

Epidemiology of Tinea Capitis among Population of Arar city, Northern Saudi Arabia

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ABSTRACT

Background: Tinea capitis is a mycosis caused by dermatophytes that invade the keratinized tissues such as skin, nails, and hair. It is important to know the prevalence, route of transmission and risk factors of these infections for prevention and treatment of this disease. The objective of this study was to determine the prevalence rate and risk factor associated with tinea capitis in the general population of Arar city, Northern Saudi Arabia. **Methods:** Cross sectional hospital based study. Data collected from 180 participant aged 5- 60 years, attending three randomly selected primary healthcare centers in Arar city during the period from 1st January to 30th June 2017. Participants selected using a systemic random sampling procedure as we take every second person attending the PHC during the study period. Each participant interviewed separately, and confidentiality assured. Data was collected by means of personal interview with the sampled person using a predesigned questionnaire covering the needed items. **Results:** The overall prevalence of tinea capitis among the studied population was 31.1%. Males were more affected (56.7%) than females (P value>0.05) and 35% of cases aged from 16-21 years (P value>0.05). **Conclusion:** The overall prevalence of tinea capitis among Arar population was 31.1%. This indicates the high tendencies of spread of tinea capitis through human-to-human mode of transmission and possible animal contact. Community health education on the cause, mode of transmission, prevention, and prompt treatment of tinea capitis is recommended.

Keywords: Epidemiology; prevalence; Tinea capitis; Arar city; Northern Saudi Arabia.

INTRODUCTION

Tinea capitis is a mycosis caused by dermatophytes that invade the keratinized tissues such as skin, nails, and hair^[1]. Dermatophytic fungi causing tinea capitis can be divided into anthropophilic and zoophilic organisms. Anthropophilic fungi grow preferentially on humans and the most common type forms large conidia of approximately 3-4 µm in diameter within the hair shaft. Zoophilic fungi are acquired through direct contact with infected animals. Smaller conidia of approximately 1-3 µm in diameter typically are present, extending around the exterior of the hair shaft^[2]. The prevalence of tinea capitis and the predominance of its etiological agents are different according to the geographical distribution^[3].

It has a worldwide distribution but is endemic to tropical regions as its growth is facilitated by the warm and moist conditions^[4]. Until recently, tinea capitis was thought to have a high prevalence mainly in the developing world because of poor hygiene, overcrowding and low socio-economic standards.

Also other factors can affect its distribution such as population migration patterns, lifestyle, primary host range, secondary host immunity, presence of immunodeficiency diseases, and patients' attitude

to prompt treatment following clinical presentation and standard of living^[5,6]. It is the most common dermatophytosis in children aged between six months and prepubertal age^[7,8], and its prevalence in Africa among children is 14–86% [5].

In some urban areas in North America, Central and South America, tinea capitis is widespread and it is still very common in parts of Africa and India^[9].

According to the literature, there has been a significant increase in the incidence of tinea capitis and a change in the pattern of infectious agents in particular.

It is important to know the prevalence, route of transmission and risk factors of these infections for prevention and treatment of this disease^[10,11].

It is generally spread through direct or indirect route, the direct transmission via direct contact with an infected person or indirect transmission by sharing facilities, including contaminated hairbrushes, towels, combs or other personal items and backs of seats which is common between family members in low socioeconomic areas. The spores are long lived and can infect another individual months later^[12]. The aim of the study is to obtain a general overview of the current state and changing pattern of tinea capitis in Arar city.

Objectives

The objective of this study was to determine the prevalence rate and risk factor associated with tinea capitis in the general population of Arar city, Northern Saudi Arabia.

PARTICIPANTS AND METHODS

Type of the study: Cross sectional community based study.

Sampling: The sample size calculated using the sample size equation: $n = z^2 p (1-p) / e^2$, considering target population more than 1000, and study power 95%.

Data collected from 180 participant aged 5- 60 years, attending three randomly selected primary healthcare centers in Arar city during the period from 1st January to 30th June 2017. Participants selected using a systemic random sampling procedure as we take every second person attending the PHC during the study period.

Each participant interviewed separately, and confidentiality assured.

Data collection: Data collected by means of personal interview with the sampled person using a predesigned questionnaire covering the following items:

(1) Socio-demographic characteristics including age, sex, educational status, marital status and working status.

(2) Questions regarding the previously diagnosed fungal skin infections (tinea), visiting swimming pools continuously, wearing head cover continuously, clinical manifestations and treatment characteristics in the affected cases, after ensuring the diagnosis and by reviewing the accompanied health reports and prescriptions.

Statistical analysis

Collected data coded and analyzed using statistical package for the social sciences (SPSS, software version 16). Descriptive statistics for the prevalence and quantitative variables was used. Significance of non-parametric factors, which influence the occurrence of cases, was done by Chi-square test. P value considered significant if <0.05 .

Ethical considerations

Data collectors gave a brief introduction to the participants by explaining the aims and benefits of the study. Informed written consent was obtained from all participants. Anonymity and confidentiality of data were maintained throughout the study. There was no conflict of interest.

RESULTS

In table 1 we show socio-demographic data, some risk factor and prevalence of fungal skin infection in studied population, 102 cases from 180 were males and just 78 cases were females and the most affected age ranged from 21-40 years as they represent about 39,4% of the cases. Researchers found that 50% of the cases were married and although above 75% reached university stage, 42% can't get work. When they were asked about visiting swimming pools continuously, 64% of them said 'NO'. The overall prevalence of tinea capitis among the studied population was 31.1%. Exposed to moisture for long period can be considered as a cause of infection as 33% were exposed to that factor, and also 36% of the cases were wearing head cover continuously (Table 2). Table 3 show the relation between fungal infection and socio-demographic characteristics of the studied population. Males were more affected (64.3%) than females and 37.5% of the cases aged from 16-21 years. Studies found that above 50% of the cases were married. Although most of the cases 76.8% reached university education, 42% of them were not working. 33% of the cases visited swimming pools continuously. In addition, 50% of the cases were exposed to moisture for long period of time. 57% of the cases wear a head cover continuously. In table 4 we discuss clinical manifestations of the affected cases and it was found that above 50% of the cases were exposed to psychological stress before the disease and 80% of the symptoms appeared suddenly. Hair loss occurs in the head in 58%. Symptoms appeared in 32.1% after visiting the barber. In 80% of the cases peels appeared in the affected area and 89% had redness or itching. The affected area was associated with fluid oozing or bad odor in 35.7% and in 78.6% of the cases combs were not used by another body. Only 19% of the cases have family member with the same symptoms.

Table 5 illustrates treatment characteristics of the cases. 58.9% of cases started seeking medical care after the onset of symptoms and 55.4% on medical treatment. Only 21% of the cases get natural herbal treatment as garlic or ginger for head area. In 37% of the cases treatment was lasting for 1 week and in 41% the response to treatment was perfect. Only 20% of the cases complained from side effect of treatment. 62.5% cured completely and 20% have recurrence after recovery. There was no difficulty in getting treatment or protection in 53% of the cases.

Table (1): Socio-demographic data, some risk factors and prevalence of fungal skin infection in the studied population

	Sex	Frequency (n=180)	Percent
Gender	Female	78	43.3
	Male	102	56.7
Age group (in years)	< 16	20	11.1
	16-21	63	35.0
	21-40	71	39.4
	41-60	23	12.8
	>60	3	1.7
Marital status	Single	82	45.6
	Married	90	50.0
	Divorced/widow	8	4.4
Educational level	Illiterate	12	6.7
	Primary	11	6.1
	Secondary	15	8.3
	University or more	142	78.9
Working status	Not working	77	42.8
	Working in private sector	45	25.0
	Working in governmental sector	58	32.2
Fungal skin infections (tinea)	No	124	68.9
	Yes	56	31.1
Visit swimming pools continuously	No	116	64.4
	Yes	64	35.6
Is your scalp exposed to moisture for long periods of time	No	119	66.1
	Yes	61	33.9
Do you wear a head cover continuously?	No	114	63.3
	Yes	66	36.7

Table (2): Sociodemographic data, some risk factors and prevalence of fungal infection in the studied population

	Sex	Frequency (n=56)	Percent
	Female	20	35.7
	Male	36	64.3
Age group (in years)	< 16	6	10.7
	16-21	21	37.5
	21-40	20	35.7
	41-60	7	12.5
	> 60	2	3.6
Marital status	Single	22	39.3
	Married	29	51.8
	Divorced/widow	5	8.9
Educational level	Illiterate	4	7.1
	Primary	3	5.4
	Secondary	6	10.7
	University or more	43	76.8
Working status	Not working	24	42.9
	Working in private sector	13	23.2
	Working in governmental sector	19	33.9
Visit swimming pools continuously	No	37	66.1
	Yes	19	33.9
Is your scalp exposed to moisture for long periods of time	No	28	50.0
	Yes	28	50.0
Do you wear a head cover continuously?	No	32	57.1
	Yes	24	42.9

Table (3): relationship between fungal infection and sociodemographic characteristics of the studied population

	Sex	Fungal		Total (n=180)	
		Yes (n = 56)	No (n=124)		
	Female	20	58	78	0.112
		35.7%	46.8%	43.3%	
	Male	36	66	102	
		64.3%	53.2%	56.7%	
Age	< 16	6	14	20	0.696
		10.7%	11.3%	11.1%	
	16-21	21	42	63	
		37.5%	33.9%	35.0%	
	21-40	20	51	71	
		35.7%	41.1%	39.4%	
40-60	7	16	23		
	12.5%	12.9%	12.8%		
>60	2	1	3		
	3.6%	.8%	1.7%		
Marital status	Single	22	60	82	0.109
		39.3%	48.4%	45.6%	
	Married	29	61	90	
		51.8%	49.2%	50.0%	
Divorced/widow	5	3	8		
	8.9%	2.4%	4.4%		
Educational level	Illiterate	4	8	12	
		7.1%	6.5%	6.7%	
	Primary	3	8	11	0.873
		5.4%	6.5%	6.1%	
	Secondary	6	9	15	
		10.7%	7.3%	8.3%	
University or more	43	99	142		
	76.8%	79.8%	78.9%		
Occupational Status	Not working	24	53	77	0.915
		42.9%	42.7%	42.8%	
	Working in privet sectors	13	32	45	
23.2%		25.8%	25.0%		
Working in governmental sector	19	39	58		
	33.9%	31.5%	32.2%		
Visiting swimming pools continuously	No	37	79	116	0.447
		66.1%	63.7%	64.4%	
Yes	19	45	64		
	33.9%	36.3%	35.6%		
Exposure of scalp to moisture for long time	No	28	91	119	0.002
		50.0%	73.4%	66.1%	
Yes	28	33	61		
	50.0%	26.6%	33.9%		
Wearing head cover continuously	No	32	82	114	0.161
		57.1%	66.1%	63.3%	
Yes	24	42	66		
	42.9%	33.9%	36.7%		

Table (4): Clinical manifestations of the affected cases, Arar, 2017

Variable	Frequency (n=56)	Percent
Are you exposed to psychological stress before disease?		
No	26	46.4
Yes	30	53.6
Have the symptoms suddenly appeared		
No	11	19.6
Yes	45	80.4
What is the area that suffered by hair loss?		
Toes of the foot	1	1.8
Eye lashes and eyebrows	4	7.1
Head	33	58.9
Bear and Mustache	5	8.9
No	1	1.8
Other sites	12	21.4
If the affected area in the head or beard or mustache, the symptoms appeared after a visit to the barber		
No	38	67.9
Yes	18	32.1
Peels appear in the affected area		
No	11	19.6
Yes	45	80.4
Redness or itching in the affected area		
No	6	10.7
Yes	50	89.3
Shape of the affected area of hair loss		
Circular or oval	22	39.3
Irregular	34	60.7
Is injury in one area		
No	22	39.3
Yes	34	60.7
Fluid oozing from the affected area		
No	36	64.3
Yes	20	35.7
Bad odors from the affected area		
No	43	76.8
Yes	13	23.2
Is your comb used by another body		
No	44	78.6
Yes	12	21.4
Do you have a family member of the same symptoms after your injury		
No	45	30.4
Yes	11	19.6

Table (5) Treatment characteristics in the affected cases, Arar, 2017

Variable	Frequency (n=56)	Percent
Seeking medical care after the onset of symptoms		
No	23	41.1
Yes	33	58.9
Having medical treatment		
No	25	44.6
Yes	31	55.4
Natural treatment like garlic or ginger for the head area		
No	44	78.6
Yes	12	21.4
Degree of response to medical treatment		
Perfect	23	41.1
Good	22	39.3
No response	11	19.6
Did you have any side effects of treatment		
No	45	80.4
Yes	11	19.6
Duration of treatment (in weeks)		
< 1	21	37.5
1-3	19	33.9
3-6	12	21.4
> 6	4	7.1
Have you cured of this disease		
No	21	37.5
Yes	35	62.5
Do you have any information about the disease before the injury		
No	44	78.6
Yes	12	21.4
Have you followed the procedures to prevent the spread of the disease		
No	25	44.6
Yes	31	55.4
Does this disease affect you psychologically		
No	25	44.6
Yes	31	55.4
Have you been injured after recovery		
No	39	69.6
Yes	17	30.4
Have you had difficulty in treatment or protection		
No	30	53.6
Yes	26	46.4

DISCUSSION

Tinea capitis is a contagious disease caused by species of *Microsporum* and *Trichophyton* that is endemic in many countries. It is a common disease of the general populations but it affects primarily the pre-pubertal children between 6 and 10 years, this might be as a result of poor hygiene at this age as well as the absence of saturated fatty acids that provide a natural protective mechanism

against dermatophytoses. The prevalence rates vary from place to place.^[13] Various factors play a role like socio-economic factors, nutrition, personal hygiene etc^[14].

The objective of this study is to determine the prevalence rate and risk factor associated with tinea capitis in the general population in Arar city, Northern Saudi Arabia. A cross sectional study, included 180 person attending three

randomly selected primary healthcare centers in Arar city during the period from 1st January to 30th June 2017. Participants selected using a systemic random sampling procedure as we take every second individual attending the PHC during the study period. Data collected by means of personal interview using a predesigned questionnaire covering the required items.

Our results revealed that the prevalence rate of tinea capitis was 31.1%. This result was higher than those obtained by **Abanmi A *et al.*** which were carried out on 119 participants in Riyadh region of Saudi Arabia ^[15], the prevalence of tinea capitis was 21.9%.

The results of this study emphasize the high incidence of tinea capitis among participants between the ages of 16 to 40 years (as 73.2% of all cases seen in this age group). Incidence is high in the age group of 5-16 years.

Similar finding noted in our study. 10.7% of the tinea cases were under 16 years old. This percentage is nearly to the results reported in Egypt; in Alexandria, the prevalence among primary school children was 7.5% ^[16]. On the other hand, our figure is much lower than that reported in schoolchildren at the same age group in Ismaelia, Azab *et al.* ^[17] reported that the prevalence was 92.9%. However, the limited number in **Azab *et al.*** study (only 56 children) may explain the wide discrepancies found. Another study done by **Triviño-Duran *et al.*** ^[18] who examined 1,305 school children, aged 3-15 years, in Barcelona and found that the infection rate was 0.23%, which is much lower than our results.

With respect to gender, in the current study, prevalence was higher among males than females, but the association was not significant ($p = 0.112$). Males infected with high rates probably due to haircuts, unclean barbers and personal equipment (like combs) with friends frequently compared with females. Also because females are always more cognizant of their appearances; and care more about personal hygiene and hair that promotes health than males. This study is in agreement with the findings in Western Nigeria ^[19,20].

Other life style factors can affect Tinea capitis prevalence, like hair dressing and styling practices such as tight hair braiding, shaving of the scalp, plaiting, and the use of hair oils which may promote disease transmission. However, the precise role of such practices remains a subject of study ^[21].

In the present study, 19.6% of our cases, another member of the family were affected because of direct contact with the patient or

indirect contact via sharing beds and other personal equipment such as combs and towels with the infected individuals ^[22]. This may be because of the prevailing fungal, social, and environmental conditions in the area. Clinical presentation of tinea capitis varies from a scaly noninflamed dermatosis resembling seborrheic dermatitis to an inflammatory disease with scaly erythematous lesions and hair loss or alopecia that may progress to severely inflamed deep abscesses termed kerion, with the potential for scarring and permanent alopecia. Most common presenting feature in our cases was alopecia with the scalp in most of the cases (58.9%). Another study done by **Khorchani H. *et al.*** ^[23] supported the high prevalence of scalp alopecia as a clinical picture of Tinea Capitis.

CONCLUSION

The overall prevalence of tinea capitis among Arar population was 31.1%. This indicates the high tendencies of spread of tinea capitis through human-to-human mode of transmission and possible animal contact. Community health education on the cause, mode of transmission, prevention, and prompt treatment of tinea capitis is recommended.

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