



Dermatophytosis: An Epidemiological Study in a Tertiary Care Center in Rural Sind

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aims and Objects: Dermatophytosis is a common infection worldwide, and a major public health issue. Hot, humid climates and overcrowding favor the spread of skin infection in general populations. The purpose of the study is to analyze the prevalence of disease in patients attending the outpatient department of dermatology PUMHS-W Nawabshah.

Methodology: The study type is cross-sectional, conducted at departments of Dermatology and Pathology, Peoples University of Medical and Health Sciences, Nawabshah, for 3 months, (June 1st, 2020 to August 31st, 2020) after written permission from ERC. A total of 93 cases were included.

Skin scraping, nail clippings, hair fragments, and scalp, samples were acquired from patients approaching the Outpatient department. Wood /s lamp examination was carried out in all patients. By using 20% potassium hydroxide (KOH) on a glass slide with the sample and passing over the

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flame 2-3 times. After confirmation, the samples were streaked on the sterilized Sabouraud dextrose agar medium containing antibiotic, Petri plates were incubated at 25-28 °C for two weeks, all cases were directed towards the microscopic examination, and results were entered into SPSS 20 analyzed and tabulated.

Results: Out of 93 suspects 84 (90.3%) samples were positive for fungal infection, and among them, 68 (73.1%) cases gave positive growth, Male predominance is noticed with 60%.Tinea corporis 45.6%is on the top of the list causing infection and T. unguium is the least common1.5%. The adult age group 20-40yrs were more affected followed by the middle-aged group.

Conclusion: Dermatophytosis is common in the younger and adult age group, but it is prevalent in our general population irrespective of age and gender.

Keywords: Dermatophytosis; scraping; clipping; Sabouraud; agar; T. corporis; streaked; ERC.

1. INTRODUCTION

Dermatophytosis is a universal concern with increasing prevalence in the developing world, especially tropical countries [1,2]. Dermatophytes are a group of fungi that infect keratinized tissues of humans and animals [2]. They produce keratinase enzymes that help the fungi to invade and digest keratin [3]. Superficial mycoses are the frequent forms of human infections frequent form of infection of skin, hair, and nails, affecting about 20–25% of the world's population [4]. The data recorded from the world shows great geographic variation in distribution, incidence, epidemiology, and target hosts. The key factors involved in these variations are geographic location, climate (temperature, humidity, wind), overcrowding, environmental hygiene, diverse culture, health care system, immigration, and socioeconomic conditions [4,5]. Studies reveal that in the developed world, the improved social, healthcare, economic, and hygiene practice factors, the dermatophytosis prevalence has significantly reducing [4,6].

Despite being a significant public health problem and a financial burden, data regarding the condition is scant from our population.

The current study was designed to ascertain the dermatophytosis prevalence and spectrum of fungal species in patients attending the tertiary care hospital in rural Sindh.

2. METHODOLOGY

The data was collected by non-probability, convenience sampling. After taking informed consent, a total of 93 patients aged up to 14 years, reporting to the dermatology department, following clinical presentation and physical examination, suspected cases were recruited in the study. Those below 14 years of age who were negative for hyphae/spores on direct

microscopy and that previously taken anti-fungal drugs were excluded. Samples were directly received from Out Patient Department/ dermatology department. Each specimen was collected under strict aseptic precautions. Standard protocol was followed while collecting the information. Nail, hair, skin, and scalp scrapings were taken with the help of sterile scalpel/blades and sent to the department of Pathology in autoclaved folded paper with proper labeling and subjected to microscopy and culture for fungal growth.

The confirmed clinical diagnosis following direct skin scraping microscopy revealed hyphae and spores in 20% potassium hydroxide. The nail clippings, hair frag, means, and scalp were also collected from patients with suspected fungal infections. All samples were attained from patients approaching Dermatology Outpatient's department. For the identification of fungal infection 20% potassium hydroxide (KOH) solution was used for the direct examination of samples for the presence of stained refractile fungal elements.

Once, the specimen was confirmed with the presence of fungal elements, the samples were streaked on the sterilized Sabouraud dextrose agar medium containing antibiotics. Petri plates were incubated at 25-28°C for two weeks at the Department of Pathology.

The whole-body body was examined for the presence of fungal infections/eruption. Woods lamp examination was carried out in all patients. Fluorescence is produced by fungus when using the Woods lamp. All numerical response variables, including age, were expressed as mean \pm Standard Deviation. All categorical variables including gender, clinical type, and culture results were presented as frequencies and percentages using SPSS 20.

2.1 KOH Mount (procedure)

The samples were treated with 20% (KOH) potassium hydroxide for 10-20 minutes, in case of skin and scalp scrapings in a microscopic slide and overnight for nail clippings /scrapings in test tubes and then transferred over to the glass slides for microscopic examination. The examination was done for fungal elements under low (10x) and high power (40 x) magnification.

2.2 Culture (procedure)

The samples were inoculated and streaked on the Sabouraud dextrose agar containing chloramphenicol (Himedia) Dermatophyte test medium (himedia) and Potato dextrose agar (himedia). The inoculated specimens were incubated at 37°C and 25°C for 4 weeks and checked every day for 1st week and then twice in 2nd, 3rd, and 4th week for fungal growth. Mold-form fungi were identified using colony morphology, microscopic findings, and slide culture technique. Yeast-form fungi were identified according to standard clinical laboratory methods, including the Gram staining, culture on SDA, and these samples were excluded from this study. Texture, rate of growth, and pigmentation of the front and reverse side of cultures were used to characterize fungal isolates macroscopically. Lactophenol cotton Blue staining was done for each culture-positive sample to observe mycelia type, conidial arrangement (macro and micro-conidia) to differentiate between species and genera.

3. RESULTS

In the current study, we screened 93 clinically suspected cases of fungal infection, out of which 84 (90.3%) samples were declared positive for fungal infection when examined under a microscope using KOH preparation. All the 93 suspected cases were inoculated on Sabouraud dextrose agar and 68 (73.1%) cases gave positive results, which were finally included in the study, comprising of 41 males and 27 females. The age of patients was ranged between 15-68 years with a mean of 32± 13.7. Males are affected more (60%) and females were (40%). *Tinea corporis* (45.6%) is the most prevalent infection found in our study while *T. unguium* is the least common (1.5%). The most common age group involved was the adult age group 20-40 years followed by the middle-aged 41-60 years of age group.

4. DISCUSSION

Dermatophytes are a group of keratinolytic fungi causing infection in humans by invading and destroying keratinized tissue of skin, hair, and nails. They are also referred to as ringworms defined as the nonliving cornified layers because of the inability of the fungi to penetrate the deeper tissues or organs of immune-competent hosts [7,8,9].

Dermatophytosis also termed as *Tinea* infections is a global health issue. In tropical areas, atmospheric humidity, overcrowding, and poor sanitation is prevalent in these areas of the globe [7].

One variant of dermatophytosis is Ringworm infection which is responsible for infecting nearly 20–25% of the population across the globe and 30 to 70% of adults are asymptomatic carriers of these diseases [10].

In this study of dermatophytosis prevalence, the affected males were slightly higher (60%) than females (40%), the same results were seen in Iceland [11], and Egypt [12], while female predominance (76.3%) were noticed in Ethiopia [13], and in another study in India [14] with (64%) female and (34%) male respectively. The variable prevalence in gender may be due to the progesterone hormone as it is thought to play a vital role in preventing dermatophyte multiplication *In vitro* [15].

The most common age group affected were adults 20-40 years of age, the same results were observed by Haroon S [16]. The disease is more common in children seen by Bakhtawar U [17], the results of Bakhtawar U [17] and Alshehri [7] are contradicted our results.

The most prevalent infective agent seen is in the current study is *Tinea corporis* (46%), In the years 1974-78 series, *Tinea corporis* was present in (69%) of infections in Srilanka [18], same results were seen in Iran [19] (69.2%) during 2015, and Libya [20] in the year 2012 while the distinct results (10.8%), and (21.4%) were seen in Ethiopia [13] and Saudi Arabia [8] in 2015 respectively.

Tinea capitis in our study is (40%), in Ethiopia [13] it is (20%), and (22.3%) were seen in Saudi Arabia [8] (22.3%). Another study conducted in Pakistan showed that *T. capitis* was (22%) [17]. A study showed that *T. capitis* was seen in

Table 1. Number of cases of different Dermatophytes in different age groups

S.NO	Age Group (years)	Number of Cases (%)										Male	Female	Total
		Tinea corporis		Tinea capiti		Tinea pedis		Tinea cruris		Tinea unguium				
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female			
01	Up to 20	02	00	03	01	00	00	00	00	00	00	05	01	06
02	21-40	06	07	09	06	02	01	01	01	00	00	18	15	33
03	41-60	08	05	04	03	01	01	00	00	00	00	13	09	22
04	>60	02	01	00	01	01	00	01	00	01	00	05	02	07
05	Total	18	13	16	11	04	02	02	01	01	00	41	27	68
06	Grand Total	31 (46%)		27 (40%)		06 (9%)		03 (4%)		01 (1%)		68 (100)		

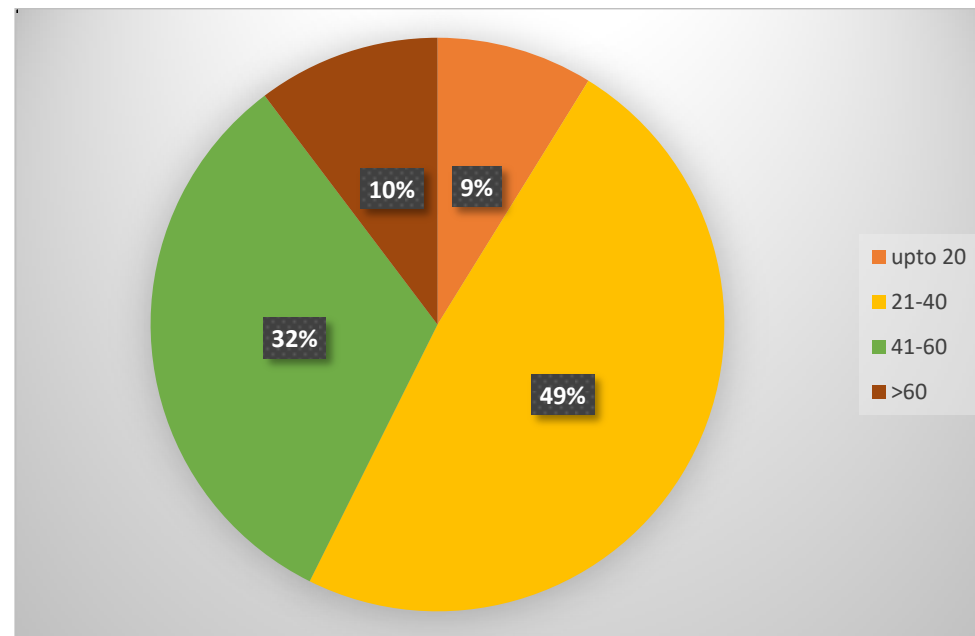


Fig. 1. Dermatophytosis in different age groups

(2.94%) of cases in India [21]. In our study *T. capitis* is 2nd most common infection but another study carried out in the central part of the Kingdom of Saudi Arabia by Abnami [22] showed that the *T. capitis* is the most prevalent infestation. In Iran [23] the least common organisms were *T. capitis* (5.4%). These variations are the results of different climate factors in those areas.

We confirm (9%) cases of *Tinea pedis*, the results from Ethiopia [13] (4.9%) were close to our results, another study from Iran by Rashdian [19] showed *T. pedis* were (3.8%), and (17%) were observed in Saudi Arabia [8]. However, another study revealed *Tinea capitis* and *Tinea pedis* to be the most common, and *Tinea corporis* as the least common in the central part of the Kingdom of Saudi Arabia by Abnami [22]. The same pattern was observed in Iran by Rezaei [24], they stated that *Tinea pedis* were seen (43.4%). *Tinea pedis* (59.3%) was the most frequent clinic form of dermatophytosis in Turkey, by Selma M [25]. *Tinea cruris* is (4%) seen in our study, the same results were observed in Saudi Arabia [8], which were (4.5%), in Ethiopia [13] (1.3%). Prevalence in Iran [19] was detected slightly higher (15.4%) than our study but it is the 2nd most common disease in that study, while in another study of Iran [24] the prevalence was (20.7%) by Rezaei [24].

We isolate *Tinea unguium* 1% in our study, in Ethiopia [13] it was the most common (51.1%) clinical manifestation, in Saudi Arabia (17.9%) [8] and in India [26] *Tinea unguium* were (27.85%).

5. CONCLUSION

In the current study, we found that dermatophytosis is more prevalent in males in comparison to females. It affects all age groups but is more common in the 20-40 years age group. *Tinea corporis* was identified as the most prevalent clinical presentation followed by *Tinea capitis*, *Tinea pedis*, *Tinea cruris*, and *Tinea unguium*.

CONSENT AND ETHICAL APPROVAL

The descriptive cross-sectional work was carried out at the Department of Dermatology and Pathology, Peoples University of Medical and Health Sciences, Nawabshah, from June 1st, 2020 to August 31st, 2020, after written approval of the ethical review committee of the concerned institute. All the demographic data were taken

from patients after informed consent and recorded on the questionnaire.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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