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Prospective Observational Study on Prescribing Pattern of Antifungal Drugs among the 400 Out-patients in Department of Dermatology in a Tertiary Care Hospital

Rashmeen Naaz[1], Shricharith Shetty[2], Sharad Chand[1], Nandakumar UP[1], Vinay BC[1] and Bharath Raj KC[1]*

[1]Department of pharmacy practice, Nitte Gulabi Shetty Memorial Institute of Pharmaceutical Sciences, Nitte (Deemed to be University), Mangaluru, Karnataka - 575018, India.
[2]Department of Dermatology and Venerology, Justice K.S. Hegde Medical Acadamy and Hospital, Nitte (Deemed to be University), Mangaluru, Karnataka - 575018, India.
*Corresponding Author E-mail: bharathraj@nitte.edu.in

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Fungal infections have been a serious disease over a few decades. Superficial fungal infections not only cause life-threatening illnesses but slowly reduce the Quality of life of patients. To study the prescribing pattern of antifungal drugs, distribution of fungal disease, and cost variability between different antifungal drugs prescribed. Prospective observational study was carried out at Justice K.S. Hegde Charitable Hospital from August 2018 to April 2019. Outpatient departments patients satisfying the inclusion criteria were included in the study. Factors like age, gender, diagnosis, and type of prescribed antifungal drugs along with Price variability among different brands of the drug were considered. Antifungal drug prescriptions of patients were analyzed. More than 50% of the patients were from age 21-40 yrs. Males (51.8%) were more than females (48%). The majority of the drugs prescribed were topically (64%). Tinea corporis was the most prevalent fungal disease. The Azoles group of Antifungal was most prescribed. And the percentage variability between different brands was high. The study concluded the extensive use of antifungal agents. The highly prescribed drug was found to be luliconazole. The study also concluded that the use of generic prescriptions might reduce the cost of illness and enhance the rational use of the drug.

Keywords: Prescribing pattern; Antifungal; Superficial infection; Price variability.

Skin is the most sensitive as well as the outermost layer of the human body; hence it is having direct contact with all the trigger factors that cause a variety of infections and diseases. Some of the factors that lead to skin diseases mainly indeveloping countries like India include Ignorance, Low hygiene, Improper sanitization, Drastic climatic change, Overcrowding[1]. For several decades superficial fungal infections have been a serious disease to the patients. Appropriate use of antifungal drugs is very important to treat the patient as well as their complications. Irrational prescribing and also inappropriate use of these drugs may lead to some adverse effects, some

persistent infections, unwanted medicinal exposure and also may lead to an increase in the treatment cost. That is why it is very much important to analyze the rationality of the prescription pattern of the drugs[2]. The earliest known fungal infections which are most common throughout the world are Tineacorporis also known as ring worm and Tineacruris also known as jockitch. However, these Tinea corporis and Tinea cruris may not cause mortality but, it is a very big cause for morbidity and also possesses a major health problem or condition[3]. Mostly all the tinea infection is treated with antifungal agents. Large varieties of systemic as well as topical antifungal agents are available in the market. Some newer antifungal agents are flooding into the market in current days e.g.,eberconazole and posaconazole[4]. Prescribing of the brand drug is very common amongst most of the dermatology department outside clinics as well as in hospital settings[5-8]. Expensive brand drugs increase the financial burden for the patients because the majority of the fungal infections are chronic and they require long term treatment regimens[9]. Hence this study aims to evaluate the prescription pattern, distribution of fungal disease & its comorbidities and price variability of antifungal drugs.

MATERIALS AND METHODS

A prospective observational study was carried out in an outpatient of the dermatology department of Justice K.S. Hegde Charitable Hospital. And the calculated sample size was approximately 400 samples by using formula at a 95% confidence interval with 5% of precision and 12% of anticipated precision. The duration of the study was eight months. Patients of either gender above eighteen years of age visiting the dermatology department knowing at least English or Kannada or Malayalam were included in the study. Before starting the study ethical approval was obtained from the institutional ethics committee (REF: NGSMIPS/IEC/17/2018-19). And patient informed consent was obtained voluntarily. Data collection was done only after getting permission from the respected hospital authorities.

The prescription was reviewed, and necessary data were collected including the age, gender, diagnosis, dosage, frequency, route of administration, name of the drug, dosage form, and duration of treatment along with the cost of the drug. Drugs with only one brand available were excluded, where as the cost per tablet of a particular drug of various dosage forms and strengths, manufactured by different companies were compared. Cost differences between the minimum and maximum costs of similar drugs were calculated. Percentage price variation for all brands of Antifungal drugs was calculated by using the formula:

$$\text{Percentage variation} = \frac{\text{Price of Maximum brand} - \text{Price of Minimum brand}}{\text{Minimum brand}} \times 100$$

Data were analyzed using descriptive statistics. The frequency with percentage was used to summarize the demographics of the patient, indications, prescribing pattern of Antifungal drugs, and route of administration. Analysis of the data was carried out by using Statistical Package for Social Science (SPSS) 20.0 for windows.

RESULTS

Gender and age-wise distribution

Four hundred patients were enrolled in the study, out of which 207(51.8%) were males and 193 were females (48.3%). The majority of the patients belong to the age group were 21 to 40 years (55%). Age-wise distribution of the patients is given in table 1.

Distribution of prescribed antifungal drugs

Out of 400 prescriptions taken in the study, it was found that total of about eight antifungal drugs was prescribed: Ketoconazole (30%), Miconazole (13.5%), Luliconazole (33.8%), Fluconazole (12%) Itraconazole (24.8%), Eberconazole (0.8%), Terbinafine (28.1%), and Clotrimazole (15%).

Route of administration

In this study of 400 prescriptions of antifungal drugs, it has been noticed that (36%) drugs were prescribed orally, and 64% were prescribed topically.

Analysis of topical antifungal drugs

Here in this study, it was found that Ketoconazole (30%), luliconazole (33.8%), Miconazole (13.5%), Eberconazole (0.8%),

Clotrimazole (15%) were topically prescribed antifungal drugs.

Analysis of oral and topical antifungal agents

In the study here, Fluconazole (12%), Itraconazole (24.8%), Terbinafine (28%) were the three different drugs given orally as well as topically.

Distribution of the total number of prescribed antifungal drugs per patients

In this study of 400 prescriptions, 200 patients that is 101 males and 99 females, received a prescription was only one antifungal drug was prescribed and 172 patients were 90 males and 82 females received prescription were two antifungal drugs were prescribed. Then 26 patients received prescription was three antifungal drugs was prescribed out of which 15 were male and 11 were females. Two patients received a prescription were four antifungal were prescribed that is one male and one female.

Table 2. Fungal infections – single lesions

Diagnosis	Frequency (n)	Percentage (%)
Sebborhoic Capititis	7	1.8
Tineacorporis	132	33
Tineacruris	103	25.8
Candidiasis	12	3
PityriasisVersicolor	39	9.8
PityriasisRoscea	4	1
Tinea incognito	1	0.3
Tineafacei	8	2
Tineapedis	12	3
Onychomycosis	5	1.3

Distribution of antifungal drug groups

From the study,we have found that prescribed antifungal drugs belonging to three different groups and shown in figure 1.

Distribution of fungal infections – single lesions

Different types of Single lesion fungal infection found in this study where tinea corporis and tinea cruris are in the highest frequency and are as shown in table 2.

Distribution of different types of tinea observed in prescription

In this study of out 400 prescriptions, it has been found that there are different types of tinea: namely Tinea incognito (0.3%), Tineapedis (3%), Tineafacei (2%), Tineacorporis (33%), and

Table 1. Age wise distribution

Age	Frequency(n)	Percentage (%)
18 – 20 yrs	66	16.8
21 – 40 yrs	221	55
41 – 60 yrs	91	22.8
61 – 80 yrs	21	5.3
+>81 yrs	1	0.3

Table 3. Distribution of co prescribed antihistaminics

Antihistamines	Frequency (n)	Percentage (%)
Hydroxizine	40	10.0
CPM	19	4.8
Levocetirizine	149	37.3
Desloratidine	29	7.3
Fexofenadine	11	2.8

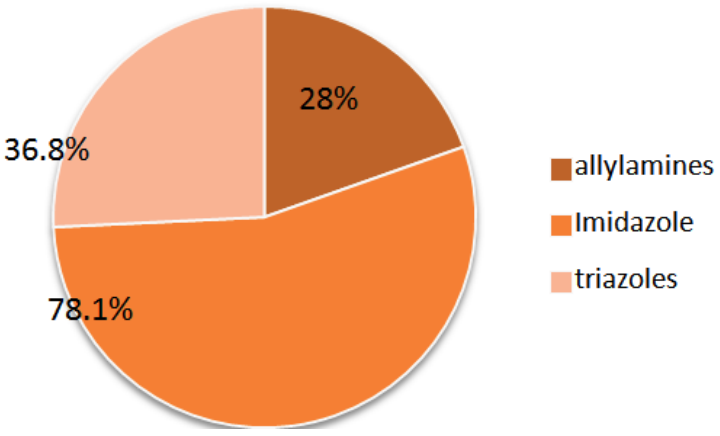

Fig. 1. Different groups of antifungal drugs

Tineacruris (25.8%). Out of all these tinea corporis followed by tinea cruris was the most found fungal infections.

Distribution of co-prescribed antihistamines with antifungals

It was found that levocetirizine, followed by hydroxyzine, was the most commonly prescribed antihistaminics. Details are shown in table no 3.

Types of topical formulation

There are different types of topical formulation found in this prescription study. For example, creams/ ointments, shampoos, lotions, sunscreen, moisturizer/ emollient, face wash, powders, soap, mouth paint etc. It has been found that creams and ointments are prescribed in maximum (69.8%), followed by lotions (19.3%) the details are referenced in table no 4.

Table 4. Types of Topical Formulations

Types of formulation	One formulation per patients		Two formulations per patients	
	Frequency	Percentage	Frequency	Percentage
Creams/Oint	279	69.8	4	1.0
Shampoo	55	13.8		
Lotion	77	19.3	2	.5
Sunscreen	22	5.5		
Moist/Emmolt	27	6.8		
Facewash	25	6.3		
Powder	16	4.0		
Soap	17	4.3		
Mouthpaint	7	1.8		

Table 5. Price variability study

Drug	Dose	Brand prescribed	Maximum price	Minimum price	Percentage variability
clotrimazole	20 gm	2	115	93.5	22.99
	50 mg	3	210	79.36	164.66
	10 gm	1	45.78		
	100 gm	2	115	111.7	2.95
	50 gm	1	152.88		
Eberconazole	20 gm	1	194		
	15 gm	1	158		
Itraconazole	200 gm	3	200	98	104.08
	100 mg	4	325	98	231.63
Miconazole	30 gm	1	140		
	20 gm	1	78		
	15 gm	1	83.7		
Ketoconazole	20mg	10	310	85	264.70
luliconazole	20 gm	2	299	258	15.99
	50 gm	1	545		
	10 gm	1	111		
	30 gm	1	358		
Terbinafine	250 mg	4	330	140	135.71
	15 gm	2	122	78	56.41
	10gm	2	83.75	81.5	2.76
Fluconazole	150 mg	2	12.4	9.9	25.25
	100 mg	1	105.83		
	200 mg	1	12.5		
	400 mg	1	23		

Price variability study

In this study, ketoconazole shows maximum price variation (264.70%) followed by itraconazole (231.63%), and the least price variation is seen in terbinafine. The complete detail is explained in table 5.

DISCUSSION

Medicine prescribing has a pivotal role in the health care system. Time to time evaluation of prescription is also very much important for proper drug utilization and proper patient compliance. In this study, the usage pattern of antifungals was observed, and the results found that the majority of the antifungal drugs were prescribed topically (64%) than orally (36%). The reason behind this is topical drugs have the least side effects and also easy application. Generic prescription is considered as the most rational and economical method of prescribing[7]. But here, the branded drug dominated the prescription. It has been found that 55% of the patient's age group falls in 21-40 years, and the males were more compared to females, which is similar to results of Rohini et al. where they had more than 50% of patients in the age group 21-40 yrs[10, 11]. After topical luliconazole, ketoconazole was the second most prescribed antifungal drug (30%). This was contradictory to a study conducted by Minocha et al., Sultana et al., and Khalid et al. where they reported the terbinafine and clotrimazole, fluconazole and terbinafine and fluconazole and nystatin as most commonly used antifungal drugs respectively[12-14].

Here in this study, tinea corporis (33%) followed by tinea cruris was the most commonly diagnosed fungal function. The other diagnosis such as intertrigo, pityriasis Versicolor, candidiasis, tinea pedis, tinea facei and many morediagnosis were comparatively less observed in the study. Its results are inaccordance with another study which was conducted by Yogesh et al. in Nepal[15]. Azoles group of antifungal drugs (imidazole 78.1% and triazole 36.8% respectively) dominated the prescription and there was also the prescription of allylamines in the study (28.1%). The study showed that the cost of the prescription was found to be high because of the prescription of branded drugs and percentage variability of the cost of the drug was also high. Percentage variability seen in ketoconazole is 264.70 %, followed by Itraconazole 231.63% which is in accordance with other studies conducted by Sumana et al., Saleem et al., Anuj et al., and Suhaina et al[1, 3, 16, 17].

CONCLUSION

The study focused mainly on antifungal drug prescribing patterns in the outpatient department of dermatology. The study also showed that the use of newer antifungal drug prescription is highly increasing. The most commonly prescribed antifungal drug here was found to be Luliconazole which is a newer Azole antifungal agent used topically. The use of generic prescriptions must be initiated using some medical education programs so that there will be some reduction in the cost of prescription and also makes the prescription pattern more rational and economical.

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Conflict of interest

Authors declare no conflict of interest.

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