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Epidemiological studies on Dermatophytoses in Warangal District, Telangana State, India

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Epidemiological studies on Dermatophytoses in Warangal District, Telangana State, India

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Abstract- The frequency of superficial fungal infections is more in hot and humid climate. Seasonal variation of skin diseases, a subject of much epidemiological interest, has been studied for centuries. The present study report is on dermatophytoses in different clinical conditions such as age, sex and seasonal impact in Warangal District, A.P. A retrospective study was done on all new outpatients visiting a single dermatologist Dr. Ramesh, at the Ramesh skin hospital, Warangal, Andhra Pradesh. The study population comprised of all new subjects visiting the outpatient department, from January to December, from 2008- 2010. The total number of cases was recorded according to the month wise prevalence. Data was obtained from the hospital outpatient records and analyzed. The total number of patients with skin diseases was 400 (Males-234 (67%); Females-166 (33%). This difference may be due to increased physical activity and more exposure to the out door activities leading to exposure to infectious dermatophytic agents. In this study, maximum number of patients was seen in the third decade in the age group of 21- 30 years with males outnumbering females. Seasonal variations have a greater impact on dermatophytoses as more number of cases was recorded in summer followed by winter. The prevalence of dermatophytic infections is governed by environmental conditions (Padhye 1970), personal hygiene (Oyeka 1992), and individual susceptibility from place to place. The prevalence of tinea infections was more in urban area with 278 cases (69.5%) than in rural with 122 cases (30.5%).

Keywords: dermatophytosis, tinea or ringworm infections, dermatophytes, woods lamp and skin scrapings.

I. INTRODUCTION

Dermatophytoses are a superficial cutaneous mycoses confined to the outer layers of skin, hair, and nails, and do not invade living tissues. The fungi are called dermatophytes. Dermatophytes, or more properly, keratinophilic fungi, produce extracellular enzymes (keratinases) that are capable of hydrolyzing keratin. These infections are commonly called as tinea infections or ringworm infections. Basing on the area or site of infections these are categorized as tinea capitis (plate-1), tinea corporis (plate-2), tinea manuum (plate-3), tinea cruris (plate-4), tinea facie (plate-5), tinea pedis (plate-6). Dermatophytes are by far the most significant fungi because of their widespread involvement of population at large and their prevalence all over the

world. They are assuming greater significance both in developed and developing countries particularly due to the advent of immunosuppressive drugs and disease. Hot and humid climate in the tropical and subtropical countries like India makes dermatophytosis a very common superficial fungal skin infection. The prevalence of dermatophytic infections are governed by environmental conditions [18], personal hygiene [17], and individual susceptibility from place to place. The isolation of different dermatophytes also varies markedly from one ecological niche to another niche depending on their primary habitat [3]. The isolation of different dermatophytes also varies markedly from one ecological niche to another niche depending on their primary habitat [3]. The Warangal district in Andhra Pradesh (India) is predominantly a rural area with tropical climate. Though the ringworm infections are more prevalent, no systemic study and analysis has been made so far. The present investigations were undertaken to identify the size and magnitude of the dermatophytoses problem in this region. Further objectives were to:

- study the incidence of dermatophytosis according to age and sex factors.
- study the effect of seasonal variations in clinical types of dermatophytosis.
- study the incidence of dermatophytoses in rural and urban areas.

II. MATERIALS AND METHODS

a) Study group

The present study was conducted in Warangal, which has favorable environment for development of superficial mycoses. The climate in the district is hot and humid for most of the year. It receives moderate to heavy rainfall in monsoon season. The present study was conducted on 400 clinically diagnosed patients with dermatophytoses who visited as out patients at Ramesh Skin Hospital (Dr. Ramesh, Dermatologist.) during the two-year period: January 2008 to December 2010. Most of the patients belong to low and middle socioeconomic groups coming from Warangal town and surrounding villages of Warangal district. The data from the patients was collected by supplying a data sheet regarding name, age, sex, address, occupation, family history, socioeconomic background, duration of illness, personal contact at home, work place /school, previous

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medication like antifungal therapy, history of using immunosuppressive drugs and involvement of more than one site. After collecting the information the patients were examined regarding the lesions, types, and presence of inflammatory margins for apparent diagnosis of infection. If the outbreak is large a random sample was examined and data was collected.

b) Sample collection

The samples from patients were collected in aseptic conditions from infected areas such as skin, nail and hair (Robinson 1988, Murray 1999).

- i. *Skin scrapings*: After disinfecting the skin by ethyl alcohol or spirit by using scalpel or blade scrapings are collected and from toe cleft the samples were collected by using epilating forceps.
- ii. *Nail clippings*: After disinfecting the nails were cut on glossy paper and in case of onychomycosis the dorsal plate was scraped.
- iii. *Hair pluckings*: By epilating forceps the hairs were plucked and a part of scalp material was scraped and stored in a glossy paper.

The samples collected from the subjects were immediately transported to the laboratory as early as possible under aseptic condition for further examinations. The following examinations were down to diagnosis and identification of species.

- i. By examination with Woods lamp (Ashwananda, 1999)
- ii. Examining the fungi by treating the scrapings with 10% KOH under microscope
- iii. By staining the histological sections with Periodic acid Schiff (Hotchkiss-McManus) if scraping and culture diagnostic techniques are negative.

- iv. Culturing of organisms from skin scraping and other samples on selective medium as Sabouraud Dextrose Agar for identification of dermatophytic species.

III. RESULTS AND DISCUSSIONS

a) Age and sex wise prevalence of dermatophytoses

The results of analysis made through sex and age wise prevalence of dermatophytosis are presented in Table 1 and Table 2. Out of the 400 patients included in this study, 234 (67%) of the patients were male and 166 (33%) were female. Male to female ratio was 2.03:1. This statistical analysis was shown in Table-1. This difference may be due to increased physical activity and more exposure to the out door activities leading to exposure to infectious etiological agents or fungi. Similar to the present observations, the study on dermatophytosis at Tirupati reported male preponderance with female ratio was 2:1. Dermatophytosis was more prevalent in men (63.4%) than in women (27). Similarly Gupta et al., (2001) have reported male preponderance with female ratio of 2.3:1. Males were affected at least 3 times more frequently than the females, according to the reports of Sentamilselviet al (1997). In most of the other studies there was a predominance of male population than females. In the present study also there was male predominance over female population. This was due to more vulnerable infections such as higher exposure to army, school activities, increased sweating and types of shoes and socks they use [20,21].

Table1 : Sex wise occurrence of dermatophytosis

	Males	Females	Total	Ratio of male/female
No. of cases	234	166	400	2.03:1
Percentage	67	33	100	

Total no. of cases = 400; Total no. of males = 234 (67%);

Total no. of females = 166 (33%)

Table 2 : Age wise occurrence of dermatophytosis

Age(years)	No. of cases	Percentage
0-10 yrs	36	9.0
11-20 yrs	78	19.5
21-30 yrs	102	25.5
31-40 yrs	78	19.5
41-50 yrs	54	13.5
51-60 yrs	28	7.0
61-70 yrs	22	5.5
71-80 yrs	02	0.5
Total	400	100

A critical analysis of Table-2, reveals that the maximum cases were seen in the age group 21 -30 (25.5%) followed by the age groups of 11-20 and 31-40 with same 78 cases each (19.5). Most of patients were in the age range of 20-29 years [27] which confirms to the results of some researches in Iran [15,1]] But in the early years 0-10 years the cases reported were less 36 (9%) than the adolescent age 11-20 with 78 cases (19.5%) as the environmental exposure and physical activities were more in this age group. In the fifth and sixth decades of life there was a gradual decrease in the incidence of disease, so 28 cases (7%) were seen in 51 60 and 22

cases (5.5%) in 61-70 years. Least incidence was reported with only 2 cases (0.5%) in 71-80 age groups due to the less survival rate at this age group. Ranganathan et al (2001). Sharma and Gupta (1983) in their investigations revealed that the maximum number of patients was in the age group of 20 – 30 (30.7%).

This increased incidence of fungal infections may be due to the hormonal change and or increase in sebum secretion [7]. The age group most commonly affected was between 20 and 40 years of age. Females were affected more between the ages of 30 to 40 years based on an Indian study report by Sentamilselviet al (1997). Similarly Verenkaret al (1991), in their study on dermatophytosis reported that ringworm infection were common in third decade of life. Gupta et al (1993) also reported high incidence of infection in the age group of 21-30 yrs. According to a study report based on the Dermatophytoses in Khammam district, Andhra Pradesh, India by Sumana and Singaracharya (2004), the prevalence of infection was more in males and infection was more common in 21-30 years of age group.

The data recorded in Table-3 was analyzed and we concluded that the incidence of dermatophytic infection was high in the age group of 21-30 yrs with males 57 cases recorded (55.8%) and females with 45 cases (44.11%) followed by the age group of 11-20 yrs with males 46 cases (58.97%) females 32 cases (45.02%) and 31- 40 yrs with males 45 cases (57.69%) females 33 cases (42. 30%). In the age group of 41- 50 yrs the males were 31 (57.40%) and females were 22 (42.59%).

Table 3 : Age and sex wise occurrence of dermatophytosis

Age group	Sex	No.of cases	Percentage	Total no. of cases	Total percentage
0-10 yrs	Male	22	61.1	36	9.0
	Female	14	38.98		
11-20 yrs	Male	46	58.97	78	19.5
	Female	32	41.02		
21-30 yrs	Male	57	55.88	102	25.5
	Female	45	44.11		
31-40 yrs	Male	45	57.69	78	19.5
	Female	33	42.30		
41-50 yrs	Male	31	57.40	54	13.5
	Female	23	42.59		
51-60 yrs	Male	18	64.28	28	7.0
	Female	10	35.71		

61-70 yrs	Male	13	59.09	22	5.5
	Female	09	40.91		
71-80 yrs	Male	02	100	02	0.5
	Female	nil	0		

The incidence of dermatophytosis gradually declined in fifth and sixth decades of life with males 18 (64.28%), females 10 (35.71%) in 51-60 yrs age group and males were 13 (51.09%) females 9 (40.91%) in 61-70 yrs age group. In the age group of 0-10 yrs male were 22 (61.1%) and females 14 (38.98%). The least incidence of infection was recorded in the age group of 71-80 yrs with only 2 (100%) cases were reported in males. In a study report by Kamothi (2010) on prevalence of dermatophyte infection in Rajkote District, young adult in age group of 21-30 years were mainly affected. Male to female ratio was 2.03:1. In this study, maximum number of patients was seen in the third decade in the age group of 21- 30 years with males outnumbering females. Similar findings have reported by other workers [19,12]. Senet al, (2005) also reported the male predominance over females, although some authors found higher incidences in the second decade of age [6].

b) Seasonal incidence of dermatophytosis

Seasonal variation of skin diseases, a subject of much epidemiological interest, has been studied for centuries. The data was collected for two years (2008-2010) and the total number of the cases were recorded according to the month wise prevalence and were analyzed according to seasons. The seasonal variations and their impact on dermatophytosis were presented in the Table -4 and the critical analysis showed the high incidence of disease in month of April (49cases, 12.25%) followed by May (43 cases, 10.75%) and June (40cases, 10%). Correlated with seasonal variations majority of our patients with fungal infections were reported to be more in summer. It is known that warm, humid climates create the environment for the development of fungal infections as the temperature, humidity, ultraviolet radiation (UVR), flora and fauna all change with season [11]. The high prevalence of dermatophytosis in June month could be attributed to the extended summer season in Warangal district of Andhra Pradesh.

Table 4 : Month –wise occurrence of dermatophytosis

Month	No. of cases*	Percentage
January	33	8.25
February	27	6.75
March	38	9.5
April	49	12.25
May	43	10.75
June	40	10
July	32	4
August	25	6.25
September	21	5.23
October	22	5.5
November	34	8.5
December	36	9

The frequency of fungal infections varies with seasons. The critical analysis of Table-5 reveals that, the highest number of cases of tineapedis and tineacuris occurred in the summer months, while tineacapitis, tineacorporis and tineanguium occurred in the spring and winter months [28]. Our findings, Table-1 and fig-1, even corroborate with the study report on dermatophytoses in Khammam district, Andhra Pradesh, India by Sumana and Singaracharya (2004). The incidence was more during the months of March to July in patients who were agricultural labourers living in rural areas.

Table 5 : Incidence of clinical types in lab investigation

Clinical types	Tinea corporis	Tinea cruris	Tinea inguinum	Tinea pedis	Tinea capitis	Tinea manuum	Tinea faciei	Total cases
Summer (March-July)	32	43	28	48	32	16	03	202
Winter (Nov-Feb)	19	21	23	20	34	12	01	130
Rainy season (Aug-Oct)	12	14	11	10	14	07	-	68

Figure 1 : Clinical types of tinea infections

Plate-1: Tinea capitis



Plate-2: Tinea corporis



Plate-3: Tinea Mannum



Plate-4: Tinea cruris



Plate-5: Tinea facie



Plate-6: Tinea pedis



The incidence of dermatophytosis in the months of November with 34 cases and December with 36 cases can be explained, as the infections with anthropophilic species being commoner during summers while infections with zoophilic species peaking during the autumn and winter months (Jang, 2000). The higher prevalence of dermatophytoses of pets like cats and dogs, coupled with greater contact of humans with their pets during the winter months have been presumed to result in common tinea infection by zoophilic species. The higher incidence of dermatophytic infections in winter than rainy season is explained that low temperature and lower humidity results in the extensibility, resistance to fissuring and hydration of the stratum corneum, thus contributing to damage of the epidermal barrier thus causing more lesions in winter..

Studies of dermatophyte infestations. *Distribution of dermatophytosis among rural and urban population.*

The prevalence of tinea infections was more in urban area with 278 cases (69.5%) than in rural with 122 cases (30.5%) and the data was presented in Table-6. The incidence of dermatophytosis is very high among the patients of low socioeconomic status in rural population with 91.8% than in urban with 75.89%. This is due to the poor hygienic conditions and overcrowding. Even the people were infected with ringworm infections by soil (geophilic), animals (zoophilic) and contact by man (anthropophilic). In the middle income group the incidence of dermatophytosis was more in urbanites (19.42%) than the rural people (8.19%). The reasons could be attributed to the high humid conditions due to concrete buildings and overcrowding of the population in urban areas.

Table 6 : Prevalence of dermatophytosis in urban and rural population

Socio economic Status	No. of cases in rural	Percentage	No. of cases in urban	Percentage
Low income	112	91.80	211	75.89
Middle income	10	8.19	54	19.42
High income	-	-	13	4.67
Total no. of cases	122	30.5	278	69.5

The prevalence of dermatophytoses in urban and rural schools was reported to be 14.3% and 10% respectively [29]. Our study report is similar with the report on extent and pattern of pediatric dermatoses in rural areas of central India by Vikas Bhatia (1989). The nutrition also has a significant role in the incidence of ringworm infections. The rural children who were lacking the sufficient diet were more prone to the tinea infections in Udaipur district [5].

Children of primary school age are usually between the ages of 3 to 14 years or above in rural areas, and thus, are more susceptible to various infections due to their close contact with each other and low immune status when compared with adults. Some other factors such as enlightenment, customs, and tradition of people, hygiene level and environmental sanitary conditions may influence the prevalence of dermatophytosis [2]. Also, their inability to keep themselves clean always, and their frequent contact with soil and infected pets like dogs and cats at home. The study was carried out to determine the prevalence of dermatophytosis among primary school children [8] at Nigeria, revealed that close contact with the soil and pets increased the incidence of dermatophytoses among the school children.

IV. CONCLUSION

The study revealed that the ringworm or tinea infections are very common in the age group of 21-30 years and less common in two extremities of the age group i.e., children and old age people. The reason for this incidence of dermatophytosis can be attributed to the increased physical activities and increased opportunity for exposure and due to the hormonal change. The male preponderance was observed in ringworm infections with male to female ratio as 2.03:1. The increased incidence in the males might be explained as increased outdoor physical activities and exposure to infectious etiological agents, as mostly they are the breadwinners of the family. Prevalence of tinea infections were observed to be more in summer season than in winter. It is known that warm, humid climates create the ideal environment for the development of fungal infections. The high prevalence of dermatophytosis in June and July months could be attributed to the extended summer season in Warangal district of Andhra Pradesh. The prevalence of tinea infections were found to be more in urban area with 278 cases (69.5%) than in rural with 122 cases (30.5%). But the incidence of dermatophytosis is very high among the patients of low socioeconomic status in rural population with 91.8%

than in urban with 75.89%. This is due to the poor hygienic conditions and over crowding. In the middle income group the incidence of dermatophytosis was more in urbanites (19.42%) than the rural people (8.19%). The reasons could be attributed to the high humid conditions due to concrete buildings and over crowding of the population in urban areas.

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