



Research/Technical Note

Assessment on Prevalence of Tinea Capitis and Its Associated Factors among School Children in Addis Zemen, Northwest Ethiopia, 2016

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Abstract: Tinea capitis also known as "herpes tonsurans ringworm of the hair, ringworm of the scalp and tinea tonsurans is a cutaneous fungal infection (dermatophytosis) of the scalp. It is a common infection especially in poor socioeconomic settings. This study determines the high prevalence of Tinea capitis and its associated factors in school children in Addis Zemen, South Gondar, North west Ethiopia. The objective of this study is to assess Prevalence and associated factors of Tinea capitis among school children in Alabo elementary school, Addis zemen. A Cross sectional study was carried out among 405 school children in Addis zemen in 2016. The data were collected by interviewer administrated questionnaire and physical examination. The collected data was entered and analyzed by SPSS version 20, Binary logistic regression was done to assess the association between each independent and dependent variable. Hosmer-lemeshow goodness-of-fit was also done to assess the reliability of our data. P-value and odds ratio was done to assess the magnitude and strength of the correlation between covariates and dependent factor. Among 405 school children the prevalence of tinea capitis was 88 (21.7%) with 95%C.I=18.3-26.2; Of which it is significantly associated with age (AOR=5.92, 95%C.I= 1.51-23.21), family size (AOR=3.12, 95%C.I=1.25-7.81), occupational status of mother (AOR=0.193, 95%C.I=0.05-0.86), bed room sharing (AOR=5.62, 95%C.I=1.09-28.84), comb sharing (AOR=3.86, 95%C.I=1.68-8.87), and family member with same symptom (AOR=8.54, 95%C.I=3.26-22.35). in conclusion Tinea capitis is prevalent in Addis Zemen, Northwest Ethiopia, risking children to poor quality of life associated with different risk factors. Provision for prevention and control should be set in the community, schools and health facilities focusing on health education, sanitation and hygiene control programs.

Keywords: Tinea Capitis, Prevalence, Addis Zemen, School

1. Introduction

In developing countries, where the majority of people have a low income and live in resource-poor settings, skin infections are prevalent. Data from recent studies provide insight into the most common skin infections and their

management [1].

Ethiopia is a financially poor country, with 40% of the population living on less than 1 US dollar a day. Among the adult population levels of illiteracy are 42%, and the availability of health care falls below World Health Organization (WHO) recommendations. A major issue that

affects the practice of dermatology in Ethiopia is poverty. Although much of the healthcare is subsidized, many patients cannot afford medication, especially for chronic diseases. Several studies confirm that skin infections account for the majority of pediatric mortality and morbidity in developing countries. They are prevalent in resource-poor settings and rural areas in certain parts of the world. Also, hot, humid climates and overcrowding predispose to skin infections. Most of the skin infections are curable with effective medication [1-3].

Tinea capitis most commonly affects school children & immune compromised adult. The cause is said to be low socioeconomic status. A study conducted in parts of Africa including Ethiopia has shown that lack of knowledge about the prevalence, carrier status, and the absence of control measures are the main reason for spread of the disease. Permanent hair loss and bald patches may be caused, due to a worsening of the scalp condition. Associated to these school children may not be able to follow their education regularly and attentively which may end up with drop out [5, 6, 8].

There are different risk factors associated to tinea capitis. Zoophilic dermatophytes were responsible for 80% of cases of tinea capitis in Adana [14]. A study carried out in Turkey try to deduce that, since all tinea capitis agents were zoophilic, it can be interpreted that tinea capitis may probably be transmitted from infected animals to the students. It is known that tinea capitis was more common in children living in home with domestic animals. Children getting education in rural areas were more likely to present with tinea capitis than children in urban areas. School settlement was identified as a risk factor for tinea capitis [15].

Another study conducted on school children in Gondar suggests provisions for prevention and control should be set in the schools focused on hygiene control and health education. Asymptomatic carriers should be detected and treated. Increased surveillance in school will be help full. Transmission should be prevented by avoiding sharing of personal object such as combs, hairbrushes, hats, toys with sibling and play mates of patients [4, 5, 9].

Tinea infections has remained a significant public health problem with poor hygiene, sharing of fomites, overcrowding and low socio economic and other factors that predisposes population to infection [10, 11].

Knowing the prevalence of Tinea capitis and its associated factor helps us to enforce the responsible bodies to take appropriate measure and we can decrease the prevalence of Tinea capitis by increasing awareness on the prevention and control methods of disease by identifying risk factors like poor hygiene, sharing of materials, exposure of children to animals, poor nutritional condition, initiating early health seeking behavior and to take drugs as prescribed by physician with good precaution.

2. Methods

Study Design and Period

Institutional based Cross- sectional study was conducted in

Addis Zemen Town, Northwest Ethiopia from January to February, 2016.

Study Area

This study was conducted in Addis Zemen which is the administrative center of Libokemkem woreda.

It is located approximately 645 km Northwest of Addis Ababa, 62 km from the Zonal town Debre-Tabor, 82 Km from the capital of the region Bahir Dar. Addis Zemen has a 12°07'N latitude, 37° 47'E longitude and an elevation 1975m (6480ft) above sea level. The city enjoys Woynadega type of climate with an average temperature of 25 °C.

Based on figures from the Central Statistical Agency in 2008 the city has an area of 4.81km² and a total population of 26756. It has three elementary school, one secondary and preparatory schools. It has also one hospital and one health center. Most of the people are Christian followers.

In the town administration there are 4 Kindergartens, 4 first cycles primary schools/1-4/, 3 first full cycle primary schools/1-8 /, 1 high School, 1 preparatory School, and 1 Technical and vocational training center. Generally there are 14 educational institutions.

Alabo is one the full cycle primary school which was founded in 1997, currently it has 1036 students, in around 37 classes, 3 students on one chair. Class rooms are cleaned by the students themselves. The school has 3 toilets and one tap water supply.

The existing health infrastructure in the town is 1 governmental health center, 3 private clinics, 1 Primary hospital and one ambulance service.

Source Population

School children who live in Addis Zemen.

Study Population

School children who are attending in Alabo elementary school in Addis Zemen.

Sample size determination

The sample size was calculated by using single population proportion formula to obtain the sample size needed to estimate the prevalence of tinea capitis and its associated factors among elementary school children in Addis zemen, taking the prevalence of tinea capitis as 47.5% based on research conducted among school children in Gondar, North West Ethiopia on October 2009

$$n = (Z_{\alpha/2})^2 p (1-p) / d^2$$

Where:

n = minimum sample size required for the study

Z = standard normal distribution (Z=1.96),

CI of 95% = 0.05

p = prevalence of tinea capitis and its associated factors

d = tolerable margin of error = 5% (0.05)

$$n = (1.96)^2 \times 0.475(1-0.475) / (0.05)^2 = 383$$

By adding 10% that of non-response rate the total sample size for this study was 422.

Sampling Technique

Systematic random sampling technique was used in our study, since our study subjects were heterogeneous. We determine the sample interval by dividing the total number of students by desired sample size.

$K=1036/422=2.4\sim 2$, then from two students on their sit, we select one which is random start. And we continuously select every second student from the random start until we get our sample size 422 in every class from grade one to eight.

Data Collection Methods

The questionnaire was prepared first in English, then translated to Amharic, the local language, to collect socio-demographic data from all subjects. It was prepared considering demographic, socio-economic status, and history of contact with animals. Public health professionals examine each individual regarding symptom, and data pertaining to the physical examination was also filled out in the same questionnaire.

Data Collection Techniques and Tools

We collected our data using interviewer administrated questionnaire. Physical examination was also done for all subjects.

Data Processing and Analysis

The collected data was processed using computer which involves editing, categorizing the question, coding, computerization and preparation of tables and diagrams. The above procedures helped us to minimize data error. Cares was taken in editing (rearranging) answers to questions. The obtained and registered data was entered, compiled and analyzed by SPSS version 20. Binary logistic regression was done to assess the association between each independent and dependent variable. Hosmer-lemeshow goodness-of-fit was also done to assess the reliability of our data. P-value and odds ratio was done with 95% confidence interval to assess the magnitude and strength of the correlation between covariates and dependent factor. The results was presented by tables and charts.

Ethical Consideration

Ethical clearance was obtained from University of Gondar, Collage of Medicine and Health Science, department of Public Health. Alabo elementary school administration, teachers and study participants (students) were informed about the benefit

of the research and their willingness were obtained. We didn't enforce those who were reluctant to respond to our questionnaire.

3. Results

Demographic characteristics

Our study shows that 203(50.1%) were male. The age of majority of study subjects 225 (55.6%) were in the range of 10-14 years, followed by 5-9 years, which were accounting 107 (26.4%). The mean age is 11.6, ranged from 5-18. Regarding the educational status of study subjects, more than half of them (52.1%) were in grade 5-8. Among 405 respondents 54.6% are living in family size greater than four family members, while the rest 45.4% are living in family size of less than or equals to four.

Among 405 of our respondents 253(62.5%) of them own domestic animal, of which 179(70.75%) are living in barn, 71(28.06%) are living with people and the rest 1.2% are elsewhere. Among those 253 respondents who own domestic animal 165(65.2%) have contact animal, and 88(34.78%) of them have no contact with them.

From 405 of our participant most them 277(52.1%) have father who didn't attend formal education followed by those who attend secondary and above accounting for 83(20.5%) and mother's educational status of most students 309(76.3%) were those who didn't have any formal education followed by those who attend secondary and above accounting for 64(15.8%).

Parent's occupation varies among our study subjects. Majority of father's 168(41.5%) were engaged in farming, 80(19.8%) were merchant, 74(18.3%) were gov't employee followed by 70(17.3%) were laborer and the rest engaged in different activities. Whereas majority of mother 279(68.9%) were housewife, 39(9.6%) were gov't employee, 36(8.9%) were merchant, 27(6.7%) were farmers, 20(4.9%) were laborer, and the rest engaged in different activities.

Table 1. Socio demographic characteristics of students in Alabo Elementary School, February 2016.(n=405).

	Categories	Frequency	Percent
Age (years)	5-9	107	26.4
	10-14	225	55.6
	15-18	73	18
Sex	Male	203	50.1
	Female	202	49.9
Educational status of Father	No formal education	162	28.4
	Primary education	165	52.1
	Secondary education and above	67	19.5
Educational status of Mother	No formal education	196	48.4
	Primary education	145	35.8
	Secondary education and above	64	15.8
Occupation of father	Government employ	74	18.3
	Farmer	168	41.5
	Merchant	80	19.8
	Labourer	70	17.3
	Other*	13	3.2
	Government employ	39	9.6
Occupation of Mother	Farmer	27	6.7
	Merchant	36	8.9
	House wife	279	68.9
	Laborer	20	4.9

	Categories	Frequency	Percent
Contact with domestic animal	Other**	4	1
	Yes	165	40.7
	No	88	21.7
Separate bed room	Yes	165	40.7
	No	88	21.7

Other* (priest, driver, retirement) other** (craftswoman, retirement)

Prevalence of Tinea capitis infection

According to this study out of 405 participant 88(21.7%) of them were diagnosed to have Tinea capitis. Based on clinical feature among 88 students diagnosed to have Tinea capitis, gray patch holds the majority of cases which account 65(73.86%) followed by black dot which accounts for 15(17.05%) of cases.

Factors associated with Tinea capitis

This study indicated that age of students were significantly associated with Tinea capitis. Capitis was more prevalent among students aged 5-9 years (AOR=5.92, 95%CI=1.51-23.21) than those aged >15 years, and among students aged 10-14 years (AOR=1.77, 95%CI=0.57-5.51) when compared with students aged >15 years.

This study shows that family size were significantly associated with tinea capitis. Tinea capitis is mostly seen among those with family size greater than four (AOR= 3.12,

95%CI=1.25-7.812) when compared with those family size of less than or equals to four.

This study also shows that sharing common bed room has significant association with Tinea capitis. Participants who share common bed with other family member were found to be at greater risk of developing tinea capitis (AOR=5.624, 95%CI=1.097-28.84).

A correlation of Tinea capitis and comb sharing revealed that share of comb is significantly associated with the capitis. Capitis is prevalent among those who share combs (AOR=3.86, 95%CI=1.68-8.87) than who do not.

Tinea capitis, in similar way as other infectious disease, is highly associated with similar illness in family. Accordingly tinea capitis is more common among those study subjects with similar illness in the family (AOR= 8.54, 95%CI= 3.26-22.35). (Table 2)

Table 2. Multiple Logistic Regression Analysis of Variables Associated With Tinea Capitis, 2016(n=405).

Variables	Categories	TineaCapitis		COR (95%CI)	AOD (95%CI)
		Positive	Negative		
Age	5-9	32	75	4.023(1.66-9.22)**	5.92(1.51-23.21)*
	10-14	49	176	2.025(1.13-6.08)*	1.77(0.57-5.51)
	>=15	7	66	1	1
Family size	<=4	31	153	1	1
	>4	57	164	1.715(1.05-2.78)*	3.12(1.25-7.81)*
Occupational	Employed	9	30	1	1
Status of mother	Unemployed	79	287	0.54(0.03-0.98)*	0.198 (0.05-0.86)*
Do you have separate bed room	Yes	5	55	1	1
	No	83	262	3.485(1.35-8.99)*	5.62(1.09-28.84)*
Do you share combs	Yes	36	71	3.66(2.08-6.42)***	3.86(1.68-8.87)**
	No	28	202	1	1
Did any of your family member develop the symptoms	Yes	30	18	8.59(4.5-16.4)***	8.54 (3.26-22.35)***
	No	58	299	1	1

*(<0.05), ** (<0.01), *** (<0.0001)

4. Discussion

Most studies have reported a significant burden of skin disease among school aged children. Finding from this study reveals high prevalence of tinea capitis which is 21.7 % (88/405). This rate was found to be higher than a research conducted in Gambo, west Arsi Ethiopia (15%) [18]. The high prevalence rate obtained in this study could be associated with high population growth which enhances overcrowding and frequent contact with infected individual, and nutritional habit variation between study area.

From earlier reports the most common clinical variety was blackdot and the inflammatory Tinea capitis (kerion and favus) accounts for 32% [5, 9, 16]; however, in this study the most

common clinical variety is gray patch (73.86%) and the inflammatory Tinea capitis accounts for 5.7%. This is may be due to the difference of study place. Because the former was conducted at hospital level at which patient came after the progression of the disease, but this study is conducted at school level at which we detect the disease early in its course even before the student recognize that he/she develop it. Kerion occurs equally among males and female while the other clinical stage is more common in male.

The other finding in our study was the presence of mixed morphology in 3.4% of the students. These was of two types, of which 2.3% were gray patch with black dot, and the rest was gray patch with favus. Although previous studies have described isolation multiple dermatophyte species from a

single patient [16], the coexistence of more than one morphological type of *Tinea capitis* in single child has only rarely been reported especially from those conducted among school children.

In relation to gender, males were most infected with higher rate probably being associated with haircuts, unclean barber, sharing of combs and the heavy mingling with friends without conscious on personal hygiene contrary to girls [7, 17]. The low prevalence rate in girls is may be due to girls weaves their hair and better personal hygiene this is may be because our society gives more focus on female's hair and beauty. This is in contrary to those obtained in Egypt and Nigeria where girls had high prevalence rate of infection than boys [5, 9, 12].

Age has significant association with *Tinea capitis* as most literature suggests. This study too suggest that age 5-9 years (42.67%) had highest prevalence rate, in agreement to most reports [13, 16]. This may be implicated by poor hygiene at this age group as well as the limitation in intake of saturated fatty acids that provide natural protective mechanism against dermatophyte infection. In addition to this, malnutrition is common in this age group which is other predisposing factor for skin disease.

Studies suggest that zoophilic dermatophytes have a great contribution for *Tinea capitis* in children, which is strongly supported by this study. 26.1% of children who have contact with domestic animals develop *Tinea capitis* [9, 13].

This study shows that family size is one of the major risk factor for *Tinea capitis*. The community around Addis Zemen is characterized by large number of family member a single house, where total member of a family reach up to 16. This leads to frequent close contact between family members. Accordingly in this study, 64.8% of children living in family size greater than four had developed *Tinea capitis*. This overcrowding probably leads to sharing of towels, combs, pillows, hats and head bars which in turn leads to intra familial disease transmission. In our study from total cases of *Tinea capitis* 62.5% of students had family history of similar illness and intra familial infection accounts for 34.1% of total case of *Tinea capitis*, which is higher than previous studies [9, 19].

5. Conclusion

According to this study prevalence of *Tinea capitis* is high. Factor like age, family size, occupational status of mother, separate bed room, sharing of comb and similar illness in family members were found to be significantly associated with *Tinea capitis*.

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Author Contributions

All authors listed, have made substantial, direct and intellectual contribution to the work, and approved it for publication.

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