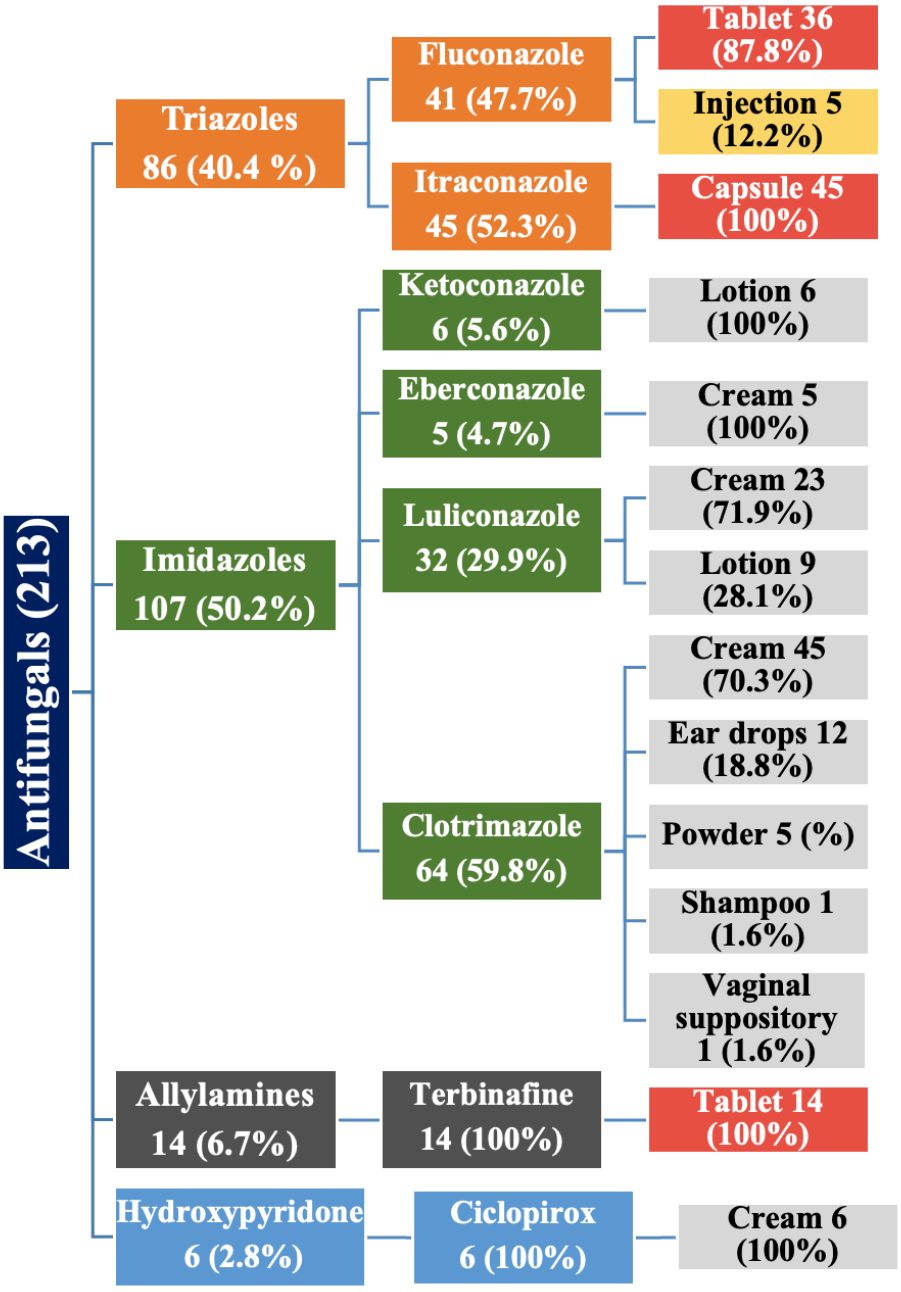

Figure 3. Antifungals Drugs Utilization according to Classification, Generic Name, and Formulation of Drugs

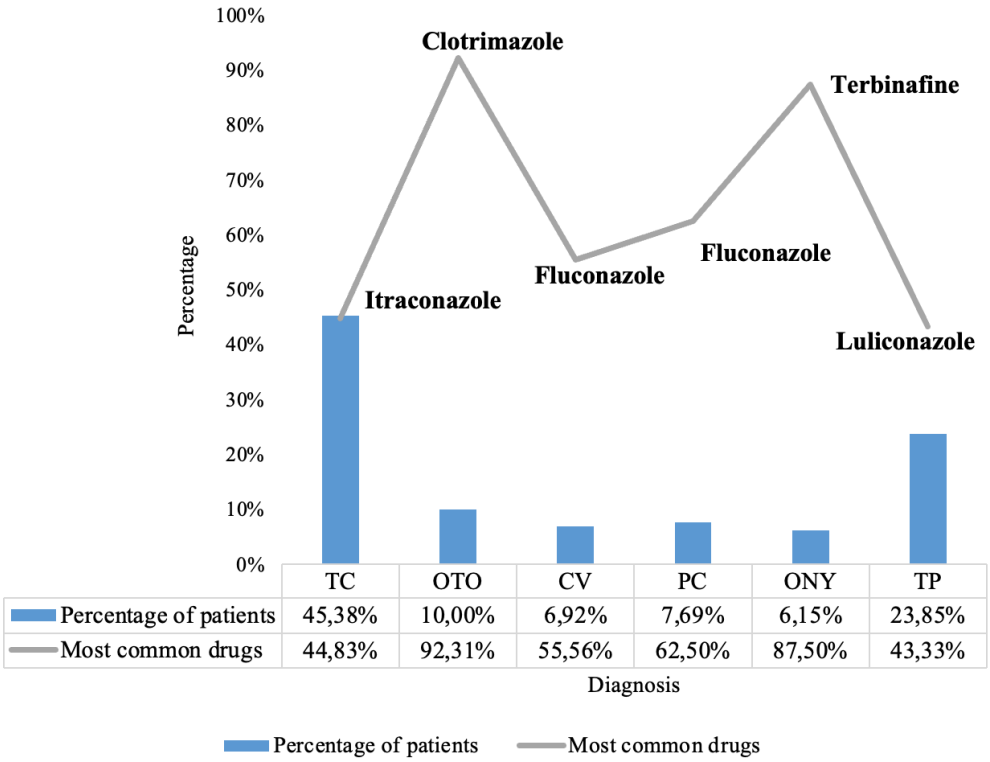

Figure 4. Distribution of Patients According to Diagnosis and Most Common Drug Given for that Condition.

TC=Tinea cruris, OTO=Otomycosis, CV=Candidial vulvovaginitis, PC=Prevention of fungal infection in covid, ONY= Onychomycosis, and TP= Tinea Corporis.

Clinical decision-making was complex for each patient, so it was difficult to check the rationality of prescribing antifungal drugs.

Conclusions

Among various departments of the hospital, antifungal drugs were most commonly used in the dermatology department for cutaneous fungal infections. Combined treatment of oral and topical antifungal drugs was frequently observed in dermatological practice. The use of newer antifungal agents like eberconazole and luliconazole is increased. We can reduce the cost of antifungal therapy by prescribing a single antifungal drug instead of combined therapy or FDCs unnecessarily. The use of generic drugs must be initiated so that there will be some reduction in the cost of treatment. Future studies may check the rationality of the antifungal drugs which was not done in our study. They may use cost-effective analysis instead of direct cost comparison.

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Conflict of Interest

None declared.

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