



Prevalence of Dermatophytosis Infection Among Patients Attending National Obstetric Fistula Centre Babbar-Ruga Hospital, Katsina State

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ABSTRACT

This study aimed to determine the prevalence of dermatophytosis infections among patients attending National obstetrics fistula center Babbar-ruga hospital, Katsina state. A total number of 100 patients were diagnosed, (40/100) were males and 60% (60/100) were females, giving a gender ratio of 3:2 (males: females), 40% of the participants were of the age range 10-29 years and 60% of age from 14-21 years respectively. Out of 60 cases, a total of 53 dermatophytes were isolated belonging to the genera *Trichophyton* and *Microsporum*. The most frequently isolated dermatophytes were *Trichophyton mentagrophyte* (26.41% 14/53), followed by *Microsporum audouinii* (22.64% 12/53), *Trichophyton rubrum* (15.09% 8/53), *Trichophyton schoenleinii* (7.547% 4/53), *Microsporum gypseum* (5.660% 3/53) and the least were *Microsporum canis* (9.433% 5/53) and *Trichophyton tonsurans* (9.433% 5/53), *Trichophyton verrucosum* (3.77% 2/53). Although 38 cases (63.33%) had single infections with dermatophytes, mixed infections with 2-4 dermatophytes of the genera *Microsporum* and *Trichophyton* were observed in 15 cases (36.67%). 67% (10/15) of the mixed infections were with *Microsporum* and *Trichophyton* species, 20% (3/15) were with *Microsporum* species alone, and 13.3 % (2/15) were with *Trichophyton* species alone. This study indicates an outstanding prevalence of dermatophytosis infection among patients who shared combs and scarves and who owned pets; this suggests a thriving animal-human transmission route of dermatophytes and the potentiality of the fomites. The research proposes intensive health promotion and education interventions to promote hygiene practices among patients.

INTRODUCTION

There are numerous accounts of dermatophytes infections in the medical and mycological literature from all over the world, with some developing nations in the tropical and subtropical areas of the planet recording an exceptional prevalence rate [1]. They are distinguished by their innate ability to infiltrate the stratum corneum and other superficial layers of the epidermis, as well as by the significant concentration of keratin in the appendages, hair, and nails of the living host [2]. The distribution of dermatophytoses on the African continents, which accurately mirrored the ratio of the causative agents, was tested in nations that kept track of variations in the leading etiological species [3]. According to the geographic region analyzed, climatic differences, population socioeconomic status, the time of the

study, and the etiological agents that cause dermatophytosis, there are variations in the distribution, frequency, and etiological agents of the disease. The geographic area analyzed, climatic differences, population socioeconomic status, period of the study, the presence of domestic animals, and the age of the subjects all have an impact on the distribution, frequency, and etiological agents of dermatophytosis [4]. Patients are more prone to dermatophytic infections because of their bad personal hygiene practices and occasionally dirty surroundings [5].

Between the ages of 4 and 16, humans are more prevalent, putting this age group at a higher risk of catching an infectious disease. There are very few studies that have looked at the prevalence of dermatophytes infection among patients, thus it is important to know the precise quantity among the population that

visits hospitals for medical treatment. Dermatophytes can be divided into three groups based on their genera: *Microsporum* (which causes infections on skin and hair), *Epidermophyton* (which causes infections on skin and nails), and *Trichophyton* (which causes infections on skin, hair, and nails) [6]. Clinically, these are divided into *Tinea capitis* (head), *Tinea faciei* (face), *Tinea barbae* (beard), *Tinea corporis* (body), *Tinea manus* (hand), *Tinea cruris* (groin), *Tinea pedis* (foot), and *Tinea unguis* (nail). *Tinea imbricata*, *Tinea pseudo imbricata*, and *Majocchi granuloma* are other clinical variations [7].

Despite having a global distribution, dermatophytosis is indigenous to tropical areas because warm, humid weather promotes the growth of dermatophytes [8]. In addition to climate, the distribution's variability of dermatophytes worldwide is attributed to other factors such as population migration patterns, lifestyle, primary host range, secondary host immunity, presence of immunodeficiency diseases, and patient attitude to prompt treatment following clinical presentation and standard of living [8]. The disease is infectious and can be transmitted by humans, animals, or objects that harbor the fungus [9].

MATERIALS AND METHODS

Research Design

This research work adopted a descriptive research design which is considered more appropriate in this study, secondary mode of data was laboratory work because the subjects were on observation setting while a questionnaire was used to collect data from the population involved in the research.

Study Area

The study was conducted at the National Obstetric Fistula Center, Babbar-ruga laboratory, located at Babbar-ruga Katsina state. Some patients attending the hospital agreed to participate in the study.

The population of the Study

Ethical approval was obtained from the National Obstetric Fistula Center Babbar-ruga hospital, Katsina state, before the commencement of laboratory work. One hundred (100) patients gave consent to participate in the study. Patients had signed the permission forms. They were interviewed and screened accordingly.

Sample Size and Sampling Technique

The sample size of the study was one hundred (100) patients. A simple random sampling technique was used in which a subset of individuals was chosen randomly, all with the same probability. Selecting enough subjects completely at random from the larger population being selected.

Sample collection and questionnaire administration

One hundred patients altogether (100) for each patient, a sample was taken by scraping the diseased area of the head with a sterile scalpel. Before collecting the sample, the collection site was swabbed with 70% ethanol [10]. To avoid exposure to moisture and sunlight, as well as to stop the accumulation of contaminants, the scrapings were collected into sterile paper and folded in a clearly labeled envelope.

The patient's name was written on the envelope [11]. Socio-demographic information, including age, gender, and details on the sharing of foodstuffs, was collected through the administration of the questionnaire.

Microscopy

Alcohol was used to remove any ointments or other local treatments from the affected area [12]. By gently scraping the diseased area with a surgical blade, the patients' scalp scrapings were obtained [13]. On the glass slide, the sample was inserted. After 3-5 minutes, the skin scrapings were dissolved and examined under a microscope after being treated with 25% KOH. Low ($\times 10$) and high ($\times 40$) power magnifications of the wet mount were used to check for the presence of fungi [14].

Media preparation

1000 ml of distilled water was mixed with 65.0g of SDA Sabouraud dextrose agar. The medium was heated and boiled until it was fully dissolved. The media was then autoclaved at 121°C for 15 minutes to sterilize it, and it was then allowed to cool at 45–50°C. The medium was thoroughly combined before being placed onto Petri dishes [15].

Culture

In Sabraud's dextrose agar plates with 0.05 g of chloramphenicol and 5 percent NaCl, the scrapings were cultivated. The samples are plated onto a medium that has been prepared, cultured for 3–4 weeks at room temperature, and checked every week for growth. [16]

Statistical analysis

Data were analyzed using simple percentage and odd ratios using epi info statistical software for epidemiology developed by the centers for disease control and prevention (CDC).

RESULTS

A total of (100) skin scrapings were collected and analyzed for dermatophytes. The characteristics of the study participants are shown in **Table 1**. The age range of study participants was 10-30 years. Of the 100 participants, 40% (40/100) were male and 60% (60/100) were females, giving a gender ratio of 2:3 (males: females). 40% and 60% of the participants were of the age range 10-30 years and 14-29 years respectively. The current study (**Table 1**) shows that the female sex was more highly infected with dermatophytosis than their male counterparts clinically. The 10-30 years age group was the most infected age group with dermatophytoses. After the incubation period and examining the microscopic features of fungal growth, there were 53 cases of dermatophytosis of which *Microsporum* cases and *Trichophyton* cases had single and mixed dermatophytes, respectively. The overall prevalence of dermatophytes in the study population is 6.0% cases were more prevalent among females (60%) Than in males (40%). There was an association between dermatophytosis infections and variables such as sharing of combs, sharing of caps/scarves, sharing of towels, hair cut at a barbing salon, keeping and playing with pets, and carrying objects on the bare head.

Table 1. Demographic data and other factors about dermatophytes in National obstetrics fistula center Babbar-ruga hospital, Katsina state.

Factor	Sub-category	Number of patients with dermatophytosis	Total number of patients	Odd ratio
Gender	Male	21(52.50)	40	0.4505
	Female	42(70.00)	60	0.6707
Age group (Years)	Oct-14	23(53.48)	43	0.467
	14-21	40(70.17)	57	0.467
Occupation	Students	22(73.33)	30	
	Hawkers	19(76.00)	25	
	Civil servants	6(40.00)	15	0.708
	tailors	10(50.00)	20	
Level of education	plumbers	6(60.00)	10	
	None	5(16.67)	3	
	Primary	31(67.39)	46	0.702
	Secondary	15(83.33)	18	
Hair cut at the barbing salon	Tertiary	12(16.67)	33	
	Yes	31(73.80)	65	0.6685
Sharing bed with other(S)	No	32(55.17)	35	0.5132
	Yes	35(53.87)	63	0.5092
Sharing combs with other(S)	No	28(80.00)	35	0.705
	Yes	41(91.00)	45	0.8532
Sharing towels with other(S)	No	22(40.00)	55	0.3532
	Yes	35(55.55)	63	0.5244
Carrying objects on a bare head	No	28(75.67)	37	0.6702
	Yes	29(72.70)	40	0.6491
Interaction with pets	No	34(56.67)	60	0.5317
	Yes	42(3.33)	45	0.8759
Previous treatment	No	21(38.18)	55	0.3532
	Yes	33(53.22)	62	0.4988

Laboratory test at National obstetrics fistula center Babbar-ruga hospital, Katsina state, 2021.

Table 2 shows that of the (100) suspected fungal infection cases, only (53%) were mycologically proven. Out of 60 cases, a total of 53 dermatophytes were isolated belonging to the genera *Trichophyton* and *Microsporum*. The most frequently isolated dermatophyte were *Trichophyton mentagrophytes* (26.41% 14/53), followed by *Microsporum audouinii* (22.64% 12/53), *Trichophyton rubrum* (15.09% 8/53) *Trichophyton schoenleinii* (7.547 4/53) *Microsporum gypseum* (5.660% 3/53) and the least was *Microsporum canis* (9.433% 5/53) and *Trichophyton tonsurans* (9.433% 5/53). Although 38 cases (63.33%) had single infections with dermatophytes, mixed infections with 2-4 dermatophytes of the genera *Microsporum* and *Trichophyton* were observed in 15 cases (36.67%) This is presented about the age group and gender in (Table 3) 67% (10/15) of the mixed infections were with *Microsporum* and *Trichophyton* species, 20% (3/15) were with *Microsporum* species alone, and 13.3% (2/15) was with *Trichophyton* species.

Table 2. Frequency of isolated dermatophytosis among patients attending National obstetrics fistula center Babbar -ruga hospital katsina state.

Dermatophytes isolated	Frequency	Percentages (%)
<i>Microsporum audouinii</i>	12	22.6
<i>Microsporum canis</i>	05	09.4
<i>Microsporum gypseum</i>	03	05.7
<i>Trichophyton mentagrophytes</i>	14	26.4
<i>Trichophyton schoenleinii</i>	04	07.5
<i>Trichophyton rubrum</i>	08	15.1
<i>Trichophyton tonsurans</i>	05	09.4
<i>Trichophyton verrucosum</i>	02	03.8
Total	53	100

A laboratory test, 2021

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Table 3. Mixed dermatophytoses infections concerning age and gender among patients attending National obstetrics fistula center Babbar-Ruga Katsina state.

Case code	Gender	Age	Dermatophytes isolated
TN 2	F	14-29	<i>M. gypseum</i> , <i>M. canis</i>
TN8	F	14-29	<i>M. canis</i> , <i>T. tonsurans</i> , <i>T. verrucosum</i>
TN10	F	14-29	<i>T. schoenleinii</i> , <i>T. rubrum</i>
TN12	F	14-29	<i>M. canis</i> , <i>T. rubrum</i> , <i>T. tonsurans</i> ,
TN 14	F	14-29	<i>M. canis</i> , <i>M. audouinii</i>
TN 16	F	14-29	<i>T. mentagrophytes</i> , <i>M. audouinii</i>
TN 18	M	10-30	<i>M. gypseum</i> , <i>M. canis</i> , <i>M. audouinii</i>
TN 20	F	14-29	<i>T. rubrum</i> , <i>M. gypseum</i> , <i>T. tonsurans</i>
TN 22	M	10-30	<i>T. schoenleinii</i> , <i>T. tonsurans</i> ,
TN 24	F	14-29	<i>T. tonsurans</i> , <i>T. rubrum</i>
TN 28	M	10-30	<i>T. mentagrophytes</i> , <i>T. verrucosum</i>
TN 30	M	10-30	<i>T. verrucosum</i> , <i>T. tonsurans</i>
TN 32	F	14-29	<i>M. Baudouin</i> , <i>M. gypseum</i> , <i>M. canis</i>
TN 33	M	10-30	<i>T. tonsurans</i> , <i>M. gypseum</i> , <i>M. canis</i>
TN 35	M	10-30	<i>T. verrucosum</i> , <i>T. tonsurans</i>

Key: *M. system*: *Microsporum gypseum*, *M. canis*: *Microsporum canis*, *T. verrucosum*: *Trichophyton verrucosum*, *T. tonsurans*: *Trichophyton tonsurans*, *T. schoenleinii*: *Trichophyton schoenleinii*, *T. rubrum*: *Trichophyton rubrum*, *M. audouinii*: *Microsporum audouinii*, *T. mentagrophyte*: *Trichophyton mentagrophyte*.

DISCUSSION

With a higher frequency among females (42.0%) than males (21.0%) and endemicity in numerous locations of Nigeria, dermatophytic infection is a frequent infection that poses a public health hazard for patients in Nigeria [17]. The dermatophytes that induced dermatophytosis among patients at the National Obstetrics Fistula Center Babbar-ruga Hospital in Katsina state were isolated and identified in this study. We discovered a significant incidence of the infection among patients aged 14 to 21 years, which is in contrast to research [17] that claimed participants in the study who were high-aged had dermatophytosis at a higher rate than those who were younger. The dermatophytoses that were isolated were *T. mentagrophytes* (26.41 percent), *M. Baudouin* (22.63 percent), *T. rubrum* (15.09 percent), *M. canis* (9.433 percent), *T. toucans* (9.433 percent), *T. schoeleinii* (7.547 percent), *M. gypseum* (5.660 percent), and *T. verrucosum*, in that order of most prevalent to least prevalent (3.773 percent).

In terms of gender, girls had a higher incidence than males, yet there is a substantial correlation (odds ratio 0.6707). The results of some earlier research, which indicated increased infections among females in Nigeria [18], support this. The prevalence rate of culture-proven dermatophytes infection was 5.0 percent (30/60 percent) in a study of 602 children from 2 public schools in the Oke-Oyi community, which indicates that the most common dermatophytes producing dermatophytosis in this study context are quite uncommon. Given factors that are known to favor person-to-person transmissions, such as the current practice of sharing personal items that can spread dermatophytosis infection directly through human or animal contact, or directly from contaminated articles on floors, the high prevalence of dermatophytes in this study was unexpected. While some objects, like towels, scissors, and scarves, may act as the breeding ground of the organisms because to the microscopic skin present, shared changing rooms and showers are frequently a source of dermatophytosis [19]. A small quantity of dermatophytosis can persist in the environment and infect someone else if it is present in the minute skin fragments that people constantly shed. The patients identified have a history of

pet ownership as well as indicators of inadequate personal hygiene. The discovery that *T. mentagrophytes* is the most widespread dermatophyte in this region is in contrast to past research that identified select strains as being common in particular regions of the nation. *Trichophyton schoeleinii* was found in Northern Nigeria, and *Microsporum audouinii* was found to be common in Eastern and Western Nigeria [20].

While the "Sudanese"-like variety *Trichophyton violaceum* occurs in the middle belt. A recent update from the Southeastern part of Nigeria suggests changing epidemiology from *M. audouinii* to *Trichophyton tonsurans* in Anambra and *Trichophyton sudanese* in Delta states [21]. In the North Central to which the community surveyed belonged, this reason can also be advanced for the observation of *T. mentagrophytes* as the commonest infecting species of dermatophytes. However, because no such study had been previously carried out in the community or this area, the assertion of a change in etiology must be taken with caution.

CONCLUSION

According to the main findings of this study, patients at the National Obstetrics Fistula Center Babbar-ruga Hospital in Katsina State, Nigeria, were more likely to be female than male when it came to having dermatophytoses infections. The most common dermatophyte fungi were *Trichophyton mentagrophyte* (26.41 percent 14/53), followed by *Microsporum audouinii* (22.64 percent 12/53), *Trichophyton rubrum* (15.09 percent 8/53), *Trichophyton schoeleinii* (7.547 percent 4/53), and *Microsporum gypseum* (5.660 percent 3/53), while the least common were *Microsporum*. The investigation revealed the potential for dermatophyte transmission-predisposing factors. Patients who had pets had higher prevalence rates, indicating a strong animal-to-human transmission pathway. In-depth health promotion and education initiatives are advised by research to encourage patients to practice good hygiene, including the early diagnosis and treatment of dermatophytoses.

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