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BAHIR DAR UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES, SCHOOL OF MEDICINE, DEPARTMENT OF DERMATOVENEREOLOGY

Magnitude And Associated Factors Of Tinea Capitis Among Children Visiting Dermatology Clinic At Addis Alem Primary Hospital, Bahir Dar, Northwest Ethiopia, 2023.

BY: Mihreteab Beza (MD, DERMATOVENEREOLOGY RESIDENT)

A THESIS SUBMITTED TO THE DEPARTMENT OF DERMATOVENEREOLOGY, SCHOOL OF MEDICINE, COLLEGE OF MEDICINE AND HEALTH SCIENCES, BAHIR DAR UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR SPECIALITY PROGRAM OF DERMATOVENEREOLOGY.

January 2024

Bahir Dar University

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COLLEGE OF MEDICINE AND HEALTH SCIENCES, SCHOOL OF MEDICINE, DEPARTMENT OF DERMATOVENEREOLOGY

Magnitude And Associated Factors Of Tinea Capitis Among Children Visiting Dermatology Clinic At Addis Alem Primary Hospital, Bahir Dar, Northwest Ethiopia, 2023.

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January 2024

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DECLARATION

This is to certify that the thesis titled ‘Magnitude and associated factors of Tinea capitis among children visiting Dermatology clinic at Addis Alem primary hospital, Bahir Dar, Northwest Ethiopia, 2023’, submitted in partial fulfillment of the requirements for specialty program in Dermatovenereology, Department of Dermatovenereology, Bahir Dar University, is a record of original work carried out by me and has never been submitted to this or any other institution to get any other degree or certificates. The assistance and help I received during the course of this investigation have been fully acknowledged.

Mihreteab Beza Sendekie **January/2024** **Bahir Dar, Ethiopia**

Name of the candidate Date Place

ADVISORS' APPROVAL SHEET

I hereby certify that I have supervised, read, and evaluated this thesis titled "Magnitude and associated factors of Tinea capitis among children visiting Dermatology clinic at Addis Alem primary hospital, in Bahir Dar, Northwest Ethiop, 2024" by Mihreteab Beza (MD) prepared under my guidance. I recommend the thesis be submitted for oral defense.

Advisor's name	Signature	Date
Dr. [illegible]	[signature]	16/07/16



EXAMINERS' APPRROVAL SHEET

We hereby certify that we have examined this thesis titled "Magnitude and associated factors of Tinea capitis among children visiting Dermatology clinic at Addis Alem primary hospital, Bahir Dar, Northwest Ethiopia, 2023" by Mihreteab Beza Sendekie (MD).

_____	_____	_____
External examiner's name	Signature	Date

ACKNOWLEDGEMENTS

I'd like to express my gratitude to Bahir Dar University College of Medicine and Health Sciences, School of Medicine, Department of Dermatovenereology for providing me the opportunity to do this research.

My special thanks and gratitude go to my Advisors Dr Mulusew Andualem and Dr Alemayehu Baye for their unreserved encouragement, timely comments, and guidance in the overall process of thesis development.

Finally, I would like to thank all Dermatovenereology residents and seniors of Bahir Dar University College Medicine and Health Sciences.

LIST OF ABBREVIATIONS AND ACRONYMS

EC

Ethiopian Calender

ETB

Ethiopian Birr

FMOH

Federal Ministry of Health

PI

Principal Investigator

SPSS

Statistical Package for Social Sciences

TC

Tinea Capitis

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ABSTRACT

Background: Tinea capitis is a fungal infection of the scalp hair follicles and the surrounding skin caused by dermatophytes which usually seen in children. It is common worldwide, and the magnitude and burden continue to increase especially in developing countries. Although this fungal infection is common in Ethiopia, the magnitude and associated factors are yet to be well investigated and documented.

Objective: The aim of the study was to determine the magnitude and associated factors of Tinea capitis among children visiting Dermatologic clinic at Addis Alem primary hospital, Bahir Dar, Northwest Ethiopia, 2023.

Method: A facility-based cross-sectional study was conducted among 450 children visiting Dermatologic clinic. Data were collected by health professionals with interviewer administrated questionnaire and physical examination. Then, the collected data were entered into EpiData version 4.6 for data clearance and checking consistency, and completeness. Data were exported to SPSS version 27 for descriptive and binary logistic regression analyses. The odds ratio (OR) with 95% confidence interval (CI) was used to show the strength of the association. A p-value < 0.05 was considered to determine statistically significant.

Result: A total of 438 (97.33%) participants were included in the final analysis. The prevalence of Tinea capitis was 130 (29.7%) with 95% CI: 25.6-34.0; of which Gray patch holds 51.5% of the cases followed by Seborrheic type (31.5%), Black dot (15.4%) and Keroin (1.5%). Tinea capitis was found to be significantly associated with age (AOR= 7.715, 95% CI: 3.11-19.138 and AOR= 3.925, 95% CI: 1.511-10.191) for 3-6.9 and 7-10.9 years, respectively; family size of greater than four (AOR= 2.442, 95% CI: 1.396-4.271); household monthly income of ≤5000 ETB (AOR= 4.308, 95% CI: 1.626-11.414); not having separate bedroom (AOR= 3.557, 95% CI: 1.837-6.887); having domestic animals (AOR= 2.551, 95% CI: 1.141-5.527); sharing pillows, combs or scissors (AOR=3.678, 95% CI: 1.982-6.824); and similar illness in the family (AOR=4.247, 95% CI: 2.169-8.317).

Conclusion and Recommendations: The magnitude of Tinea capitis is very high. Health education focusing on Tinea capitis transmission, prevention and control strategies at the community and health facilities level is important. Eary detection and treatment of cases is also crucial to minimize transmission and complication.

Key words: Tinea capitis, Children, Addis Alem, Bahir Dar, Ethiopia

1. INTRODUCTION

1.1. Background

Tinea capitis (TC) is a superficial fungal infection of the scalp hair follicles and the surrounding skin which is caused by dermatophytes. It is also called scalp ringworm or dermatophytosis of the scalp, and it is preponderantly occurs in prepubescent children (1). Geographical and temporal shifts are evident in the pathogen spectrum, which includes zoophilic, anthropophilic, and occasionally also geophilic dermatophytes. This shift in pathogens is influenced by a number of factors, such as age, gender, general health, location, the socioeconomic status of the affected populations, and the predominant therapeutic agent that is most commonly used to treat diseases (2).

Superficial fungal infections are common around the world. They are considered to affect 20% to 25% of the total populace, and the frequency keeps on expanding (3). Worldwide, TC is a public health issue primarily affecting developing nations, where its prevalence is close to 20% (4). It is estimated to cause 1% of all superficial fungal infections in northern and western Europe (5). Individual studies ranged from 0.003% to 79.9% for those diagnosed clinically and 0.21% to 81.3% for those diagnosed mycologically. Tinea capitis remains a significant public health issue in Africa, where it has been reported to affect 10% to 30% of school-age children (6, 7). It is among the most prevalent childhood health condition in Ethiopia affecting over one in every four schoolchildren (8).

Tinea capitis is one of the most contagious infections which can be transmitted from infected individual to healthy one through direct actual contact, pets (like cats, dogs, and rodents) and cattle, or indirectly through fomites (like combs, brushes, towels, and stuffed animals) (4).

Any child who develops dermatitis of the scalp should be evaluated for Tinea capitis (9). Tinea capitis has a variety of clinical manifestations. The Black dot type results from breakage of the hair at the scalp surface; Seborrheic dermatitis type that looks like dandruff, with or without hair loss in some areas. Alopecia areata-like baldness may also appear in a patient with tinea capitis. The scalp becomes inflamed and impetiginized when Kerion formation occurs. Favus presents as yellow to white, cup-like crustations on the scalp around the hair shaft (10),(11).

Because topical antifungals do not reach the hair follicle, Tinea capitis always needs systemic treatment. Topical treatment is only used in conjunction with systemic antifungals as an adjuvant (12). Treatment for Tinea capitis depends on the use of systemic antifungals such as griseofulvin, terbinafine, itraconazole, and fluconazole. Griseofulvin was the first effective drug used for the treatment of Tinea capitis, and it is still being used widely in resource-limited settings because it is still effective (13). Spore transmission can be reduced with the help of topical agents. Patients should be instructed not to share hairbrushes, combs, hats, dress-up clothes, or other hair accessories with siblings or classmates who are infected. Other measures include exclusion from school, family screening, educating the patient about proper hygiene techniques, and cleansing fomites (14, 15).

1.2. Statement of the problem

The most prevalent form of dermatophytosis among children is Tinea capitis, which significantly contributes to the global burden of skin and hair infections (16). Tinea capitis is a disease that is highly contagious and can be found anywhere in the world (17).

Due to its high incidence and shifting geographic patterns of infection, Tinea capitis is a growing public health concern. As quite possibly of the most widely recognized cutaneous disease in pre-pubertal children, rate of contamination is high universally, with the World Health Organization considering it is the second most common dermatologic infection after bacterial infections. According to reports, the prevalence of Tinea capitis in the United States was as high as 15% (15). It is endemic in numerous African nations; There are approximately 20 million active infections with an even higher carriage rate, and its prevalence ranges from 10% to 30% (18). One of the most prevalent childhood health conditions in Ethiopia is Tinea capitis, which affects over one in every four schoolchildren; a systematic review and meta-analysis among school children, pooled prevalence is found to be 29.03% (8).

It is more common in hot, humid tropical climates. Numerous factors, including race, socioeconomic status, cultural norms, and public health measures, influence the disease's prevalence (17).

Outbreaks of infection often appear to be due to indirect spread through external factors like combs, or hairdressers' equipment, or person to person transmission in case of overcrowded conditions, such as in schools or refugee camps (18).

In Ethiopia, schoolchildren who had a family background of Tinea capitis and were younger than 10 years were the distinguished risk factors, however, having their hair washed something like once seven days was protective for tinea capitis among schoolchildren. Clinical and public commitment exercises are expected to beat the weight of the infection (8).

Most of the dermatological conditions, including Tinea capitis, do not cause death, but they can cause suffering and incapacity. Tinea capitis leads to hair loss and loss of self-esteem. Children in particular suffer greatly from embarrassment and discomfort, which results in unnecessary absences from school (19, 20). However, parents, health professionals, and policymakers

frequently overlook the impact of tinea capitis on patients' lives. They focus on diseases that are thought to be more serious.

There are several studies done on Tinea capitis at local and global level, however, most of the studies are inconsistent in showing the prevalence and contributing factors of Tinea capitis. Though some studies have been conducted in Ethiopia to determine the prevalence of Tinea capitis, variables related with the disease have not been adequately investigated. In this institution, health workers frequently meet the disease, but no research has been undertaken in the area. Therefore, this study aimed to investigate the magnitude and associated factors of Tinea capitis among children visiting Dermatology clinic at Addis Alem primary hospital, Bahir Dar, Northwest Ethiopia, 2023. This will be important to design evidence-based prevention and control interventions to prevent Tinea capitis, and narrow literature gaps in the field.

1.3. Significance of the study

This research will assist the hospitals specifically health practitioners in understanding the disease epidemiologically and making decisions regarding the diagnosis and treatment. It will also help in detecting the disease early and preventing the disease and its complications. The community will benefit from the awareness and the treatment of the disease given by health professionals. This study will also help ministry of health and regional health bureaus in designing evidence-based control programs to prevent and treat Tinea capitis. Finally, future clinical researchers will utilize this study as a reference when conducting further studies.

2. LITERATURE REVIEW

2.1. Magnitude of Tinea capitis

According to the results of a systematic review of worldwide data on Tinea capitis, the frequency of various Tinea capitis etiologic agents in the reported studies varied worldwide, ranging from 0.4–87.7 percent in Africa, 0.2–74.0% in North America, 0.0–91.2% in Eastern Asia, 0.0–69.0% in Eastern Europe, and 2.9–86.4% in Oceania (4).

Nationwide Children Hospital in Columbus, Ohio, conducted a retrospective database analysis, estimating that 3–8% of children in the United States have Tinea capitis; represents up to 92.5% of dermatophytosis in children under the age of 10 years (21). In a survey of 4760 primary school children conducted in Turkey, 34 cases of Tinea capitis were clinically diagnosed (22). The prevalence of Tinea capitis among school-age children in Kolkata, West Bengal, was found to be 10% in a cross-sectional study. Between the ages of 6 and 8, 9 and 11, and 12 and 14, prevalence rates were nearly identical, ranging from 9 to 11%. The prevalence rate was essentially high among male children (14%) (23).

Africa performed a systematic review and meta-analysis; The analysis included forty studies involving a total of 229,086 children from 17 out of 54 African countries. Tinea capitis had a combined prevalence of 23%. Africa was estimated to have 138.1 million cases of Tinea capitis, with 600 million (or 46% of the population) being children. Sub-Saharan Africa is affected by more than 96% (132.6 million cases). Nigeria and Ethiopia with the most elevated populace of children contributed 16.4% and 8.5% of cases, respectively. With a mean age of ten, most participants were primary school students. The majority of the cases are diagnosed clinically. One of the most common childhood conditions in Africa is Tinea capitis, which the study found affects about one in five children (24).

Dermatophytosis was found to be the second most common skin condition, affecting 33% of children and accounting for 18% of all diagnoses, according to a study conducted in southwest Ethiopia. 29% of children had clinical evidence of Tinea capitis, and three children (1.4% of the total) had favus (18). In a cross-sectional institution-based study in Addis Zemen Town, Northwest Ethiopia, 88 (21.7%) of 405 schoolchildren had Tinea capitis (25).

2.2. Associated factors of Tinea capitis

2.2.1. Sociodemographic factors

A 20-year retrospective analysis and systematic review of global data on Tinea capitis were carried out regarding the gender and age distribution, it was noted that males between the ages of 3 and 15 were more likely than females to develop Tinea capitis. However, adult prevalence remains low (4).

In a retrospective study which was done at an outpatient clinic in Vienna, Southeastern Austria; the youngest infected child was 9 months old, while the oldest was 13 years old, with an average age of 6 years. The ratio of infected boys to infected girls was as high as 54 to 46% (26). A study done in North India has shown the mean age of children who are affected by Tinea capitis found to be 6.8 ± 3.05 years. Most of the children (25.2%) belonged to the 8–10-year age group. In contrast to the majority of studies, there was a slight female preponderance, with 51.4% of patients being female (27).

Tinea capitis prevalence and associated factors were examined in two selected government-owned public primary schools in Osogbo, Southwestern Nigeria, in a case-control study. Students between the ages of 4 and 7 years had the most noteworthy distribution (67%) followed by those between the ages of 8 and 11 years (39%); with a sex ratio of 6.75 (28). A cross-sectional study conducted in Ivory Coast; Western Africa found that boys were more likely than girls to be affected. Tinea capitis was found in 10.9% of children between the ages of 4 and 7, 13.5% of children between the ages of 8 and 11, and 7.5% of children between the ages of 12 and 15. This indicates that the prevalence of Tinea capitis among children in the intermediate age group is significantly higher (29).

In October 2012, a prospective cross-sectional school-based study was conducted at Gambo School in Kore, West Arsi, Oromia Region, Ethiopia; and it has shown that the mean age of these children was 10 years (range: 4–14 years). The prevalence of dermatophytosis was higher in males than in females (42.2% and 30.5%) among pupils aged 5–7 years; and 24.6% of children were diagnosed to have Tinea capitis (30).

Students' age was found to be significantly associated with Tinea capitis in a cross-sectional study conducted in Addis Zemen, Northwest Ethiopia, based on institutional data. Tinea capitis

was higher among children whose age is between 5 and 9 years than those >15 years of age, and among children between the age of 10 and 14 years when compared to children whose age is more than 15 years (25).

A systematic review of worldwide data on tinea capitis showed that the rate of finding new cases was higher in the people who had low socioeconomic status, which might reflect poor hygiene, low educational level of parents or guardians, and overcrowded living condition (4).

In New Delhi, India, a prospective, cross-sectional study was conducted; It revealed that approximately 19% of children belonged to the lower income groups and 74% to the lower middle class. There were fifteen sets of siblings among these patients, with two to three children in each set (31). A case-control review done at public elementary schools in Osogbo, Osun State, Nigeria demonstrated that students who resided in families that had six tenants, or more were found to be infected; Sixty-five percent of the students lived in homes with six or more people, and 64 percent of them had tinea capitis; Ninety-three percent of the participants came from families with low incomes (28).

An institutional cross-sectional study conducted in Addis Zemen, Northwest Ethiopia, found that the community is characterized by many family members living in a single house, with the average family size reaching up to 16 people. As a result, members of the family come into close contact frequently. According to this study, Tinea capitis affected 64.8% of children in families with more than four members (25).

According to a systematic review of global data on Tinea capitis, people with pets (dogs and cats) at home and direct contact with domestic animals or breeding have higher incidence of Tinea capitis (4). Only 14% of respondents to a prospective, cross-sectional study conducted in New Delhi, India, reported having pets at home or having prolonged contact with animals. It was reported that the pets in all cases did not have any skin problems (31). In a case-control study conducted at public primary schools in Osogbo, Osun State, Nigeria, each case of Tinea capitis infection was significantly correlated with playing with animals (28). An institutional based Cross-sectional review done in Addis Zemen, Northwest Ethiopia shows that 26.1% of children who have contact history with domesticated animals develop Tinea capitis (25).

2.2.2. Behavioral Factors

A study done in North India have shown that 62% of patients had a history of sharing hair accessories and combs; and 78% of the children who were examined used oil to their hair on a regular basis (31). In a case-control study conducted at public primary schools in Osogbo, Osun State, Nigeria, the prevalence of Tinea capitis was approximately 5% higher among those sharing beds with fewer than six people than among those sharing beds with more than six people. Majority of the members (82%) likewise revealed that they don't claim their own pillows, and roughly 29% of the individuals who shared pillows had tinea capitis. In each case, sharing combs and not using soap to bathe were significantly linked to tinea capitis infection (28). An institutional-based cross-sectional review done in Addis Zemen showed that congestion most likely prompts the sharing of towels, hairbrushes, pillows, caps or hats, and head bars, which leads to intrafamilial infection transmission. In the study, 62.5 percent of students with total cases of Tinea capitis had a family history of a similar illness, and intra-familial infections accounted for 34.1% of all cases, which is higher than in previous studies (25).

3. CONCEPTUAL FRAMEWORK

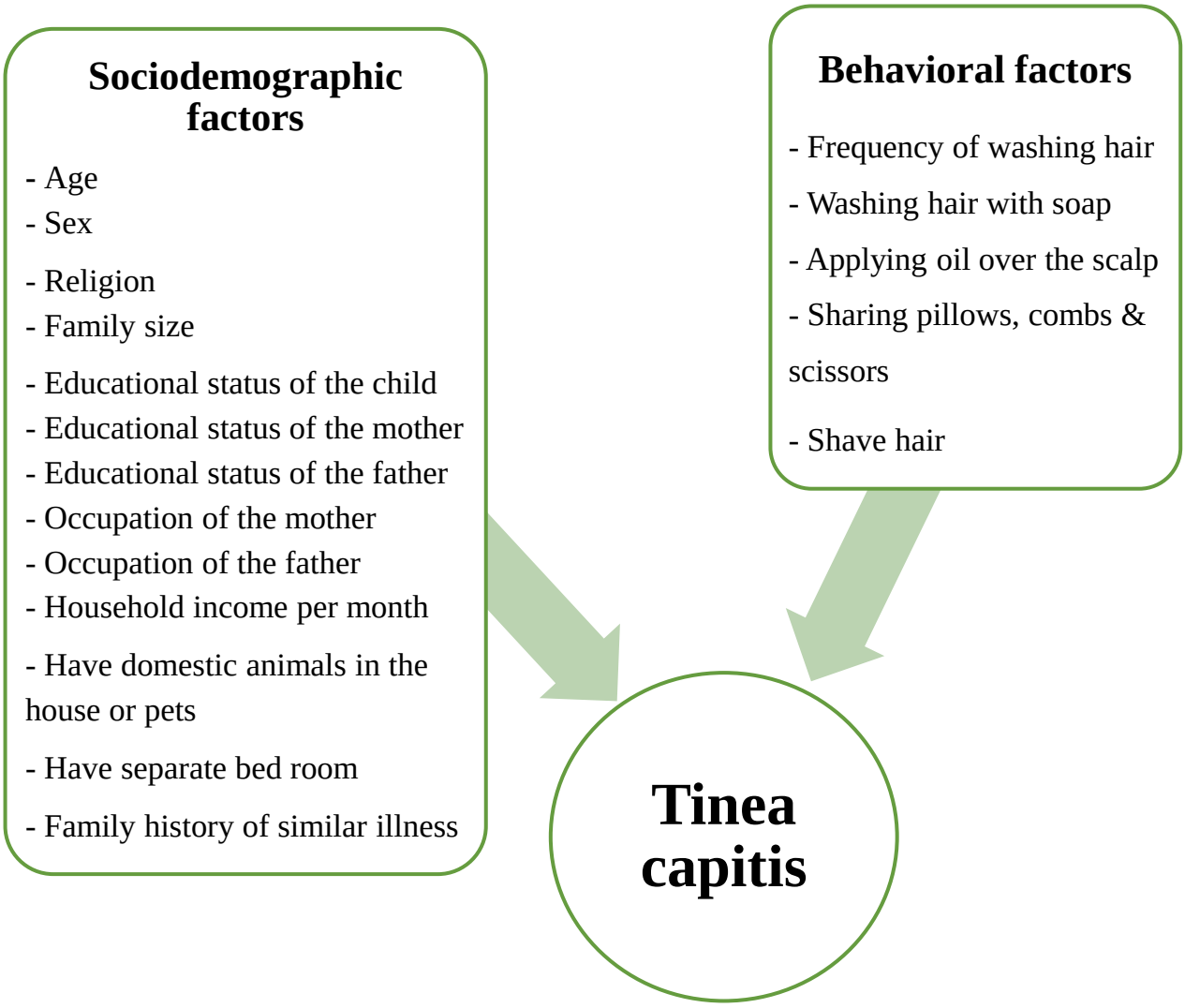

Figure 1: Conceptual Framework (25).

4. OBJECTIVES

4.1. General objective

- To investigate magnitude and associated factors of Tinea capitis among children visiting Dermatology clinic at Addis Alem primary hospital, Bahir Dar, Northwest Ethiopia, 2023.

4.2. Specific objectives

- To determine magnitude of Tinea capitis among children visiting Dermatology clinic, at Addis Alem primary hospital, Bahir Dar, Ethiopia, 2023.
- To identify factors associated with Tinea capitis among children seen at Dermatology clinic, Addis Alem primary hospital, Bahir Dar, Ethiopia, 2023.

5. METHODS AND MATERIALS

5.1. Study design and period

- ✓ A facility-based cross-sectional study was conducted from October 1 to December 31, 2023.

5.2. Study area and settings

The research was conducted among children visiting Dermatology clinic, at Addis Alem primary hospital, Bahir Dar, Ethiopia.

Bahir Dar is the capital city of Amhara regional state with population of 260,000. It is the third largest city in Ethiopia after the capital Addis Ababa and Dire Dawa. It is 578 kilometers (360 miles) northwest of Addis Ababa, with a height of 1,840 meters (6,036 feet) above sea level located on the southern shore of Lake Tana, which is the headwaters of the Blue Nile (locally called Abay).

Currently, the city administration has two comprehensive specialized hospitals, one primary hospital and ten health centers which are governmental.

Addis Alem primary hospital is located about 5km north from the city center. It is one of primary hospitals owned by the Amhara regional health bureau-serving people in the catchment area. It provides medical service in four major departments and leishmania treatment center. Dermatology services are provided three days a week, with two outpatient clinics and six inpatient beds, as per an agreement reached in 2019 between the hospital and Bahir Dar University College of Medicine and Health Science. The department of Dermatovenereology has two outpatient clinics with eight Dermatovenereologists (one of them is Epidemiologist), 16 Dermatovenereology specializing residents and 2 clinical nurses.

5.3. Population

5.3.1. Source population

- ✓ All children visiting Dermatology clinics at Addis Alem primary hospital.

5.3.2. Study population

- ✓ All children visiting Dermatology clinics at Addis Alem primary hospital during the study period.

5.4. Eligibility criteria

5.4.1. Inclusion criteria

- ✓ Children visiting Dermatology clinics at Addis Alem primary hospital whose age ranges from 3 to 15 years during the study period.

5.4.2. Exclusion criteria

- ✓ Children visiting Dermatology clinics at Addis Alem primary hospital who came more than once.

5.5. Variables of the study

5.5.1. Dependent variables

- ✓ Tinea capitis (No or Yes)

5.5.2. Independent variables

- ✓ **Socio demographic**

  - Age
  - Sex
  - Religion
  - Family size
  - Educational status of the child
  - Educational status of the mother
  - Educational status of the father

- Occupation of the mother
- Occupation of the father
- Household income per month
- Have domestic animals in the house or pets
- Have separate bedroom
- Family history of similar illness

✓ **Behavioral**

- Frequency of washing hair
- Washing hair with soap
- Applying oil over the scalp
- Sharing pillows, combs & scissors
- Shave the hair

5.6. Operational Definitions

Tinea capitis is a superficial fungal infection of the scalp skin & hair commonly seen in children.

It can be defined based on its clinical variants or types as follows (32):

- ✓ **Gray patch**: A grayish scaly, annular patches with non-scarring hair loss over the scalp.
- ✓ **Black dot**: Black dots within patches of polygonal-shaped scalp hair loss with finger-like margins and diffuse scaling.
- ✓ **Seborrheic**: Diffuse scalp scaling, often without noticeable hair loss.
- ✓ **Kerion**: Follicular pustules to furuncles or boggy inflammatory plaques with or without scarring hair loss.
- ✓ **Favus**: A yellow-red follicular papule to thick yellow concave crust (scutulum) around a single dry hair, either localized or more diffuse with or without scarring hair loss.

5.7. Sample size determination

5.7.1. Sample size determination

The sample size was calculated by using single population proportion formula to obtain the sample size needed to estimate the magnitude of Tinea capitis and its associated factors among children who visit Dermatology clinics at Addis Alem primary hospital, Bahir Dar, Ethiopia; taking the prevalence of Tinea capitis 21.7% based on research conducted among school children in Addis Zemen, Northwest Ethiopia.

$$n = \frac{(Z\alpha/2)^2 P(1-P)}{d2}$$

Where, n = Initial sample size required for the study

Z= Standard normal distribution (Z=1.96), CI of 95% = 0.05

P = Magnitude of tinea capitis and its associated factors

d = Tolerable margin of error= 4% (0.04)

$$n = \frac{(1.96)^2 0.217(1-0.217)}{(0.04)^2} = 408$$

By adding 10% that of non-respondent rate,

408 x10% = 40.8

The total sample size for this study was = 408 + 40.8 ≈ **450** children.

5.7.2. Sampling technique

Selection of participants was done using systematic random sampling method based on arrival order of patients to the health institution for medical care. Sampling interval (5th) was calculated by dividing the total number of patients seen during the study period by estimated sample size (K^{th} = 2400/450 = 5). The first participant was chosen by lottery method from the sample interval. After the doctors' visit, every five patients were interviewed until the required sample was reached.

5.8. Data collection instrument and techniques

A structured questionnaire was prepared first in English, then Amharic version questionnaire was used. The questionnaire had three parts:

1. The socioeconomic, demographic, and behavioral characteristics of the study subjects
2. Physical examination
3. Diagnosis (presence or absence) of Tinea capitis

To carry out the survey with systematic random sampling method, four Dermatovenereology residents were included to conduct the data collection and a supervisor was also supervising those data collectors. After informed consent or assent was taken and confidentiality was assured, parents or guardians were interviewed with an exit face-to-face interview technique. Then, clinical examination and diagnosis were done by dermatologists and senior dermatology residents.

5.9. Data quality assurance

Training and practical demonstrations on interview techniques were given to data collectors for two consecutive days. Close supervision was maintained during data collection and filled checklists were double-checked daily for consistency and completeness by data collectors and principal investigator. Before the actual data collection, a pretest was performed at Tibebe Ghion Comprehensive Specialized Hospital on 5% of sample size to ensure that the data collection tool was consistent and easy to understand. It was done after informed consent or assent was taken, and the purpose and confidentiality were explained and assured respectively. After the pretest, question number 10 was clarified to avoid potential misinterpretation.

5.10. Data processing and analysis

Data were checked for consistency and completeness using EpiData version 4.6 and exported to Statistical Package for Social Science Studies (SPSS) version 27 for descriptive and logistic regression analysis. For the purposes of analyzing pertinent clinical data and sociodemographic variables, descriptive statistics such as frequencies and percentages were used to describe categorical variables, while means and standard deviations were used to describe continuous variables. The result of the analysis is presented using tables, charts, and graphs. The odds ratio

and the confidence interval for statistical associations were determined by using bivariate and multivariate binary logistic regression. The bivariate binary logistic regression was run at 25% level of significance (P-value < 0.25) to screen out potentially significant independent variables. Multivariate binary logistic regression model was performed using the significant independent variables from the bivariate binary logistic regression. To measure the presence and strength of association between the independent variables and Tinea capitis, adjusted odds ratios (AOR), 95% confidence intervals (CI) and P-value were used. From the final model, variables with P-value < 0.05 were considered to be significantly associated with Tinea capitis.

6. ETHICAL CONSIDERATIONS

Prior to data collection, ethical clearance was obtained from Bahir Dar University College of medicine and health sciences, Ethical Review Board and Amhara Public Health Institute. A support letter was taken from the Amhara Public Health Institute.

Written informed consent and assent was obtained from each study participants' parents or guardians to guarantee voluntary participation and get the necessary information. Each participant's parents or guardians were briefed on the objectives of the study, concerns regarding confidentiality, and the respondent's autonomy prior to the start of the data collection process. Any information forwarded was kept confidential and names were not written or specified, and all the questionnaires were coded for anonymity. Only the principal investigator knew the details, and it was discarded after completing analysis. Those cases who had Tinea capitis were evaluated and managed accordingly by the respective physicians. They were also told about the possible modes of transmission and prevention methods.

7. RESULT DISSEMINATION PLAN

The result of this study was submitted to Bahir Dar University, College of Medicine and Health Sciences, Department of Dermatovenereology in partial fulfillment for specialty program. In addition, as the results are assumed to be inputs for the health sector, effort will be exerted to notify the Federal Ministry of Health (FMOH), Amhara regional health bureau and other concerned bodies on the gross picture of the study findings. Finally, the manuscript will be submitted to reputable scientific journals for possible publication.

8. RESULTS

8.1 Sociodemographic Characteristics

The total number of participants in the final analysis was 438, which makes the response rate 97.33%. More than half 223 (50.9%) were males, 229 (52.3%) were in the age range of 3-6.9 years, followed by 7-10.9 years accounting 123 (28.1%) with mean age of 6.5 years (SD = ± 3.12 years).

The majority, 401 (91.6%) of participants were Orthodox, followed by 28 (6.4%) Muslims and 9 (2.1%) protestants. Regarding the educational status of study subjects, 232 (53%) were in primary school, 98 (22.4%) didn't start school and 92 (21%) were in kindergarten. Of 438 participants, 248 (56.6%) were living in family members of less than or equals to four.

From 438 of our participants' mothers, more than half of them attended primary school and secondary school, accounts 98 (22.4%) and 127 (29%) respectively. Only 124 (28.3%) of participants' fathers attended secondary school and 125 (28.5%) have bachelor's degrees and above. More than half of the study subjects 223 (50.9%) are from families with household income of ≤ 5000 ETB. More than half 240 (54.8%) of mothers of participants were housewives and 109 (24.9%) of fathers were civil servants (**Table-1).**

Table-1: Summary of sociodemographic and behavioral factors of study participants in Addis Alem primary hospital, Bahir Dar, 2023 (n = 438)

	Categories	Frequency	Percent (%)
Age	3-6.9	229	52.3
	7-10.9	123	28.1
	11-15.0	86	19.6
Sex	Male	223	50.9
	Female	215	49.1
Religion	Orthodox	401	91.6
	Muslim	28	6.4
	Protestant	9	2.1
Family size	≤ 4	248	56.6
	> 4	190	43.4
Educational status of the child	Didn't start school	98	22.4
	Nursery	16	3.7
	Kindergarten	92	21.0
	Primary	232	53.0
Educational status of the mother	Unable to read and write	46	10.5
	Able to read and write	26	5.9
	Primary school (1-8)	98	22.4
	Secondary school (9 12)	127	29
	Diploma	60	13.7
	> Degree	81	18.5
Educational status of the father	Unable to read and write	19	4.3
	Able to read and write	52	11.9
	Primary school (1-8)	69	15.8
	Secondary school (9 12)	124	28.3
	Diploma	49	11.2
	> Degree	125	28.5
Occupation of the mother	Housewife	240	54.8
	Farmer	41	9.4
	Merchant	42	9.6
	Civil servant	62	14.2
	Daily laborer	12	2.7
	Private	41	9.4
Occupation of the father	Farmer	88	20.1
	Merchant	87	19.9
	Civil servant	109	24.9
	Daily laborer	53	12.1
	Private	56	12.8
	Driver	36	8.2
	Others*	9	2.1

Household income	≤ 5000	223	50.9
	5000-9000	147	33.6
	> 9000	68	15.5
Have separate bedroom	Yes	143	32.6
	No	295	67.4
Have domestic animals or pets	Yes	58	13.2
	No	380	86.8
Frequency washing hair	Daily	30	6.8
	03 times per day	81	18.5
	02 times per day	170	38.8
	Once per week	135	30.8
	Once per 02 weeks	22	5.0
Washing with soap	Yes	430	98.2
	No	8	1.8
Applying oil on the scalp	Yes	336	76.7
	No	102	23.3
Sharing pillows, combs & scissors	Yes	229	52.3
	No	209	47.7
Shaving of hair	Yes	237	54.1
	No	201	45.9
Family history of similar illness	Yes	85	19.4
	No	353	80.6

*= Cajoler, Contractor, Priest

8.2. Magnitude of Tinea capitis infection and patterns of clinical variants

According to this study out of 438 participants 130 (29.7%, 95% CI: 25.6-34.0) of them were diagnosed to have Tinea capitis. Based on clinical variants among 130 children diagnosed to have Tinea capitis, Gray patch holds most of the cases which account 67(51.5%) followed by Seborrheic type which accounts for 41(31.5%) of cases; Black dot and Keroin variants account 20(15.4%) and 2(1.5%) respectively **(Figure-2).**

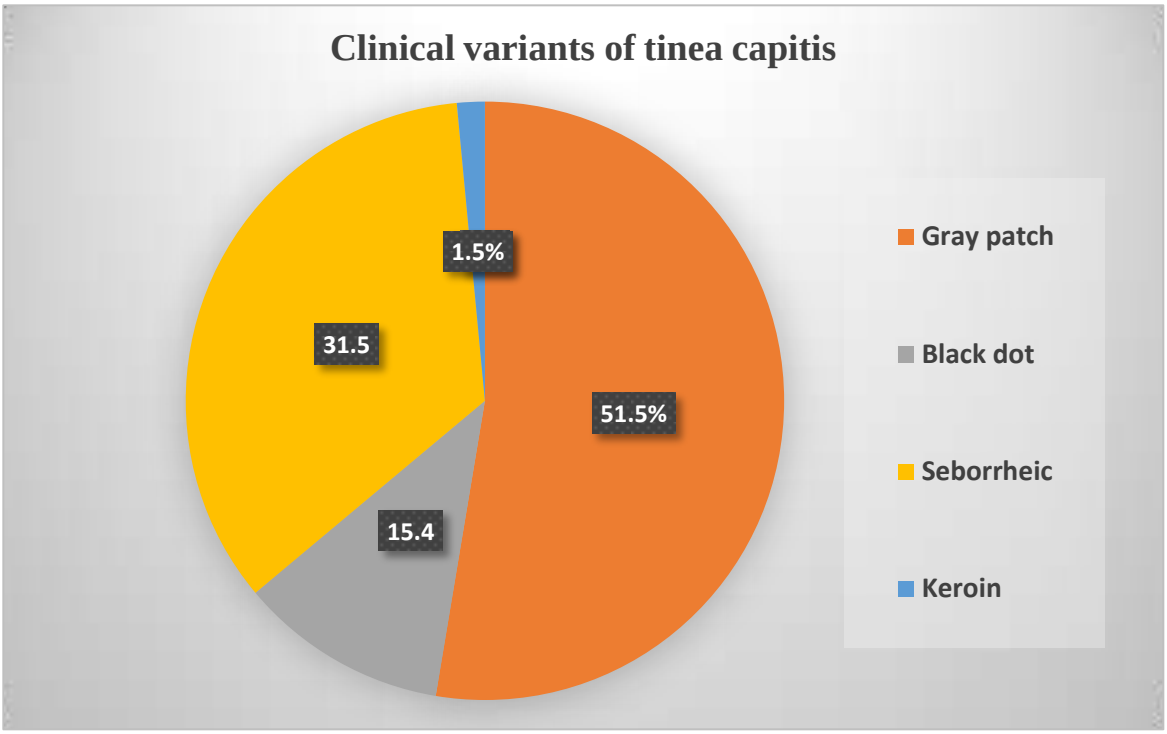

Figure- 2: Clinical variants of Tinea capitis study participants in Addis Alem primary hospital, Bahir Dar, 2023 (n = 438)

8.3 Factors Associated with Tinea Capitis

Based on the results of bivariate binary logistic regression analysis, variables significantly associated with the magnitude of Tinea capitis at 25% level of significance or P-value < 0.25 were: age, sex, family size, occupation of the mother, average household monthly income, presence of domestic animals or pets in the house, having separate bedroom, applying oil on the scalp, sharing pillows combs and scissors, shaving of the hair and presence of similar illness in the family.

However, variables found to be significantly associated with magnitude of Tinea capitis in multiple binary logistic regression model at 5% level of significance or P-value < 0.05 were only age, family size, household income per month, domestic animals in the house, having separate bedroom, similar illness in the family, sharing pillows, combs & scissors.

Accordingly, after adjusting for other covariates, compared to those in the age range of 11-15 years, the odds of having Tinea capitis among those in the age group 3-6.9 and 7-10.9 was 7.715 and 3.925 times higher, (AOR = 7.715, 95% CI: 3.11- 19.138) and (AOR=3.925, 95% CI:1.511-10.191), respectively. The odds of developing Tinea capitis in the family size of more than four was 2.442 times higher (AOR = 2.442, 95% CI: 1.396 – 4.271). The odds of having Tinea capitis was 4.308 times higher in household monthly income of 5000 ETB and less (AOR= 4.308, 95% CI: 1.626-11.414). Similarly, the odds of having Tinea capitis was 3.557 times higher in children who haven't separate bedroom (AOR=3.557, 95% CI: 1.837- 6.887). The odds of developing Tinea capitis was 2.551 times higher in those who have domestic animals living in the house as compared to those who haven't (AOR=2.551, 95% CI: 1.141-5.527). The odds of developing Tinea capitis was 3.678 times higher in those who share pillows, combs or scissors (AOR=3.678, 95% CI: 1.982- 6.824). Compared to those who have no Tinea capitis in the family, the odds of having Tinea capitis was 4.247 times higher in those who have family with Tinea capitis (AOR=4.247, 95% CI: 2.169- 8.317) (**Table 2**).

Table 2: Multivariate Binary Logistic Regression Analysis of Variables Associated with Tinea Capitis, in Adis Alem hospital, Bahir Dar, 2023 (n=438)

Variable	Category	Tinea capitis		COR (95% CI)	AOR (95% CI)
		Yes	No		
Age	3-6.9	86	143	4.571 (2.244- 9.311)*	7.715(3.110-19.138)*
	7-10.9	34	89	2.903 (1.346- 6.262)*	3.925(1.511-10.191)*
	11-15.0	10	76	1	1
Sex	Male	80	143	1.846 (1.215- 2.805)*	0.924 (0.506- 1.686)
	Female	50	165	1	1
Number of family	≤ 4	50	198	1	1
	> 4	80	110	2.880(1.886- 4.398) *	2.442(1.396- 4.271) *
Household income/month in ETB	5000 and less	91	132	5.170(2.359-11.331)*	4.308(1.626-11.414)*
	5000- 9000	31	116	2.004(0.868- 4.631)*	1.530 (0.547- 4.280)
	> 9000	8	60	1	1
Mother's occupation	Housewife	97	143	1	1
	Farmer	5	36	0.205 (0.078- 0.540)*	0.213 (0.060- 0.747) *
	Merchant	9	33	0.402 (0.184- 0.878)*	0.566 (0.194- 1.647)
	Civil servant	12	50	0.354 (0.179- 0.699)*	0.899 (0.371- 2.179)
	Daily laborer	2	10	0.295 (0.063- 1.375)*	0.179 (0.034- 0.948)
	Private	5	36	0.205 (0.078- 0.540)*	0.735 (0.219- 2.468)
Have separate bedroom	Yes	18	125	1	1
	No	112	183	4.250 (2.459-7.346) *	3.557(1.837- 6.887) *
Domestic animals in the house or pets	Yes	30	28	3.000 (1.708-5.270) *	2.511(1.141- 5.527) *
	No	100	280	1	1
Applying oil on the scalp	Yes	92	244	1	1
	No	38	64	1.575(0.987-2.513)**	1.002 (0.504- 1.991)
Sharing pillows, combs	Yes	103	126	5.510 (3.407-8.912) *	3.678 (1.982-6.824) *
	No	27	182	1	1
Shaving of the hair	Yes	89	148	2.347 (1.523-3.616) *	1.497 (0.798- 2.807)
	No	41	160	1	1
Similar illness in the family	Yes	50	35	4.875 (2.961-8.027) *	4.247 (2.169-8.317) *
	No	80	273	1	1

** = P-value (< 0.25), * = P-value (< 0.05)

9. DISCUSSION

Most studies have shown that children have a notable prevalence of skin diseases. Tinea capitis is one of the highly prevalent and contagious fungal infections very common in children before puberty. According to this study the magnitude of Tinea capitis is high, accounting 29.7%. This result is found to be greater than that of a study carried out among School Children in Addis Zemen, Northwest Ethiopia, which was 21.7 % (25). A study done in Ivory Coast (western Africa), Tinea capitis accounted 11.34% (29). This variation may be due to in our study findings may stem from its hospital-based nature. This setting often attracts cases where parents seek medical attention for their children upon noticing lesions on their scalps, potentially increasing magnitude of TC.

Similar study done in Kolkata, West Bengal, found Tinea capitis to be 10% (23). A study conducted at Nationwide Children Hospital in Columbus, Ohio, found that 3–8% of children in the United States have Tinea capitis which is much lower than our study (21). The high magnitude identified in our study could be attributed to the rapid population growth, resulting in overcrowded conditions that facilitate frequent contact with infected individuals. Additionally, the economic challenges in Ethiopia, being one of the low-income countries, may also contribute to the higher magnitude, potentially linked to poverty.

In this study, gray patch holds more than half of the cases which accounting 51.5% followed by seborrheic type which accounts for 31.5% of cases; Black dot and Keroin variants account 15.4% and 1.5% respectively. Similarly, a study conducted in Addis Zemen, Northwest Ethiopia the predominant variant was gray patch 73.86% followed by black dot which accounts for 17.05 %, and the other finding was the presence of mixed morphology in 3.4% of the children(25); but we didn't find mixed subtype in our study. A study done in Karachi, Pakistan gray patch was also observed in 35.1% of the patients, black dot in 31.2%, kerion in 24.8%, favus in 5.0%, and seborrheic type in 1.0% patients (33). But, in our study favus type was not found. This variation may be due to differences in study areas and etiologies. The other reason may be misdiagnosing seborrheic type Tinea capitis as dandruff or seborrheic dermatitis which is not common in pediatrics age.

Sex was not significantly associated with Tinea capitis in our study, however, boys were more affected than girls with a ratio of 1.6:1. Similarly the study done in Addis Zemen, Northwest Ethiopia have shown that males were more infected than females (25).

According to a study done in school children, Nairobi, Kenya gender, males (45.3%) were most infected compared to females (36.7%) with sex being a significant risk factor to infection (34). This is likely linked to factors such as frequent haircuts, unsanitary barber practices, sharing combs, and close social interactions with friends in males lead them acquire the infection. Other explanation could be female children and their guardians or parents are more aware of their personal hygiene and appearance than males as suggested in some previous studies. In contrast, in study done in North India, almost equal number of males and females were affected (27).

Most of the literature indicates that Tinea capitis and age are significantly correlated. Similarly, our study has found that age is significantly associated with magnitude of Tinea capitis. Accordingly, the odds of having Tinea capitis among those in the age group 3-6.9 and 7-10.9 was 7.715 and 3.925 times higher, respectively. This result is similar to a study done in Osogbo, Southwestern Nigeria, which showed that children between the ages of 4 and 7 years had the most noteworthy distribution (67%) followed by those between the ages of 8 and 11 years (28). In Europe, particularly Austria, childhood-population (3–7 years of age) was the most commonly affected (5). Various explanations have been offered for this, including, children in these age groups have close contact with each other while playing or at school. Additionally, the likelihood of poor hygiene in younger children as compared to older ones who usually are more conscious of their hygiene practices. The other possibility is that the fatty acids in the sebum produced during puberty possess fungistatic characteristics, which could shield older children against infection.

In this study compared to children in the family size of less than or equal to four, the odds of developing Tinea capitis in those in the family size of more than four is 2.442 times higher. This result is similar to a study conducted in Addis Zemen; Northwest Ethiopia demonstrated that 64.8% of children living in family size of greater than four had developed Tinea capitis. Likewise, study done in Osogbo, Nigeria found that children who resided in families that had six tenants, or more were found to be infected; 65% of the children lived in homes with six or more people, and 64% of them had tinea capitis (28). This is probably due to overcrowding that leads

to sharing of beds and fomites like pillows, combs, and hats, which in turn increase intra-familial disease transmission.

Household monthly income is also the other significantly associated factor with Tinea capitis in this study. Thus, the odds of having Tinea capitis was 4.308 higher in those children whose household monthly income is 5000 ETB or less. In contrast, the study done in Osogbo, Nigeria socioeconomic status was not found to be statistically significant for Tinea capitis; However, it was observed that about 48% & 62% of children from low- & middle-income households, respectively, have the infection (28). This is due to low socioeconomic status commonly leads to poor hygienic and living conditions.

In this study, the odds of having Tinea capitis was 3.557 times higher in those who haven't a separate bedroom. This result is like the study conducted in Osogbo, Nigeria which showed that the occurrence of Tinea capitis among those who shared beds with ≥ 6 persons was about 5% more than those did so with less persons(28). This result could be because sharing bed and bedroom increases contact with the infected person which increases transmission.

In our study, the odds of developing Tinea capitis is 2.551 times higher in those who have domestic animals. Similarly, from the study in Addis Zemen, Northwest, Ethiopia have shown that 26.1% of children who have contact with domestic animals developed Tinea capitis (25). This is because animals are the source for some of the etiologies (Zoonophilic) of Tinea capitis.

The odds of developing Tinea capitis was 3.678 times higher in those who share pillows, combs or scissors. Our study result is similar to the Osogbo, Nigeria study which demonstrated, of the participants (82%) reported that they do not own their own pillows, and around 29% of those who shared pillows had tinea capitis (28). This is because Tinea capitis can be easily transmitted by fomites.

Compared to those who have no Tinea capitis in the family, the odds of having Tinea capitis was 4.247 times higher in those who have family history of Tinea capitis which is much higher than other previous studies. The Addis Zemen, Northwest Ethiopia, study have similar result, from total cases of Tinea capitis 62.5% of children had family history of similar illness and intra familial infection accounts for 34.1% of total case of Tinea capitis (25). In study done, in Lahore, Pakistan have also shown positive family history of Tinea capitis in 18% of cases (33). This

indicates that Tinea capitis is a communicable infection, with a notable likelihood of intra-familial transmission being significantly elevated.

9. STRENGTHS OF THE STUDY

To the best of our knowledge, there is no specific cross-sectional hospital-based study conducted for Tinea capitis in the area.

The study period for our study is longer compared to other previous studies which makes our study strong.

10. LIMITATIONS OF THE STUDY

Reliance on parental or guardian reporting for certain factors could introduce bias. Parents or guardians could underreport or overreport certain behaviors or conditions, impacting the accuracy of our data.

The study was confined to only one health institution, consequently, the outcomes may be considered specific and lack comprehensive representation across diverse healthcare settings and populations.

11. CONCLUSION

According to this study magnitude of Tinea capitis is very high, this implies that, transmission of Tinea capitis is also high, and treatment and prevention of the infection is poor in the area. Factors such as age, family size, household income per month, domestic animals in the house, having separate bedroom, similar illness in the family, sharing pillows, combs & scissors are found to be significantly associated with magnitude of Tinea capitis.

12. RECOMMENDATIONS

For Addis Alem Primary hospital

- ✓ To give intensive health promotion and education interventions to promote living practices and mode of transmission of Tinea capitis.
- ✓ To give the necessary diagnostic and treatment services which aids in reducing the spread of Tinea capitis and mitigating associated complications.

For regional health bureau

- ✓ To prepare training programs for health professionals on Tinea capitis.
- ✓ To access skilled healthcare professionals and essential supplies crucial for diagnosis, prevention, and treatment.

For ministry of health

- ✓ To prepare guidelines on Tinea capitis diagnosis and management.

For future researchers

- ✓ To conduct research aimed at obtaining profound insights into Tinea capitis, with the goal of establishing a causal relationship between the observed outcomes and the associated variables.
- ✓ To perform studies by including several healthcare settings and populations to have a comprehensive representation.

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APPENDIXES

I: Information sheet and consent form

A) Information Sheet

Principal investigator: Mihreteab Beza (MD, Dermatovenereology resident)

Title: Magnitude and associated factors of Tinea capitis

Objective: To determine magnitude and associated factors of Tinea capitis among children visiting Dermatologic clinics at Addis Alem primary hospital, Bahir Dar, Northwest Ethiopia, 2023.

Background: Tinea capitis is a fungal infection of the scalp hair follicles and the surrounding skin caused by dermatophytes which usually seen in children. It is common worldwide, and the magnitude and burden are increasing especially in developing countries. Although these fungal infections are common in Ethiopia, the clinical patterns are yet to be well investigated and documented comprehensively; and some the studies done are inconsistent and need to be updated.

Benefit of the study: There will not be any direct payment for participating in this study. But findings from this study reveal important for health personnel and community at large.

Risk of the study: Participating in this study will not have any risk or harm.

Rights of Participants: You have full right either to participate or decline participation in this study; you may respond to all the questions, or you may not answer to questions; you may end the interview at any time you want; and you can ask any question which is not clear for you.

Confidentiality: Any information forwarded will be kept confidential and names will not be written or specified, and all the questionnaires will be coded for anonymity. Only the principal investigator will know the details and he will discard it after completing analysis.

Contact details of principal investigator:

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የአጥኚው ስም፡- ምህረተአብ በዛ (ሃኪም፣ የቆዳ እና አባላዘር ትምህርት ረዚደንት)

የጥናቱ ርእስ፡- የቆረቆር በሽታ እና ተጓዳኝ ምክንያቶች

የጥናቱ አላማ፡- በባህርዳር አዲስ አለም የመጀመሪያ ደረጃ ሆስፒታል የቆዳ ህክምና ክፍል ዉስጥ ከሚታዩ ህጻናት መካከል ያለዉን የቆረቆር በሽታ ስርጭት እና ተጓዳኝ ምክንያቶችን ማዎቅ።

ስለቆረቆር በሽታ አጠር ያለ ገለጻ፡- ቆረቆር የጭንቅላት ቆዳን እና የጸጉር ስርን የሚያጠቃ የፈንገስ በሽታ ሲሆን ብዙ ጊዜ የሚስተዋለዉም ህጻናት ልጆች ላይ ነው። በሽታው በብዙ የአለም ሃገራት የሚስተዋል ቢሆንም የበሽታው ስርጭት እና የሚያመጣው የጤና እክል በተለይ በታዳጊ ሃገራት እየጨመረ ይገኛል። በሃገራችን ኢትዮጵያም በሽታው የተለመደ ቢሆንም ስርጭቱ እና ተዛማጅ ወይንም ተጓዳኝ ምክንያቶቹ በአጥጋቢ ሁኔታ ጥናት አልተካሄደባቸውም በመሆኑም ይሄን ጥናት ማካሄድ አስፈላጊ ሆኗል።

ጥናቱ የሚሰጠው ጥቅም፡- ጥናቱ ለተሳታፊው ቀጥተኛ ጥቅም ባያስገኝም ጥናቱ በሚያስገኘው ዉጤት የጤና ባለሙያዎችንም በአጠቃላይ ማህብረሰቡንም ተጠቃሚ ያደርጋል።

ጥናቱ የሚያስከትለው ጉዳት፡- በዚህ ጥናት ውስጥ መሳተፍ ምንም አይነት የሚያስከትለው ጉዳት የለም።

የጥናቱ ተሳታፊ መብት፡- በጥናቱ ውስጥ የመሳተፍም ሆነ ያለመሳተፍ ሙሉ መብት አለዎት። የጥናቱን መጠይቆች የመመለስም ሆነ ያለመመለስ ሙሉ መብት አለዎት። እንዲሁም ጥናቱን በፈለጉበት ጊዜ የማቋረጥ ሙሉ መብት አለዎት። ያልገባዎት ጥያቄ ካለም ማብራሪያ መጠየቅ ይችላሉ።

የጥናቱ ሚስጥራዊነት፡- የሚሰጡት መረጃ ሚስጥሩ የተጠበቀ ሲሆን ስምዎትም የማይጻፍ ወይንም የማይጠቀስ ይሆናል። የጥናቱ ዋና አጥኚ ብቻ ስለመረጃው ዝርዝር ሁኔታ የሚያዉቅ ሆኖ ጥናቱ ከተካሄደ በኋላ መረጃዉን በጥንቃቄ የሚያስወግደው ይሆናል።

የዋና አጥኚው አድራሻ፡-

የአጥኚው ስም፡- ምህረተአብ በዛ (ሃኪም)

ስልክ ቁጥር፡- +251912216012

B) Informed Consent

As to the information given ahead, participating in this study has no risk. Your name will not be written on this form and the information you give will never be shared to others. You may not answer any questions that you don't want to answer, and you may end this interview at any time you want. Now we would like to tell you that you are selected randomly to be participant of the study. Your genuine response to the interviews will be very important for the purpose of the study and the questions usually take about 10 minutes.

At the same time, we would like to appreciate your voluntarily participation in the survey after a thorough understanding of the information given to you.

Are you willing to participate in this study?

1.No

2. Yes

I confirmed to participate the study by my own signature……

ለ) የፈቃድ ቅጽ

ከላይ እንደተጠቀሰው በዚህ ጥናት መሳተፍዎ የሚያስከትለው ጉዳት አይኖርም። በጥናቱ ስም የማይገለጽ ሲሆን የሚሰጡት መረጃም ለሌሎች አይገለጽም። መመለስ ያልፈለጉትን ጥያቄ እንዲመልሱ አይገደዱም፤ ቃለ መጠይቁን በፈለጉት ሰአት የማቋረጥ መብት አለዎት። በቃለ መጠይቁ እንዲሳተፉ የተመረጡት በእድል ወይም በአጋጣሚ ነው። ለቃለ መጠይቁ የሚሰጡት ትክክለኛ መልስ ለጥናቱ እጅግ አስፈላጊ ነው፤ ቃለ መጠይቁ አስር ደቂቃ የሚወስድ ይሆናል።

በጥናቱ በፍቃደኝነት ለመሳተፍ ስለተስማሙ እርስዎንም ልጅዎንም እጅግ አድርገን እናመሰግናለን።

በጥናቱ ለመሳተፍ ይስማማሉ?

1/ እስማማለሁ 2/ አልስማማም

C) Assent form

Parental/Guardian Consent Form:

I am informed about nature and purpose of the study. The decision to let my child join, or not to join, is up to me, and my child can stop participating at any time and will not lose any benefits as thereof. As parent or legal guardian, I assure in my signature to become my child a participant in the research study described in this form.

Parents / Guardian's Signature: ……..……..

Date ……...

Investigator's Signature: ……..

Date …….

ሐ) የወላጅ ወይም የአሳዳጊ ፈቃድ መጠየቂያ ቅጽ

ጥናቱን በሚመለከት እና የጥናቱ አላማ በደንብ ገለጻ ተደርጎልኛል። የልጄ በጥናቱ መሳተፍንም ሆነ አለመሳተፍ ውሳኔ የምሰጠዉ እኔ ነኝ፤ እንዲሁም ልጄ ጥናቱን በፈለገው/በፈለገችው ሰአት ቢያቋርጥ/ብታቋርጥ የሚገኝ ቀጥተኛ ጉዳትም ሆነ ጥቅም እንደሌለ አውቃለሁ። እንደ ወላጅ/አሳዳጊ ልጄ በዚህ ጥናት እንዲሳተፍ መወሰኔን በፊርማየ አረጋግጣለሁ።

የወላጅ/አሳዳጊ ፊርማ.....

ቀን.....

የአጥኚው ፊርማ.....

ቀን.....

II: English Version Structured Questionnaire

A) Sociodemographic and behavioral factors

1. Sociodemographic factors

№	Questions	Answer	Skip to	Code
1	Age	……		
2	Sex	1. Male 2. Female		
3	Religion	1. Orthodox 2. Muslim 3. Protestant 4. Catholic 5. Others		
4	Number of family	……..		
5	Educational status of the child	1. Child didn't start school 2. Nursery 3. Kindergarten 4. Primary		
6	Educational status of the mother	1. Unable to read and write 2. Able to read and write 3. Primary (1-8) 4. Secondary (9-12) 5. Diploma 6. Degree and above		
7	Educational status of the father	1. Unable to read and write 2. Able to read and write 3. Primary (1- 8) 4. Secondary (9-12) 5. Diploma 6. Degree and above		

8	Occupation of the mother	1. Housewife 2. Farmer 3. Merchant 4. Civil servant 5. Others		
9	Occupation of the father	1. Farmer 2. Merchant 3. Civil servant 4. Others		
10	Household income per month in ETB	1. < 2000 2. 2000- 3000 3. 3000- 5000 4. 5000- 7000 5. 7000- 9000 6. > 9000		
11	Animals living in the house	1. Yes 2. No		
12	Have separate bedroom	1. Yes 2. No		
13	Presence of similar illness in the family	1. Yes 2. No		

2. Behavioral factors

№	Questions	Answer	Skip to	Code
1	Frequency of washing hair	1. Daily 2. Three times per week 3. Twice per week 4. Once per week 5. Others		
2	Washing hair with soap	1. Yes 2. No		
3	Applying oil over the scalp	1. Yes 2. No		
4	Sharing pillows, combs & scissors	1. Yes 2. No		
5	Shave hair	1. Yes 2. No		

B) Physical Examination

1	Gray patch	1. Yes 2. No		
2	Black dot	1. Yes 2. No		
3	Seborrheic	1. Yes 2. No		
4	Keroin	1. Yes 2. No		
5	Favus	1. Yes 2. No		

C) Diagnosis

Tinea capitis	1. Yes 2. No		

ሀ) የአማርኛ መጠይቅ (Amharic Version Structured Questionnaire)

1) Socio-demographic factors: Amharic version

ተ.ቁ.	ጥያቄ	መልስ	ይለፉ	ኮድ
1	ዕድሜ	.....		
2	ጾታ	1. ወንድ 2. ሴት		
3	ሃይማኖት	1. ኦርቶዶክስ 2. ሙስሊም 3. ፕሮቴስታንት 4. ካቶሊክ 5. ሌላ ካለ ይጥቀሱ		
4	የቤተሰብ ቁጥር	.....		
5	የልጅ የትምህርት ደረጃ	1. ትምህርት አልጀመረም/አልጀመረችም 2. ነርሰሪ (የልጆች መንከባከቢያ ጣቢያ) 3. ሙአለ ህጻናት 4. አንደኛ ደረጃ		
6	የእናት የትምህርት ደረጃ	1. ማንበብ እና መጻፍ የማትችል 2. ማንበብ እና መጻፍ የምትችል 3. አንደኛ ደረጃ (1- 8) 4. ሁለተኛ ደረጃ (9- 12) 5. ዲፕሎማ 6. ዲግሪ እና ከዛ በላይ		
7	የአባት የትምህርት ደረጃ	1. ማንበብ እና መጻፍ የማይችል 2. ማንበብ እና መጻፍ የሚችል 3. አንደኛ ደረጃ (1- 8) 4. ሁለተኛ ደረጃ (9- 12) 5. ዲፕሎማ 6. ዲግሪ እና ከዛ በላይ		

8	የእናት ስራ	1. የቤት እመቤት 2. ገበሬ 3. ነጋዴ 4. የመንግስት ሰራተኛ 5. ሌላ ካለ ይጥቀሱ		
9	የአባት ስራ	1. ገበሬ 2. ነጋዴ 3. መንግስት ሰራተኛ 4. ሌላ ካለ ይጥቀሱ		
10	የቤተሰብ ወርሃዊ ገቢ በብር	1. < 2000 2. 2000- 3000 3. 3000- 5000 4. 5000- 7000 5. 7000- 9000 6. > 9000		
11	ቤት ዉስጥ የቤት እንስሳት ይኖራሉ	1. አዎ 2. አይኖሩም		
12	የሚተኙት በተለየ መኝታ ቤት ነው?	1. አዎ 2. አይደለም		
13	ቤተሰብ ዉስጥ ተመሳሳይ የጭንቅላት ቁስለት አለ?	1. አዎ 2. የለም		

2) Behavioral factors: Amharic Version

ተ.ቁ.	ጥያቄ	መልስ	ይዝለሉ	ኮድ
1	የልጅዎን ጸጉር ምን ያህል ጊዜ ያጥባሉ?	1. በየቀኑ 2. በሳምንት ሶስት ጊዜ 3. በሳምንት ሁለት ጊዜ 4. በሳምንት አንዴ 5. ሌላ ካለ ይጥቀሱ		
2	የልጅዎን ጸጉር ሲያጥቡ ሳሙና ይጠቀማሉ?	1. አዎ 2. አልጠቀምም		
3	ለልጅዎ የጸጉር ቆዳ ቅባት ይጠቀማሉ?	1. አዎ 2. አልጠቀምም		
4	ልጆችዎ ትራስ ልብስ፣ማበጠሪያ፣ መቀስ በጋራ ይጠቀማሉ?	1. አዎ 2. አይጠቀሙም		
5	የልጅዎን ጸጉር ይላጫሉ/ያስላጫሉ?	1. አዎ 2. አልላጭም/አላስላጭም		