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Epidemiology of Tinea Capitis and Associated Factors among School Age Children in Hawassa Zuria District, Southern Ethiopia, 2016

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Abstract

Introduction: Africa, being the settings mostly affected, the rates of tinea infection ranges between 10 and 30% among school-aged children. For instance in Ethiopia, the prevalence of tinea capitis among school children was 47.5%. The aim of this study was to determine the magnitude of tinea capitis and associated factors among school age children in Dorebafano town, Hawassa Zuria Disrict, Southern Ethiopia.

Methods: A community based cross-sectional study design was conducted among 292 children in Dorebafano town from June 30 to July 6, 2016 using systematic random sampling technique. Data was collected using pretested and interviewer administered structured questionnaire. The presence or absence of tinea capitis was confirmed by physical examination and taking samples from scalp scratch and observing under a microscope with potassium hydroxide (KOH). Logistic regression was carried out to identify factors associated with presence of tinea capitits. Model fitness was checked using Hosmer and Lemeshow show.

Result: The magnitude of tinea capitis among the study subjects was 32.3% [CI: 27.3%-37.5%]. Age of child (AOR=3.2, 95% CI: 1.40, 7.00), sex of child (AOR=0.10, CI (0.03, 0.40), educational status of the child (AOR=6.9, 95% CI: 1.4, 33.5) and presence of similar illness (AOR=6.49, 95% CI: 2.42, 17.43) were identified to be independent factors for the occurrence of tinea capitis.

Conclusion: The magnitude of tinea capitis among the study subjects was found to be high. Age, sex, educational status of children and presence of similar illness were identified factors for occurrence of tinea capitis. Health promotion, health education measures and early identification and treatment of tinea capitis need to be given emphasis.

Keywords: Tinea capitis; School aged children; Dorebafano town

Introduction

Tinea capitis is a disease resulted due to cutaneous infection of the scalp, eye lashes and eye brows. Similar terms are used to name the infection, including ringworm of the scalp and Tinea tonsurans. The disease is considered to be a form of superficial mycosis or dermatophytosis [1]. It accounts for up to 92.5 % of dermatophytoses in children younger than 10 years [2,3]. It is a contagious disease which is endemic in many countries that causes specific therapeutic challenges [4].

In spite of the high cases being detected in poor resource settings, these infections have a worldwide distribution with most cases being diagnosed in Africa, Asia, and Southern and Eastern Europe [5-7] and having curable nature of the disease, inter-human transmission of tinea capitis is nevertheless a significant public health problem due to the increasing number of children affected and the risk of contagion in schools [8] where its transmissibility enhanced by poor hygiene, overcrowding, contaminated hats, brushes, pillows and other inanimate objects [9].

Africa, being the settings mostly affected, the rates of tinea infection ranges between 10 and 30% among school-aged children [10]. For instance in Ethiopia, Nigeria and Palestine, the prevalence of tinea capitis among school children was 47.5%, 40% and 27% respectively [11-13] yet it is now uncommon in the developed world due to improved social condition and the development of effective treatments [14].

Tinea capitis happens predominantly in rural areas and some of the factors that favor the occurrence of the infections are poor personal hygiene, overcrowding, and low socioeconomic status [15], educational and occupational status of parents, being male, sharing facilities, close contact with people with the diseases as contributing factors. Organisms that cause tinea capitis are usually found as fomites on items such as combs, hats, pillows, and theater seats, where the spores can live for long periods of time, contributing to spread of the disease [16].

Nevertheless, the epidemiological distribution of tinea capitis has shown diverse geographical and seasonal variations depending on several factors, including life style, type of the population, migration of people and climatic conditions [17]. Apart from climate, the variability in distribution 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's attitude to prompt treatment following clinical presentation and standard of living [18,19].

Difficulty of obtaining information from children, anxiety of children about the examinations and hair removal, incorrect information regarding monthly income and personal hygiene, unawareness of peoples who are interviewed about Tinea capitis, nature of study sample and its size, lack of appropriate policy for controlling tinea capitis were some of the obstacles identified in the prevention and control of tinea capitis [20,21].

Health promotion and health education to promote good hygiene, better living conditions, early identification and treatment, periodic surveillance of Tinea capitis, training for school teachers and appropriate policy were some the recommended interventions to control this contagious infection [20,22]. Therefore, this study was aimed to determine the magnitude of tinea capitis and associated factors among school aged children in Dore bafano town, Hawassa Zuria District, Sidama Zone, Southern Ethiopia.

Materials and Methods

Study setting

The present study was conducted in Dore Bafano town, Hawassa Zuria District, Sidama Zone, Southern Ethiopia. The town is located 23 kilometer (KM) from Hawassa; capital city of Southern Nation and Nationalities and people Region, Ethiopia and 298 KM far from Addis Ababa; capital city of Ethiopia.

Study design and population

Community based quantitative cross sectional study design was employed to assess the magnitude of tinea capitis and associated factors among school age children (6-15 years). The source and study population were all school age children with their parents/care takers and living in Dorebafano town. Children who were diagnosed as, mentally and physically not capable of being interviewed, by physicians and residing in the study area for less than six months were excluded from the study.

Sample size and sampling procedure

Sample size was determined using single population proportion formula considering the following assumption: 95% confidence level (Za/2), 5% margin of error (d) and proportion (p) of tinea capitis in previous study was taken as 47.5% [11].

n (sample size) = $Z_{\alpha/2})^2 \frac{P[1-P]}{d^2}$, n=383, since the total number of children in the town was less than 10,000, correction formula was used to calculate the final sample size and it became 292 with 10% non-response rate. The study subjects were selected using systematic random sampling.

Data collection tool and procedure

Pre-tested and interviewer administered structured questionnaires and physical examination was used to collect quantitative data. Five registered female nurses and two laboratory technicians were recruited to collect the data. For laboratory examination, before collecting specimens any ointment or local appliances on children's head were removed with alcohol and then infected hairs appearing as broken off hairs were collected with gentle rubbing with moist gauze and transported in a folded square paper to laboratory. The specimens were treated for 30 minutes with two drops of potassium hydroxide (KOH) and carefully examined under low (X10) and high (X40) power objective lens for the presence of hyphae and bud.

Two Bachelor degree holder nurses supervised the overall data collection process and check for filled questionnaire for consistency and completeness. The questionnaire was prepared in English language and translated to Sidamigna language/local language and back to English to maintain the consistence of the data. Training was given to data collectors for two days. During and after data collection, questionnaires were reviewed and checked for completeness and relevance by the principal investigators and the supervisors.

Data processing and analysis

After data collection, each questionnaire was checked for completeness and code was given before data entry. Data was cleaned and entered into computer by using EPI Info version 3.5.3 and the analysis was done using SPSS version 20.0. Data was edited and cleaned before data analysis.

Frequency, percentage and descriptive summaries were used to describe the study variable using univarite analysis. Logistic regression was carried out to identify factors associated with presence of tinea capitis. Adjusted odd ratio (AOR) with 95% Confidence Interval (CI) and p-value were computed to measure the associations between the outcome variable and the explanatory variables. A p-value of less than 0.05 was considered as a significant result. The fitness of the model was checked by Hosmer and Lemeshow and the p-value was found to be 0.966.

Ethical consideration

Ethical clearance was obtained from the ethical clearance Institutional Review Board of Hawassa University, College of Medicine and Health Sciences. Supportive letters was taken from Dorebafano town health office. The study participants were informed about the purpose of the study and informed written and verbal consent was taken from parents/care takers of children. During data collection children with clinical manifestation of tinea capitis were provided health education and referred the near bye health facilities for further investigation and treatment.

Results

Socio demographic and economic characteristics

A total of 288 children aged 6-15 were included in the study with a response rate of 98.6% where, 166 (57.6%) were females. Age of the study subjects ranged from 6 to 15 years with three among four 217 (75.3%) children were found in the age range 6 to 10 years and the mean age of the study participants was 8.96 years (+2.625) standard deviation (SD). The average family size of the study participants was 5.22. Two hundred sixty eight (93.1%) and 276 (95.8) were protestant by religion and Sidama by ethnicity, respectively (Table 1).

Concerning education status, one among five, 58 (20.1%) mothers attended secondary and above school, 125 (43.4%) of their partners/husbands attended primary education and nearly two among three children attended grade 1 to 4. Almost two among three mothers, 182 (63.2%) were house wife by occupation and 118 (41%) of their counterparts were merchant by occupation. One hundred four study participants (30.4%) were living in rural areas.

The average number of living rooms of the study participant was found to be 2.2 with the minimum and the maximum being 1 and 5 respectively. Almost one in five, 66 (22.9%) study participants perceived that there is overcrowding in the living household. Nearly two among three households, 169 (58.7%) had monthly income of one thousand and less Ethiopian Birr (Table 2).

Characteristics		Frequency	Percentage
Age of child in years	6-10	217	75.3
	11-15	71	24.7
Sex	Male	122	42.4
	Female	166	57.6
Religion	Protestant	268	93.1
	Orthodox	4	1.4
	Muslim	16	5.6
Ethnicity	Sidama	277	96.2
	Gurage	7	2.4
	Silte	4	1.4
Family size	1-4	103	35.8
	≥ 4	185	64.2
Place of residence	Urban	221	76.7
	Rural	67	23.3
Educational status of children	Didn't start	41	14.2
	Kindrgarten	47	16.3
	1-4	179	62.2
	>4	2	7.3
Maternal education	Can't read and write	76	26.4
	Read and write	31	10.8
	Primary education	123	42.7
	2nd education and above	58	20.1
Paternal education	Can't read and write	53	18.4
	Read and write	31	10.8
	Primary education	125	43.4
	Secondary and above	79	27.4
Maternal occupation	Housewife	182	63.2
	Merchant	39	13.5
	Governmental employee	67	23.3
Paternal occupation	Governmental employee	68	23.6
	Farmer	102	35.4
	Merchant	118	41
Number of living rooms	≤ 2	196	68
	>2	92	31.9
Monthly Family income (in Ethiopian Birr)	≤ 1000	169	58.7
	1001-2000	55	19.1
	2001-3000	23	8
	3001-4000	41	14.2

Table 1: Socio demographic and socioeconomic characteristics of the study subjects in Hawassa Zuria District, Sidama Zone, Southern Ethiopia, 2016.

Variables		Frequency	Percentage
Clinical Manifestation:			
Itching	Yes	97	33.7
	No	191	66.3
Loss of hair	Yes	30	10.4
	No	258	89.6
Scarring alopecia	Yes	14	4.9
	No	274	95.1
Oozing of the lesion	Yes	7	2.4
	No	281	97.6
Scaly lesion	Yes	121	42
	No	167	58
Sharing of bed	Yes	206	71.5
	No	82	28.5
Sharing of blades/scissors for cutting hair	Yes	61	21.2
	No	227	78.8
History of contact with animals	Yes	166	57.6
	No	122	42.4
Presence tinea capitis in the family member	Yes	47	16.3
	No	241	83.7

Table 2: Tinea capitis related characteristics among children/study subjects in Hawassa Zuria District, Sidama Zone, Southern Ethiopia, 2016.

Of the study subjects 97 (33.7%) and 30 (10.4%) had a clinical manifestation of itching and loss of hair in their head.

Nearly seven among ten, 206 (71.5%) study subjects shared sleeping bed with siblings and parents. It was found that 166 (57.6%) of the household members had history of contact with animals. It was also

observed that forty seven (16.3%) of the study subjects family members ah history of tinea capitis related illness (Table 2).

Magnitude of Tinea capitis

The overall magnitude of tinea capitis among the study subjects was 93 (32.3%) [CI: 27.3%-37.5%].

Among the total positive results of tinea capititis microscopically nearly two in three 72/93 (77.41%), three in ten 28/93 (30.10%) and 13/93 (13.97%) children had a clinical manifestation of itching, loss of hair and scaring alopecia, respectively (Table 2).

Associated factors with occurrence of Tinea Capitis

In the multiple binary logistic regression analysis after controlling potential confounders: age of child, sex of child, educational status of the child, sharing of bed, presence of similar illness in the family members were found to be significantly associated with occurrence of tinea capitis among children.

The present study revealed that children in the age group 6-10 years old were three times (AOR=3.2, 95% CI: (1.4, 7.0)) more likely to develop tinea capitis compared with the age group 11-15 years old.

Variables	Presence of tinea capitis		Crude Odd Ratio (COR)	Adjusted Odd Ratio (AOR)	P-value
Age of child	Yes	No			
6-10	78	119	2.10 (1.10,3.90)	3.20 (1.40,7.00)	0.005
11-15	17	56	1	1	
Sex					
Male	48	74	1	1	
Female	45	121	1.70 (1.06,2.90)	0.10 (0.03,0.40)	0.001
Educational status of the child					
Didn't start	12	29	1.34 (0.47,3.86)	1.66 (0.40,6.89)	0.485
Kindergarten	23	24	3.07 (0.97,9.74)	6.94 (1.43,33.53)	0.016
1-4	53	126	1.32 (0.40,4.44)	2.65 (0.51,3.13)	0.245
≥ 5	5	16	1	1	
Similar illness in the family					
Yes	40	7	15.95 (6.74,37.79)	6.50 (2.42,17.44)	0.00
No	53	188	1	1	

Table 3: Factors Associated tinea capitis among children in Hawassa Zuria District, Sidama Zone, Southern Ethiopia, 2016.

The study showed that the occurrence of tinea capitis among females was 90% (AOR=0.10, CI (0.03, 0.40) less likely to occur compared with males.

Children whose school level in kindergarten were 7 times (AOR=6.9, 95% CI: 1.4, 33.5) more likely to develop tinea capitis than who were above grade 5 and above.

Another important factor was having tinea capitis among the family members. The probability of tinea capitis occurrence was 6 (AOR=6.496, 95% CI: 2.42, 17.43) times higher among children whose family members had tinea capitis (Table 3).

Discussion

In spite of the high cases being detected in poor resource settings, tinea capitis has a worldwide distribution with most cases being diagnosed in Africa, Asia, and Southern and Eastern Europe. Thus, this study had tried to determine the magnitude of tinea capitis and associated factors among school age children in Dore Bafano town, Hawassa Zuria District, Sidama Zone, Southern Ethiopia

In the present study the magnitude of tinea capitis was determined to be 32% [CI: 27.3%-37.5%] supported with laboratory investigation. This prevalence was indicated to be lower than those obtained in North West Ethiopia (47.5%), [11]. Tulugudu Island, Ethiopia, (79.5%) [23,24], in Mathare, an informal settlement in Nairobi, Kenya (81.2%) [25], nearly similar with a study conducted in Kenya (33.3%) [10], and higher than a study done in Tanzania (4%) [25]. Many factors has been contributing for the difference in the magnitude of tinea capitis which might be due to population growth, close contact among infected children at home and school, and poor personal hygiene as a result of less access to water and hygienic materials in general.

This study demonstrated that tinea capitis is more likely to increase among school aged children who were in the age group 6-10 years compared with children in the age group 11-15 years old. This result was supported with the finding s in Nigeria [10] and Kenya [24]. This might be due to 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.

On the other hand, probably because females are more cognizant of their appearances; and as a result they care more about personal hygiene and hair that promotes health than males, it was pointed out tinea capitis was more likely to occur among males in comparison with females whose number of children were above four. It is also perhaps that males were most infected with high rates probably due to with haircuts, unclean barbers and personal equipments (like combs) with friends frequently compared with females. This study was in agreement with the finding in Western Nigeria [26,27].

Tinea capitis was more likely to occur among children who were attending kindergarten compared with children attending grade five and above. This might be explained by the fact that there is no question that as level of education increase, awareness and knowledge of students about personal hygiene will be increased and they will be able to care themselves. Education provides better health knowledge and improves the effectiveness of health behavior.

The study also revealed that the probability of having tinea capitis was increased among children whose family members had similar illness (tinea capitis) compared with those who were free from tinea capitis. The higher tinea capitis among children whose family members had similar illness might be due to the fact that there would be a higher probability of frequent contact and sharing of personal equipment such as combs and towels with the infected individuals.

When interpreting the finding of this study, scholars need to take into consideration the following limitation. First, the cross sectional nature of the data had made impossible to arrive at the causal relation between the different explanatory variables and occurrence of tinea

capitis. Second, culture was not performed to identify the types of fungal species.

Conclusion

In general the magnitude of tinea capitis among the study subjects was found to be 32% [32%, CI: 27.3%-37.5%]. Age, sex and educational status of children and presence of similar illness were identified to be independent factors for occurrence of tinea capitis.

Health promotion and health education measures needs to be given emphasis to promote good hygiene, better living conditions, early identification and treatment and there needs to have a continuous epidemiological surveillance of tinea capitis in a community as an important component in the prevention and control of this infectious disease.

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Contributions

Desalegn Tsegaw Hibstu (DTH) took part in planning the study, monitoring data collection process and analyzing the data, writing the result and the manuscript. Deresse Legesse Kebede (DLK) participated in data collection process and writing the manuscript. Both authors read and approved the final manuscript.

Competing Interest

The authors declared that there are no competing interests

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