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Clinico-demographic study of dermatophytosis in Southern Rajasthan

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Keywords: Dermatophytoses, Mycological study, Southern Rajasthan

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Abstract

Superficial fungal infections have become a significant health problem affecting all age groups. Skin infections due to Dermatophytes are caused by a group of closely related keratophilic fungi, capable of invading the keratinized tissues of skin. A total of 128 samples from suspected cases of dermatophytosis were received and processed in the department of microbiology. All the samples were subjected to microscopic examination and culture by standard techniques. Their clinic-demographic profile, KOH and fungal culture details were obtained and Dermatophytes were identified by studying macroscopic and microscopic characteristics of the isolates. Out of total 128 patients, male predominance was noted. 54% of study population belonged to rural area. Maximum numbers of cases were from the age group 21 to 30 years. Majority of patients (72.63%) belong to poor socioeconomic status. Poor hygiene was observed in about 86% cases. Out of 128 samples, 88 (68.75%) had a positive KOH mount and 95 (74.22%) had positive culture results. Out of culture positive samples 72 (75.79%) were Dermatophytes among which most common isolate was *T. mentagrophytes* (26.31%) followed *T. rubrum*in (21.05%) and *T. tonsurans* (16.84%). This study highlights the change in clinical pattern of dermatophytosis and emergence of *T. mentagropthyte* as a causative agent.

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Introduction

Infectious diseases, particularly those involving the skin and mucosal surfaces, are a serious problem all over the world due to deficient sanitation and education. An important group of these skin pathogens are fungi (Meenakshi *et al*., 2012). Superficial mycoses refer to the diseases of skin and its appendages caused by fungi. This group includes dermatophytosis, pityriasisversicolor, and candidiasis and non-dermatomycotic molds (Anil Kumar Gupta *et al*., 2018). About 20-25% of the world's populations are infected with dermatophytic fungi and the incidence is increasing on a steady basis (A. Naglot *et al*., 2015).

Dermatophytosis is a common clinical entity characterized by the infection of keratinized tissues such as skin, hair, and nails (Lakshmi *et al*., 2015). Infection is generally cutaneous and restricted to the non-living cornified layers because the fungi is not able to penetrate the deeper tissue or organ of healthy immunocompetent host (KAK Surendran *et al*., 2014). Incidences of fungal infections are increasing throughout the world as a result of the use of broad-spectrum antibiotics, immunosuppressive therapies, cytotoxic agents, chemotherapies and new medical therapeutic methods. Other risk groups suffering from fungal infections are most notably in the aged population with increased prevalence of chronic diseases. Socioeconomic status, a warm and humid environment, lifestyle, presence of pets, age and personal hygiene of a patient are also important factors predisposing to dermatophytic infections. Fungal infection risks are highly dependent on a combination of host immune competency and specific exposures of people both within the health care system and their communities (Zuzana *et al*., 2018).

India is a large subcontinent with different climatic and topographic conditions. The hot and humid climate favours the acquisition and maintenance of fungal infections. This as well as due to overcrowding, poor socioeconomic condition and poor hygiene increase the chances of acquiring fungal infection. Although dermatomycoses are worldwide in distribution, the endemic and most prevalent species of dermatophytosis differ strikingly from one geographic locality to another (Anil Kumar Gupta *et al*., 2018). In city of lakes Udaipur, Rajasthan Udaipur where temperature exceeds even 44°C and high humidity during the monsoon season. These climatic conditions favour the occurrence of fungal infection. Hence, this study is designed keeping in mind the that this systemic study might give us more clear picture of different aspects of dermatophytosis i.e. correlation with age, gender, occupation, clinical and mycological types etc, Therefore this study was designed to find the occurrence of dermatophytic infections in Udaipur region to study socio-demographic profile of dermatophytosis patients attending tertiary care health centre in Udaipur Rajasthan with correlation of site involved and causative agent responsible.

Material and methods

The present study will be carried out at a Department of Microbiology, RNT Medical College Udaipur during the period February2019 to September 2019 to study socio-demographic profile of clinically diagnosed case of dermatophytosis and correlate site of infection and causative Dermatophytes. The data was collected in prescribed proforma and later analysed.

Type of study

Institution based cross sectional study.

Inclusion criteria

All clinically suspected cases of dermatophytosis coming to Skin OPD of RNT Medical College.

Exclusion criteria

Clinical suspected cases of other fungal infections.

Keeping in view the ethical considerations, the participants were explained the purpose and the methodology of the study and their consents was obtained for using sample for study.

Procedure of sample collection

After taking informed written consent, prior to the collection of specimen the affected area was cleaned with 70% alcohol. The skin scales, crusts were scraped from the edge (active margin) of the lesion using a 15 number blunt scalpel. Nail specimen were collected by taking clippings of infected nails, while Hair specimen were collected by plucking with the epilating forceps along with the base of the hair shaft around the follicle.

Sample Processing and Interpretation

Specimen collected were subjected to *potassium hydroxide (KOH) wet mount* preparation of various concentrations (10%, 20%, & 40%) depending upon the type of clinical specimen for the presence of fungal elements.

For culture, the specimen were inoculated onto three sets of test tubes cantaining Sabouraud's Dextrose Agar with 0.05% chloramphenicol, Sabouraud's Dextrose Agar with 0.05% Chloramphenicol and 0.5% Cycloheximide and Dermatophyte Test Medium. The first two test tubes containing Sabouraud's Dextrose Agar were incubated at 28^0C for up to four weeks and observed for any growth. The third test tube containing Dermatophyte Test Medium was incubated at 28^0C for up to ten days and observed for colour change.

Fungal isolates will be identified based on colony morphology in culture, pigmentation, growth rate, Lactophenol cotton blue mount microscopy, Slide culture and Urease test.

Results

Samples from suspected cases of dermatophytosis were received and subjected to microscopic examination and culture by standard techniques processed in the department of microbiology. After examination, out of 128 clinically suspected cases 72 were found to be positive for dermatophytes by culture examination and 88 cases were found positive for fungus by KOH examination. Their clinico demographic profile, KOH and fungal culture details were obtained and Dermatophytes were identified by studying macroscopic and microscopic characteristics of the isolates. The results obtained was tabulated and analysed under different categories. On analysis following observations were made.

Out of total 128 patients, male predominance was noted with male to female ratio 3.16:1. Out of 128 subjects, 75.78% (97 subjects) were male and 24.22% (31 subjects) were females (Fig. 1). 53.91% (69 subjects) of the study population were from rural area and remaining 46.09% (59 subjects) belonged to urban area (Fig. 2).

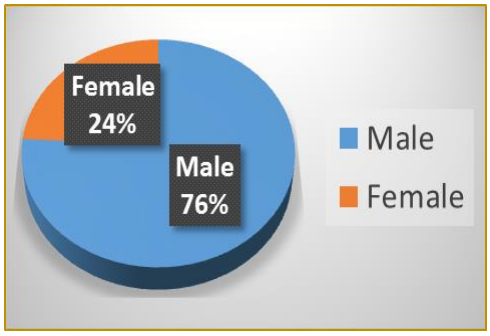


Fig. 1. Gender wise distribution of study population.

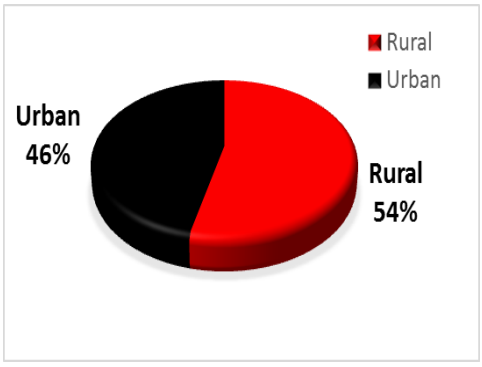


Fig. 2. Area wise distribution of study population.

It was observed that most common age group was 21 – 30 (32.03%) years followed by 41-50 years (23.44%), 31-40 years (14.06%), 11-20 years (10.94%). 12 (9.38%) cases of age group less than 1 year were observed, while 4.69% subjects were in age group 2–10 years and more than 50 years. The youngest patient was of age 20 days female child while eldest was 73 years old male (Fig. 3).

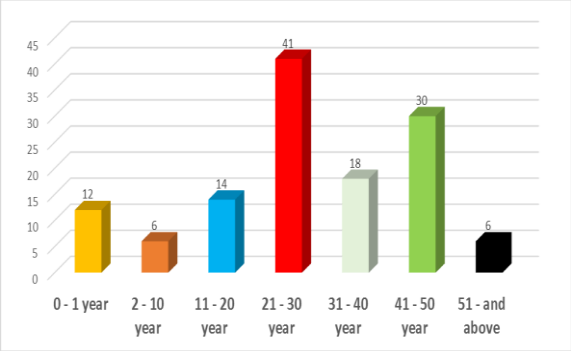


Fig. 3. Age wise distribution of study population.

Out of remaining 116 cases (excluding infants), most of the study population i.e. 73.27% (85) had an educational qualification of class 5th to 12th, while 20.68% (24) had an educational qualification higher than 12th standard. 6.03% (7) had education less than 5th standard (Fig. 4). Most of the study population i.e. 71.09% (91) belonged to low socioeconomic class, followed by middle socioeconomic class (24.22%, 31 subjects) and high socioeconomic class (4.69%, 6 subjects) (Fig. 5). Poor hygiene was observed in about 80% cases.

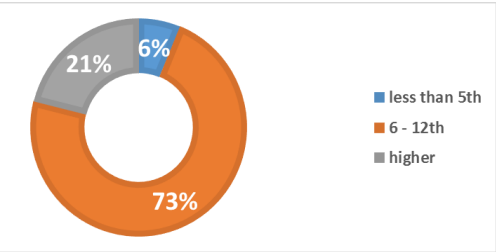
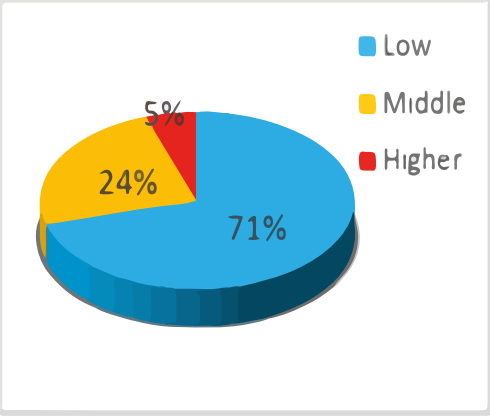


Fig. 4. Educational status of study population.



**Excluding infant cases

Fig. 5. Socioeconomic status of study population.

In respect to clinical diagnosis, most common type observed was *T. Corporis* (45 cases, 35.15%) followed by *T. Cruris* (28 cases, 21.88%), multiple site of involvement (27 cases, 21.1%), Onchomycosis (14 cases, 10.94%), *T. Faciei and T. Pedis* (4 cases, 3.13%) and *T. Capitis and T. Unguim* (3 cases each, 2.34%) (Table 1).

Table 1. Correlation of samples according to clinical diagnosis.

Clinical Diagnosis	Number of cases
T. Capitis	03 (2.34%)
T. Corporis	45 (35.15%)
T. Cruris	28 (21.88%)
T. Pedis	04 (3.13%)
T. Unguim	03 (2.34%)
T. Faciei	04 (3.13%)
Onychomycosis	14 (10.94%)
Multiple site of involvement	27 (21.1%)

In our study, maximum number of samples received were of skin scrapping (86.72%, 111 samples) followed by nail (10.94%, 14 samples) and hair (2.33%, 03 samples) (Fig. 6). On processing and examination of the samples received, it was observed that out of total of 128 samples 68.75% (88 samples) showed elements of fungus on KOH mount and 56.25% (72 samples) were positive for Dermatophytes on culture, whereas in 25.78% (33 samples) there was no growth on culture. KOH mount could not be done in case of 12 samples collected from infants because of insufficient amount of samples (Table 2).

Table 2. Analysis of samples received.

Clinically suspected dermatomycosis	128
KOH positive	88 (68.75%)
Microbiological confirmed case of Dermatophytes	72 (56.25%)
Non Dermatophyte growths	23 (17.97%)
No growth	33 (25.78%)

** KOH mount of 12 infant cases could not be done due to insufficient samples

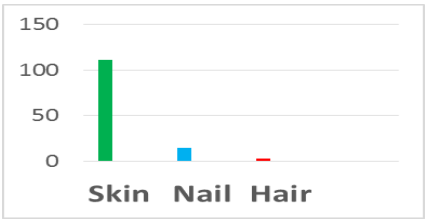


Fig. 6. Distribution of sample collected and processed.

In present study, it was observed that, among microbiologically (culture positive) confirmed cases of dermatophytic infections most common isolate was *T. mentagrophytes* (26.31% cases) followed *T. rubrum*in (21.05% cases), *T. tonsurans* (16.84% cases), *T. verrrucosum* (5.26% cases), *T. Violaceum* (4.21% cases) and *T. schonlenii* (2.1%). Hence *T. mentagrophyte* is most prominent organism responsible for causing dermatophytosis (Fig. 7).

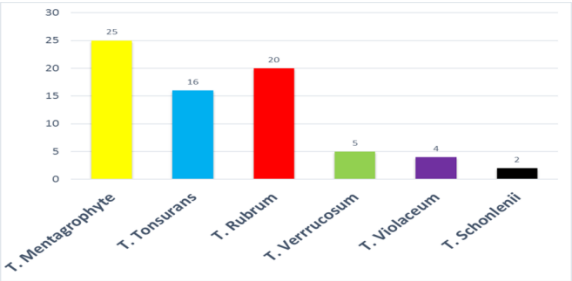


Fig. 7. Microbiological isolates of confirmed Dermatophytes cases.

In this study, it was observed that none of the *T. Capitis* case was positive for dermatophyte on culture. Among 45 *T. Corporis* cases most prominent organism responsible was *T. mentagrophyte* followed by *T. rubrum* and *T. tonsurans*, *T. verrucosum, T. violaceum* and *T. schonlenii* in sequential manner. Among 28*T. Cruris* cases most prominent organism responsible was *T. mentagrophyte* followed by *T. rubrum and T. tonsurans, T. schonlenii* and *T. verrucosum* and *T. violaceum* in sequential manner. All the 04 *T. pedis* cases were caused by *T. rubrum*. Among 03 *T. ungium* cases, only one was culture positive and was caused by *T. verrucosum*. Among 14 cases of *Onychomucosis*, only one was culture positive and was caused by *T. rubrum*. Among 27 cases of multiple site involvement most common organism isolated was *T. tonsurans* followed by *T. mentagrophyte* and *T. rubrum, T. violaceum* and *T. verrucosum* (Table 3).

Thus**,** Maximum number of positive culture was observed from cases of *T. Corporis*, only 01 sample of nail gave positive culture while none of the samples of hair was positive. *T. mentagrophyte* was responsible for causing dermatophytosis in maximum number of cases.

Table 3. Correlation of dermatophytes isolated and site of sample collected.

Site	Mentagrophyte	Rubrum	Tonsurans	Verrucosum	Violaceum	Schonlenii
T. Capitis	00	00	00	00	00	00
T.Corporis	14 (31.11%)	0613.3%)	06 3.33%)	03 (6.67%)	02 (4.44%)	01 (2.22%)
T. Cruris	05 (17.86%)	03 10.7%)	03(10.71%)	00	00	01(3.57%)
T. Pedis	00	04 100%)	00	00	00	00
T. Unguim	00	00	00	01 (33.33%)	00	00
T. Faciei	01 (25%)	00	00	00	00	00
Onycho -mycosis	00	01 7.14%)	00	00	00	00
Multiple site	06 (22.22%)	06 22.2%)	07 25.93%)	01 (3.7%)	02 (7.4%)	00

In present study, among microbiologically confirmed cases of fungal infection 23 cases were caused by non dermatophytes fungi. Among these cases most common non dermatophytes isolate was *Aspergillus niger* (30.44%, 07 cases) followed by *Aspergillus flavus* (13.04%, 03 cases), *Curvularia* (8.70%, 02 cases), *Alternaria* (8.70%, 02 cases), *Cladosporium* (8.70%, 02 cases), *Rhodotorula* (8.70%, 02 cases), *Sterilia mycelia* (8.70%, 02 cases),

Aspergillus glaucus (4.35%, 01 case), *Ulocladium* (4.35%, 01 case) and *Penicillium* (4.35%, 01 case) (Gig. 8).

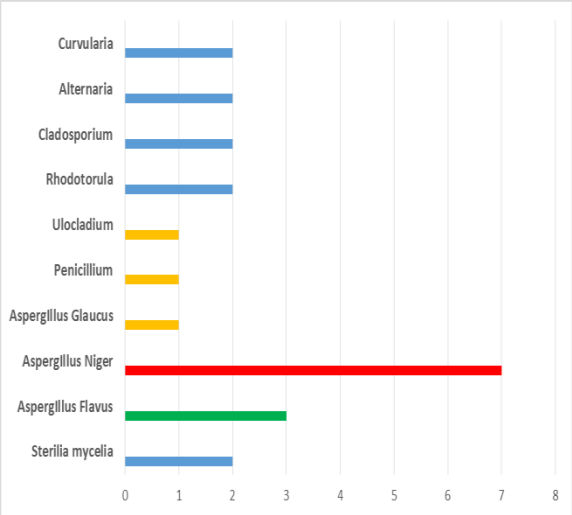


Fig. 8. Non–dermatophytes fungal isolates observed in the study.

In our study, total 116 samples were subjected to both KOH and culture examination, in 12 cases (infants) KOH mount could not be done because of insufficient amount of sample. It was observed that 62 samples were positive for both KOH and culture. 25 samples were positive for KOH examination but gave negative result on culture while 04 samples were negative for KOH but positive on culture. 25 samples were negative for both KOH and culture examination (Table 4). The Sensitivity of combined KOH and culture was 93.94% while Specificity of combined KOH and culture was 50.00%. Positive predictive value and Negative predictive value were 71.26% and 86.21% respectively and Accuracy was 75.00%

Table 4. Correlation between direct microscopy (KOH positive) and Culture positive cases.

Parameter	Culture Positive	Culture Negative
KOH positive	62	25
KOH negative	04	25

**Out of 116 samples subjected to both KOH and culture examination. For 12 cases KOH mount could not be done because of insufficient amount of sample.

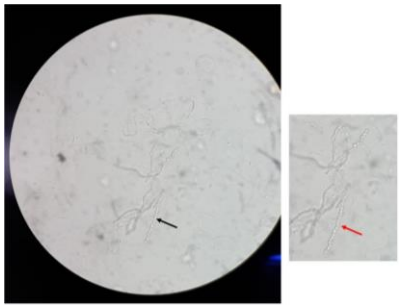


Fig. 9. KOH mount.
Left: Photomicrograph of KOH mount, illustrating a fungal hyphal.
Right: Hyphal segment breaking up into tiny arthroconidia

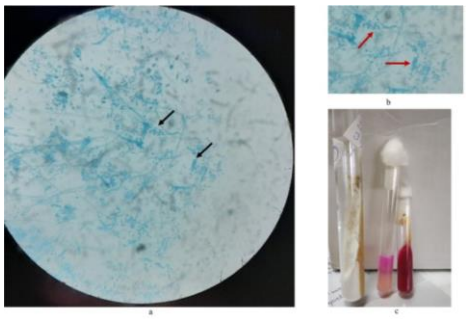


Fig. 10. *Trichophyton mentgrophytes.*
Photomicrograph of *Trichophy tonment* grophytes as seen in LPCB (slide culture) showing, a & b: LPCB (slide culture) showing abundant *Globose microconidia* arranged in grape like clusters and cigar shaped 3 to 6 celled macroconidia. c: Growth of mentagrophyte on SDA (left), Urease test (middle) and colour change of DTM (right).

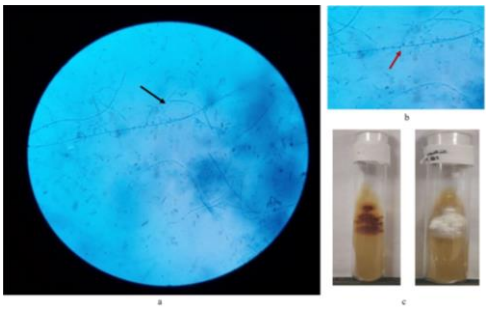


Fig. 11. *Trichophyton rubrum.*
Trichophyton rubrum as seen in LPCB (slide culture) showing: abundant clavate or tear drop shaped microconidia and pencil shaped macroconidia with thin smooth walls.

A & b: "bird on fence" appearance of clavate or tear drop shaped microconidia. c: growt on SDA reverse pigmentation (left) and obverse (right)

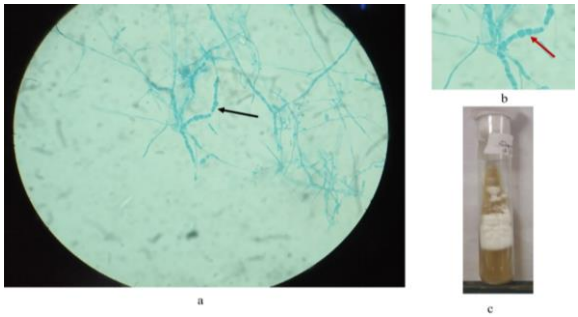


Fig. 12. *Trichophyton verrucosum.*
a& b: *Trichophyton verrucosum* as seen in LPCB showing numerous chlamydospores arranged in chains. c : growth on SDA

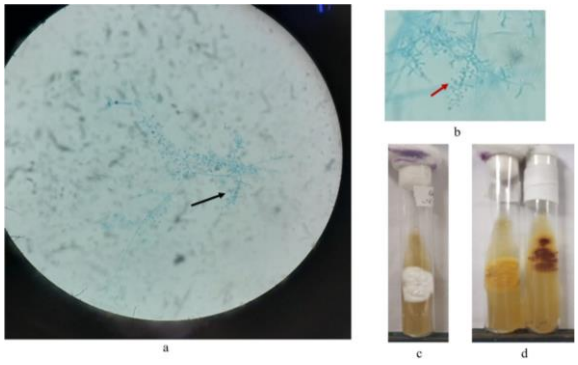


Fig.13. *Trichophyton tonsurans.*
A & b: *Trichophyton tonsurans* as seen in LPCB (slide culture) showing numerous microconidia that vary in size and shape (clavate, elongate or pyriform).
c: growth on SDA (obverse)
d: growth on SDA reverse (left) as compared with T. rubrum (right) showing pigmentation.

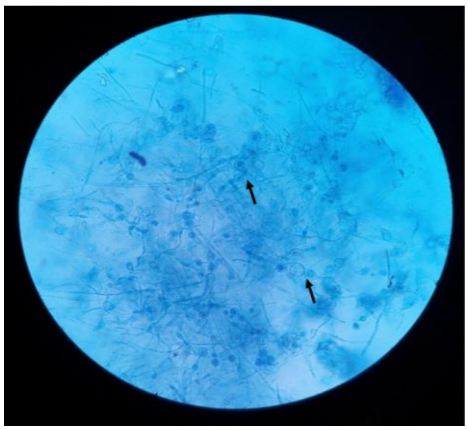


Fig. 14. *Trichophyton violaceum.*
Trichophyton violaceum as seen in LPCB showing sterile hyphae, intercalary chlamydoconidia and swollen hyphal cells containing cytoplasmc granules.

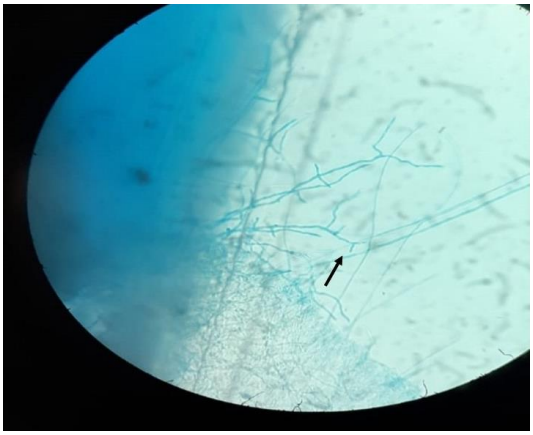


Fig. 15. *Trichophyton schonlenii.*
Trichophyton schonlenii as seen in LPCB showing sterile "antler" hyphae.

Discussion

Superficial mycoses are among the most frequent forms of human infections, affecting more than 20–25% of the world's population. They are predominantly caused by a group of closely related keratinophilic mycelia fungi (Dermatophytes) in the genera of *Trichophyton*, *Microsporum*, and *Epidermophyton* (Babak *et al*., 2018).

These organisms cause cutaneous mycosis, which begins when a person receives the fungus by person-to-person contact or via an intermediate inanimate object. The infection initially presents with red patches on affected areas of the skin and later spreads to other parts of the body. The infection may affect the skin of the scalp, feet, groin, beard, or other areas. The distribution, frequency, etiological agents of dermatophytosis vary according to the geographical region, the climatic variations, the socioeconomic level of the population, the time of study, the presence of domestic animals and age of the individual (Babak *et al*., 2018).

Careful epidemiological study could improve our knowledge about fungal infections, their causative agent and the risk factors for infections and can help to design of better control methods for these infection groups (Rafat *et al*., 2019).

Dermatophytosis is common in Rajasthan due to its geographical and demographical position. This study was conducted to study socio-demographic profile of patients of dermatophytosis patients attending tertiary care health centre in Udaipur Rajasthan, by correlating site of involvement and causative agent along with socio-demographic profile of the patients including their age, gender, place of living, occupation, educational status, hygiene status etc.

A total of 128 samples from clinically diagnosed cases of dermatophytosis were taken, processed and analysed in the department of microbiology.

It was observed that male patients outnumbered female patients (76% male and 24% females) with male to female ratio 3.16:1. A male predominance was also reported by researchers Meenakshi *et al*., 2012; Anil Kumar Gupta *et al*., 2018; A. Naglot *et al*., 2015; Lakshmi *et al*., 2015; KAK Surendran *et al*., 2014; Krishan *et al*., 2018; Shivanshi *et al*., 2018; Sucheta *et al*., 2018; Agarwal *et al*., 2014; Sumit *et al*., 2014; G. kumaran, 2014; Tonita *et al*., 2016; R. Saraswati *et al*., 2016; Jitendra *et al*., 2016; B. Janardhan, 2017; Soniya *et al*., 2017; Santwana *et al*., 2017; Shilpi *et al*., 2018; Shyam *et al*., 2018; Nitin *et al*., 2018; K. Sri Sandhya *et al*., 2018; Syed *et al*., 2018; Girish *et al*., 2018; S Balamuruganvelu *et al*., 2019; Jha *et al*., 2019 and Vandana *et al*., 2019 in the recent past years. While Researchers A Lakshmanan *et al*. (2015) and Nisha *et al*. (2016) reported slight more number of male patients as compared to female patients.

Female predominance was reported by authors Zuzana *et al*., 2018; Maninder *et al*., 2018; Mayuri *et al*., 2018 and Sripriya *et al*., 2018. In this study males were affected approximately 3 times greater than females. This is probably due to increased exposure of males to outdoor activities by nature of their work profile, thereby increasing their vulnerability to the infection. Another cause for lower incidence in females may be due to shy nature and negligent attitude on part of family members many of the infections in females go unreported.

We observed that 54% of the study population was from rural area. Similar observation was reported by B. Janardhan (2017) while opposite observation was reported by Lakshmi *et al*. (2015) (80% cases from urban area). Higher incidence in rural population is probably due to more exposure to hard work and outdoor activities along with low level of awareness for fungal infections and poor hygiene in rural areas. In our study, most of the study population i.e. 73% had educational qualification of class 6^{th} to 12^{th} and poor hygiene was observed in 95% cases.

In our study, the youngest patient was of 20 days while oldest patient was of 73 years. Analysis of age group distribution revealed that, maximum number of affected people were in third decade of life i.e. 21 – 30 years (32.03%) followed by 41-50 years (23.44%). Low incidence were reported the two extremes of age. Similar observations were reported by researchers Anil Kumar Gupta *et al*., 2018; A. Naglot *et al*., 2015; Shivanshi *et al*., 2018; Maninder *et al*., 2018; Agarwal *et al*., 2014; Sumit *et al*., 2014; Tonita *et al*., 2016; Soniya *et al*., 2017; Santwana *et al*., 2017; Shyam *et al*., 2018; K. Sri Sandhya *et al*., 2018; Syed *et al*., 2018; S Balamuruganvelu *et al*., 2019; Jha *et al*., 2019 and Jitu *et al*., 2019 who reported 20 – 30 years as most common age group infected by dermatophytes. Some researchers (Meenakshi *et al*., 2012; Lakshmi *et al*., 2015; KAK Surendran *et al*., 2014; Krishan *et al*., 2018; G. kumaran, 2014; A Lakshmanan *et al*., 2015; and Shilpi *et al*., 2018) reported wider range of age infected by dermatophytes including age 20 – 30 years in most common age group. A different most common age group was reported by researchers Zuzana *et al*., 2018; Sucheta *et al*., 2018; Nisha *et al*., 2016; B. Janardhan, 2017; Nitin *et al*., 2018; Mayuri *et al*., 2018; Babak *et al*., 2018; Rafat *et al*., 2019; Vandana *et al*., 2019 and Antuori *et al*., 2019 from other part of country and world. We also observed 12 (9.38%) cases of age group less than 1 year were observed.

Highest incidence in 21–30 years may be due to maximal physical activity, more sweating and more exposure to outdoor activities in third decade of life. Minimal physical activity during childhood and old age could explain a low incidence at these age periods. Another probable reason may be sharing of clothes, towels and other articles along with more outdoor physical activity among students (again in age group 20 to 30 years) living in hostels etc.

In our study out of Out of 128 samples 88 (68.75%) had a positive KOH mount which was in accordance with observations of Meenakshi *et al*., 2012; G. kumaran, 2014; Nisha *et al*., 2016 and Santwana *et al*., 2017 (positive results 62.7 to 68%). A lower KOH positive rate 33% to 57% was reported by researchers Lakshmi *et al*., 2015; Krishan *et al*., 2018; Sumit *et al*., 2014; A Lakshmanan *et al*., 2015; Tonita *et al*., 2016; R. Saraswati *et al*., 2016; Jitendra *et al*., 2016; Shilpi *et al*., 2018; K. Sri Sandhya *et al*., 2018; Jha *et al*., 2019 and Jitu *et al*., 2019. On the contrary higher KOH positive rate 73% to 98.7% was reported by Anil Kumar Gupta *et al*., 2018; KAK Surendran *et al*., 2014; Sucheta *et al*., 2018; Agarwal *et al*., 2014; B. Janardhan, 2017; Soniya *et al*., 2017; Shyam *et al*., 2018; Nitin *et al*., 2018; Syed *et al*., 2018; Mayuri *et al*., 2018; Girish *et al*., 2018; Sripriya *et al*., 2018 and Vandana *et al*., 2019.

In present study deermatophytes were isolated on culture in 72 (56.25%) cases. This observation is in agreement with the reports (51.3 to 64.3%) of other research workers Meenakshi *et al*., 2012; A. Naglot *et al*., 2015; Lakshmi *et al*., 2015; Sucheta *et al*., 2018; G. kumaran, 2014; Soniya *et al*., 2017 and Vandana *et al*., 2019. On the contrary some other research workers Anil Kumar Gupta *et al*., 2018; Krishan *et al*., 2018; Shivanshi *et al*., 2018; Agarwal *et al*., 2014; A Lakshmanan *et al*., 2015; B. Janardhan, 2017; Syed *et al*., 2018 and Mayuri *et al*., 2018 from other parts of the county reported higher rates of positive culture (64 – 81.6%) while low rate (21.5 to 49.3%) of positive culture was reported by KAK Surendran *et al*., 2014; Sumit *et al*., 2014; Nisha *et al*., 2016; Tonita *et al*., 2016; Jitendra *et al*., 2016; Shilpi *et al*., 2018; Shyam *et al*., 2018; K. Sri Sandhya *et al*., 2018 and Jha *et al*., 2019. In our study no growth (culture negative result) even after 4 weeks of incubation was observed in 33 (25.78%) cases. Negative culture or lower rate of positive culture may be probably due to several patients already on antimycotic treatment or self-medication before sampling.

In our study we collected samples of different sites, it was observed that most common clinical type was *T. Corporis* (35.15% cases) followed by *T. Cruris* (21.88% cases) and multiple site of involvement (21.1% cases). This observation is in accordance with the reports of Meenakshi *et al*., 2012; Anil Kumar Gupta *et al*., 2018; A. Naglot *et al*., 2015; Lakshmi *et al*., 2015; KAK Surendran *et al*., 2014; Sudha *et al*., 2016; Shivanshi *et al*., 2018; Sucheta *et al*., 2018; Maninder *et al*., 2018; Agarwal *et al*., 2014; Sumit *et al*., 2014; G. kumaran, 2014; A Lakshmanan *et al*., 2015; Nisha *et al*., 2016; R. Saraswati *et al*., 2016; Jitendra *et al*., 2016; B. Janardhan, 2017; Santwana *et al*., 2017; Shilpi *et al*., 2018; Santhosh *et al*., 2018; Nitin *et al*., 2018; Syed *et al*., 2018; Mayuri *et al*., 2018; Girish *et al*., 2018; Sripriya *et al*., 2018; Jitu *et al*., 2019; Vandana *et al*., 2019 and Antuori *et al*., 2019 i.e. *T. corporis* being most common clinical type followed by *T. cruris.* However, different observations were reported by Soniya *et al*., 2017 *(multiple site involvement),* 7 Krishan *et al*., 2018 *(T. Cruris),* Zuzana *et al*., 2018 (*T. ungium*), Sripriya *et al*., 2018 (*T. ungium*), Babak *et al*., 2018 (*T. mannum*), Rafat *et al*., 2019 (onychmycosis) and Antuori *et al*., 2019 (*T. ungium* in age more than 15 years and *T. capitis* in age less than 15 years).

In our study maximum samples received were skin scraping (86.72% samples) followed by nail clippings (10.94% samples) and least sample were of hair (2.33% samples). Similar pattern was reported by researchers Sumit *et al*., 2014; G. kumaran, 2014; Jitendra *et al*., 2016; Santhosh *et al*., 2018; Jitu *et al*., 2019; and Vandana *et al*., 2019. Probable reason for maximum number of skin samples may be due to the fact that skin is the most easy to penetrate thus most vulnerable structure among skin, hair and nails.

It was observed that, among microbiologically confirmed cases of dermatophytic infections predominant organism was *T. mentagrophytes* (26.31%) followed *T. rubrum* (21.05%). This finding is similar to reports many researchers Sucheta *et al*., 2018; Maninder *et al*., 2018; Agarwal *et al*., 2014; G. kumaran, 2014; Tonita *et al*., 2016; Soniya *et al*., 2017; Santwana *et al*., 2017; Shilpi *et al*., 2018; Santhosh *et al*., 2018; Nitin *et al*., 2018; Mayuri *et al*., 2018; S Balamuruganvelu *et al*., 2019 and Jitu *et al*., 2019**.** However, researchers Meenakshi *et al*., 2012; A. Naglot *et al*., 2015; Lakshmi *et al*., 2015; KAK Surendran *et al*., 2014; Zuzana *et al*., 2018; Krishan *et al*., 2018; Shivanshi *et al*., 2018; Sumit *et al*., 2014; G. kumaran, 2014; Nisha *et al*., 2016; R. Saraswati *et al*., 2016; Jitendra *et al*., 2016; B. Janardhan, 2017; Shyam *et al*., 2018; K. Sri Sandhya *et al*., 2018; Syed *et al*., 2018; Sripriya *et al*., 2018; Jha *et al*., 2019 and Antuori *et al*., 2019 reported *T. rubrum* as predominant organism causing dermatophytosis. *T. verrucosumwas* reported as predominant organism by Anil Kumar Gupta *et al*. (2018) and Vandana *et al*. (2019).

Earlier the growth of non Dermatophytic molds from skin, hair and nail in culture were regarded as contaminant. Their emergence as causal agents of superficial mycosis needs evaluation and their significance is only when same fungi is isolated repeatedly from the same site. In our study, non Dermatophytes were isolated on culture in 23 cases.

Most common non dermatophytes isolate was Aspergillus Niger (30.44%, 07 cases) followed by AspergillusFlavus (13.04%, 03 cases. Meenakshi *et al*. (2012) reported *Chrysosporium tropicum*, G. kumaran (2014) reported Candida albicans, *Aspergillius niger, Mucorand curvalaria* species as non dermatophytes growths. Jitendra *et al*. (2016) reported Candida, Soniya *et al*. (2017) reported *Aspergillus* fumigates and *Fusarium solani* while Jitu *et al*. (2019) reported Candida as non dermatophytes organisms leading to infection clinically diagnosed as dermatophytic infection. Non dermatophytes isolates may be due to contamination or wrong clinical diagnosis labelling them as case of dermatophytic infection.

Conclusion

Males are more commonly infected by dermatophytes. Dermatophytosis is slightly more common in rural area, in people of low socioeconomic status, people with poor hygiene. Middle age group especially 3rd decade is more vulnerable to Dermatophytosis. Most common clinical presentation is *T. corporis* followed by *T. cruris* wherein *T. mentagrophyte* is the prominent organism. KOH and culture are only good methods available for diagnosis of Dermatophytosis and gives well enough results.

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