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**BAHIRDAR UNIVERSITY**

**COLLEGE OF MEDICINE AND HEALTH SCIENCES,**

**SCHOOL OF MEDICINE**

**DEPARTMENT OF DERMATOVENEREOLOGY**

# MAGNITUDE AND ASSOCIATED FACTORS OF TINEA PEDIS AMONG PATIENTS VISITING DERMATOVENOROLOGY CLINIC AT PUBLIC HOSPITALS, BAHIR DAR

**BY-DR.YEABSIRA SEMEGN (MD, DERMATOVENEREOLOGY RESIDENT)**

**A RESEARCH THESIS SUBMITTED TO SCHOOL OF PUBLIC HEALTHCOLLEGE OF MEDICINE AND HEALTH SCIENCES BAHIRDAR UNIVERSITY, FOR THE PARTIAL FULLFILMENT OF THE REQUIREMENT FOR SPECIALITY PROGRAM OF DERMATOVENEREOLOGY**

JANUARY, 2026 G.C

BAHIR DAR, ETHIOPIA

## PRINCIPAL INVESTIGATOR:

DR. YEABSIRA SEMEGN (MD, DERMATOVENEREOLOGY RESIDENT)

Address: Bahir Dar

Mobile: +251 945 552 430

Email-yabseseme@gmail.com

## ADVISORS:

1. DR.MESKEREM GIRMA (PhD, Assistant Professor)

Address: Bahir Dar

Phone number: +251 911 368 114

Email-girmam280@gmail.com

2. DR.MIHRETU ENYEW (MD, Assistant professor of Dermatovenereology)

Address: Bahir Dar

Phone number: +251 922 984 022

Email: **mihrenyengda178@gmail.com**

## DECLARATION

This is to certify that the thesis titled ‘Magnitude and associated factors of Tinea Pedis among patients attending Dermatologic clinic at public hospitals at Bahir Dar, Amhara, Ethiopia, 2025’, 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.

**YeabsiraSemegnKassie** **January/2026** **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 Pedis among patients attending Dermatologic clinic at public hospitals at Bahir Dar, Amhara, Ethiopia, 2025" by YeabsiraSemegn (MD, Dermatovenereology resident) prepared under my guidance. I recommend the thesis be submitted for oral defense.

| Advisor's name | Signature | Date |
|---|---|---|
| Dr. Mihretu Fenyew | | 06/08/2018 |
| Dr. Mesfin Gizma | | 06/08/2018 |



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## ABSTRACT

**Background**: Tinea Pedis is one of the common superficial dermatophyte infection defined as fungal infection that affects the interdigital toe-web spaces as well as skin of the foot. This condition is considered as major public health problem affecting quality of life because of its contagious and recurrent nature. In addition, Tinea pedis is the most common entry point for bacteria in cellulitis of the leg. However, information on prevalence and associated factor of Tinea Pedis is limited in Ethiopia.

**Objective:**To assess the magnitude of Tinea Pedis and associated factors among patients visiting public hospitals in Bahirdar, Ethiopia 2025 Gregorian calendar.

**Method**: Institution based cross-sectional study was conducted on 422 patients, which were selected by systematic random sampling technique. Data collection was done with structured questioner after informed consent was obtained from each participant. The collected data was cleaned and checked for consistency and completeness and entered into EPI info version 7 and was exported to SPSS version 26 for descriptive and logistic regression analysis. Bivariable and multivariable analysis was carried out to see the association of each independent variable with the dependent variable. The strength of statistical association was measured by adjusted odds ratios and 95% confidence intervals and Statistical was declared at (P<0.05).

**Result:** A total of 422 study subjects were included and 62 (14.2%) had Tine Pedis. Male with adjusted odds ratio (AOR) of 10.853(95% CI; 4.201-19.035), Wearing occlusive footwear with AOR of 3.871(95% CI: (1.612-9.293), habit of sharing shoes with AOR of 4.530 (95%CI; 2.076-9.888), not drying after bathing with AOR of 10.603(95% CI; 4.476-15.119), Diabetes mellitus with AOR of 3.140(95% CI:.1.232-8.000) and other dermatophyte infection with AOR of 5.758(CI 95%: 2.597-12.767) significantly associated with TineaPedis.

**Conclusion and Recommendations:** The prevalence of TineaPedis was high. It is important to counsel patients regarding the nature of the disease during management time and health education is also important to address modifiable risk factors.



**Keywords** –Tinea pedis, Prevalence, associated factors, Bahir Dar, Amhara, Ethiopia

# ABBREVIATIONS AND ACRONYMS

BMI: Body Mass Index

DM: Diabetes Mellitus

E.C: Ethiopian Calendar

ETB: Ethiopian Birr

OPD: Out Patient Department

TGSH: Tibebe Ghion Specialized Hospital

T.Pedis: TineaPedis

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# 1. INTRODUCTION

## 1.1.BACKGROUND

Tinea Pedis, formerly known as athlete's foot, is one of the common superficial dermatophyte infection defined as fungal infection that affects the interdigital toe-web spaces as well as skin of the foot(1). Tinea or dermatophytosis is a superficial fungal infection caused by invasion of keratinized tissues such as hair, nails and corneal layer of the skin by filamentous fungi called dermatophytes. Dermatophytes are filamentous fungi in the genera Trichophyton, Microsporum, and Epidermophyton. It metabolize and subsist upon keratin in the skin, hair, and nail(1) .These fungi are alike in their physiology, morphology, and pathogenicity. Overall, 10 species of dermatophytes are commonly isolated and an additional 20 are occasionally cultured. The pathogenesis of dermatophyte infection depends on the release of enzymes, adherence and invasion of keratinized tissue followed by host response(1). The feet are the most common location for dermatophyte infections(2).

Disease transmission occurs by direct contact with infected humans /animals or indirectly by contaminated fomites(3). Other dermatophyte infections often occur together with tinea pedis – in particular, tineacruris, onychomycosis, and tineamanuum and the groin, hand and the nails should be examined. The dermatophytes that are typically responsible for tinea pedis are T. rubrum, T. interdigitale, T. mentagrophytes, E. floccosum, and T. tonsurans(in children).This condition is considered as major public health problem affecting quality of life because of its contagious and recurrent nature(4). In addition, tinea pedis is the most common entry point for bacteria in cellulitis of the leg(5).

Common presentations revolve around the interdigital (intertrigenous), hyperkeratotic scaly (Moccasin-type), vesiculobullous, acute ulcerative and pustular types(6). The interdigital type is the most common presentation with erythema, erosion and maceration of toe web spaces. The moccasin type is characterized by patchy or diffuse scaling on the soles and the lateral and medial aspects of the feet. The vesiculobullous variant presents with tense vesicles, vesiculopustules, or bullae on the soles and periplantar areas. The acute ulcerative and

pustulartype caused by zoophilic fungi in combination with Gram-negative bacterial super infection produces vesicles, pustules, and purulent ulcers on the plantar surface (1)

Studies show adult period dermatophytoses are highly prevalent in risk groups such as soldiers, sportsmen, factory workers and dormitory students(7). The lack of sebaceous glands and the moist environment created by occlusive shoes are important factors in the development of tinea pedis(2). The Incidence is higher among those using communal baths, showers, or pools but host factors, such as an individual's immune response to dermatophytes also plays a determining role in disease development(1).

The clinical diagnosis of T.Pedis can be established based on the typical manifestation and distribution of the disease but KOH determination and histopathologic examination have highest rate of positive finding(1).Managment of T.pedis typically involves topical, oral antifungals and antibiotics if there is bacterial superinfection. Mild interdigital type can be treated with topical antifungals like imidazoles and allylamines. Systemic antifungals are primarily reserved for Moccasin type T.pedis and for patients who fail topical therapy. Avoidance of occlusive foot wear, foot hygiene and desiccating foot powder can also considered as adjuvant therapy(1).

## 1.2 STATEMENT OF THE PROBLEM

There is increase in prevalence of superficial fungal infections in recent years and is estimated to affect roughly 20-25% of the world population(3). The prevalence of T.pedis is estimated to be 10% worldwide(1). Around 70% of the population may have the disease sometime in their Life (7).The prevalence of Tinea Pedis varies globally and depends on different social, geographical and environmental factors which may change with the passage of time. These factors include age, sex, geographic location, personal hygiene, occupation and immune status of the individual. It affects all age groups but is more common in adolescent and young male adults(8). The disease is more common in tropical and subtropical regions because of high temperature and humidity(9).Dermatophytosis in general have been recorded all over the world but with variation in distribution, incidence, epidemiology, types based on body parts and target hosts from one location to another(10).The prevalence of dermatophytosis has significantly reduced in many developed nations of the world compared to developing ones(10).

European studies showed a Tinea Pedis frequency of 4.4–34.9% in the general population while estimated to be around 10% in USA(1),(11)).

In Africa most of the studies are done in Tunisia, and Algeria and showed a prevalence of T.Pedis ranging from 15% to 41%((4),(12).All of these studies were epidemiological and etiological studies in which most of them were done on study population that only contained target groups like military cadets, athletes and swimmers. The remaining studies took the clinically suspected cases of dermatophytosis as their source population and assessed the prevalence of T.pedis from this study population. The study population containing only target groups or clinically suspected individuals will not tell the accurate prevalence of Dermatophytosis and T.pedis in particular.

In Ethiopia there are no studies done on prevalence and associated factor of Tinea Pedis. There are few studies done on the epidemiology and etiologic factors of Dermatophytosis in general. Additionally, these researches do not study the associated factors. The other studies have a study topic focused on dermatophyte and non dermatophytedermatomycosis. While these studies have broadly examined dermatomycosis encompassing T.capitis, T.ungum, T.Mannum, candida infection, pitryasisversicolor and T.pedis, they have not specifically focused on the prevalence

and associated factor of Tinea Pedis. The epidemiology of T.pedis in the previous studies has reported a wide range, from 4.9% to 13.9%, indicating statistically significant difference that remained unexplained. This variation highlights a critical gap in our understanding of the factors influencing T.Pedis prevalence. This gap hinders our ability to develop targeted intervention as effective preventive strategies. In addition, Most of them are done on specific section of population, that is, school children. These studies may not be a true representation of the overall disease pattern of the country.

Since Ethiopia is a developing nation located in tropical region where it experiences a high prevalence of T.pedis, it is imperative to conduct further research to gain a comprehensive understanding of the epidemiology and its associated risk factors (9). Because of the prolonged period of treatment and the recurrence of infections, T.pedis is still considered as a major public health problem affecting quality of life. The associated social, environmental and host factors influence the disease development and recurrence nature (4). Understanding and addressing the associated factors are essential in the comprehensive management of T.pedis.

Tinea Pedis is a prevalent condition that significantly impacts a large portion of the population. Till now this topic is not studied in our hospital as well in our locality.A comprehensive understanding of T.Pedis epidemiology encompassing global, national and regional perspectives is crucial for developing effective prevention and control strategy. Currently, there is a lack of specific data on the prevalence of T.pedis and its associated factors in Ethiopia. This study aims to fill this gap and provide recent baseline data that can be used by healthcare providers to improve patient care, allocate resources, and guide research directions. By doing so, it will highlight areas where health education should be emphasized to make a difference in addressing this issue.

## 1.3 SIGNIFICANCE OF THE STUDY

This study, focusing on the prevalence of T. pedis in Ethiopia, will provide crucial data to address the knowledge gap regarding the epidemiology of this condition. By understanding the

prevalence patterns and associated risk factors in Ethiopia, this research can contribute valuable insights that will initiate targeted interventions and public health initiatives. Additionally, this study could help healthcare providers in improving patient care by identifying high-risk groups or populations that may require specialized treatment approaches.

It is also important to suggest some recommendations for the management team, the department, the hospital, and the health chain leaders at large. The findings may also have a tremendous benefit in intensifying efforts in health education for early diagnosis and management. The results from this study can guide future research efforts and identify areas for further investigation. It would also allow policymakers to allocate resources effectively, ensuring adequate healthcare facilities, medications, and expert personnel for managing T. pedis

# 2 LITERATURE REVIEW

## 2.1 PREVALENCE OF TINEA PEDIS

Tinea Pedis prevalence overall is reported to be 10% in literatures(1). It has been documented in multiple studies and the prevalence is variable among each study which accounts from (2.4% - 41%)((1),(4),(6),(12)(13)(14)(15))

A meta-analysis that incorporated a total of 58 PubMed articles with a study design of Cohort, cross-sectional, and case-control studies published from 1979–2022 were analyzed in North America which showed a prevalence of 10% in the general population. Another meta-analysis of PubMed articles conducted from 2013-2023 estimated the prevalence of TineaPedis to 3%(16). While European studies showed a higher prevalence ranging from 4.4-34.9%((11),(14)). In contrast to the above studies, A Spanish study of the general adult population and Italian study on prevalence of T.pedis in Italian Navy showed a low prevalence of 2.4%(5,(17)).A cross-sectional study done among adults in primary health care settings in Qatar showed even lower prevalence of 1.8%(18).

A prospective study that was carried out during one year from March 2013 in Tunis, Tunisia with a total of 392 patients within age range of 3-85 years visiting the dermatovenerology Out Patient Department indicated 22.5% as a prevalence of T.pedis(4). Another cross sectional epidemiologic study done in Algeria during the period November 2003 to November 2004 with sample size of 1300 individuals approximated prevalence to 19.9%(12).A 5 year study done in Port Hacourt Teaching Hospital, Nigeria confirmed that 70% of the general population will experience T.Pedis once in their life time(19)

In Ethiopia, in contrast to the world and African studies, A cross sectional study done on 305 patients visiting dermatovenereolgy OPD at TikurAnbessa Teaching Hopsital, for the assessment of Dermatophytosis prevalence and etiologic agents during September 2014 to October 2015 indicated the prevalence of T.Pedis was 4.9%(10). A household survey done in two communities(S/UO and Kishe) showed a prevalence of 3.74% which is comparable to other Ethiopian studies(13).In similar fashion, a retrospective laboratory based cross-sectional study done in Addis Ababa on a total of 1122 sample size showed 7.8% prevalence of T.pedis(20)

## 2.2 FACTORS ASSOCIATED WITH T.PEDIS

### 2.2.1 SOCIO-DEMOGRAPHIC FACTORS

In many of the studies, gender distribution for T.Pedis was higher in male compared with female((3)(8)(5)(15)(18)(21)(22) .In contrast to this, a prospective cross sectional studies done in Tunisia and TikurAnbessa Tertiary Hospital, Addis Ababa Ethiopia showed higher prevalence in Females than Males((4),(10)). Male and Female are equally affected in the laboratory based cross-sectional study done in Arsho Advanced Medical Laboratory, Addis Ababa(20)

Tinea pedis prevalence escalates with age. In relation to age distribution, Most of the studies showed highest T.Pedis prevalence in adults with age group of 40-60 years followed by young adults between 20 to 40 years ((4),(5),(10),(12),(18)(22)). All studies showed lowest prevalence of T.pedis in children aged<10 years. In contrast to this, One study done in Addis Ababa Tertiary Hospital found out the age group 20-40 years are the most commonly affected age group(10).

In accordance to monthly income, a hospital based study in India demonstrated lower monthly income is associated with higher prevalence of T.Pedis(57% in low income Vs 13% in high income)((3)).

Educational status of the patient also has an impact on the prevalence of T.Pedis. Patients with lower educational background (uneducated and primary school) have a higher prevalence of T.Pedis. A hospital-based cross-sectional study in India showed a 55.5% prevalence of T.Pedis in patients with lower educational background in comparison with better educational status accounting for 32.5% (3).

In hospital based cross-sectional study done in India during the study period from December 2015 to May 2016,majority of the patients were from rural background(65.3%) compared to urban dwellers. This is further supported by the prevalence study done in Turkey(8)

Occupation is frequently associated with T.Pedis. People in certain occupation wearing synthetic shoes and safety shoes for long period throughout the year are at high risk. Most of the studies rank soldiers, factory workers, manual workers including miners, runners and agriculturist predisposed to develop T.Pedis ((3)(5) 12)(13)(22)).

Correlation of obesity with T.Pedis varies across studies. the cross-sectional study done in Qatar showed obesity as a major risk factor, with morbidly obese individuals being 15.1 times more likely to develop T.pedis than underweight individuals(32). In contrast to this, obesity was not found to be a risk factor for T.Pedis development as it was illustrated in the cross-sectional study done in Tunisia and in European runners((4),(22)).

In respect to household size, a study done in Turkey showed that number of siblings has no statistically significant correlation with prevalence of T.pedis(8).In contrast, one study done in Hawassa, Ethiopia showed that majority of patients (68.7%). affected by T.Pedis was from family size of 4-6(9).

### 2.2.2 BEHAVIORAL AND HYGIENE RELATED FACTORS

The impact of shoe wearing pattern is well-studied. Prolonged occlusive footwear is considered as a contributing factor for the development of the disease by creating moist environment, useful for reproduction of the dermatophyte fungi. The prospective cross-sectional study done in Tunisia found significant correlation between wearing prolonged occlusive footwear and T.pedis magnitude(4). The occlusive footwear was also found to be a risk factor for developing Tinea Pedis in a study conducted among 284 uniformed Philipine National Police Personnel (23) and military recruits at Pakistan(6). A cross-sectional study done in Adana, Turkey found statistically significant between shoe-wearing pattern and Tinea Pedis. Subjects who consistently wear rubber shoes have higher prevalence of T.Pedis(78.2%) compared to subjects who wear open sandals(7). This result was further supported by a study done on Italian navy cadets(24) and by observational study done in Osaka,Japan((25). In contrast to these, a study done in Israel population demonstrated no significant difference in magnitude of T.Pedis in relation to preferred foot wear type (open sandals Vs occlusive foot wears)(26). Although limited studies exist regarding the correlation between use of socks and T.pedis, a meta-analysis using the MEDLINE database showed that dermatophytes tend to persist on clothing, particularly socks, thus serving as environmental risk factor for T.Pedis transmission (27). Additionally, a study done on foot care applications in a state hospital of Anatolia, Turkey, showed that the use of cotton socks with daily changing can significantly reduce the risk of acquiring T.Pedis(28).

Use of communal bath or public swimming pools is also known to create easier transmission, in addition to the comfortable environment for the disease progression. The cross-sectional study in Tunisia found significant correlation between sharing of communal bath/swimming pool and T.pedis magnitude(4). A comparative study between athletes and no-athletes done in University of Tsubuka, Japan showed that swimming pools are high-risk facilities for acquiring T.Pedis infection(29). The review article on T.Pedis etiology and global epidemiology and cross-sectional study done in Pakistan also support this association o((5),(6)).

The cross-sectional study done on 461 subjects who are worshipers in the mosque of Turkey concluded that there is statistically significant association between frequent bathing ( >1-2 times/day), drying foot after bathing, footwear and foot care instrument sharing and prevalence of T.Pedis(7). 63.9% of patients with frequent bathing develop T.Pedis while only 31.61% with less bathing frequency have the disease. In another cross-sectional study done on the association of T.Pedis with feet-washing behavior illustrated that the subjects who wash their foot with soap has significantly lower prevalence of T.Pedis(30). 32.25% Patient who never dries their foot has T.Pedis in contrast to 2.9% for person who almost always dries their leg (7).

### 2.2.3 MEDICAL/ COMORBIDITY FACTORS

The impact of comorbidities and drugs such as Diabetes mellitus, Atopic dermatitis, HIV/AIDS infection and immunosuppressive drugs has been studied in different research. There are controversial data from studies done on the association between Diabetes Mellitus (DM) and T.Pedis. Significant association was found in 2 studies done on 167 patients and 600 patients in Turkey((31),(32)).This was further backed up by the cross-sectional study done in Qatar(18).In the opposite, cross-sectional study done in Tunisia and the review article on T.Pedis etiology and global epidemiology did not show any correlation((4),(5)).

A prospective study done in Tunisia with a sample size of 392 illustrated statistically significant association of T.Pedis with use of immunosuppressive drugs(4). This was further supported by a meta-analysis of 506 articles which were published from 1971-2020, particularly mentioning chemotherapy agents (33). This meta-analysis also demonstrated HIV/AIDS as a risk factor for

severe form of T.Pedis. However, the Tunisia study did not found statistically significant association between HIV/AIDS and T.Pedis(4).

A PubMed search conducted in April 2023, which included studies done in the past 10 years showed that Atopic dermatitis is predisposing factor for T.Pedis(34). These finding is also supported by the study done in Tunisia(4).

Many studies demonstrate the co-existance of other dermatophyte infection with T.Pedis. Most commonly associated ones are TineaUngum, T.Mannum and T.corporis in order of decreasing frequency(4,12,26).

Previous history of T.Pedis has opposite reports in different researches. Previous history of T.Pedis was observed in 26.9% of the military soldiers in Pakistan, a cross-sectional study done from March to September 2012(6). A study done in Israel mentioned previous history of T.pedis as a risk factor(26).This study result was not supported by the study done on European runners with no T.Pedis patient presented with previous history(24).

Positive family history is also mentioned as a risk factor in some of the studies ((3),(4)). Family history was positive in 72% of the patients evaluated in the cross-sectional study done in India(3). In similar fashion, a study done in Israel found statistically significant difference of T.Pedis prevalence in the presence of positive family history(26).

### 2.2.4 ENVIRONMENTAL FACTORS

Although few studies mention the role of home floor type in the prevalence of T.Pedis, the meta-analysis done using MEDLINE database showed that earthern floor type with high house dust (41%) tends to serve more as a reservoir for dermatophyte species and contributes for T.pedis transmission (27)

Workplace exposure to water (wet work) has significant association with developing T.Pedis, which was illustrated by the study done in a state hospital of Anatolia, Turkey. In this study,

swimming pool workers whose feet constantly gets wet has 15 times higher risk of developing T.Pedis than normal individuals(28).

In respect to humidity, most studies report T.Pedis is more prevalent in summer season with high temperature, humidity and rainfall(4,9,11).

## 3. CONCEPTUAL FRAMEWORK

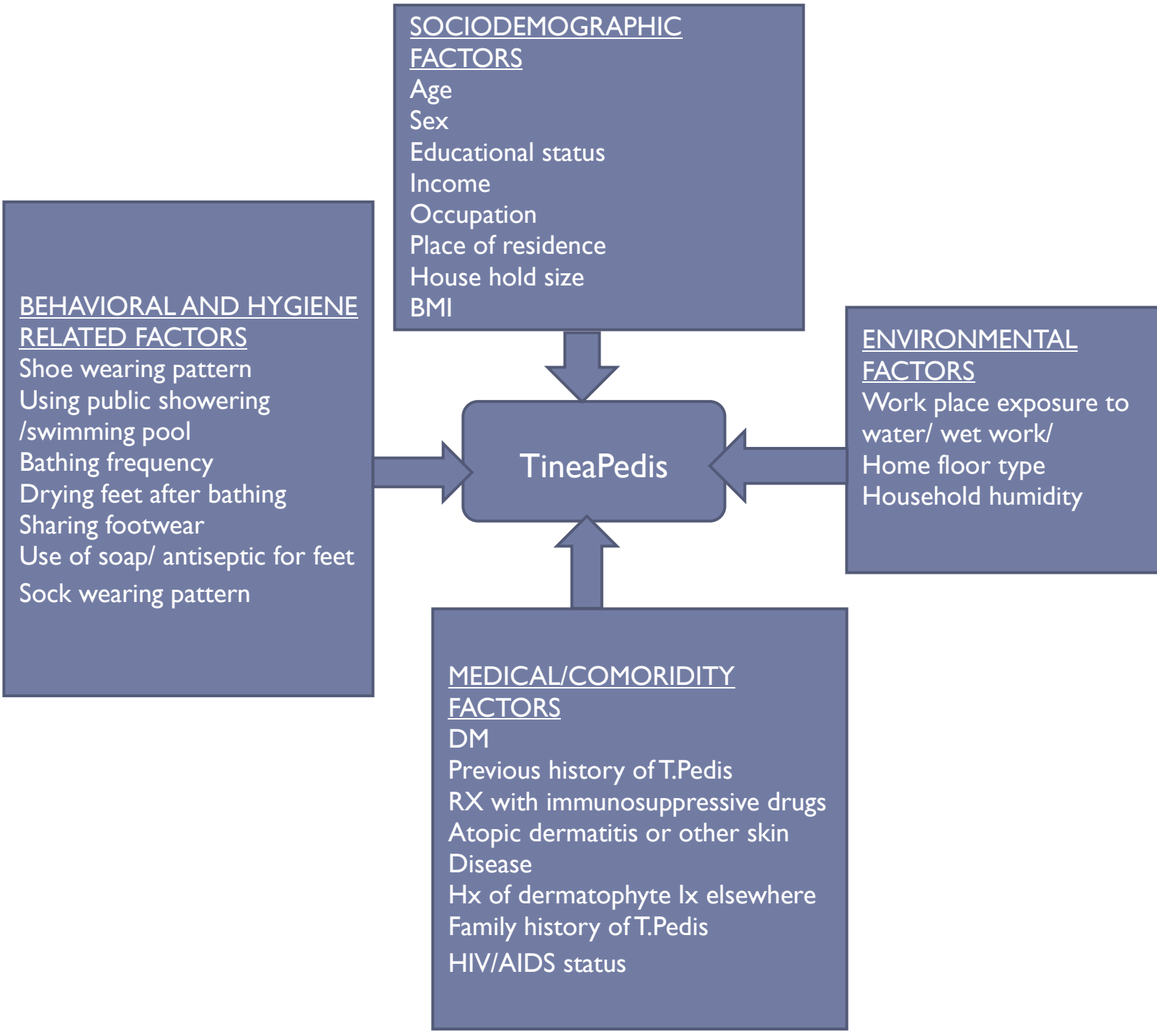


**Figure 1-conceptual framework**

# 4. OBJECTIVE OF THE STUDY

## 4.1 GENERAL OBJECTIVE

-To assess the magnitude and associated factors of Tinea Pedis among patients visiting Dermatovenerology OPD at public hospitals,north Ethiopia, Bahirdar, in 2025 G.C

## 4.2 SPECIFIC OBJECTIVES

-To determine the magnitude of Tinea Pedis among patients visiting Dermatovenerology OPD at public hospitals ,North Ethiopia, Bahirdar, in 2025 G.C

- To identify associated factors of Tinea Pedis among patients visiting Dermatovenerology OPD at public hospitals, north Ethiopia, Bahirdar, in 2025 G.C

# 5. METHODS AND MATERIALS

## 5.1 Study area and period

This study was conducted in public hospitals at Bahir Dar, Ethiopia. The regional state of Amhara's capital, Bahir Dar, has a population of half million according to 2022. After the capital Addis Ababa and Diredawa, it ranks as Ethiopia's third-largest city. With a height of 1,840 meters (6,036 feet) above sea level, it is situated on the southern coast of Lake Tana, the headwaters of the Blue Nile (also known as Abay) and is about 578 kilometers (360 miles) northwest of Addis Ababa.

There are 3 public hospitals in the city, which are Tibebe Ghion specialized teaching hospital, Felege hiwot comprehensive specialized hospital and Adiss Alem primary hospital.

TGSTH is located about 10 km south from the city center. It is a tertiary university teaching hospital and serves more than five million people in the catchment area and patients who are referred from across the Amhara and abuttal regions. It provides a broad range of medical services with more than 500 inpatient beds and outpatients in four major departments and other specialty unit’s. Dermatovenereology department has 2 OPDs, 6 Dermatovenereologist, 15 dermatovenereology residents and 2 clinical nurses.

FHCSH serves more than 5 million people in the catchment area and patients who are referred from across the Amhara and benshangul gumuz region. It provides a broad range of medical services with more than 500 inpatient beds and outpatients in four major departments and other specialty units. Dermatology department in this hospital has one OPD, 2 Dermatovenereologist, 1 general practitioner and 2 clinical nurses.

AAPH is located about 5 km north from the city center. It is one of the primary hospitals owned by the Amhara regional health bureau-serving people in the catchment area. It provides medical services in four major departments and Leishmaniasis treatment center. Dermatology services are

providedthree days in a week, with two outpatient clinics and six inpatient beds, by Dermatovenereologist and Dermatovenereology residents from TGSTH, as per an agreement reached in 2019 between the hospital and Bahir Dar University College of Medicine and Health Sciences.

The study was conducted from September 6to December 30 2025 G.C.

## 5.2 Study design

An Institutional based cross-sectional study was conducted to determine the magnitude and associated factors of Tinea Pedis among patients visiting Dermatovenerology OPD at public hospitals from September 6 2025 to December 30, 2025 G.C.

## 5.3 Population

### 5.3.1 Source population

- All patients who visitedDermatovenerology OPD at public hospitals

### 5.3.2 Study Populations

- All patients who visited the Dermatovenerology OPD at public hospitals during the study time 2025 G.C, Bahirdar, North West Ethiopia.

### 5.3.3 Study unit

- The study unit was selected patients who fulfill the inclusion criteria in the specified study period.

## 5.4 Inclusion and Exclusion criteria

### 5.4.1 Inclusion Criteria

All patients that are seen in the dermatology OPD during the study period was included in the study.

### 5.4.2 Exclusion Criteria

Participants who were on antifungal treatment and patients who were critically ill during data collection were excluded.

## 5.5 Sample Size Determination and Sampling technique

### 5.5.1 Sample Size Determination

The sample size was calculated by using single population proportion formula with the assumption of p as 50%, 95% confidence level, and 5% margin of error.

$$n = \frac{(Z\alpha/2)^2 P(1-P)}{d^2} = \frac{(1.96)^2 0.5(1-0.5)}{(0.05)^2} = 384$$

- Where n= minimum sample size required for the study
- Zα/2 = 1.96, standardized normal distribution curve value for the 95% confidence Interval
- p= 0.5
- d= 0.05 degree of margin of error

With 10% for non-respondents' rate (38) the final Sample size will be 422.

### 5.5.2 Sampling technique

The study subjects were selected by using systematic random sampling technique.

The number of sample taken from each hospital is calculated as below;

The average number of patients in dermatologic OPD of each hospital is stated below. The total average number of patients seen within 3 months (October –December) in last year was 1200, 1482 and 1440 at TGSTH, FHCSH &AAPH respectively. When we add them the sum of patients seen in 3 months in the 3 hospitals become 4122.

Proportion of number of sample from TGSTH = (1200×100)/4122=29%, with similar formula the proportion of FHCSH & AAPH become 36% and 35% respectively.

Number of samples from TGSTH = 29% ×422 =122

Number of samples from FHCSH = 36% ×422 =152

Number of samples from AAPH = 35% ×422 =148

The total average patients seen within 3 month period at TGSTH, FHCSH & AAPH were 1200, 1482 and 1440 respectively. K-value = number of patients within study period/total sample size in each hospital = 1200/122 = 10, 1482/152 = 10, 1440/148 = 10 respectively.

Every $10^{th}$ patient was included in the study until the required sample is reached. The first participant was selected by lottery method from sample interval.

### 5.6 Study variables

#### 5.6.1 Dependant Variable

Tinea Pedis (yes/no)

#### 5.6.2 Independent Variable

**Socio -demographic characteristics**

Age

Sex

Income

Educational status

Place of residence

Occupation

Household size

BMI

**Behavioral and Hygiene related factors**

Shoe wearing pattern

Footwear sharing

Sock wearing pattern

Use of public shower/swimming pool

Frequency of bathing

Use of soap/ antiseptic for feet

Drying feet after bathing

Towel/foot care instrument sharing

**Medical/ comorbidity factors**

Diabetes Mellitus

HIV/AIDS status

Previous history of Tinea Pedis

Treatment history of T.pedis

Family history of T.pedis

Treatment with immune-suppressive drugs

Atopic dermatitis/other skin diseases

Other dermatophyte infection

**Environmental factors**

Exposure to water/wet work/

Home floor type

Humidity of the house

## 5.7 Operational Definition

**TineaPedis**- superficial dermatophyte infection of interdigital toe-web spaces and skin of the foot diagnosed clinically by the physician(1)

**BMI**- weight in kg divided by height in $m^2$. The healthy range for BMI is 18.5–24.9, while BMI > 25 is considered overweight and BMI > 30 is considered obese(35)

**Prolonged occlusive footwear-** wearing shoes and socks that prevent air circulation for >8 hours a day(6)

**Frequent bathing-** taking shower >2 times per day (7)

### 5.8 Data collection tools and procedure

A structured questionnaire were prepared first in English, and then translated to Amharic version questionnaire.TheQuestionnaire had four parts to address the socio-demographic characters, the behavioral and hygiene related factors, relevant medical/comorbidity history and environmental factors respectively.

A face to face interview technique was used to collect data from each study subject after obtaining informed consent. The interview was conducted by two Dermatovenereology residents at TGSH and AAH and one general practitioner at FHCSH.

### 5.9 Data quality assurance

The diagnosis of new patients was done by the senior residents and attending senior physicians working at the Dermatovenerology OPD. To control quality of data, an appropriate training for data collector was given on briefing the general objective of the study, and discussing the contents of the questionnaire. The overall activity of data collection was supervised and coordinated by the principal investigator. A pretest was done on 5% of the sample size before the actual data collection is started to correct ambiguity, vagueness and lack of clarity.

### 5.10 Data processing and analysis

The data was collected, cleaned, recoded and then entered into EPI info version 7.0 and was exported to SPSS version 26 for descriptive and logistic regression analysis. Descriptive statistics was used for analyses of sociodemographic variables and relevant clinical data. Categorical variables were described by frequencies and percentages. Binary logistic regression analysis was made to obtain odds ratio and the confidence interval of statistical associations. Variables with $p<0.25$ in univariate analysis was further analyzed by multiple logistic regressions to avoid confounders. The strength of statistical association was measured by

adjusted odds ratios and 95% confidence intervals and Statistical significance was declared at ($P<0.05$). Model fitness was checked by Hosmer and Lemeshow test.

### 5.11 Ethical Consideration

Ethical clearance was obtained from the Ethical review board of Bahirdar University, College of Medicine and Health Science. A support letter was obtained from the department of Dermatovenereology. Each patient was informed on the objective of the study, confidentiality and their autonomy just before the data collection starts. Consent was obtained from each study participant. Patient identification variables such as name, house number, phone number was not used in the study.

### 5.12 Dissemination and Utilization of the result

The results of this study will be disseminated through, Bahir Dar University College of medicine and health science, and the hospital included in the study, international journals, public health association and Ministry of Health.

# 6 RESULTS

## 6.1 SOCIODEMOGRAPHIC CHARACTERSTICS

The study consists of 422 participants and the minimum and maximum age of study participants were 3 year and 80 years of age respectivelywith median age of 30 years and majority of respondents were between 21–40 years (41.7%). Most respondents resided in urban areas (62.4%). In terms of religion, Orthodox followers were the largest group (49.1%). Regarding occupation, students represented the highest proportion (30.1%). Nearly half of the respondents lived in households with 1–3 family members (48.3%). Regarding BMI status, the majority of participants were non-obese (85.1%).

**Table 1- sociodemographic characteristics of study participants (n-422) at dermatologic clinic,publichospitals,bahir dar,Ethiopia,2025**

| | **Categories** | **Frequency** | **Percent (%)** |
|---|---|---|---|
| **Age** | <20yrs | 94 | 22.3% |
| | 21-40yrs | 176 | 41.7% |
| | 41-60yrs | 104 | 24.6% |
| | >60yrs | 48 | 11.4% |
| **Sex** | Male | 180 | 42.7% |
| | Female | 242 | 57.3% |
| **Monthly Income** | Low | 327 | 77.5% |
| | High | 95 | 22.5% |
| **Educational status** | Uneducated | 85 | 20.2% |
| | Primary | 140 | 33.2% |
| | Secondary | 117 | 27.7% |

| | | | |
|---|---|---|---|
| | Higher education | 80 | 18.9% |
| **Place of Residence** | Rural | 158 | 37.4% |
| | Urban | 264 | 62.6% |
| **Religion** | Muslim | 119 | 28.2% |
| | Orthodox | 207 | 49% |
| | Protestant | 72 | 17.1% |
| | Catholic | 24 | 5.7% |
| **Occupation** | Farmer | 110 | 26.1% |
| | Daily Laborer | 20 | 4.7% |
| | Government Worker | 47 | 11.1% |
| | Student | 127 | 30.1% |
| | Merchant | 42 | 10.0% |
| | Factory worker | 31 | 7.3% |
| | Others | 45 | 10.7% |
| **Household size** | 1-3 family members | 204 | 48.3% |
| | 4-6 family members | 196 | 46.4% |
| | >=7 family members | 22 | 5.3% |
| **BMI** | Obese | 63 | 14.9% |
| | Non-Obese | 359 | 85.1% |

## 6.2 BEHAVIORAL AND HYGIENE RELATED FACTORS

More than half of the respondents wore open footwear such as sandals (55.5%). Most participants did not share shoes (68.0%), and half reported wearing synthetic socks (50.2%). Additionally, a slightly higher proportion of respondents did not use communal baths or swimming pools (55.5%). The majority reported drying their feet after bathing (76.5%).

**Table 2-behavioral and hygiene related characteristics of study participants (n=422) at Dermatologic clinic, Public hospitals, Bahir Dar, Amhara, Ethiopia, 2025**

| Characteristics/variables | Categories | Frequency | Percent (%) |
|---|---|---|---|
| **Shoe wearing Pattern** | Bare foot | 40 | 9.5% |
| | Occlusive foot wear | 148 | 35% |
| | Open foot wear(open sandals) | 234 | 55.5% |
| **Shoe sharing habit** | Yes | 135 | 32.0% |
| | No | 287 | 68.0% |
| **Sock wearing status** | No | 177 | 41.9% |
| | Synthetic | 212 | 50.3% |
| | Cotton | 33 | 7.8% |
| **Use of communal bath/swimming pool** | Yes | 188 | 44.5% |
| | No | 234 | 55.5% |
| **Frequency of bathing** | 1-2x/day | 262 | 62.1% |
| | >=3x/day | 51 | 12.1% |
| | Not daily | 109 | 25.8% |
| **Drying after bathing** | No | 99 | 23.5% |
| | Yes | 323 | 76.5% |
| **Use of soaps/antiseptic for foot** | Yes | 282 | 66.8% |

| | | | |
|---|---|---|---|
| | No | 140 | 33.2% |

## 6.3 MEDICAL/COMORBIDTY FACTORS

Most respondents did not have diabetes mellitus (87%) and were not receiving immunosuppressive treatment (95.7%). The majority were HIV negative (65.6%), although nearly one-third had an unknown HIV status (29.6%). About one-fifth reported having other dermatophyte infections (22.3%).Moreover; most respondents had no previous history of T.pedis(86.3%).

**Table 3-Medical/comorbidity characteristics of study participants (n=422) at Dermatologic clinic, Public hospitals, Bahir Dar, Amhara, Ethiopia, 2025**

| Characteristics/variables | Categories | Frequency | Percent (%) |
|---|---|---|---|
| **Diabetes Mellitus** | Yes | 55 | 13% |
| | No | 367 | 87% |
| **HIV/AIDS status** | Positive | 20 | 4.7% |
| | Negative | 277 | 65.6% |
| | Unknown | 125 | 29.7% |
| **Treatment with Immunosuppressive drugs** | Yes | 18 | 4.3% |
| | No | 404 | 95.7% |
| **History of Atopic** | Yes | 43 | 10.2% |

| | | | |
|---|---|---|---|
| **dermatitis** | No | 379 | 89.8% |
| **Other Dermatophyte infection** | Yes | 94 | 22.3% |
| | No | 328 | 77.7% |
| **Previous history of T.pedis** | Yes | 58 | 13.7% |
| | No | 364 | 86.3% |
| **Family history of T.Pedis** | Yes | 93 | 22% |
| | No | 329 | 78% |

### 6.4 ENVIRONMENTAL FACTORS

Most respondents were not exposed to water at work (83.9%). Earthen floors were the most common home floor type (41.7%), followed closely by cement floors (38.6%). Additionally, the majority of households did not report humid housing conditions (86.7%).

**Table 4-Environmental factors of study participants (n=422) at Dermatologic clinic, Public hospitals, Bahir Dar, Amhara, Ethiopia, 2025**

| Characteristics/variables | Categories | Frequency | Percent (%) |
|---|---|---|---|
| **Exposure to water at work(wet work)** | Yes | 68 | 16.1% |
| | No | 354 | 83.9% |
| **Home floor type** | Earthen | 176 | 41.7% |
| | Cement | 163 | 38.6% |
| | Tile | 83 | 19.7% |

| | | | |
|---|---|---|---|
| **Humidity of the house** | Yes | 56 | 13.3% |
| | No | 366 | 86.7% |

## 6.5 PREVALENCE OF TINEA PEDIS

Out of a total of 422 patients who visited Dermatovenereology OPD during the study period, only 62 (14.2%) at 95% CI (11.5%-18.4%) had Tinea pedis. This infers that only 14.2% has Tinea Pedis where as 85.8% of participants don't have T.Pedis.

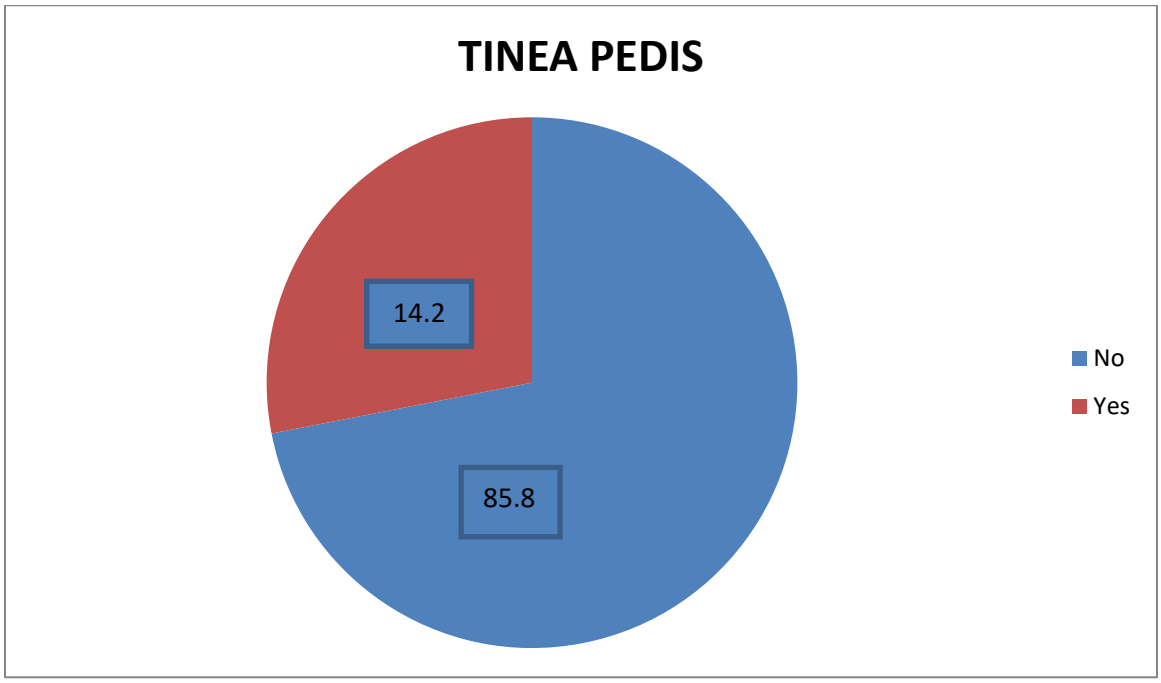


**Figure 2-prevalence of tinea pedis**

## 6.6 FACTORS ASSOCIATED WITH TINEA PEDIS

On the bivariate logistic regression analysis, only seven variables were eligible ($p<0.25$) to be analyzed by multivariate logistic regression(Table 5). Accordingly, Sex, shoe wearing pattern,shoe sharing habit, drying after bathing, Diabetes mellitus, other dermatophyte infection and family history were selected as candidate variables for multivariable analysis. Model fitness was checked using the Hosmer and Lemeshow test and its adequacy was confirmed as 0.658.

The multivariate logistic regression showed that male (AOR= 1O.853,95% CI (4.201-19.035), P=0.001) are 10.853 times more affected by T.Pedis than females.

Patients who walk barefoot (AOR=3.605, CI 95% (1.988-13.023), P=0.05) tend to be 3.605 times more affected by T.pedis than patients who wear open footwear. Similarly, patients who wear occlusive footwear have 3.871 more risk of developing T.Pedis than patients who wear open foot wear.

Patients who have a habit of sharing shoes (AOR=4.530 CI 95% (2.076-9.888,p=0.0004) are 4.530 more likely to be affected by T.pedis than those who don't share their shoes with others.

Study participants who don't dry their feet after bathing are (AOR=10.603 CI 95% (4.476-15.119),p=0.005) 10.603 times more likely to develop T.Pedis than participants who dries their feet.

Moreover, study participants who have Diabetes mellitus (AOR=3.140 CI 95% (1.232-8.000), p=0.016) are 3.140 times more affected by T.Pedis than non-diabetes mellitus participants.

Those patients who have other dermatophyte infection (AOR=5.758 CI 95% (2.597-12.767),p=0.003) are at 5.758 times more risk of developing T.Pedis in comparsion with patients who don't have other dermatophyte infection.

Study participants with family history of T.Pedis(AOR=1.989, CI 95%(0.863-4.581),p=0.106) are1.989 times more affected by T.pedis than those with no family history, though it was not statistically significant.

**Table 5-Multivariable binary logistic regression of associated factors of Tinea Pedis among patients (n=422) attending Dermatologic OPD at public hospitals, Bahir Dar, Amhara, Ethiopia, 2025**

| Variables | Categories | Tinea Pedis | | COR(95%CI) | AOR(95% CI) | P –value |
|---|---|---|---|---|---|---|
| | | Yes | No | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Sex** | **Male** | 52 | 128 | 9.425(4.632-19.177) | 10.853(4.201-19.035) | 0.001 |
| | **Female** | 10 | 232 | | 1 | |
| **Shoe wearing pattern** | **Bare foot** | 8 | 32 | 3.0(1.205-7.467) | 3.605(1.988-13.023) | 0.050 |
| | **Occlusive foot wear** | 36 | 112 | 3.857(2.096-7.099) | 3.871(1.612-9.293) | 0.002 |
| | **Open footwear** | 18 | 216 | | 1 | |
| **Shoe sharing habit** | **Yes** | 46 | 89 | 8.754(4.722-16.228) | 4.530(2.076-9.888) | 0.0004 |
| | **No** | 16 | 271 | | 1 | |
| **Drying after bathing** | **No** | 37 | 62 | 7.114(3.997-12.660) | 10.603(4.476-15.119) | 0.005 |
| | **Yes** | 25 | 298 | | 1 | |
| **Diabetes Mellitus** | **Yes** | 20 | 35 | 4.422(2.340-8.356) | 3.140(1.232-8.000) | 0.016 |
| | **No** | 42 | 325 | | 1 | |
| **Other dermatophyte infection** | **Yes** | 33 | 61 | 5.578(3.155-9.861) | 5.758(2.597-12.767) | 0.003 |
| | **No** | 29 | 299 | | 1 | |
| **Family history** | **Yes** | 23 | 70 | 2.443(1.371-4.353) | 1.989(0.863-4.581) | 0.106 |
| | **No** | 39 | 290 | | 1 | |

## 7.DISCUSSIONS

The aim of this study was to determine the prevalence and identify factors associated with Tinea Pedis. The prevalence of T.Pedis in our study population was 14.2%(95% CI: 11.5%-18.4%). This figure was lower than the study done in Tunisia 22.5%(4)Algeria 19.9% (12).The reason for this variation may be due to the use of KOH and mycological culture as diagnostic modality in addition to clinical examination alone unlike our study which relied on physical examination alone(4)(12)

On the other hand, the prevalence observed in the present study was considerably higher than that reported in studies conducted in Addis Ababa, which documented a prevalence of 4.9% (10)and in Qatar, where prevalence rates reaches 1.8% (18).The higher prevalence identified in our study may be attributable to differences in sample size between the studies.Moreover, the study conducted in Addis Ababa primarily investigated dermatophyte infections in general rather than focusing specifically on Tinea pedis. Additionally, the discrepancy observed with the study conducted in Qatar may be attributable to differences in the study population, as the latter included only participants aged over 18 years.(10)(18)

In this study males were 10.08 times more affected by Tinea Pedis than females.This result was consistent with other studies(3)(5)(18). The higher incidence of T.Pedis in males may be due to excessive physical activity and sweating, increased opportunity for exposure, tendency to wear occlusive foot wear and hormonal pattern.(3)(5)(18)

In our study, the multivariate regression analysis show that patients who wear occlusive footwear have 3.871 more risk of developing T.Pedis than patients who wear open foot wear.This finding was consistent with results from Tunisia and Pakistan (4)(7). Occlusive foot wear contributes for the development of the disease by creating moist environment, useful for reproduction of the dermatophyte fungi. In contrast to our study, a study done in Israel population demonstrated no significant difference in magnitude of T.Pedis in relation to preferred foot wear type(26). This difference may be explained by variations in the study population and the inclusion of occult (asymptomatic)Tinea pediscases as confirmedTineapedispatients. In similar fashion,people who walk barefoot have are 3.605 fold increased risk of developing T.pedis than patients who wear open footwear.

In the current study, patients with a habit of sharing shoes had a significantly higher likelihood of developing Tinea pedis (AOR = 4.53). This association may be explained by the role of shared footwear as a reservoir for dermatophytes, as shoes provide a warm, moist environment that facilitates fungal survival and transmission(1)(7).A similar finding was reported in a study conducted among mosque worshippers in Turkey (7).

Drying the feet after bathing is considered an important protective practice against Tinea pedis. In the present study, individuals who did not habitually dry their feet after bathing had a markedly increased risk of developing Tinea pedis *(*AOR = 10.603). Similarly, a statistically significant difference was observed between participants who never dried their feet (47%) and those who practiced drying after bathing in a study conducted among worshippers in Adana, Turkey(7). The protective effect of drying the feet after bathing may be attributed to the reduction of moisture in the interdigital spaces, which limits the warm and humid conditions required for dermatophyte growth and persistence(1)(7).

In the present study, participants with diabetes mellitus were 3.14 times more likely to develop Tinea pedis compared with non-diabetic participants. This finding is consistent with a cross-sectional study conducted in Qatar, which reported a 7.1-fold increased risk of Tinea pedis among individuals with diabetes mellitus compared with non-diabetic individuals(26). Moreover, the Turkish study on the prevalence of T.Pedis showed that T.Pedis was significantly more frequent in diabetes patients (14.2%) than in the control group (5.9%)(32). Diabetes mellitus may predispose individuals to Tinea pedis through impaired immune function, reduced peripheral circulation, and alterations in skin integrity, all of which facilitate fungal colonization and infection. In contrast, a cross-sectional study conducted in Tunisia did not demonstrate a statistically significant association between diabetes mellitus and Tinea pedis(4). This discrepancy was explained by increased health awareness and improved self-care practices among individuals with chronic conditions (diabetes mellitus) likely resulting from targeted health education initiatives(26)(32).

This study showed that the presence of other dermatophyte infection has also significant association with the development of T.Pedis. This result is in line with other studies done in Tunisia, Algeria and Israel(4,(12)(26)). This association can berelated to autoinfection that represents an important sourceof transmission to another location of the same body(1)(4)(12)(26)

Even though this result did not show statistically significant correlation between positive family history and T.Pedis, family history was associated with the development of T.Pedis. This was further supported by the Tunisian study showing family history of foot mycoses (28.6%) but with no statistically significant association(4).

## 8 .STRENGTH OF THE STUDY

Comprehensive data collection was one of the strength of this study as it included all public hospitals in the city and could get samples representative of the population. It had also high response rate which could decrease non response bias. Moreover, this study specifically investigated the prevalence of tinea pedis and its associated factors, an area that has not been previously addressed in Ethiopia, where existing studies have primarily focused on dermatophyte infections in general. It identifies modifiable associated risk factors; as such they are significant public health relevance.

## 9. LIMITATION OF THE STUDY

Despite the aforementioned strengths, this study employed a cross-sectional design, which limits the ability to establish a direct causal relationship between T.Pedis and the associated factors. In addition, the study was subject to potential recall and response bias, as participants may not accurately remember certain variables, such as the presence of similar lesions in themselves or among family members. Furthermore, the absence of potassium hydroxide (KOH) examination as a diagnostic tool represents another limitation of this study.

## 10.CONCLUSIONS

This study revealed a considerably higher prevalence of Tineapedis compared with other studies. Sex, shoe-wearing patterns, shoe-sharing habits, drying practices after bathing, diabetes mellitus,

and the presence of other dermatophyte infections were found to be significantly associated with Tinea pedis. These findings highlight the need to address modifiable risk factors, particularly shoe-sharing practices, the use of occlusive footwear, and inadequate drying of the feet after bathing.

# 11. RECOMMENDATIONS

**Recommendations for health professionals**

- Screeningof Tinea pedis in high-risk groups, especially males, diabetes patients, patients wearing occlusive footwear, and those with a history of other dermatophyte infections.
- Provide targeted education on foot hygiene, emphasizing drying feet after bathing, avoiding shared footwear, and limiting occlusive shoe use and walking bare foot.
- Counsel patients with existing dermatophyte infections at other sites of the body to prevent the risk of autoinfection to the foot**.**

**Recommendations for bahirdar public hospitals**

- Incorporate routine foot examination protocols into outpatient services, particularly in medical clinics managing diabetes and dermatology units.
- Develop standardized educational materials on prevention of Tinea pedis, focusing on footwear practices, foot hygiene, and avoidance of shared personal items

**Recommendations for national and regional health sectors**

- Integrate Tinea pedis prevention and control into broader skin health and non-communicable disease programs, particularly those targeting diabetes mellitus.
- Develop guidelines to encourage the use of standard diagnostic approaches**,** including laboratory confirmation where possible, to improve case detection and reporting accuracy

**Recommendations for future researchers**

- To use different study design  to assess causality of different associated risk factors
- To expand geographic scope beyond institution based study
- To use diagnostic tools like woods lump and KOH

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## 9. ANNEXES

**Annexes 1 -Information Sheet**

TITLE OF RESEARCH- magnitude and associated factors of Tinea Pedis among patients visiting public hospitals, Bahir Dar, Ethiopia in 2024

Before participating, it is essential to understand the purpose of this research. Feel free to discuss it with others before you decide to take part in this study.

BACKGROUND- Tine Pedis is one of the common superficial dermatophyte infection defined as fungal infection that affects the interdigital toe-web spaces as well as skin of the foot. There is increase in prevalence of superficial fungal infections in recent years. This condition is considered as major public health problem affecting quality of life because of its contagious and recurrent nature. However, information on prevalence and associated factor of T.Pedis is limited

in Ethiopia. Treatment includes topical and systemic antifungals, together with behavioral interventions.

OBJECTIVE-To determine the magnitude and associated factors of T.Pedis among patients visiting dermatovenereology OPD at public hospitals, Bahir Dar, Ethiopia in 2025 G.C

BENEFIT AND RISK- There is no known risks associated with participating in this study. It will only take 10-15 minute of your time. The potential benefit of your participation is to contribute to our understanding of T.pedis prevalence and associated factors.

For further queries, comments or suggestions please contact me at the following address

YeabsiraSemegnKassie (MD, Dermatovenerology resident)

Phone no-+251945552430

**Annexes 2- Consent form**

My name is Dr. YeabsiraSemegn. I am conducting a research study to determine the magnitude and associated factors of Tinea Pedis among patients visiting Dermatovenereology OPD at public hospitals in 2025 G.C. This study involves collecting data through questionnaires administered by trained interviewers. This study is important because it helps us to determine the prevalence and associated factors of T.pedis, which will bring practical change to problems related to the disease. Your response will be kept confidential. All data collected will be anonymized, meaning your name or any other identifying information will not be linked to your response. You are free to choose whether or not to participate in this study. You can withdraw from the study at any time without any penalty. But the information you provide would be quite useful for the study and your willingness to participate is appreciated. The interview will roughly take ten minutes. Are you willing to participate in the interview of this study?

1. Yes

2. No

Signature of the respondent----------

**Annexes 3- Ascent 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 name……..…….Signature: ……..…Date …….

Investigator's name…….Signature: ……Date ……

**Annexes 4- Questionnaire English Version**

SECTION 1-sociodemographic factors

| S.No | Question | Response | Skip | Code |
|---|---|---|---|---|
| 1. | Sex | 1. Male<br>2. Female | | |
| 2. | Age | in years _____ | | |
| 3. | Level of education | 1. Unable to read and write<br>2. Primary<br>3. Secondary<br>4. Higher | | |

| | | | | |
|---|---|---|---|---|
| 4. | Monthly Income | In birr---------- | | |
| 5. | Occupation | 1. Soldier<br>2. Factory worker<br>3. Manual worker<br>4. Athlete<br>5. Student<br>6. Agricultural worker<br>7. Employed<br>8. If Other,specify | | |
| 6. | Place of residence | 1.Urban<br>2.Rural | | |
| 7 | BMI | ---------- | | |
| 8 | Household size | --------- | | |
| 9 | Religion | 1,orthodox<br>2,protestant<br>3,muslim<br>4,catholic | | |

SECTION TWO-BEHAVIORAL AND HYGIENE RELATED FACOTRS

| S.No | Question | Response | Skip | Code |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| 1 | Shoe wearing pattern | 1 Barefoot<br>2 Occlusive footwear<br>3 open sandals | | |
| 2 | Do you have habit of sharing shoes with others? | 1 Yes<br>2 No | | |
| 3 | Sock wearing pattern | 1 No<br>2 Synthetic<br>3 cotton | | |
| 4 | Do you have a habit of using public shower/swimming pool | 1.Yes<br>2.No | | |
| 5 | If yes, how many times a week do you use? | ------ | | |
| 6 | Foot hygiene/Bathing frequency | 1 not daily<br>2.1-2 times/day<br>3. 3-5 times/day | | |
| 7 | Do you use soaps/antiseptic for foot hygiene? | 1 yes<br>2 no | | |
| 8 | Do you dry your feet after bathing? | 1yes<br>2 no | | |

| | | | | |
|---|---|---|---|---|
| 9 | Do you have a habit of sharing towel or foot care instrument | 1 yes<br>2 no | | |

SECTION 3-MEDICAL/COMORBIDITY FACTORS

| S.No | Question | Response | Skip | Code |
|---|---|---|---|---|
| 1. | Have you been diagnosed with Diabetes mellitus | 1.Yes<br>2.No | | |
| 4. | Have you ever been diagnosed with Tinea Pedis previously? | 1.Yes<br>2.No | | |
| 7 | Is there family history of T.pedis? | 1 yes<br>2 no | | |
| 8 | What is your HIV/AIDS status? | 1 negative<br>2 positive<br>3 unknown | | |
| 9 | Do you have history of treatmentwith immunosuppressive drugs? | 1 yes<br>2no | | |
| 12 | Have you ever been diagnosed with AD/other skin disease? | 1 yes<br>2 no | | |

| | | | | |
|---|---|---|---|---|
| 13 | Dermatophyte infection elsewhere? | 1 yes<br>2 no | | |
| 14 | If yes, which one? | 1 T.Ungum<br>2 T.Manuum<br>3. T.Capitis<br>4. T.corporis/T.cruris | | |

SECTION4- ENVIRONMENTAL FACTORS

| S.No | Question | Response | Skip | Code |
|---|---|---|---|---|
| 1 | Do you have exposure to water at workplace(wet work) | 1 yes<br>2 no | | |
| 2 | =If yes, how many hours? | -------- | | |
| 3 | What is your home floor type? | 1 earthen<br>2 cement<br>3tile | | |
| 4 | Is there humidity in your house? | 1 yes<br>2 no | | |

**Annexes 5- Amharic Version Information Sheet**

ስሜዶ/ርየአብስራስመኝእባላለሁ

ይህመጠይቅከባህርዳርዩኒቨርሲቲየቆዳእናአባላዘርትምህርትክፍልጋርበመተባበርበባህርዳርከተማዉስጥባሉ የመንግስትሆስፒታሎችየተመላላሽቆዳህክምናክፍልየጫቋትህመምላይለሚደረገውጥናትመረጃለመስጠት ነው።

የዚህጥናትአላማየጫቋትህሙማንበሚሰጡትመረጃላይተንተርሶየጫቋትስርጭትንእናተያያዥጉዳዮችላይ መረጃለመስጠትነው።ይህጥናትየሚመለከተውአካልየአገልግሎትጥራትለማሻሻልለሚያደርጉትጥረትእንዲ ሁምለውሳኔሰጪዎችጥቅምይኖረዋል።

ለዚህምበአሁኑጊዜያለውመረጃበሆስፒታሎችየተመላላሽቆዳህክምናክፍልበመታከምላይካሉትህሙማንመ ጠይቅበማድረግይሰበሰባል።የሚጠየቁትህሙማንበከፊልወይምሙሉበሙሉላለመሳተፍመብትያላቸውሲ ሆንየመረጃውሚስጥራዊነትየሚጠበቅይሆናል።ለዚህምየተጠያቂስምወይምስልክመጻፍአያስፈልግም።በጥ ናቱላይመሳተፍምንምጉዳትወይምስጋትአያስከትልም።

ስለጥናቱየበለጠለማወቅከፈለጉየጥናቱዋናተጠሪዶ/ርየአብስራስመኝበዚህአድራሻማግኘትይችላሉ።ስልክ 0945552430 Iሜይልyabseseme@gmail.com

**Annexes 6- Amharic Version Informed Consent (የፍቃደኝነትመጠየቂያቅጽ)**

ስለዚህበዚህጥናትላይእንዲሳተፉበትህትናእጠይቃለሁ።ጥናቱንጊዜወስደውመረዳትእናለመሳተፍወይምላለ መሳተፍመወሰንየራስዎመብትነው።አንዳንድጥያቄመመለስካልፈለጉየማይገደዱሲሆንመጠይቁንበፈለጉጊ

ዜማቆምይችላሉ፤ሆኖምየእርሶትብብርናትክክለኛመልስቢሰጡኝምስጋናዬከፍያለይሆናል።መጠየቁከ10 - 15 ደቂቃሊወስድይችላል።

በጥናቱላይለመሳተፍፈቃደኛነዎት?

1.አዎ

2.አይደለሁም

**Annexes 7- Amharic Version Ascent Form**

የቤተሰብ/ተወካይቅፅ

ስለጥናቱሁኔታናጥቅምተረድቻለሁ::

በጥናቱላይልጄእንዲሳተፍወይምእንዳይሳተፍሃላፊነትእወስዳለሁ።ልጄበጥናቱላይመሳተፉንበማነኛዉምጊ ዜማቆምእነደሚችልናበዚህምምክንያትምንምአይነትጥቅምእንደማያጣተረድቻልሁ።እንደቤተሰብ/ህጋዊ ወኪልነቴልጄበዚህጥናታዊፅሁፍላይእንዲሳተፍበፊርማየአረጋግጣለሁ።

የቤተሰብ/ተወካይስም……..……ፊርማ……..……ቀን…….

የጥናቱባለቤትስም……..ፊርማ……..ቀን……

**Annexes 8- Amharic Version Structured Questionnaire**

| ተ.ቁ | መጠይቅ | መልስወይምምልክታ |
|---|---|---|
| 1. | ፆታ | 1.ወንድ 2.ሴት |
| 2. | እድሜ | ……..ዓመት |
| 3. | የትምህርትደረጃ | 1.ያልተማረ(ማንበብእናመጻፍየማይችል)<br>2.የመጀመሪያደረጃትምህርት<br>3.የሁለተኛደረጃትምህርት<br>4.ዲፕሎማእናከዛበላይ |
| 4. | ወርሃዊገቢ | 1.ዝቅተኛ(‹5000 ብር)<br>2.መካከለኛ(5000-15000ብር)<br>3.ከፍተኛ(›15000ብር) |
| 5. | የስራድርሻ | 1.ወታደር<br>2.የፋብሪካሰራተኛ<br>3.የቀንሰራተኛ<br>4.አትሌት<br>5. ተማሪ<br>6.አርሶአደር<br>7.ተቀጣሪ<br>8.ሌላ |
| 6. | በቀንለረዥምጊዜሽፍንጫማይጫማሉ(ከ 8 ሰአትበላይ) | 1.አዎሁሌም<br>2. አልፎአልፎ<br>3. የለም |
| 7. | የህዝብመታጠቢያወይምመዋኛገንዳያዘወትራሉ? | 1.አዎ 2.የለም |
| 8. | በቀንምንያህልጊዜገላዎትንይታጠባሉ? | 1.በየቀኑአልታጠብም 2.1-2 ጊዜበቀን |

| | | |
|---|---|---|
| | | 3. 3-5 ጊዜበቀን |
| 9. | ከታጠቡበሁዋላእግሮትንያደራርቃሉ | 1.አዎሁሌም<br>2. አልፎአልፎ<br>3የለም |
| 10. | ጫማከሌሎችሰዎችጋርይዋዋሳሉ | 1.አዎ<br>2.የለም |
| 11. | የሰውነትክብደት | 1.በኪ.ግ<br>2.ቁመት<br>3.የወገብስፋት |
| 12. | ከዚህበፊትበሀኪምየስኳርበሽታአለበዎትተብለውያውቃሉ? | 1.አዎ 2.የለም |
| 13. | ለተ.ቁ 13 ጥያቄመልስዎትአዎከሆነ፣ለምንያህልጊዜ ? | ------አመት |
| 14. | ለስኳርበሽታየሚወስዱትመድሃኒትአለ ? | 1.አዎ<br>2.የለም |
| 15. | ከዚህበፊትየጫቋትበሽታታመውያውቃሉ? | 1.አዎ<br>2.የለም |
| 16. | ለተ.ቁ 16 ጥያቄመልስዎትአዎከሆነ፣ታክመውስያውቃሉ | 1.አዎ<br>2.የለም |
| 17. | በምንአይነትመድሀኒትታከሙ? | 1.በሚቀባ<br>2.በሚዋጥኪኒን<br>3.ቤትውስጥበተዘጋጀ<br>4.ሌላ |
| 18. | የመኖሪያሁኔታ | 1.ከተማ 2.ገጠር |
| 19. | በቤተሰብተመሳሳይህመምያለበትሰውአለ? | 1.አዎ--------ማን------- |

| | | |
|---|---|---|
| | | 2.የለም |
| 20. | የናሙናምርመራ? | 1.አዎ<br>2.የለም |
| 21. | በባዶሆድየሚሰራየስኪርምርመራ ? | 1.ኖርማል<br>2.ቅድመ-ስኪር<br>3.ስኪር |

**Annexes 9-Declaration Form**

I, the undersigned, declare that this thesis is my original work, has not been presented for a degree in this or any other university/college and that all sources of materials used for the thesis have been fully acknowledged.

**Principal investigator**

Name: Dr. yeabsirasimegnkassie(MD, Dermatovenereology Resident)

Signature: _____

Date: _____

**Advisors**

Name- Dr.MihretuEnyew (MD,Assistant Professor of Dermatovenereology)

Signature: _____

Date: _____

Name: Dr.MeskeremGirma(PhD, Associate Professor)

Signature: _____

Date: _____