Evaluation of Prescribing Practices and Therapeutic Utilization of Antifungal Agents in the Dermatology Outpatient Department of a District General Hospital.

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ABSTRACT

Objective: The current study was undertaken to study drug utilization pattern of antifungal drugs and to check rationality of prescriptions containing antifungal agents. Rationality was verified from standard treatment protocol, Government of Maharashtra and National Formulary of India (NFI) 2011. **Method:** The retrospective, observational study was designed. Total 120 prescriptions were enrolled as per inclusion criteria. **Result:** Out of 120 patients, 54% (n=65) were male and 46% (n=55) were female. *Tinea cruris* was the most common indication observed (32%). The commonly used antifungal agents were Fluconazole (30%), Clotrimazole (19%), Griseofulvin (18%), Itraconazole (15%), Luliconazole (11%), Miconazole (5%), Econazole (1%) and Amorolfine (1%). Antifungal agents were distributed among prescriptions as monotherapy (29%), dual-drug therapy (47%), triple-drug therapy (18%) and multiple drug therapy (6%). **Conclusion:** In most of the cases, drug-drug interactions were found to be observed and antifungal agents prescribed rationally were observed predominantly.

Key words: Antifungal agents, Fungal infection, Demographic, Co-morbidity, Drug-drug interaction, Rationality.

INTRODUCTION

Fungal infections are common in the tropical area as well as in the developing countries.[1] In the tropical region, conditions such as climate, and economic (poor hygiene), and social (overcrowding) status are the leading factor to influence the infections.[2] India is the tropical region and a developing country. Nowadays, more use of the antineoplastic agents, immunosuppressive agents, grafts, intravenous catheters, broad-spectrum antibiotic agents, transplantation surgeries, and foreign material administration had contributed to increasing the risk of infection.[3]

Irrational prescription commonly occurs in the clinical practice. Data of antifungal drug prescription pattern guide to the rational use of antifungal agents. The recent data on the prescription pattern of the drug is sparse. In the recent study, it has been shown that resistance to Candida has increased to first and second-line treatment.[3] Therefore there is a need for periodic auditing in order to increase therapeutic efficacy, and to decrease adverse effect, adverse drug reaction, and drug resistance.

Drug utilization study is essential for obtaining information about drug use patterns and the role of the drug in society. These analyses help to improve the standard of treatment, quality of life, and to estimate the problem regarding drugs such as multiple uses of the drug, drug-drug interactions, and adverse drug reactions.[5]

The adequate data regarding drug utilization pattern of the antifungal drugs in dermatology in India is lacking.[5] Therefore, the present study was planned to determine the drug prescription pattern of antifungal agents.

MATERIALS AND METHOD

Study site and study duration

A study was performed at District General Hospital, Amravati and involved 120 clinically suspected cases of fungal infections, observed for a period of 6 months.

Study design and Clinical evaluation

A retrospective, observational hospital-based study was performed. The data of patients enrolled in the study was collected such as- Socio-demographic details, current medical problems, past medical history, diagnosis, antifungal therapy, other drug therapy. Drug-drug interactions were assessed using Medscape database. Rational use of antifungal was assessed by comparing prescriptions with the standard treatment protocol, Government of Maharashtra, and NFT 2011.

Inclusion criteria

All outpatients who were prescribed with at least one antifungal agent and more than 12 years of age were enrolled in the study.

Exclusion criteria

Pregnant and lactating women, patients below 12 years and who were not willing to participate in the study were excluded from the study.

RESULT AND DISCUSSION

Demographic detail

A total of 120 patients included in the study. Out of 120 patients, (54%) were male and (46%) were female. Majority patients belong to 13-18 years age group. The average age was 26.17±16.27 [mean±SD]. Prevalence of male patients was more than female in 13-18 years age group due to more physical activity, life-style, and unaware of self-hygiene. The previous study conducted by Vegada BN *et al* (2014) also shown the prevalence of male more than female with age group 16-30 years.[1] Demographic detail showed in Table 1.

Table 1: Demographic profile of patients.

Sr. No	Properties	No. of patients
	Age groups	
1.	13-18	53
2.	19-35	46
3.	36-50	13
4.	51-65	5
5.	66-74	1

6.	75-84	2
	Gender	
1.	Male	65
2.	Female	55

Region of patients

The group of urban comprised of the highest number of population 67% (n=80). It was followed by a group of rural which included 33% (n=40). Thus, results indicate the prevalence of fungal infections in patients belonging to the urban area. This is probably because of more exposure to humid, moist, and cruddy condition which is favorable for fungal infection. Another reason might be ignorance of patients of the rural area towards mild skin infections. Region of patients showed in Figure 1.

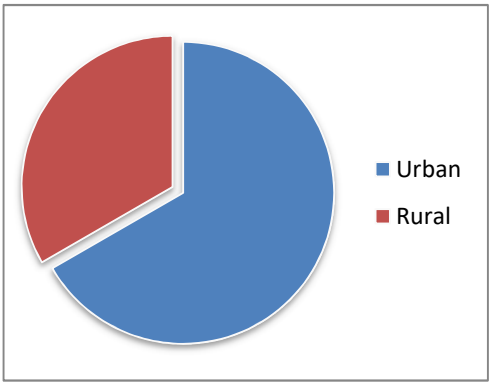
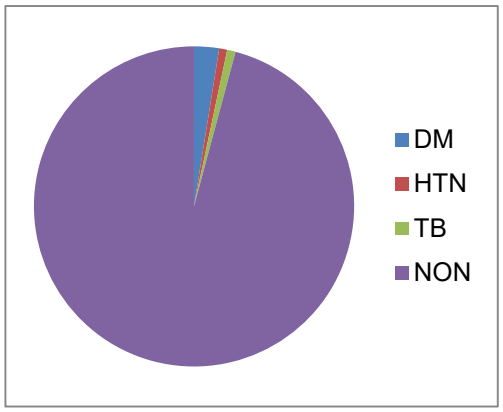


Fig. 1: Region of patients

Co-morbidity of patients

A total of 5 patients from 120 had co-morbidities with Diabetic Mellitus (DM) 2% (n=3) followed by hypertension 1% (n=1), Tuberculosis 1% (n=1) and 115 (96%) had no co-morbidity. Fungal infections are an opportunistic infection; decreased immunity caused by co-morbid diseases has the chance to grow fungal infection. Co-morbidity of patients showed in Figure 2.

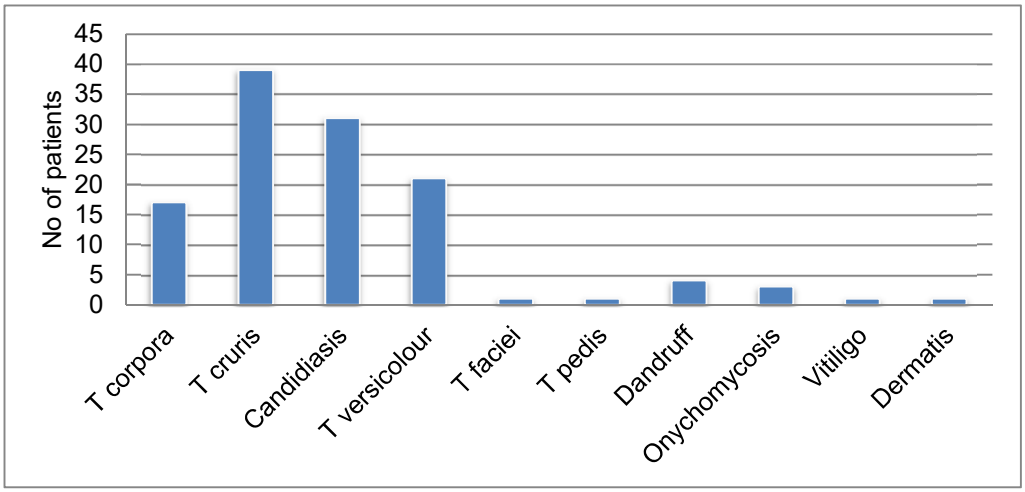
Fig. 2: Co-morbidity of patients



Antifungal agents use in diseases

Patients having fungal infections as *tinea corpora* 14% (n=17), *candidiasis* 26% (n=31), *tinea versicolor* 17% (n=21), *tinea faciei* 1% (n=1), *tinea pedis* 1% (n=1), *dandruff* 3% (n=4), *onchomycosis* 3% (n=3), *dermatis* 1% (n=1) and *vitiligo* 1% (n=1) showed in Figure 3. Prevalence of *tinea cruris* was frequently observed 32% (n=39). *Tinea cruris* is commonly present in male patients shown in our study. The study of Sheikh Munir *et al* showed that *trichophyton rubrumas* the common fungal infection.[2]

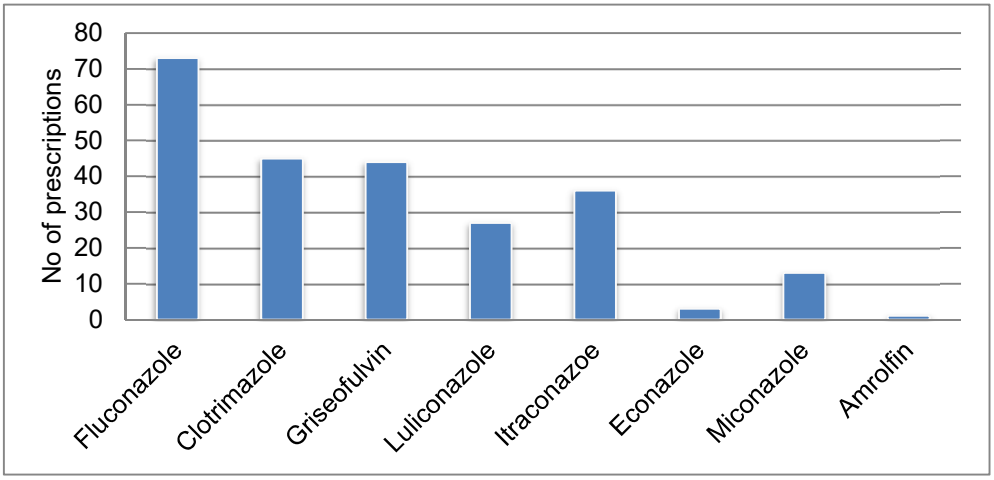
Fig. 3: Antifungal agents used in diseases



Antifungal agents used in prescriptions

In our study, antifungal agents were prescribed as Fluconazole (FLZ) 30% (n=73), followed by clotrimazole 19% (n= 45), griseofulvin 18% (n=44), Itraconazole (ITZ) 15% (n=36) luliconazole 11% (n=27), Miconazole (MCZ) 5% (n=13), Econazole (ECZ) 1% (n=3), amorolfine 1% (n=1) showed in Figure 4. The commonly used antifungal agents were fluconazole. The fluconazole may be used commonly due to available in hospital pharmacy and cost-effective due to once in week use. The prevalence of fluconazole was more, also showed in the study conducted by Katja de With *et al.*[8] Figure 4 showed antifungal agents used in prescriptions.

Fig. 4: Antifungal agents used in prescriptions



Treatment pattern of antifungal agents

Total 242 numbers of agents were prescribed in a study. Maximum antifungal agents prescribed by oral route 58% (139) and less with topical 42% (102). Out of 120 prescriptions, single oral therapy was found in 24 prescriptions, topical therapy in 18 prescriptions and combination therapy (oral+topical) in 78 prescriptions. The treatment pattern of antifungal agents was shown in Table 2. The combination therapy of oral fluconazole and topical clotrimazole were commonly used. The combination therapy of oral and topical is more effective than single therapy of oral or topical. The average number of antifungal agents per prescription was found to be 2.01. Vegada BN *et al* study shows that the average number of antifungal agents was found 2.08, and combination therapy of oral fluconazole and topical therapy of clotrimazole were highly used.[1]

Table 2: Treatment pattern of antifungal agents.

Sr. No	Antifungal treatment	Number of prescriptions
	Combination therapy	(78)
1.	(Oral+Topical)	78
	Monotherapy	(42)
1.	Topical	18
2.	Oral	24
	Topical antifungal agents	(102)
1.	Fluconazole	6
2.	Clotrimazole	45
3.	Luliconazole	26
4.	Itraconazole	8
5.	Econazole	3
6.	Miconazole	13
7.	Amorolfine	1
	Oral Antifungal agents	(139)
1.	Fluconazole	67
2.	Griseofulvin	44
3.	Itraconazole	28

Drug therapy distribution

The antifungal agents were distributed in a study as monotherapy 29% (n=35), dual-drug therapy 47% (n=56), triple-drug therapy 18% (n=22) and multiple-drug therapy 6% (n=7). The maximum number of patients underwent dual-drug therapy.

In monotherapy, fluconazole was highest prescribed drug 54% (n=19) showed in Figure 5. In dual combination therapy, the combination of fluconazole+clotrimazole was the highest prescribed 57% (n=32) showed in Figure 6. In triple drug therapy, highest used of griseofulvin+itraconazole+luliconazole 45% (n=10) combination of drug showed in Figure 7. Commonly antifungal agents used by multiple drug therapy were fluconazole+clotrimazole+griseofulvin+luliconazole 72% (n=5) showed in Figure 8.

Fig. 5: Monotherapy (FLZ-fluconazole, CLZ-clotrimazole, GRF-griseofulvin, LLIZ-luliconazole, ITZ- itraconazole, ECZ – Econazole, MCZ- miconazole,)

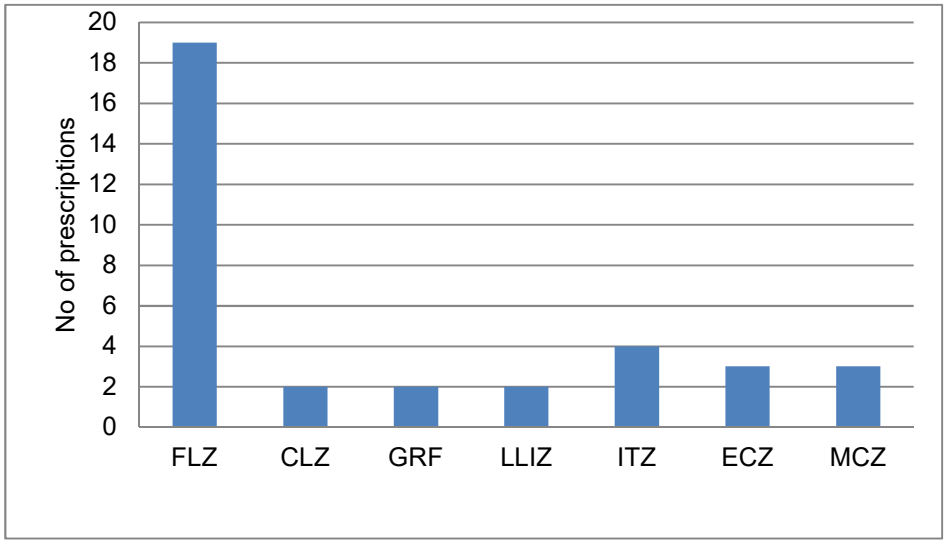


Fig. 6: Dual Drug therapy (FLZ-fluconazole, CLZ-clotrimazole, GRF-griseofulvin, LLIZ-luliconazole, ITZ- itraconazole, ECZ – Econazole, MCZ- miconazole, AMF - Amrolfine)

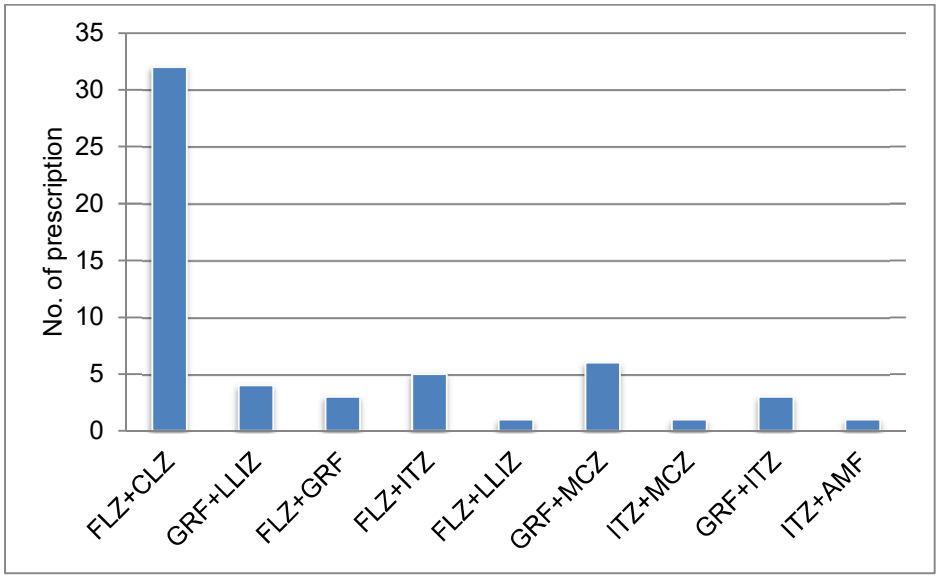


Figure 7: Triple-drug therapy (FLZ-fluconazole, CLZ-clotrimazole, GRF-griseofulvin, LLIZ-luliconazole, ITZ- itraconazole, MCZ- miconazole,)

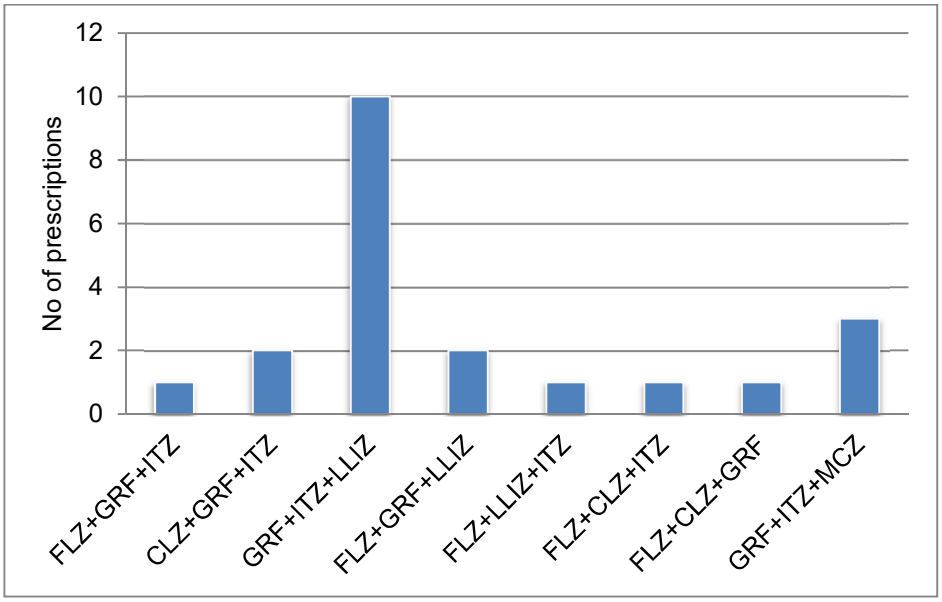
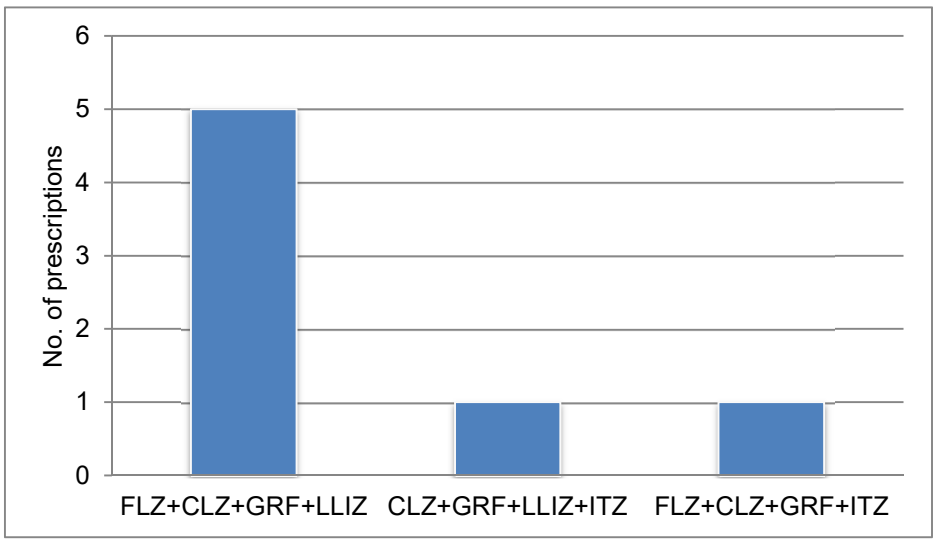


Figure 8: Multiple drug therapy (FLZ-fluconazole, CLZ-clotrimazole, GRF-griseofulvin, LLIZ- luliconazole, ITZ- itraconazole, MCZ- miconazole,)



Drug-drug interactions

Prescriptions were subjected to drug interactions. Out of a total of 120 patients, drug interactions were found in prescriptions 32% (n=38) which had at least 1 interaction and remaining 68% (n=82) not have any interaction. A 58 number of drug interactions counted from these 38 prescriptions. The average number of drug interaction per prescription was found to be 1.5± 1.01 [mean ± Standard Deviation (SD)]. The most frequent prescription was found minor interaction 50% (n=29), moderate interaction 19% (n=11), serious interaction 31% (n=18). Drug-drug interactions were assessed from Medscape. Detail distribution of drug-drug reactions showed in Table 3.

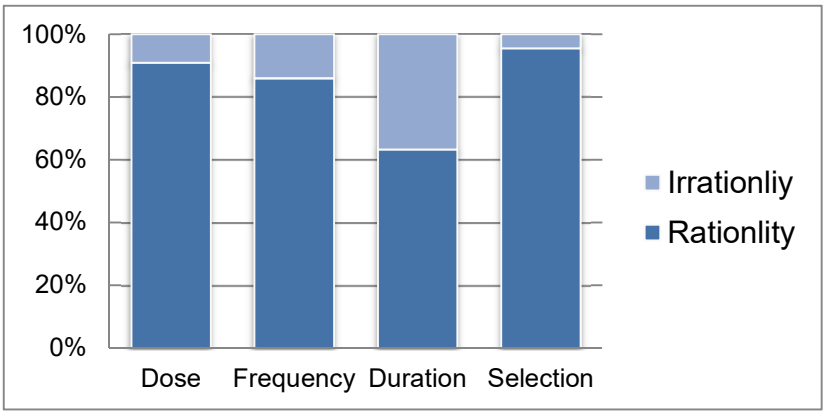
Table 3: Drug-drug interactions.

Sr. No	Type	No. of Interactions	Interactions
1.	Serious	7	Itraconazole+Calcium carbonate
		5	Itraconazole+Ranitidine
		6	Itraconazole+Fluconazole
2.	Moderate	9	Fluconazole+Diclofenac
		1	Fluconazole+Atorvastatine
		1	Fluconazole+Glimipiride
3.	Minor	1	Fluconazole+Amlodipine
		21	Griseofulvin+Itraconazole
		7	Itraconazole+Diclofenac
		Total - 58	

Rational use of drugs

The rationality of antifungal agents was assessed from NFI 2011 and Standard treatment protocol, Government of Maharashtra. Rationality was assessed by dose, selection, frequency, and duration. From data, the rationality as the appropriateness of treatment was found to be 84% and irrational 16%. Rational use of a drug by dose was 91%, frequency 86% selection 95% and duration 63% showed in Figure 9.

Figure 9: Rational use of drugs



CONCLUSION

The results of the present study reveal that fungal infections are more prevalent in male patients in the age group 13-18 years at the urban site. Patient of fungal infections was mostly co-morbid with DM. The greater prevalence rate of tinea cruris has occurred in the study. Overall the fluconazole was most often prescribed in fungal infection by oral route and clotrimazole by topical route. Also, fluconazole most frequently prescribed with clotrimazole in dual-drug therapy. The most interactions found were minor interaction followed by serious interaction in prescriptions. The rational use of the antifungal drug was observed.

ABBRIVATIONS

DM: Diabetic malitus

NFI: National formulary India

FLZ: Fluconazole

CLZ: Clotrimazole

GRF: Griseofulvin

LLIZ: Luliconazole

ITZ: Itraconazole

MCZ: Miconazole

AMF: Amrolfine

ECZ: Econazole

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