

## Dermatophytosis

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### INTRODUCTION

Dermatophytosis is a chronic contagious disease caused by a class of pathogenic fungus called dermatophytes (Bitew 2018). It is also known as ringworm when the lesion takes the shape of a circle in which the center of the lesion is clear and surrounded by the inflammatory reaction. Tinea is an alternative name of dermatophytosis based on the affected body site, such as Tinea unguium where dermatophytes infected nail (Chang et al. 2022). Dermatophytosis is commonly cutaneous in nature and limited to the superficial layer of skin, nails and hair of human (Vishnu et al. 2015) due to the inability of the fungi to tolerate human body temperature (37°C), acidic properties of skin (pH 4.7) and the antifungal activity of blood proteins in immunocompetent individual (Martinez-Rossi et al. 2012; Al-Janabi 2014). Currently, dermatophytosis is a significant disease across the world with a public health issue in numerous countries mainly in third world countries (Nweze and Eke 2016). Several factors considered as risk factors for the occurrence of the dermatophytosis in developing countries, including crowding, low socio-economic position, insufficient health

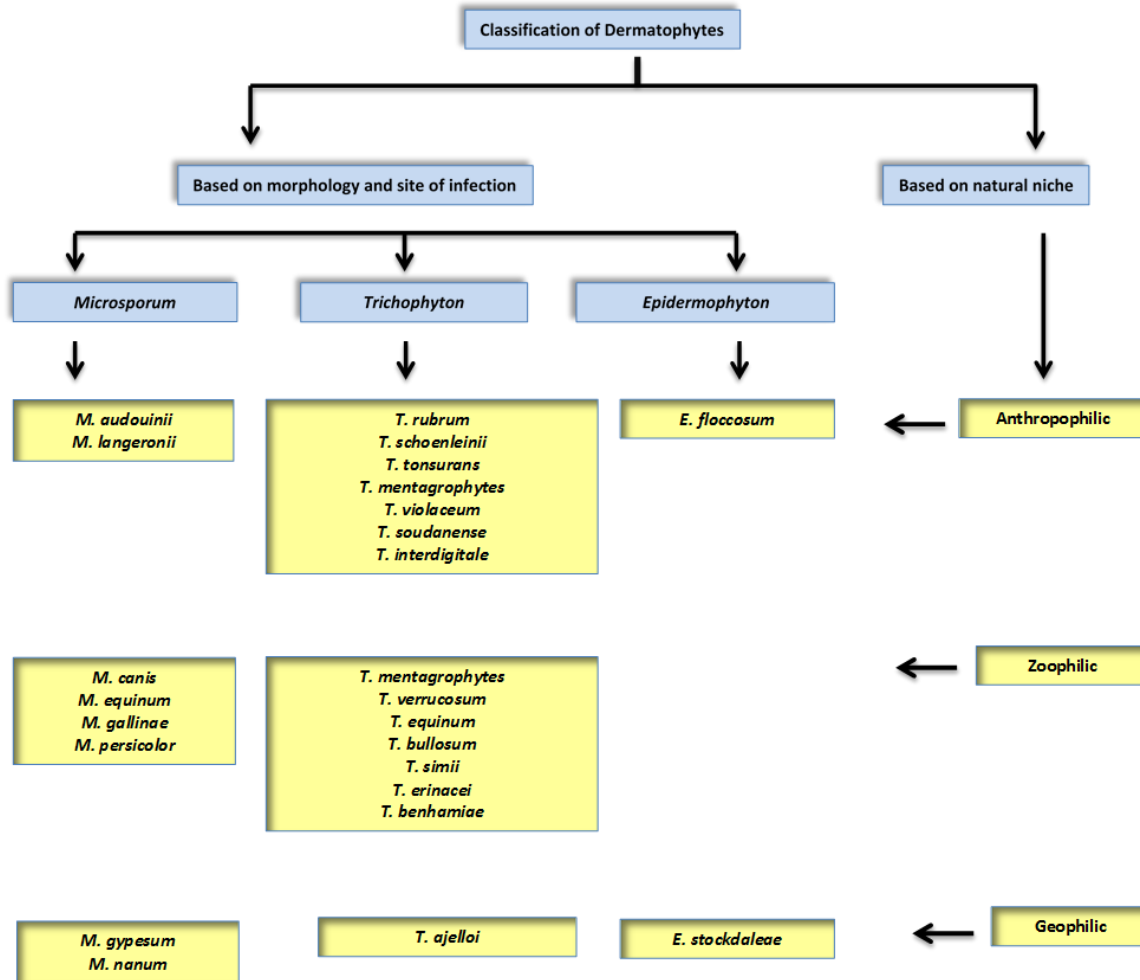
services, poor hygiene, and the exchange of footwear, clothing and barbershop supplies among people (Moto et al. 2015). Dermatophytosis can be caused by almost 40 species of fungus typically in the genera *Microsporum*, *Trichophyton* and *Epidermophyton*. It is transmitted directly through contact with infected humans or/and animals or indirectly via contact with fomites (Degreef 2008; McBain et al. 2016). The lesion of the dermatophytosis typically, is an itchy, erythematous, scaly, circular plaque on the skin (Mora-Montes and Lopes-Bezerra 2017). Clinical symptoms of dermatophyte infections may be mild to severe based on the virulence factors of the species, the immunological status of the host, the affected region, and the external environmental factors. These fungal infections are associated with high morbidity however, they are rarely related to a fatal consequence (White et al. 2008; Bitew 2018). Eventually, most cases of dermatophytosis require about 2-4 weeks to be treated and may take many months in cases of onychomycosis (nail infection) and tinea capitis (Hay 2018).

### Etiology

Dermatophytes are filamentous, keratinophilic fungi naturally found in soil (Zhan and Liu 2017). Dermatophytes species have the ability to produce different enzymes such as keratinases, adhesins, lipases, phosphatases, DNases, and non-specific proteases playing an essential role in attachment and invasion to the stratum corneum of skin (Martinez-Rossi et al. 2012).

In the past, dermatophytes were divided into three genera, namely *Trichophyton* (*T*), *Epidermophyton* (*E*), and *Microsporum* (*M*), however, with the new diagnostic tools, three new genera of the dermatophytes were discovered namely *Nannizzia*, *Lophophyton*, and *Arthroderma* (Begum et al. 2020). The *Trichophyton* and *Microsporum* species can cause infections in human and animals. Although, the only pathogenic species of the *Epidermophyton* genus recognized to cause dermatophytosis is a *E. floccosum*, which only infects human. The term "dermatophytoids" refers to species of the genera *Trichophyton*, *Microsporum* and *Epidermophyton* that live in soil and are rarely or never known to cause infection, for example *T. terrestre* (Distribution 2005).

On the other hand, the dermatophytes can divide into three groups based on their usual niche (Fig. 1). The first group is anthropophilic which is transmitted from one person to another by direct contact, i.e., *Microsporum langeronii* and *Trichophyton interdigitale*. Occasionally, some anthropophilic species cause ringworm infection in animals such as *Trichophyton rubrum* has been reported to cause an



**Fig. 1:** Classification of dermatophytes according to the morphological characteristics and usual habitat

infection in dog (Georg 1960; Simpanya 2000). The second group is zoophilic which is transmitted from animals to human or other animals such as *Microsporium canis* and *Trichophyton mentagrophytes* which generally affect dogs and cats. The last group is geophilic which as saprophytes living on the keratinous resources in soil, and transmitted to person through contaminated soil i.e., *Microsporium gypseum* (Mancianti et al. 2003).

### Epidemiology

Dermatophytosis, as a common superficial skin infection, is distributed around the world, with a higher prevalence in tropical and subtropical regions because of high temperature and humidity (Jartarkar et al. 2022). Nevertheless, it is commonly approved that between 20-25% of people worldwide are affected by dermatophytosis (Ameen 2010). The ascending of recalcitrant dermatophytosis might be associated with epidemiological change in pattern of growth of the pathogens resulting in enhancing persistence and the

evolution in the dermatophytes genotypes which is increasing their virulence as well as pathogenicity, and drug-resistant species dramatically have appeared due to the widespread use of inadequate dosages of potent antimycotic drugs (Agarwal et al. 2014; Jartarkar et al. 2022).

Over the past few year's studies concluded that the prevalence and spectrum of infection have increased simultaneously with changing of migration, tourism patterns, socioeconomic conditions, and interaction with animals. In addition, rare species have been isolated in different countries (Lakshmanan et al. 2015). For instance, endemic dermatophytes to Asia and Africa (*T. soudanense*, *T. violaceum*, *M. audouinii*) increased in occurrence in North America and Europe because of the migration. Furthermore, tinea pedis is most common in Northern Europe and Central America, and in contrast, *M. canis* or *T. verrucosum* (zoophilic dermatophytes) are more frequent in Europe and Arab countries. Moreover, the frequency of *M. canis* infection in Mediterranean countries have increased which causes tinea capitis in infants (Mora-Montes and Lopes-Bezerra 2017). In the developing countries few

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studies focused on the etiology of the dermatophytes infection as less data about epidemiological changes is available. Subsequently, findings from a specific location of a country cannot regard as a precise reflection of the total dermatophytosis of that country. It is challenging to make an accurate assessment of the dermatophytes prevalence in overall countries of the world (Ameen 2010).

### Predisposing Factors

The ability of dermatophyte species to produce different proteolytic enzymes (i.e., keratinases and mycelium) and the contagiousness of dermatophytosis which can spread through direct contact with animals and fomites are the major predisposing factors to cause infection (Stollery 2007). Some extrinsic factors can also relate to the high incidence of dermatophytosis, such as low socioeconomic status increases the risk of infection by these fungi compared to high socioeconomic status which is likely associated with poor hygiene and poor medical care. Superficial infection of human skin is stimulated by humid and high temperature in tropical and subtropical regions and are exaggerated by the sweating, wearing of occlusive clothing and footwear. The occurrence of infection is related to the type of geographical location i.e., infection is mostly developed in rural areas than in urban areas (Coulibaly et al. 2018). The prevalence of onychomycosis due to *T. rubrum* increased by chronic diseases or disorders as reported in chronic venous insufficiency and diabetic patients (Da Silva et al. 2014; Eba et al. 2016). The use of antibiotics, steroid drugs and advanced age, are also enhancing the skin infection. Moreover, there are evidences of a genetic or family susceptibility to dermatophytosis, as some of these peoples have autosomal recessive (caspase recruitment domain containing protein 9) CARD9 deficiency (Lanternier et al. 2013). According to a study, dermatophytes have the capacity to infect deep layers of skin and other adjacent organs, such as lymph node. The majority of these deeply infection cases has been reported in patients with human immunodeficiency virus syndrome (HIV) and patients who are taking immunosuppressive therapy. Eventually, with the same factors all individuals are not equally predisposed to infection (Da Silva et al. 2014).

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In humans, dermatophytosis is also referred as tinea or ringworm, and is named according to the sites of the body affected as shown in Table.1. For example, tinea manus and tinea pedis referred to the hands and feet infections, respectively (Warnock 2012). Additionally, infection can transmit from one site of the body to another, i.e., tinea capitis (scalp dermatophytosis) can transmit to facial region and causes tinea faciei (facial dermatophytosis) (Zhan and Liu 2017).

### Transmission

Dermatophytes are transmitted to the hosts through penetration in the injured skin, burns, and scars. Dermatophytes are abundant in different ecological niches and all three groups of dermatophytes can infect humans and produce dermatophytosis (Segal and Frenkel 2015). Zoophilic and anthropophilic groups are generally transmitted among hosts by conidia or arthrospores. It has been reported that some spores can survive in salt water for at least one year and in suitable environments for up to 1-2 years (Distribution 2005).

The zoophilic group are transferred from animal to people by direct contact with subclinically infected or sick animal, mostly pet animals (dog, cat). In sick animal, the shaft of the affected hair is fragile and hair fragments comprising arthrospores are powerful in increasing dermatophytes infection. Furthermore, non-infected pet animals can passively transmit arthrospores on their hair. Indirect transmission may arise by contaminated toys, brushes, and collars. Arthrospores are widely spread by dust particles, even in room without entering pet animal (Frymus et al. 2013). This type of skin disease is an occupational infection of Veterinarians, abattoir and tannery workers, farmers, and pet owners particularly the teenagers who care the infected cat and dog (Samanta 2015). Animal is commonly an asymptomatic carrier of dermatophytes because of the pathogen adaptation to the immune system of the host subsequently; zoophilic species cause severe inflammatory reactions. Most species are specific to only one host, like *T. verrucosum* to cattle, *M. canis* to cat, or *T. erinacei* to hedgehog (Gräser et al. 2018). As a result of improvement of hygiene, new lifestyle, and generalization of animals domestication, it is possible that, these pathogens will shift from zoophilic (*T. mentagrophytes*, *M. canis*) to anthropophilic species (*T. rubrum*, *T. tonsurans*, and *T. violaceum*), which are transmitted by unknown methods and cause mild infection in human (Zhan et al. 2015).

From human to human, the indirect transmission of dermatophytes such as *T. schoenleinii* via lost hair strands and desquamated skin cells is most common than the direct transmission. The transmission may happen through contaminated hats, combs, and hairbrushes. The transmission among family members may occurred horizontally between household members or vertically between the generations (from mother to grandchild). The vertical transmission of infection is much more common than the horizontal spread. *T. schoenleinii* can survive in homes for numerous generations without appropriate cleaning (Samanta 2015). It has been shown that shared wet surfaces (patios, balconies, showers, bathtubs) and shared tools may contribute to the transmission of dermatophytes among family member, as dermatophytes groups can persist on a variety of surfaces for up to 18 months (Jazdarehee et al. 2022). Other sources of infection are fitness studios, mats in sports facilities, public pools, hotels, and mosques (Tlougan et al. 2011; Yenişehirli et al. 2012; Watanabe et al. 2017).

**Table 1:** Clinical manifestations of dermatophytosis

Type of tinea	Sites of infection	Clinical features	Causative agents	References
Tinea capitis (scalp ringworm)	Scalp and hair shaft	Well demarcated or irregular alopecia and scaling. When affected hairs break a few millimeters from the scalp black dot alopecia is made. Follicular pustules with extensive purulent discharge, mainly when zoophilic species invade hair follicles deeply	<i>T. tonsurans</i> <i>M. ferrugineum</i> <i>T. violaceum</i> <i>T. soudanense</i> <i>M. canis</i> <i>M. audouinii</i>	(Havlickova et al. 2009; Fuller et al. 2014; Lova-Navarro et al. 2016)
Tinea faciei (Facial ringworm)	Glabrous (hair less) skin of the face	Erythematous, itchy, disc-shape, peripheral scaling lesions with healing of the foci in the center	<i>T. rubrum</i> , <i>T. mentagrophytes</i>	(Stollery 2007)
Tinea corporis (Body ringworm)	Glabrous skin of the arms, legs and trunk	Redness, scaly, erythematous papulosquamous lesions with central sparing and accentuated margins	<i>M. canis</i> <i>T. rubrum</i> <i>T. verrucosum</i> <i>T. tonsurans</i>	(Havlickova et al. 2009; Segal et al. 2013)
Tinea pedis (Foot ringworm, Athlete's Foot)	Foot	Interdigital form (most popular): peeling, maceration, erosion, fissures chiefly in the space between third and fourth digits. Squamous hyperkeratotic form: dry, diffuse scaling, and non-inflammatory keratosis of the entire foot sole	<i>T. interdigitale</i> <i>T. rubrum</i> <i>E. floccosum</i>	(Degreef 2008)
Tinea manus (Hand ringworm)	Dorsum, or palm, interdigital folds of one or both hands	On the palm, there is a fine, partially collarette-like scaling, which highlights lines of the palm. On the dorsum and fingers the lesion similar to tinea corporis with erythemato-squamous lesions	<i>T. rubrum</i>	(Stollery 2007)
Tinea unguium (Onychomycosis, nail infection)	Toe and finger nails	Small yellowish discoloration of the nail plate to complete crumbly decay of it	<i>T. tonsurans</i> <i>T. rubrum</i> <i>T. violaceum</i> <i>M. gypseum</i> <i>T. soudanense</i> <i>E. floccosum</i> <i>T. interdigitale</i>	(Degreef 2008; Havlickova et al. 2009)
Tinea barbae	Beard, mustache area and eyebrows of adult man	Erythema with superficial inflammation, scaling, and pustules quickly penetrates into the hair follicles deeply, creating soft, infiltrated, furunculoid nodules. The lesion is covered with follicular pustules	<i>T. verrucosum</i> <i>T. mentagrophytes</i>	(Tosti et al. 2015; Vazheva and Zisova 2021)
Tinea cruris (Groin ringworm, "jock itch")	Inguinal region, sub-mammary folds in fatty women	Itchy and enflamed rash in the inguinal area. It is frequently found in young men of tropical area. Axillary infection can be seen as an analogous tinea form in woman	<i>T. rubrum</i> <i>T. mentagrophytes</i> <i>E. floccosum</i>	(Stollery 2007; Degreef 2008; Havlickova et al. 2009)
Tinea Incognito	Face and intertriginous areas	Erythematous, well demarcated lesions with pustules and a squamous margin. It is modified case of dermatophytosis following the use of systemic or topical steroids	<i>M. gypseum</i> <i>T. rubrum</i>	(Jacobs et al. 2001; Yu et al. 2010; Dutta et al. 2017)
Tinea nigra	Palms, soles and elsewhere	A single brown to black non-scaling macule.	<i>T. rubrum</i>	(Degreef 2008)

### Incubation Period

Incubation period of disease ranges from one to two weeks in human (Distribution 2005).

### Diagnosis

The rapid and proper diagnosis of etiological agents and mode of infection is crucial for accurate treatment and inhibition of further spread (Rezaei-Matehkolaei et al. 2013). Diagnosis is made using the patient history, physical inspection, microscopic investigation of skin scrapings and hairs from the lesions, fungal culture, Wood's lamp examination, and histopathological inspection of the tissues (Distribution 2005; Tosti et al. 2015).

### Potassium Hydroxide (KOH) microscopy (Wet mount preparation)

The direct visualization of hyaline, septate, and branching hyphae under the light microscope is an essential method for the diagnosis of dermatophytes. Scrapings of kin should be obtained from the active border of the lesion, nail scrapings are usually taken from the subungual debris, and hairs sample should be pulled from the affected area without breakage. The hairs that are scaly, broken, and glow under a Wood's lamp are the ideal ones for collection (Distribution 2005). The small fragments of the specimen are placed on a clean microscope slide, a coverslip is placed, and heated to remove non-fungal materials as heating accelerates the maceration of the skin scale and makes it easier to see the

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hyphae among the keratinocytes. A few drops of 10- 20% KOH put to the edge of the coverslip (Ponka and Baddar 2014). The wet mount preparation is then inspected under a microscope. Hyphae rounding up into arthroconidia are diagnostic, but hyphae alone could be caused by other fungi, including contaminants. On the surface of the affected hairs shaft, arthroconidia can be visualized externally (ectothrix) or internally (endothrix) (Mohamed Shalaby et al., 2016).

### Fungal Culture

If Potassium Hydroxide microscopy does not provide adequate information, culture is the most reliable test for accurate diagnosis of dermatophyte species. Specimens for culture involve skin, hair, and nails. During identification of asymptomatic carriers, other methods such as, hair brushing, using adhesive tape for sample collection, or rubbing the lesion with a sterile toothbrush or moistened cotton swab may also be effective. Colonies develop in five days to four weeks, based on the pathogens (Distribution 2005).

Morphology of colony can differ with the medium. Sabouraud peptone-glucose agar (Emmons' modification) amended with cycloheximide and chloramphenicol is commonly used (Weitzman and Summerbell 1995). Species of dermatophyte can be distinguished by their colonial characteristics (the appearance of microconidia and macroconidia) on Sabouraud glucose agar, range of growth temperature, limited nutritional tests, cycloheximide resistance, and biochemical test such as urease production. Differential media as bromocresol purple-milk solids glucose and phytone yeast extract agar can be helpful during differentiation from negative result (Distribution 2005; Dowd, 2007; Vermout et al. 2008). Dermatophyte test medium (DTM) is another isolation medium containing a pH indicator-phenol red. After incubation at room temperature for 5-14 days, the color of the media turns from yellow to bright red when the dermatophytes utilize proteins resulting in ammonium ion release and an alkaline environment (Jartarkar et al. 2022).

### Wood's Lamp Examination (Ultraviolet light, Black light)

Wood's lamp examination may be useful in making the diagnosis of some dermatological disorders. In addition, it has lately been used as a diagnostic tool for certain skin cancers. Robert Willams Wood made Wood's lamp in 1903 and for the first time, it was used in dermatological practice for the finding of hair fungal infection (Gupta and Singhi 2004). Wood's lamp produces an invisible long-wave ultraviolet radiation which is named black light at the wavelength of 340-450 nm (Suraprasit et al. 2016). Dermatophytes that cause fluorescence mostly belongs to the *Microsporum* genus. For example, *M. audouinii*, *M. canis*, *M. ferrugineum*, and *M. distortum* shows blue-green

light, while, *M. gypseum* shows dull-yellow light (Gupta and Singhi 2004). A value of Wood's lamp is limited in detecting some dermatophytes like *T. rubrum*, *T. metagrophytes*, and *T. violaceum* in tinea capitis as they are non-fluorescent under wood's lamp. For that reason, the lack of fluorescence does not certainly eliminate tinea capitis as most *Trichophyton* members, are non-fluorescent with the exception of *T. schoenleinii*, which shows dull-blue light (Suraprasit et al. 2016). Some practical caution should be kept in mind to avoid misdiagnosis in use of a Wood's lamp. The lamp must perfectly be allowed to warm up for about one minute. The examination lab should be totally dark and the inspector should get dark adapted in order to see the contrast obviously. The light source should be 10 cm away from the lesion. Avoid washing the affected area or applying topical medicaments before exposing it for Wood's lamp examination as it may produce false negative results (Gupta and Singhi 2004).

### Histopathological Examination (Skin and nails biopsy)

Histopathological examination of the affected area is occasionally helpful, especially in onychomycosis. Microscopically, the species of dermatophyte cannot be detected. There is no distinctive histopathological lesion related to dermatophytes. The microscopical section reveals the degenerating and dead mycelium, cellular debris at the centre, and hyphae at the peripheral of the lesion. In *T. schoenleinii* infection, the concave, cup-shaped yellow crust (scutulum) is observed on the atrophic epidermis. The epidermis may appear unaffected to mildly hyperkeratotic with patchy parakeratosis. Spongiosis and microabscesses in the stratum corneum may be seen. A perivascular infiltration of inflammatory cells can be present in the upper dermis, depending on the infecting species. Branching, septate hyphae can be visualized best in the stratum corneum with a special stain such as periodic acid-Schiff (PAS) with diastase predigestion, Grocott methenamine silver and calcofluor white (CFW) stains (Jartarkar et al. 2022), Although, they may also be seen in Hematoxylin and Eosin stained preparations. The diagnostic sensitivity can be increased with biopsy which is not always possible to conduct especially in human patients suffering with diabetes (Samanta 2015).

### Molecular Biology

Molecular methods have been established to provide more fast and precise alternatives to pre-existing diagnostic methods due to overlapping phenotypic characteristics, variability, and pleomorphism (Li et al. 2008). According to a number of studies, the rate of dermatophytosis detection is increased by 10-19.5% when Polymer Chain Reaction (PCR) techniques were used instead of the fungal culture approach. However, the result of the PCR assays may differ

**Table 2:** Summary of systemic antifungals in dermatophytosis

Class	Active agents	Mechanism of action	Dose (adult)	Duration of use	Contraindications
Imidazole (Azoles)	Ketoconazole	Block lanosterol 14- $\alpha$ demethylase resulting in the inhibition of synthesis of ergosterol, and impairment of fungal cell membrane permeability	200-400 mg/day	3-6 weeks (Tinea capitis) 4 weeks (Tinea cruris) 4 weeks (Tinea pedis) 6 months (onychomycosis)	- Acute or chronic hepatic disorders - Adrenal insufficiency -Hypersensitivity reaction to ketoconazole
Triazoles (Azoles)	Fluconazole	Block lanosterol 14- $\alpha$ demethylase	150-450 mg/week	3-6 weeks (Tinea capitis) 2-4 weeks (Tinea cruris) 4-6 weeks (Tinea pedis) 3 months (fingernails) and 6 months (toenails) onychomycosis	- Severe liver disease - Use with caution in patients sensitive to other azoles
Triazoles (Azoles)	Itraconazole	Block lanosterol 14- $\alpha$ demethylase	200 mg/day	4-8 weeks (Tinea capitis) 1 weeks (Tinea cruris) 1 week (Tinea pedis) 1 week/months (onychomycosis)	Patient with congestive heart failure (CHF)
Allylamine	Terbinafine	Inhibiting the enzyme squalene monooxygenase which is involved in the synthesis of sterol in fungi. This inhibits fungal sterol biosynthesis by decreasing ergosterol levels	250 mg/day	3-4 weeks (Tinea capitis) 1 weeks (Tinea cruris) 2 weeks (Tinea pedis) 6-12 weeks (onychomycosis)	None
Benzofurane	Griseofulvin	Disruption of mitotic spindle and inhibition of fungal mitosis	500 mg/day	6-8 weeks (Tinea capitis) 2-4 weeks (Tinea cruris) 4 weeks (Tinea pedis) 6-9 months (fingernail) and 12-18 months (toenail) onychomycosis	Patients with porphyria or hepatocellular failure

The data from (Finkelstein et al. 1996; De Beule and Van Gestel 2001; Johnson and Kauffman 2003; Stollery 2007; Newland and Abdel-Rahman 2009; Pires et al. 2014; Fuller et al. 2014; Kaul et al. 2017; Hay 2018; Sonthalia et al. 2019; Jartarkar et al. 2022).

based on the origin of the clinical sample, sample preparation, selection of the target sequence, and laboratory conditions (Gordon et al. 2016). The rapid detection of etiological agents accurately in clinical cases relating to dermatophytosis occurred by employing specific primers, followed by interpretation of the results based on the amplicon size in agarose gel (Verrier and Monod 2016). Conventional PCR technique is a simple and low cost molecular technique for application. Real-time PCR-based methods expand the possibilities of multiple simultaneous species recognitions and limit the risk of contamination, whereas methods employing post-PCR techniques prolong the turnaround time and may increase the contamination risk (Jensen and Arendrup 2012).

## Treatment

Dermatophytosis is treated with different topical and systemic antifungal drugs (Gupta and Cooper 2008). Topical treatments are indicated for localized and mild dermatophytes infections while systemic drugs (Table 2) are recommended for more extensive (chronic) infections or where application of a topical drug is not possible. Combination of local and systemic treatments is preferred to

obtain a better clinical and mycological therapy. In addition, for preventing the appearance of drug resistance different group of antifungals can be used (Jartarkar et al. 2022). For the accurate treatment, asymptomatic dermatophytosis such as onychomycosis or tinea pedis should be considered specifically, individual with tinea capitis and tinea corporis should be closely inspected for possible infections or as carriers of an animal source such as those found on pets, in order to ensure that the optimal therapeutic measures are taken (Zhan et al. 2015). A wide variety of topical medications are available, in shampoo, lotion, gel, and cream formulations. A majority of the agents are of the 'azole' and 'allylamine' family. Families of these agents are known for their high efficacy against the dermatophyte infection. Topical drugs applied once or twice daily (Gupta and Cooper 2008). An ideal treatment should have a low cost, rapid onset of effect, low relapse rate, high cure rate, high anti-inflammatory action, minimal systemic absorption, minimal side effects, and safe to be used in lactation, pregnancy, renal and hepatic failure (Jartarkar et al. 2022).

## Conclusion

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Dermatophytosis is a frequent skin disease caused by keratinolytic fungi called dermatophytes. Causative agents responsible for dermatophytosis are generally classified into anthropophilic, zoophilic, and geophilic groups from the *Trichophyton*, *Epidermophyton*, and *Microsporum* genera. Recently, due to immigration from tropical areas, increased international tourism, and interaction with animals (particularly dog and cat) the frequency of dermatophytosis in humans has dramatically increased during the past 20 years. Additionally, taking immunosuppressive drugs is a predisposing factor that makes people more susceptible to developing dermatophytosis. The frequency and severity of each dermatophyte infections are variable in a particular region based on the host, pathogens, and environmental conditions. It is essential to note that due to the contagiousness of the dermatophyte infection, spreading can occur from person to person, from animal to human, even from one area to another within the same body of an infected person. The flaky, annular with central clearing appearance is a typical lesion in an immunocompetent individual; however, the lesions can be deep and extensive in immunocompromised person. In general, treatment of dermatophytosis requires long duration to acquire effective result. Various antifungal drugs are used in the treatment of dermatophytosis. However, the most vital factor for control of the infections is maintenance of appropriate hygienic conditions. Almost all varieties of dermatophytosis require at least 2-4 weeks to be treated, whereas onychomycosis and tinea capitis could take up to 6 months.

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