

Magnitude and Associated Factors of Superficial Fungal Infections on HIV/AIDS Patients Who Attends in Debretabor General Hospital ART Clinic, Debretabor, North West Ethiopia, 2015/16

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Abstract

Introduction: HIV/AIDS has been occurring in the world as the major pandemic disease that affects all parts of the world, but sub-Saharan Africa it is high in prevalence which reduces the effectiveness of the immune system and makes individuals susceptible to opportunistic infections and tumors. This often leads the patients to a variety of opportunistic infections including fungal infections and the like. Superficial fungal infections are common in HIV patients that can have an atypical clinical severity and variability of presentation and may be extensive, recurrent, and difficult to treat.

Objectives: This study aims to determine the magnitude and associated factors of superficial fungal infections on HIV/AIDS patients who have follow up at ART clinic in Debretabore General Hospital.

Methods: Institutional based cross sectional study design was used via systematic random method with kth value of 3rd on 299 study population from December/2015-February/2016.

Result: Prevalence of superficial fungal infection in this study was 59.2% with 99.7% response rate. Female [AOR(95% CI); 2.6 (3.06, 7.901)], age ranges less than 15 [AOR(95% CI); 4.03 (0.002, 0.994)], and ages between 16-30 years [AOR(95% CI); 2.1 (1.93, 7.16)], uneducated subjects [AOR (95% CI); 3.4 (0.00, 0.150)], presence of pets in the home 5.3 [(0.001, 0.183)], income source being a farmer [AOR (95% CI); 4.3 (0.031, 0.72)], CD4 level less than 200cells/mm³ [AOR (95% CI); 8 (0.00, 0.007)] and work condition associated to water [AOR (95% CI); 6.3 (7.31, 13.800)] were statistically significant to the presence of superficial fungal infection in Debretabor General hospital at ART clinic.

Conclusion: The overall prevalence of superficial fungal infection in the study area was relatively high (59.2%) with 78% of the cases were neglected as nothing would do on patients life having a statistical significant association with age, sex, income source (farmer), educational status, presence of pets in the home, CD4 level, work condition associated with water body. Thus, a continuous health education about the disease, factors with education on preventive methods and treating the cases accordingly of fungal infections should be sought.

Keywords: Magnitude, Superficial fungal infection, HIV/AIDS.

Introduction Background

Infection due to Human Immunodeficiency Virus (HIV) and resulting Acquired Immunodeficiency Syndrome (AIDS) has been occurring in the world as the major pandemic disease that is the most significant emerging infectious pathogen of the 20th

century. Since the Acquired immunodeficiency syndrome was first recognized in 1981 from North America [1,2].

HIV/AIDS has affected all parts of the world, but sub-Saharan Africa is the hardest hit. In Kenya, Ethiopia and Djibouti the HIV epidemic reached double-digit rates of infection, as reported by the United Joint (UN) Joint Program on HIV/AIDS in 2000. HIV/AIDS is a huge problem in Nigeria which has a population of

about 160 million people [3,4].

The epidemic continues its expansion across the globe including Ethiopia [4,5]. Pattern and distribution of HIV in Ethiopia country widely varies. Although reports indicate that the HIV epidemic is leveling off in Ethiopia, a significant number of people live with the virus and many families are affected. This is because the majority of the Ethiopian population lives in rural areas with limited access to HIV services and challenged by prevailing poor socio-economic status [6].

The progressive destruction and marked depression of cellular immunity of the immune system by chronic HIV infection leading to progressive fall in level of CD4 cells (<200) which makes individuals susceptible to several opportunistic infections & tumors including fungal infections [3,7].

The populations that increases in the burden and risk of serious fungal infections has been demonstrated in some parts of the world to include those with usually multiple underlying medical conditions, such as solid organ and hematopoietic stem cell transplantation (HSCT), chronic obstructive pulmonary disease (COPD), novel immunosuppressive therapies for rheumatoid arthritis and other inflammatory and malignant conditions, human immunodeficiency virus (HIV) infection, premature birth, advanced age, complex surgery and cancer [8].

Overall, the prevalence of fungal infection increases time to time on HIV/AIDS like oropharyngeal colonization is found in 30-55%, 20-30% of patients with disseminated cryptococcosis and the rest other superficial and deep fungal infections [9].

The prevalence of different fungal infections varies with geographical areas and patient's immune status. Prevalence of Dermatophyte species in HIV positive patients was increased by 4%, 5-25% rate with an increasing incidence in elderly people, tinea capitis from a range of 0% to 19.4% on deprived areas and black children [10-12].

Meanwhile, in order to reduce the morbidity, recurrence and mortality many scholars try to provide prophylactic agents of fluconazole as a varies pattern for fungal infections with various outcomes due to its relatively good compliance, safe, top effectiveness to almost all forms of fungal infections [13].

Fluconazole is an antifungal prescription medicine approved by the U.S. Food and Drug Administration (FDA) for the treatment of candidiasis, Onychomycosis due to any cause, Tinea corporis and its sub-types, Tinea cruris, Tinea pedis, Tinea capitis, Pityriasis versicolor, Sporotrichosis, mycetoma, T. barbae, P. versicolor, p.folliculities and other fungal infection with a dose between 150-400mg as a daily and/or weekly based having a good compliance and minimal side effects for the patients. As studies showed fluconazole as pulsed dose therapy with a dose between 150-400mg as a daily and/or weekly based having monthly or at least three times weekly monitoring patients AST, ALT, alkaline

phosphatase, lactate dehydrogenase), blood urea nitrogen levels, serum creatinine, SGOT, SGPT and electrolyte levels were obtained at nil to none side effects at the end intended time [13,14].

Statement of the Problem

33.2 million People are affected by HIV/AIDS all parts of the world. The health situation of Africa continent is characterized by immense disease burden and weak health systems embedded by the context of poverty, under development and conflicts, but sub-Saharan Africa it showed a high prevalence. In this perspective Ethiopia is not unique as the case is testified by its poor socio-economic and health conditions even by sub-Saharan Africa's standards that she has one of the highest numbers of people affected by HIV/AIDS. Such epidemic has affected a large proportion of the society and that no region or zone in the country is spared no immune for this problem [5,15,16].

HIV/AIDS results progressive destruction and marked depression of immune system that results to progressive fall in level of CD4 cells which makes individuals susceptible to several opportunistic infections including fungal infections & tumors that lead the patients to a great deal of mortality and morbidity including psychological impact to reduce quality of life [3,6].

Currently, the patient with HIV/AIDS increases in the burden and risk of serious fungal infections. Specially, superficial fungal infections reach prevalence rates of 15 to 25% in some communities, with the common infections being dermatophytosis or ringworm, pityriasis versicolor, and superficial candidosis, whereas on HIV/AIDS patients like oropharyngeal colonization is found in 30-55%, 20-30% of patients with disseminated cryptococcosis [9,17].

Various studies show increasing incidence of dermatophytosis in HIV infected patients even at their early stage of infection and hence it becomes imperative for a dermatologist to have a good knowledge of cutaneous manifestations of fungal infections and respective treatment in those infected with HIV.

To date no prophylactic vaccine is available for the problem. However, there are anti-retroviral drugs used to prolong the life of AIDS patients in developing countries. On this respect the best intervention available is prevention of the acquisition of the infection. Similar study on superficial fungal infections separately were conducted in other parts of the world including Ethiopia but this study differ in that it is intended to assess all patterns of dermatophytes superficial fungal infections on HIV/AIDS patients.

Thus, to determine such gaps this preliminary study was conducted on the title entitled as Prevalence of superficial fungal infection and its associated factors on ARV patients, Debretabore General Hospital ART clinic, Debretabore, Ethiopia, 2008/9E.c.

Significance of the study

This study provides a basic information on the prevalence of superficial fungal infections and anti-fungal agents that have a valuable contribution for the program planners, the academic

community, service providers, health care professionals and above all HIV/AIDS patients who is suffering from superficial fungal infections that is beneficiary from this study as prevention and early detection which would to lower morbidity due to this debilitating, preventable and curable disease.

Literature Review

Magnitude of HIV/AIDS

According to USAIDS report, currently, HIV prevalence is leveling off and there is a fall in the number of new infections globally. These positive changes are a result of the impact of HIV programs and interventions that are taking place worldwide. Though, HIV/AIDS is showing a decline; still it remains one of the leading obstacles to health and development for poor countries. There are still a huge number of people infected and affected by HIV. However, it was also reported that HIV/AIDS has become the leading cause of death in the region [1].

Human Immunodeficiency virus (HIV) is the most significant emerging infectious pathogen of the 20th century. This infection due to HIV and resulting Acquired Immunodeficiency Syndrome (AIDS) has been occurring in the world as the major pandemic since the last two decades of the past century [2,4].

At the end of 2013, globally, 35.0 million [33.2–37.2 million] people were living with HIV/AIDS 14 million in Europe and 24 million in Sub Sahara Africa with varied prevalence rate Swaziland has the highest HIV prevalence of any country worldwide (27.4%) and India has an estimated 2.6 million infection making India the country with the 3rd largest population of HIV patients while South Africa has the largest epidemic of any country-5.9 million people are living with HIV [3,18-20].

Although the continent is home to about 15.2 percent of the world's population, Sub-Saharan Africa alone accounted for an estimated 69 percent (22.5 million) of all people living with HIV and 70% [19].

According to a 2008 report from the Joint United Nations Program on HIV/AIDS, Ethiopia had prevalence of newly infected people 790,000 with a prevalence rate of 1.4% whereas Nigeria had 3.4 million people infected with a rate of 3.7% and South Africa 5.9 million with a prevalence rate of 17.3% (largest epidemic) [19,21].

HIV/AIDS is a major public health concern and cause of death in many parts of Africa. Sub-Saharan Africa is the most affected region, with 25.8 [24.0-28.7] million people living with HIV which accounts for almost 70% of the global total of new HIV infections. HIV/AIDS has affected all parts of the world, but sub-Saharan Africa is the hardest hit. Currently, more than 5 million patients in South Africa are living with HIV/AIDS [3,20,22].

The HIV/AIDS epidemic continues its expansion across the globe including Ethiopia. Ethiopia currently has one of the highest

numbers of people affected by the problem. In Ethiopia this epidemic has affected a large proportion of the society and that no region or zone in the country is spared [2].

HIV progressively reduces the effectiveness of the immune system and makes individuals susceptible to opportunistic infections & tumors [5]. The progressive destruction and marked depression of cellular immunity of the immune system by chronic HIV infection leading to progressive fall in level of CD4 cells (<200 to <50) which is responsible for the occurrence of infections by opportunistic microorganisms. This often leads to a wide array of opportunistic infections and are at higher risk to pathogenic infections including fungal infections. Besides, causing morbidity and mortality by themselves, opportunistic infections accelerate the progression of HIV disease itself [23-27].

Smith E et al. and WHO progress report showed that oral thrush is common on HIV/AIDS patients that occurs in ~9.5 million people worldwide based on ~90% of HIV/AIDS patients not taking. Repeated attacks of vulvo-vaginal affect at least 75 million women annually as 5–8% has at least 4 attacks annually [28,29].

Magnitude of superficial fungal infections

Fungi are ubiquitous in nature, and while most usually pose no threat to humans, some can cause serious illnesses. Fungal infections can be broadly classified into three categories: i.e. superficial (affecting the skin, hair, nails, inside of the mouth, and genital organs), subcutaneous (beneath the skin); and deep (affecting internal organs) [17,30].

Havlickova et al. and Pierard G et al. observed that fungal infection of the skin, hair or nails affects ~25% of the world's population (~1.5 billion) and in the US alone accounted for 4 million outpatient medical visits and nail infection (onychomycosis) is common in the general adult population, 5-25% rate with an increasing incidence in elderly people [31-33].

Fungal infections, also known as mycoses, that results/causes from a range of mild and barely noticed to severe and sometimes even fatal on the general population. In addition to infections, fungi are also responsible for some allergic disorders, such as allergic alveolitis and asthma [17,22].

Jordaan HF et al. revealed superficial fungal infections are common in HIV patients that can have an atypical clinical severity and variability of presentation and may be extensive, recurrent, and difficult to treat like facial involvement can mimic Seborrheic dermatitis, lesions may appear psoriasiform. Palmoplantar lesions are commonly hyperkeratotic [16,29,34].

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Mycoses, the infectious diseases caused by fungi, are more common on those whose immune systems are suppressed by immunosuppressant drugs, corticosteroid drugs, and chemotherapy, often associated with HIV/AIDS in sub-Saharan Africa on a disorder such as AIDS and people who are taking antibiotic drugs (which destroy the bacterial competition). Such serious fungal infections are described as opportunistic infections because they take advantage of the body's lowered defenses [17,22,30].

According to the research conducted in India by Kaviarasan et al. revealed that the prevalence of dermatophytosis was 22.2% with male to female ratio of 3:1. Among these tinea corporis was realized as the common dermatophyte infection 53.7%, followed by tinea cruris 49.9%, tinea pedis in 17.1 %, tinea faciei in 14.7%, extensive dermatophyte 19.9% and one patient had tinea manuum infection Tinea unguium was recorded in 11 cases [36].

A research conducted in Nigeria by R. O Oladele et al. showed that nearly 1.5million Nigerian women whose ages between 15 and 50 get recurrent vaginal thrush, i.e. at least 4 times annually, 15.5M (9.4%) children have tinea capitis occurs in >20% of school age children, 253,000 (0.15%) oral candidiasis and 144,000 oesophageal candidiasis with an overall, 11.8% of prevalence in the population with a serious fungal infection each year [5].

A research conducted by Shobhana et al., SP Nair et al. and research conducted in Rajkot tertiary Care hospital showed that the prevalence of different fungal infections varies with geographical areas and patient's immune status with a Prevalence of dermatophytes infections in HIV positive patients were 13%, 1.65% and 4%, respectively. Superficial fungal infections may reach prevalence rates of 15 to 25% in some communities, with the common infections being dermatophytosis or ringworm, pityriasis versicolor, and superficial candidosis [1].

Raza Aly, et al. observed that Seborrheic dermatitis (SD) is one of the earliest clinical markers of HIV infection; its prevalence is up to 80%, Pityriasis versicolor (3%), Onychomycosis due to dermatophytes (58%), and recurrent episodes of oral candidiasis (11%) usually occur in patients whose CD4 cell counts are <300/mm³ and are an important predictor of disease progression among patients with AIDS [10].

Goodman et al. observed that the prevalence of dermatophytosis was four times higher amongst HIV infected population and it followed a normal pattern, but atypical form or extensive in HIV infected individuals [37].

Risk factors of superficial fungal infections

The prevalence of superficial fungal infections including onychomycosis on immunosuppressed individual is as higher as 25%, 45% in Ghana and India respectively [17,38]. On the other way, fungal colonization is more prevalent in females than males [39]. That about 75% of women will get a vaginal yeast infection during their lifetime, and 90% of all people with HIV/AIDS develop Candida infections. Oral infections, called oral

thrush, are most common in infants, elderly people, and those with a weakened immune system and Candidiasis rate of infection was 12%, with a female predominance 73% [40].

Superficial fungal infections are mostly affects age on adults were ~30 times more likely than children to suffer the condition. In addition, it affects 2.6% of children younger than 18 years; prevalence of 9.4% tinea capitis amongst school children, age over 60 is nearer 20%. Fungal colonization among the age the age ranges of 31-40 years and 21-32 years had the highest rate of fungal colonization for males and females respectively [39,41]. Incidence was significantly higher in young children aged 7-11 years and 4-6 years than in older children aged 12-16 years. Moreover, there was a significant difference in the incidence of dermatophytoses amongst children in urban and rural areas [42].

Symptomatic HIV (CD4 cell count less than 500 cells/mm³) - superficial fungal infections like Thrush, recurrent vaginal candidiasis, onychomycosis, seborrhea [43]. 31.2% of pt with their CD4 counts less than 400cells/mm³ had a fungal infection on various parts of their body. The lower the CD4 count the higher the frequency of fungal isolates [39]. Nigeria revealed a prevalence of 12.7% in those with CD4 cell counts less than 200. A review in London and Churchil Livingston revealed that fungal infections we associated with daily activities related to water. [42,44].

Objectives

General objectives

To assess the prevalence and associated risk factors of superficial fungal infections on HIV/AIDS patients who attends in Debretabore general hospital art clinic, Debretabore, North west Ethiopia, 2008E. C.

Specific objectives

To assess the prevalence of superficial fungal infections on HIV/AIDS patients, Debretabore General Hospital ART clinic, Debretabore, South Gondar, Ethiopia. To determine the associated risk factors of superficial fungal infections on HIV/AIDS patients who attends in Debretabore general hospital ART clinic.

Methodology

Study area and period

Debretabor, oldest town that believed to establish in 1923 E.C by the missionaries from Italian, in the South Gondar zone in Amhara National Regional State, lies 100 kilometers southeast of Gondar and 50 kilometers east of Lake Tana, 666 km north central of Addis Ababa and having an altitude and longitude of 11°51'N 38°1'E with an elevation of 2,706 meters (8,878 ft.) above sea level. The town is bounded by mountain ranges in the east and north with a notable physical feature of hills and valleys.

Debretabore town has 1 governmental (1 general) Hospital, 3 governmental health centers, 3private clinics, 3 private pharmacies which serves for a total of 2.3million within Debretabore and the surrounding nearby woredas, zones and region. These both governmental and private health institutions provides health care

services on prevention and control of communicable disease, and numerous activities on non-communicable diseases through providing a diagnostic, preventive, therapeutic and rehabilitative services having a coverage 83% since 2006 [2].

The Debretabore General Hospital, largest hospital in the zone, has been provided services to the 2.3million population in its catchment areas of the Amhara Regional States. Having above 6 specialists in the various areas of medical specializations and fairly adequate numbers of all the other health professionals constituting the health care team, the Hospital is now emerging as a shining hot spot for advanced medical care and treatment in the North central parts of Ethiopia with the total capacity of 110 inpatient beds in five major departments. As well as the Hospital used as a teaching hospital for the College of Health Sciences, Debretabore University for three years with a total of more than 101,357 patient flows per year. At the end, the research was carried out from December 2015 E.c that takes approximately a month duration.

Study design

Institutional based cross sectional study design were undertaken to assess the prevalence of superficial fungal infection on HIV/AIDS patients and the effects of fluconazole pulsed dose in Debretabre General Hospital ART clinic.

Population

Source population: All patients who come to ART clinic.

Study population: All pts. who are selected through systemic random sampling methods.

Eligibility criteria

Inclusion criteria: All patients who comes to the ART clinic from South Gondar during the study period regardless of age and sex.

Exclusion criteria: All pts. who are out of the study area i.e. South Gondar was excluded from this study.

Sample size calculation and sampling procedures

Sample size determination: Sample sizes were determined based on either previous prevalence of the case (Nigeria on HIV-11.8% or Rajkot Hospital on HIV-13%) with level of significance α 0.05 desire precision and considering 10% of non-respondent rate.

$$n = Z (\alpha/2)^2 P (1-P) / d^2$$

Where: n=Sample size; d=precision (marginal error); Z ($\alpha/2$) =critical value (confident limit); P=previous prevalence of CL;

$$n = (1.96)^2 \times (0.13) (1-0.13) / (0.05)^2 = (3.84)^2 \times (0.13) (0.87) / (0.0025)^2 = 0.434304 / 0.0025 = 173.7216.$$

≈ 174 and having 10% non-response rate $17.4 = 191.4 \approx 192$.

Total sample size ≈ 192 , (p-p 11.8% gives 176 whereas p-p 13% gives 192).

But since the sample size too small, I used to reduced margin of error to 0.04.

Then it provides $= 0.434304 / 0.0016 = 271.44 \approx 272$ and with 10% non-response rate 27.2 finally gives to 299.2 ≈ 300

Final sample size = 300

Sampling procedures

Debretabore is the only hospital where better number of Medical professionals and field specialist are providing services for the zonal population and to the nearby other zonal patients. Thus considering this, most patients with HIV/AIDS are come to the hospital where varies numbers of field specialist are available there. Therefore, considering this situation, the topic under study conducted so in Debretabore general hospital at ART clinic.

Average numbers of pts flow from ART clinic in the consecutive previous ten days were analyzed and found to be 600(20pts daily from each OPD) pts from all ART clinic OPDs. I.e. around 200 pts from each ART OPD (we have 3 OPDs) within ten days. Further, during data collection period. i.e ten working days, I have got around 600 pts who come to ART OPD. Moreover, in order to have the calculated sample size (n=300) within ten days from 600 source population, the study population were selected through systematic probable sampling methods with a value $kth=2nd$. Thus, this calculation provides 100 study populations from each OPD and final sum up source population that I have conducted the study were 300. Thus, Systematic sampling technique was implemented to conduct this research.

Data collection tools and techniques

Data collection was undertaken from January- December/2015 through clinical observation using a checklist, standardized questionnaire and laboratory investigation. During data collection I data collectors (Msc Tropical dermatology students), 3 clinical nurse professional, one laboratory expert, one clinical pharmacist and respective seniors from Internal medicine and pediatrics was be assigned to collect the data from those patients who come to Debretabore General hospital ART OPDs as if selected through systematic sampling methods.

Study variables

Dependent variable: Superficial fungal infections.

Independent variable

- Socio-demographic variables (sex, age, education status, religion).
- Socio-economic variables (economic status, occupation, Housing condition).
- Sexual and hygiene variables (No of sexual partners, frequency washing genital area).
- Clinical variables (Co-morbidities, CD4, duration of the lesion, clinical types).
- Ecological variables (Presence of other clients, Presence of pets).

Operational definition

Superficial fungal infections-presence of scaly, annular, dystrophic, darken/hyper-pigmented nails/ or whitish mucoid discharge from genitals regardless of KOH result.

Data quality assurance

In order to keep the data quality, the questionnaires first prepared

in English and then translated to Amharic again in order to check the consistency of the Amharic questionnaire was again translated to English by other person who knows the local language very well.

Pre-test were conducted on 30 patients who come to ART OPD, then based the result of the pretest, confusing, leading and questions that should be included were reviewed, reorganized and rewrite and necessary corrections were made with selected data collectors.

During a pre-test data collection, all data collectors (1 tropical dermatology professional and 3 clinical nurses) were informed/ aware about the questionnaires' purpose, how to collect and confusing things on questionnaires were well understood.

During data collection period adequate supervision was undertaken by two supervisors and by principal investigator. In addition 10% of the questionnaire was being randomly included in the study to avoid errors during data entry. Besides this, the principal investigator was carefully entered and thoroughly cleaned the data before the commencements of the analysis. Finally, the PI was reviewed all filled questionnaires, lab findings, effectiveness and side effects of fluconazole at the end of the study period accordingly.

Data analysis procedure

For all categorical variables frequencies and percentages were calculated. In addition, data entry and analysis was conduct by using SPSS v-20. Then, the entered data was edit, cleaned and analyzed. Binary logistic regression analysis was made to obtain odds ratio and the confidence interval of statistical associated variables. All variables with $P < 0.05$ in the bivariate analysis and one which were fit in Hosmer and Lemeshow Test goodness fit model were included in the final model/multivariate analysis, accepting $P \leq 0.05$ as the inclusion level for the independent variables. Finally, the magnitude of association between different variables in relation to the outcome variable was being measure by odds ratio with 95% confidence interval.

Ethical considerations

Letter of ethical clearance was obtained from Debretabore general hospital. Then official letter was written to the service delivery points/area, i.e. ART unit. Moreover, consent was obtained from the entire study sample after providing brief information about the objectives and the aim of the research. In addition, all study samples were informed about the participation to this study relies on there was no one can enforced them to participate to the study.

Finally, confidentiality of the information gathered were assured to the interviewee via avoiding the name and address of the interviewee in the questionnaire.

Dissemination of the results

The result of the study was disseminating to Debretabore general hospital, South Gondar health office, Amhara health bureau and

sponsoring body (if).

Result

The study was conducted on 299 clients through systematic sampling method with Kth value of 3rd. Meanwhile, 177 (59.2%) had sign and symptoms of superficial fungal infections on one or more sites of their bodies.

Socio-Demographic characteristics

Most cases 183 (61.2%) were aged between 16 and 47 years followed by age less than 15 years 86 (28.8%). The mean (SD) age of the clients was 2.26 ± 1.045 SD years with the age range from 1-67 years. The majority of the respondents were females 174 (58.2%). Most respondents 60.2% (n=180) were illiterate that unable to read while 39.8% (n=39.8%) were able to read and write (11.9% degree and above, 31.3% Grade 10 and above, 56.8% Grade 3-10 and informal education followers). Besides, most of the respondents 44.5% (n=133) were never married yet while the rest 55.5% (n=166) were married. Most of the study populations, 99.3% (n=297) were Orthodox Tewahido followed by Muslim constitute the rest n=3 of the study subjects. Moreover, the majority of the clients/study subjects 179 (59.9%) were come from urban while the rest 120 (40.1%) of the patients were from rural.

In addition, 31.8% (n=95) of the respondents were Daily laborer followed by civil servants 25.8% (n=77), and other group of the population source of income as farmers, merchants and others.

Clinical variable for the presence of superficial fungal infections Most of the respondents', 65.6% (n=196), daily activities/work habit were one or another way associated with water, 30.4% (n=91) related to area with public service sites and the rest comprises other daily activities.. Mean while, 57.9% (n=173) study subjects had a habit to genital washing with at least twice 27.1% (n=81) and 21.1% (n=63) trice per day using soap 17.1% but only quarters (27.4%) of the study subjects had a habits of drying their body after washing.

Surprisingly nearly half (52.5%) of the study subjects had other medical illness rather than RVI including bronchial asthma and atopic dermatitis 56.5% (n=101), urticaria 36.72% (n=65) and 8.7% (n=26) constitute other cases/illnesses (Table1).

In addition, 42.5% (n=127) of the study subjects were had previous history of at least one of the superficial fungal infections, nearly 3/4th (71.6%) similar illness/cases in the family, 69.2% (n=207) pets like cats, dogs, and the like in the home, 22.1% (n=66) were exposed to immunosuppressive agents predominantly prednisolon (37% less than a couple of weeks and 63% more than two weeks) for the case of PPE and allergic contact dermatitis as I checked respective patients' chart, 20.7% (n=62) had a history of sharing articles like comb, towel and the like (89% on age less than 15) and 6.7% (n=20) frequent use of common shower with bare foot.

As this study findings signifies that 177 (59.2%) had sign and symptoms of superficial fungal infections on one or more sites of

S. No	Variables	Characteristics	Frequency	
			N	%
1.	Age	Less than or =15	86	28.8
		>=16-30	88	29.4
		>=30-47	95	31.8
		>=47-60	21	7.0
		>=60	9	3.0
2.	Sex	Sex	174	58.2
			125	41.8
3.	Educational status	Unable to read and write	180	60.2
		Able to read and write	119	39.8
4.	Marital status	Single	133	44.5
		Married	82	27.4
		Divorced	59	19.7
		Widowed	25	8.4
5.	Residence	Urban	179	59.9
		Rural	120	40.1
6.	Family Income source	farmer	37	12.4
		merchant	75	25.1
		Daily laborer	95	31.8
		Civil servant	77	25.8
		others	15	5.0

Table 1: Socio-Demographic Characteristics for the presence of superficial fungal of infections on RVI patients at Debretabore General Hospital, ART clinic, Debretabore, Amhara, Northern-West Ethiopia, 2016 (n=299).

their bodies where 22.1% (n=66%) vulvo-vaginal candidiasis with a recurrence 4x 36.36(n=26) and 3x/year 19.7% (n=13), 19.6% (n=64) tinea capitis, 12.8% (n=42) tinea facaei, 21.8 (n=71) onychomycosis of all forms, both on nail and scalp 14% (n=46), and more than on two sites of the body 31.8% (n=104) which have been confirmed using KOH test 43% (n=43) and/or physical examination. These superficial fungal infections affect social life (86.4%) (n=77) of the patients.

Nearly half of the study subjects CD4 count <200cell/ mm³ 45.48% (n=136), between 200-400cells/mm³ 28.78% (n=86) and CD4 count more than 400cell/mm³ constitutes 25.75% (n=77) (Figure 1) (Table 2).

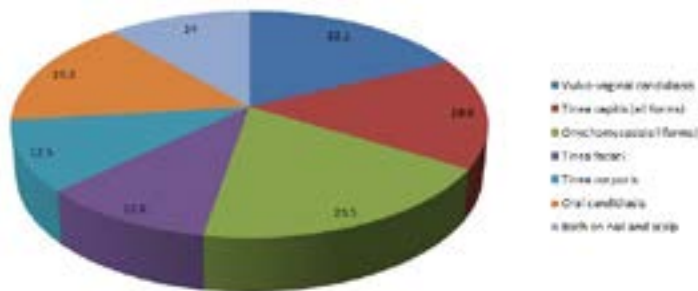


Figure 1: Pie chart show types of types of superficial fungal infections on the respondents' Debretabore General Hospital, Debretabore, Amhara, 2016(n=299).

S No	Variable		Frequency		
	Risk factors		N	%	
1	Trauma		49	16.4	
2	Pets in home		207	69.2	
3	Exposure to immunosuppressive agents		66	22.1	
4	Sharing of articles		62	20.7	
5	Previous History of such an infection(s)		127	42.5	
6	Similar cases in the family		214	71.6	
7	Use of common shower on bare foot		20	6.7	
8	Genital washing	Yes	173	57.9	
		With use of soap	51	17.1	
		Frequency	2x	81	27.1
			3x	63	21.1
Confirmed superficial fungal infection					
9	Vulvo-vaginal candidiasis		66	22.1	
	Tinea capitis (all forms)		64	19.6	
	Onychomycosis(all forms)		71	23.5	
	Tinea facaei		42	12.8	
	Tinea corporis		41	12.5	
	Oral candidiasis		63	19.3	
	Both on nail and scalp		46	14.0	

Table 2: Clinical factors for the presence of superficial fungal of infections on RVI patients at Debretabore General Hospital, ART clinic, Debretabore, Amhara, Northern-West Ethiopia, 2016 (n=299).

Factors associated with presence of superficial fungal of infections

Bivariate Analysis: Determination of all independent variables to the factors for the presence of superficial fungal of infections was made by logistic regression model with the assumption that it helps to predict the extent by which this outcome variable could be explained by independent variables. All variables which had $p < 0.05$ on the bivariate analysis after goodness fit model was entered in to multivariate analysis. Thus, through bivariate logistic regression ten independent variables, i.e., age, sex, income source, educational status, exposure to trauma, genital washing habits, presence of pets, similar cases in the family, Level of CD4, and work habits were shown a significant association via bivariate analysis to the presence of superficial fungal of infections.

The odds of having superficial fungal infections on age less than 15 with respect to age between 30-47 study population were found to be 1.7 with {COR (95%CI); 1.7 (0.194, 0.464)}, females with respect to males study population were found to be 2.05 with {COR (95%CI); 2.05 (2.483, 6.616)}, income source farming COR (95%CI); 26.25 (3.03,7.81)}, and daily laborers {COR

(95%CI); 2.5 (8.037,11.506)} with respect to the civil servants, one who were unable to read and write with {COR (95%CI); 1.5 (0.631, 0.918)}, presence of pet in the home with {COR(95%CI); 1.7 (6.183, 11.312)}, work associated to water, {COR (95%CI); 10.8 (17.94, 24.03)}, one who exposed to trauma {COR (95%CI); 1.7 (0.571, 0.671)}, CD4 count < 200 {COR (95%CI); 11 (7.034, 9.152)} with respect to CD4 count greater than 400cell/ mm³.

Then, these variables were re-entered in to the multivariate analysis to make it filtered out to their real respective association after testing in to the model goodness fitness test these data.

Multivariate Analysis

The odds of having superficial fungal infections among female participants was 2.6 compared to male participants with {AOR(95%CI); 2.6(3.06, 7.901)} whereas the odds of having superficial fungal infections among respondents whose age ranges less than 15 with {AOR(95%CI); 4.03(0.002, 0.994)}, and ages between 16-30 years with respect to between 30-47 had association with the {AOR(95%CI);2.1(1.93, 7.16)} (Table 3).

Variables	Characteristics	Fungal Infections		OR (95%CI)	
		Yes	No	COR	AOD
Age	Less than or =15	54	32	1.7 (0.194, 0.464)	4.03 (0.002, 0.994)
	>=16-30	54	34	1.6 (2.089, 2.314)	2.1 (1.93, 7.16)
	>=30-47	48	47	+1	—
	>=47-60	14	7	2.0 (1.058, 1.478)	7.1 (0.00, 47.03)
	>=60	7	2	3.4 (0.193, 0.508)	3.3 (0.00, 10.08)
Sex	Female	127	47	2.05 (2.483, 6.616)	2.6 (3.06, 7.901)
	Male	50	75	+1	—
Genital washing (soap)	Yes	41	10	0.4 (1.002, 3.260)	18 (0.914,13.105)
	No	136	112	+1	—
Educational status	Unable to read, write	114	66	1.5 (0.631, 0.918)	3.4 (0.00, 0.150)
	Able to read and write	63	56	+1	—
Presence of Pet	Yes	131	76	1.7 (6.183, 11.312)	5.3 (0.001, 0.183)
	No	46	46	+1	—
Similar cases(family)	Yes	151	63	5.4 (0.001,0.902)	11 (0.726, 15.013)
	No	26	59	+1	—
Income source	Farmer	35	2	26.25 (3.03,7.81)	4.3 (0.031, 0.72)
	Merchant	27	48	0.8 (0.934, 0.991)	0.2 (0.893, 22.00)
	Daily laborer	59	36	2.5 (8.037, 11.506)	1.09 (22.00, 17.01)
	Civil servant	50	27	+1	—
	Others	6	9	2.8 (0.002, 0.951)	9.01 (0.91, 23.09)
Exposure to trauma	Yes	49	68	1.7 (0.571, 0.671)	3.8 (0.531, 0.72)
	No	54	128	+1	—
CD ₄	<200	155	81	11 (7.034, 9.152)	8 (0.00,0.007)
	200-400	18	18	1.3 (1.972, 3.560)	1.9 (0.79, 8.92)
	>400	4	23	+1	—
Work condition	Associated to water	107	90	10.8 (17.94, 24.03)	6.3(7.31, 13.800)
	Related to public place	63	28	1.6 (1.903, 3.731)	8 (0.994, 3.90)
	Others	7	5	+1	—

Table-3: Factors associated with the presence of superficial fungal of infections on RVI patients at Debretabore General Hospital, ART clinic, Debretabore, Amhara, Northern-West Ethiopia, 2016 (n=299).

On the other way, the odds of having superficial fungal infections among those respondents who were uneducated had {AOR (95%CI); 3.4(0.00, 0.150)}, presence of pets in the home with 5.3(0.001, 0.183), being a farmer had a risk factor association with {AOR (95%CI); 4.3(0.031, 0.72)}. Besides, exposure to trauma, CD4 level less than 200cells/l3and occupation/daily works associated with water had significant association to the presence of superficial fungal infections.

But age more than 60 years, genital washing using soap, presence of similar cases in the family, being a merchant and daily laborer and work condition related to public place characteristics/variables had no significant association with presence of superficial fungal infections through Multivariate analysis.

Discussion

This study was tried to assess the prevalence and associated factors of superficial fungal infections on RVI patients who had follow up at the hospital's ART clinic as institutional level with specific socio-demographic data of the study population. Thus, the prevalence of superficial fungal infections in the study area was (59.2%) with associated factors of sex, age, income source and frequent contact with water.

The prevalence of superficial fungal infections in the study area was 59.2%, which was relatively higher finding compared to other similar studies conducted in India (45%), Ghana (25%), Cuba (30-55%) and Rajkot tertiary hospital (13%) [1,9,36,38]. This is due to the other similar studies were conducted as a community level but in our setting it was conducted at institutional level where most clients/patients come for the seek of preventive, rehabilitative and curative services in the hospital, most of the population/study subjects 96% had habits of work associated to water (65.6%) and public services areas (30.4%), 21.1% of females used to wash genitalia at least trice per day using soap, the difference in diagnostic methods in that this study was determined by using clinically diagnosing methods and/or KOH (which were only 43% were positive) but the other study areas were used including multiple sophisticated diagnosing methods like culture and PCR and the like could be a basic reason that make the study as such outnumbered.

In this study gender and age had significant association to the prevalence of superficial fungal infections. The odds of having superficial fungal infections on female gender were {AOR (95%CI); 2.6 (3.06, 7.901)}. This implies the possibility of having superficial fungal infections was relatively higher more three folds as females than males. This was similar to the study conducted in Nigeria, Algeria, WHO progress report and a research done in Danish but to the contrary a research done in India which was found to as 22.2% with male to female ratio of 3:1. This is probably due to the fact that this study was hospital based while the other studies were community based as well as the fact that females have been known to have a better health-seeking behavior than males, females with a higher (15,19) environmental exposure to water (65.6%) due to activities/work, frequent genital washing habits (57.9) using soap

(17.1) even 4x/day (21.1%). Our cultural activities that mostly females are faced with look after/carrying children in the home though also males faced to trauma (16.4%). In addition to gender, the odds of having superficial fungal infections on age less than 30 years were {AOR (95%CI); 4.03(0.002, 0.994)}, one whose age less than 15 and {AOR (95%CI); 2.1(1.93, 7.16)} age between 16-30years. This implies the possibility of having superficial fungal infections was relatively higher more four folds as age less than 15 and double fold between 16-30. This was consistent to the study conducted in Saudi Arabia, Algeria, and couple reviews from Nigeria, Fitzpatrick review and others. This is due to most children had a frequents contact habits with children via playing, learning, eating and sleeping meantime they share any material that they could possess like contaminated combs, brushes, hats, and pillows, frequent contact with pets and double immune-suppression due to HIV/AIDS and physiological based immunity till they produce sebum which capable of protect from at least fungal infections.

Being a farmer had a significant association to the presence of superficial fungal infections with the odds of {{AOR (95%CI); 4.3 (0.031, 0.72)}}. This meant that being a farmer had a relative higher exposure to acquire superficial fungal infections as nearly fourfold to contract the disease with respect to daily workers, merchants, and civil servants. This is due to 65.6% daily activities/work habit were one or another way associated to water and 69.2% of study subjects (53% farmers) had at least one pets/cattle in their home.

A level of CD4 count less than 400cells/mm3 had a significant association to the presence of superficial fungal infections with {{AOR (95%CI); 8(0.00, 0.007)}}. This implies that patients whose CD4 level less than 200cells/mm3 (specially) had eight folds with respect to CD4 level above 400cells/mm3 superficial fungal infections. This is consistent to the study conducted in Nigeria (31.2% fungal infections on pt with their CD4 count less than 400cells/mm3), America (12.7% in those with CD4 cell counts less than 200cells/mm3) and Kenya. This is due to cellular differentiation which used to suggest the immune-status of HIV/AIDS patient. Thus, as CD4 count less than 400cells/mm3, patients will faces to multiple infections, infestations and malignant (4,13,16,24).

At last the prevalence of superficial fungal infections vulvo-vaginal candidiasis (22.1%), Tinea capitis (all forms) (19.6%), Onychomycosis (all forms) (23.5%), Tinea facaei (12.8), Tinea corporis (12.5%) and Oral candidiasis (19.3%). This was relatively a higher magnitude with respect to other similar studies conducted in Nigeria, India and New York due to their source of study subjects (from the communities), used diagnostic methods (sophisticated like Molecular methods-PCR, Culture, KOH and clinical methods) in combinations but this research was done using clinical methods with KOH. Thus, it was not as such made me to be surprised. On the other way, the result is too minimal relative to a research conducted in Cuba-Habana by Luis Enrique et al. where they were determine the prevalence of fungal infection increases time to time on HIV/AIDS like oropharyngeal colonization is found in 30-55%35.

Conclusion

The finding in this study in relation to the presence of superficial fungal infections revealed that the prevalence of superficial fungal infections in the study area was 59.2% which were too high relative to the study conducted yet. Most females, age less than 30years, CD4 count, and farmers are groups to have relatively higher exposure for superficial fungal infections.

Recommendation

To the health professionals

Surprisingly, more than half of RVI patients had one or more types of superficial fungal infections on their various parts of the body. Even though, it is not fatal diseases it results high sky of psychological impacts on their social life. Thus, understanding this one assigned to the ART clinic should treat the case accordingly with their daily ART drugs.

To debretabore general hospital

Since, Debretabore hospital is the figurehead/sample hospital in the zone even to the region, the hospital medical director and other top managers should provide work focus/instructions on the treatment, preventive and rehabilitative services on superficial infections and infestation should be a routine service in the ART clinic rather than neglecting as harmless in addition to providing ART agents.

To the regional health bureau

However, treating non-life threatening are not area of focus like superficial infections and infestations, each RVI patients need psychological and social wellbeing in addition to providing ART agents. Thus, the bureau also should focus/provide instructions on the treatment, rehabilitative and preventive services to this non-life threatening because such cases that leads to psychological and social stigma in the communities.

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