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## A Study on Prevalence and Drug Utilization Pattern of Antifungal Drugs for Dermatophytosis in a Tertiary Care Hospital



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### ABSTRACT

Dermatophytosis, commonly known as ringworm, is caused by filamentous fungi called dermatophytes. It has contagious properties that can be transmitted from person to person and even from animal to human. Dermatophyte infections are widespread throughout the world. Treatment of dermatophytosis involves primarily oral and/or topical formulation of antifungal drugs. The main objectives of this study were to estimate the prevalence of dermatophytosis and to assess the drug utilization pattern of antifungal drugs in the treatment of dermatophytosis. A prospective observational study was conducted after obtaining ethics committee approval in a tertiary care teaching hospital. The study was conducted on 260 patients after fulfilling the inclusion and exclusion criteria over 5 months. Study was assessed and evaluated using appropriate statistical methods. Among the 260 patients involved in the study, there were more men (53.46%) than women (46.54%). High occurrence of infection was observed in the age group of 13–20 years (24.23%) followed by the age group of 31–40 years (21.92%). In the clinical distribution of dermatophytosis, tinea corporis (53.88%) was the most common infection. The average number of antifungals prescribed per prescription was 1.95. Itraconazole (42.97%) was the most commonly prescribed oral antifungal followed by terbinafine (29.30%). The highly prescribed topical antifungal was Luliconazole (23.72%) followed by clotrimazole (21.34%). The prevalence of dermatophytosis can vary from country to country or even within the same country. Of the prescribed systemic antifungals, itraconazole was the most prescribed and luliconazole was the most commonly prescribed topical antifungal.



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## INTRODUCTION:

Dermatophytosis is a superficial mycotic infection caused by a group of fungi called dermatophytes.<sup>[1]</sup> Dermatophytosis or tinea occurs on the skin of various parts of the human body, taking different names depending on the affected area, such as tinea pedis on the feet, tinea unguium on the nails, tinea capitis on the scalp, tinea cruris on the groin and tinea corporis on the body. The disease causes chronic morbidity with a high prevalence and distribution in the global population.<sup>[2]</sup>

Of the millions of fungal species on earth, there are about 100,000 species capable of causing disease in humans and animals, particularly in temperate and tropical countries.<sup>[3]</sup> Dermatophytes are a large group of pathogenic fungi that cause skin diseases worldwide. Dermatophytes are a specialized group of keratinous fungi capable of living on keratin-rich mammals, in soil, or human or animal tissues such as skin, hair, and nails.<sup>[4]</sup> About 40 different species, *Trichophyton species*, *Microsporum species* and *Epidermophyton species* are the most important genera.<sup>[3]</sup> Dermatophytosis or ringworm usually has variable clinical symptoms depending on the site of infection, the type of dermatophytes and the immune status of the host.<sup>[5]</sup> The characteristic features of ringworm in affected skin in humans are characterized by the presence of an annular plaque with a progressive, scaly rim and central relief. These symptoms may show varying degrees of scaling and inflammatory response, which may extend to scar tissue and alopecia. Therefore, inflammatory and erythematous symptoms are identified in many types of dermatophytosis infections. Other clinical symptoms, such as itching, atrophy, pain, scaling, blistering or plaster formation, and erythematous rates vary between mild and advanced degrees.<sup>[6]</sup> The stimulus for developing such clinical symptoms is primarily spread through the scaly layer of the skin by fungal metabolites and induces a host response.<sup>[5]</sup>

Treatment for dermatophyte infections includes systemic and topical antifungal medications. The use of oral antifungals may be practical when the condition is widespread or chronic, or when topical use is not possible. Various drugs are used for the topical treatment of dermatophytosis infection. The azole and allylamine groups are the most common classes of topical agents used in the treatment of dermatophytosis.<sup>[7]</sup>

Several studies have examined the prevalence of dermatophytosis in various parts of the world as well as in many regions of India. This study was designed to determine the prevalence and evaluate the pattern of antifungal drug use in the management of dermatophytosis in a tertiary care teaching hospital.

## **MATERIALS AND METHODS:**

### **Study Site:**

The study was conducted in the Dermatology outpatient department of Rajah Muthiah Medical College and Hospital located in Chidambaram, Cuddalore district.

### **Study Design:**

It was a prospective and observational study, prescriptions of 260 patients were used to study the prevalence and drug utilization pattern of antifungal drugs for dermatophytosis.

### **Study Period:**

The study was conducted over a period of 5 months from January 2021 to May 2021 after getting approval from the Institutional Human Ethics Committee (IHEC/727/2021).

### **Study Population:**

All the outpatients from the dermatology department who visited the hospital during the month (January 2021 – May 2021) were subjected to the study. The selection of patients was based on the following inclusion and exclusion criteria.

### **Inclusion Criteria:**

Patients of both gender of above 12 years of age who visited the dermatology department for the first time and were diagnosed with dermatophytosis.

### **Exclusion Criteria:**

- Patients below 12 years of age, pregnant and lactating women were excluded from our study.
- Patients who are not diagnosed with dermatophytosis.
- Patients who were not willing to give a written informed consent form.

**Data Collection:**

All the required data were collected from the patient’s prescription. Proforma was used for data collection which includes patient details such as name, age and gender, diagnosis, and medication information such as name of the drug, dose, frequency, route and duration of the treatment.

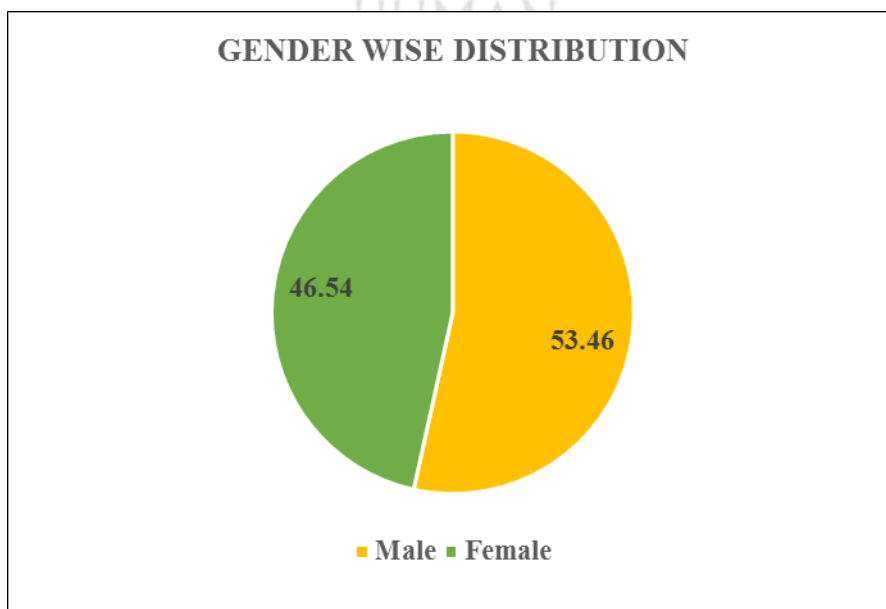
**Statistical analysis:**

Data collected from prescriptions were analyzed for demographic characteristics and patterns of drug use. All data were compiled using Microsoft Word and Excel and presented using tables and pie charts. Statistical tools and SPSS were used to compute the mean and standard deviation. The significance of the study results ( $<0.05$ ) was evaluated by using the chi-square test.

**RESULTS:**

A total number of 260 cases of dermatophytosis were enrolled in our study. All dermatophytosis cases were studied and results were taken.

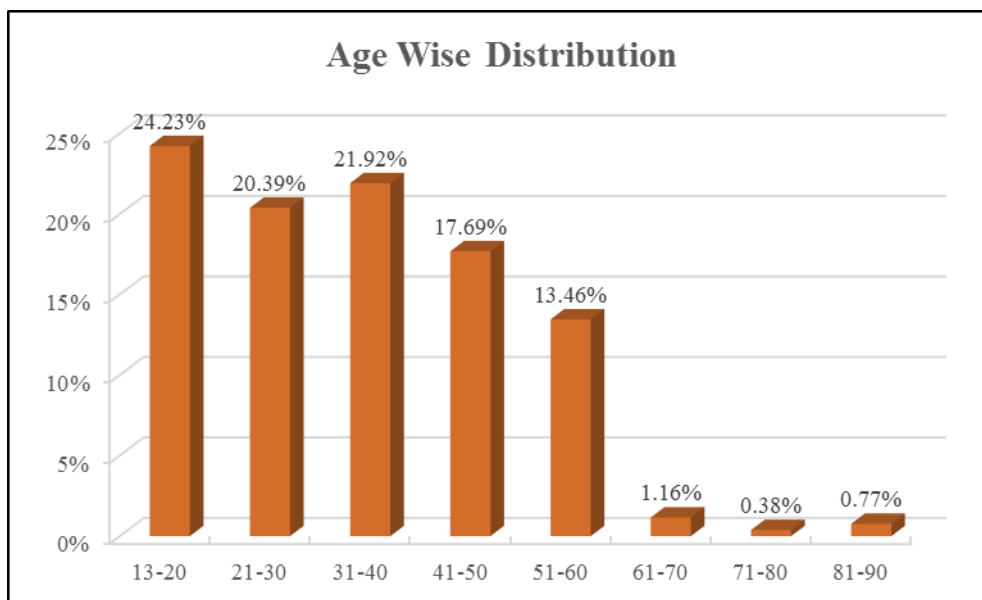
**GENDER WISE DISTRIBUTION**



**Figure 1: Gender wise distribution of patients**

Out of 260 clinically suspected cases of dermatophytes, gender wise distribution of patients showed that 53.46% (139 patients) were males and 46.54% (121 patients) were female. From our observation males (53.46%) were mostly affected by dermatophytosis than the females (46.54%).

#### AGE WISE DISTRIBUTION:



**Figure 2: Age wise distribution of patients**

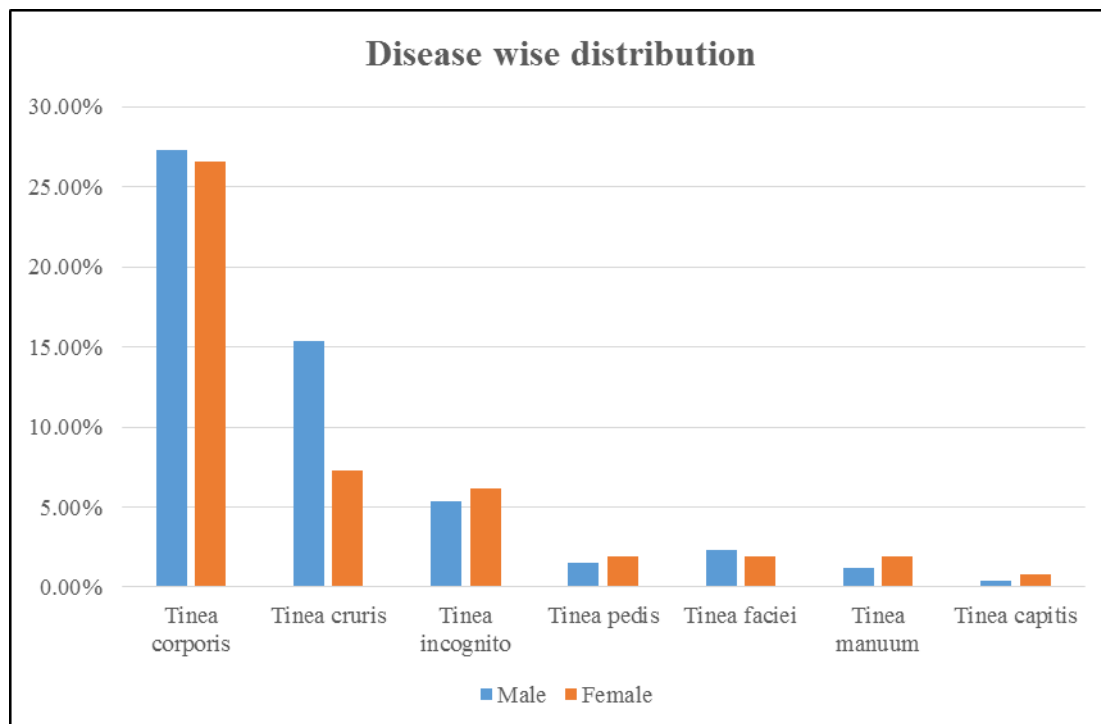
In this study, out of 260 patients, 24.23% (63 patients) were in the age group of 13-20 years, 20.39% (53 patients) were in the age group of 21-30 years and 21.92% (57 patients) belong to the age group 31-40 years, 17.69% (46 patients) were between 41-50 years, 13.46% (35 patients) were between 51-60 years, 1.16% (3 patients) were between 61-70 years, 0.38% (1 patient) aged between 71-80 and 0.77% (2 patients) aged between 81-90.

According to clinical manifestations concerning age, patients belonging to age group 13-20 years (24.23%) were most commonly infected with dermatophytosis followed by 31-40 years (21.92%).

#### DISTRIBUTION OF CLINICAL TYPES OF DERMATOPHYTOSIS

Among 260 cases of dermatophytosis, tinea corporis was more predominant in 140 (53.85%) patients followed by tinea cruris in 59 (22.69%) patients. Tinea incognito was seen in 30 (11.54%) patients, tinea faciei was observed in 11 (4.23%) patients, tinea pedis was seen in 9

(3.46%) patients and tinea manuum and tinea capitis were found in 8 (3.08%) and 3 (1.15%) patients respectively.

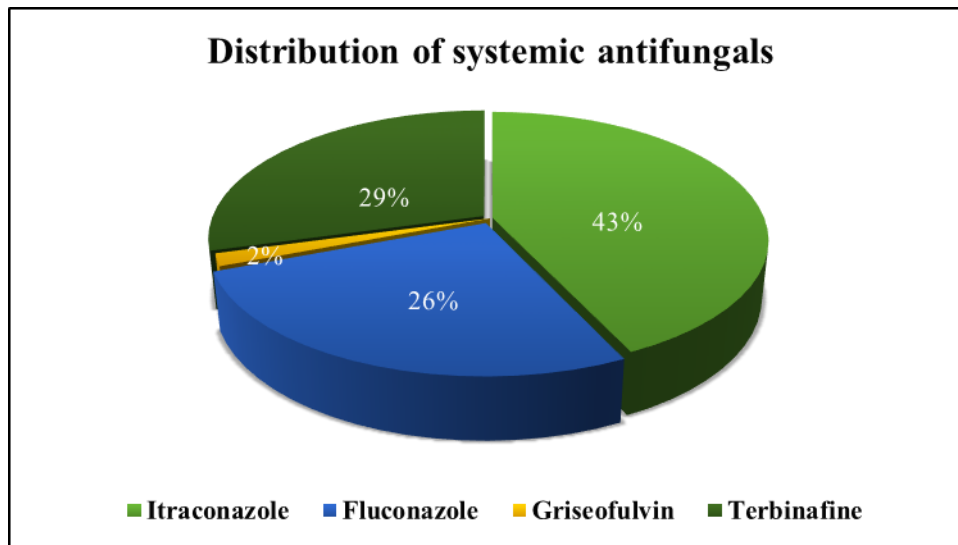


**Figure 3: Distribution of clinical types of dermatophytosis among the study participants**

According to the distribution of clinical types of dermatophytosis, tinea corporis (53.88%) was the most common clinical presentation followed by tinea cruris (22.69%).

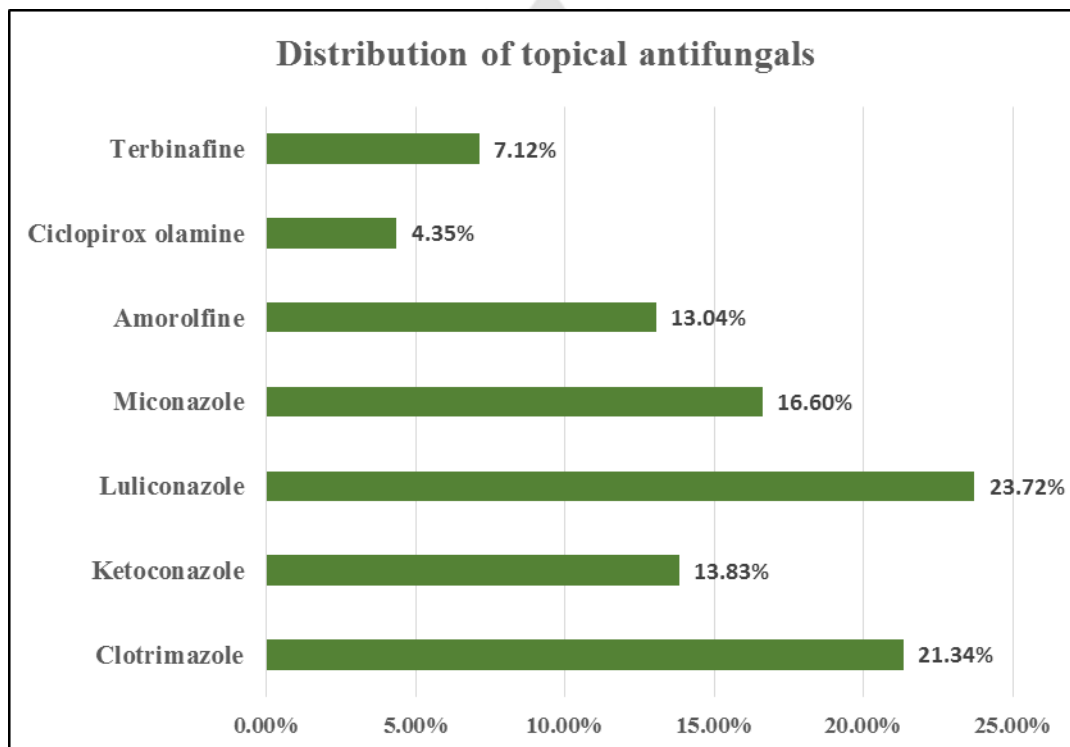
### ANALYSIS OF PRESCRIPTION

In this study, 260 patients have prescribed four different types of systemic antifungal drugs those include itraconazole, terbinafine, fluconazole, and griseofulvin. Each prescription contains either an oral/topical antifungal or both and other medications. A total of 509 antifungals were prescribed to 260 patients, out of which were 256 oral antifungals. The use of these drugs was observed among study participants. Out of 256 oral antifungals, 110 patients (42.97%) were prescribed with itraconazole, 67 patients (26.17%) were prescribed with fluconazole, 4 patients (1.56%) were prescribed with griseofulvin and 75 patients (29.30%) were prescribed with terbinafine for the treatment of dermatophytosis.



**Figure 4: distribution of systemic antifungals**

In this distribution of systemic antifungals, Itraconazole was the highly prescribed systemic antifungal for dermatophytosis of about 42.97% (110 patients) and griseofulvin was the least prescribed systemic antifungal of about 1.56% (4 patients).



**Figure 5: Distribution of topical antifungals**

Out of 260 patients, 60 patients (23.72%) were prescribed with luliconazole, 54 patients (21.34%) were prescribed with clotrimazole, 35 patients (13.83%) were prescribed with

ketoconazole, 42 patients (16.6%) were prescribed with miconazole, 33 patients (13.04%) were prescribed with amorolfine, 11 patients (4.35%) were prescribed with ciclopirox olamine and 18 patients (7.12%) were prescribed with terbinafine for the treatment for dermatophytosis.

Among the seven different types of topical antifungals, Luliconazole was the most prescribed topical antifungal for the treatment of dermatophytosis at about 23.72% (60 patients) followed by clotrimazole of about 21.34% (54 patients) and ciclopirox olamine was the least prescribed topical antifungal of about 4.35% (11 patients).

## **DISCUSSION:**

Dermatophytosis is generally considered to be a diverse epidemic worldwide and reflects the varied geographic distribution of the disease. Wet and warm conditions are the most encouraging factors for the development of dermatophytosis in tropical countries.<sup>[8]</sup> The prevalence of dermatophytosis can vary from country to country or even within the same country.

In this study, out of 260 patients, 139 (53.46%) were male and 121 (46.54%) were females, with male-female ratio being 1.1:1. Similar findings with male predominance were seen in the study conducted by George et al showed 51.35% males and 48.64% females (1.05:1).<sup>[9]</sup> The majority of the participants were males who engaged as active workers such as laborers, farmers, domestic workers, and also of low socioeconomic status. The high incidence of dermatophytosis in these patients may be due to sweating from strenuous outdoor activities, infected animals, soil, poor personal hygiene and lack of disease awareness, etc. Studies by Basak P et al also confirm these findings. The lower incidence among women is attributable to their ignorance of consulting doctors, especially among patients in rural areas.<sup>[10]</sup>

Every age group is susceptible to dermatophytosis; no age group is immune to the infection. In our study, maximum cases of dermatophytosis were seen in the age group of 13-20 years (24.23%) followed by 31-40 years (21.29%) and 21-30 years (20.39%). Most of the patients were between the ages of 13-40 years. This infection is common among young people irrespective of gender and is attributed to the work culture that adapts them to the climate. Also, personal hygiene and the nature of work are factors for dermatophytosis in adults. Similar findings have been noted in study done by Walke HR et al.<sup>[11]</sup>



Among all clinical presentations of dermatophytosis, tinea corporis (53.88%) was found to be the most prevalent, followed by tinea cruris (22.69%). This is following the findings of Santhosh Gadadavar et al, where the most common presentation was tinea corporis (41.6%) followed by tinea cruris (33.35%).<sup>[12]</sup> Other clinical distribution of dermatophytosis includes tinea incognito, tinea pedis, tinea faciei, tinea manuum and tinea capitis were found less common.<sup>[1]</sup>

Systemic antifungal agents such as terbinafine, ketoconazole, fluconazole, griseofulvin and itraconazole are active against dermatophytosis. Of these drugs, itraconazole and terbinafine are more commonly prescribed than fluconazole and griseofulvin.<sup>[13]</sup> In this study, Itraconazole (42.97%) was the highly prescribed systemic antifungal in the treatment of dermatophytosis followed by terbinafine (29.30%), which is in accordance with the findings of Bansal P et al.<sup>[14]</sup>

Topical antifungal agents offer a high concentration of the drug at the site of action and are therefore preferred to be used in conjunction with systemic antifungal medications.<sup>[13]</sup> In this study, Luliconazole (23.72%) was the most prescribed topical antifungal in the treatment of dermatophytosis. Similar findings were seen in a study conducted by Kaur M et al.<sup>[15]</sup>

## **CONCLUSION:**

Dermatophytosis is a common but significant superficial fungal infection that affects people of all ages. Many factors influence the incidence of dermatophytosis, such as age, gender, illiteracy, poor hygiene and socioeconomic status. In this study, we sought to understand the prevalence and drug use patterns of antifungals in dermatophytosis. Of these, tinea corporis dominates the clinical presentation of dermatophytosis. Itraconazole is the systemic antifungal medication that is prescribed the most frequently, and luliconazole is the most frequently prescribed topical antifungal.

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