ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF NURSING AND MIDWIFERY
DEPARTMENT OF NURSING AND MIDWIFERY

Risk factors of active tuberculosis among people living with HIV who are on ART follow up at HararGovernment Hospitals, Ethiopia, 2019.

By: Lidya Zerihun(BSc)

A Thesis submitted to The School of Nursing and Midwifery Presented in partial fulfillment of the requirements for the degree of Master of Science in Adult Health Nursing

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Submitted by: Lidya Zerihun

Submitted by: Lidya Zerihun _____ _____

Name of Student Signature Date

Approved *for submittal to* thesis assessment committee

1. Dr Erdaw Tachbele _____ _____

Advisor Signature Date_____

2.MrTadesse Bedada (Ph.D fellow)

_____ _____

Advisor Signature Date_____

3. _____ _____ _____

Department chairperson Signature Date

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ABSTRACT

Risk factors of active tuberculosis among People Living with HIV who are on ART follow up at Harar Government Hospitals, Ethiopia, 2019

Lidya Zerihun

Addis Ababa University, 2019

Background: Tuberculosis is the most frequent life-threatening opportunistic infection and a leading cause of death among HIV infected people. Tuberculosis increases HIV replication through the process of immune activation leading to increased viral load.

Objective: To assess the risk factors of active Tuberculosis among People living with HIV on ART follow upat Harargovernment hospitals, Ethiopia, 2019.

Methodology: An institutional based case control study was conducted from March 13 to April 15, at Harar government hospitals, Ethiopia, 2019using pre-tested, validated, structured interviewer-administered questionnaire and total of 301 participants responded. The Study participants were selected by simple random sampling technique after proportional allocation of samples to the hospitals. Furthermore, descriptive statistics, binary and multivariable logistic regression analyses were employed to assess factors associated with active tuberculosis among people living with HIV.

Results: Out of 321 participants a total of 301 responded 101 cases and 200 controls. After adjustment for potential confounders, CD4 200-499 (AOR=7.15,95% CI:2.71-18.84), being single (AOR=4.47, 95% CI:1.04-19.27), BMI<18.5 (AOR=6.1,1 95% CI:2.28-16.36), previous smoking (AOR=7.75, 95% CI:2.27-26.50), no formal educational (3.78, 95% CI:1.29-18.84), were independently associated with the development of active tuberculosis in people living with HIV/AIDS.

Conclusion: This study reflects that most of host related factors are identified as independent risks so health care providers should focus on this and provide intensified screening and health education to prevent the risk is recommended and need to be done.

Recommendation: health care professionals should have to establish well organized education program and they should strength the existing programs. Further research should be done in order to overcome inconsistent findings from different regions of Ethiopia.

Key words= Risk factors, active tuberculosis, People living with HIV

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ACRONYMS AND ABBREVIATIONS

AAU	Addis Ababa University
AFB	Acid Fast Bacilli
ART	Anti-Retroviral Therapy
AOR	Adjusted Odd Ratio
CI	Confidence Interval
COR	Crude Odds Ratio
CSA	Central Statistical Agency
ETB	Ethiopian Birr
IRB	Institutional Review Board
OI	Opportunistic Infection
OR	Odd Ratio
PLHIV	People living with HIV
PTB	Pulmonary Tuberculosis
SPSS	Statistical Package for Social Sciences
TB	Tuberculosis

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the study

Tuberculosis is an infectious disease caused by the bacillus Mycobacterium tuberculosis. It typically affects the lungs (pulmonary TB), but can also affect other sites (extra pulmonary TB). The disease is spread when people who are sick with pulmonary TB expel bacteria into the air, for example by coughing. 1.7 billion People infected with M. tuberculosis will develop TB disease during their lifetime. However, the probability of developing TB disease is much higher among people infected with HIV(1).

It is also the most frequent life-threatening opportunistic infection and a leading cause of death among HIV infected people. TB increases HIV replication through the process of immune activation leading to increased viral load. This results in more rapid progression of HIV disease. On the other hand, HIV increases susceptibility to be infected with Tuberculosis and the risk of progression to TB disease and the incidence and prevalence of TB. The life time risk of HIV positive individuals to develop TB is 20-37 times greater than HIV negative individuals(2).

Globally in people living with HIV,TB remains the major health problem (3) and the most common opportunistic infection It occurs earlier in the course of HIV infection than many other opportunistic infections. When someone has both HIV and TB each disease speeds up the progress of the other. In addition to HIV infection speeding up the progression from latent to active TB, TB bacteria also accelerate the progress of HIV infection (4).

Human Immunodeficiency Virus (HIV) is a major contributing factor for developing active TB. HIV infected individuals had 3.5-fold higher risk of tuberculosis than HIV negative individuals. Ethiopia is also among high TB/HIV burden countries with over 10% TB/HIV co-infection rate(3).

Although ART is initiated for all HIV diagnosed patients as early as possible, most patients present for care and treatment at late clinical stages, therefore screening and management of OI is still critical. Opportunistic infections are the predominant causes of morbidity and mortality

among HIV-infected patients from these life-threatening infections, such as TB, may occur early as well as later. When TB occurs later it is atypical, more disseminated and more extra pulmonary(2).

A risk factor is defined in health and disease as those characteristics, conditions, or behavior that increases the likelihood of getting a disease or injury. Risk factor is often presented individually, however in practice they do not occur alone. They often coexist and interact with one another. In general risk factor can be categorized into groups as behavioral, physiological, demographic, environmental and genetic so reducing exposure to risk factors would greatly improve global health and life expectancy by many years(5).

Different Scholars argued that knowing the Risk factors of active Tuberculosis among HIV is crucial to decrease burden of TB among HIV (1, 2)and Tuberculosis case finding should be intensified in all HIV testing and counseling services for HIV positive clients by using a set of simple questions for early identification of presumptive TB cases. HIV positive clients coming through HCT services should be informed about the advantages of being screened for TB. Once informed about the risk of developing active TB, they should undergo screening for it. Adults and adolescents living with HIV should be screened for TB with clinical algorithm, those who report any one of the symptoms of current cough, fever, weight loss or night sweats may have active TB and should be evaluated for TB and other diseases (2).

1.2 Statement of the problem

Tuberculosis and HIV are the major growing health problem in the world and remains one of the world's deadliest communicable diseases. Globally in 2017, 920000 people live with TB and HIV. Which is an equivalent to 12% of TB patients with an HIV test result. The number notified was only 51% of the estimated number of incident cases among people living with HIV but an increase from 49% in 2016(1).

TB is a major public health problem throughout the world. About a third of the world's population is estimated to be infected with tubercle bacilli and hence at risk of developing active disease(6)In 2017 TB is the tenth leading cause of death worldwide, and since 2011 it has been the leading cause of death from a single infectious agent, ranking above HIV/AIDS, Globally starting from 2000-2017 a total of 54 million deaths is due to TB/ HIV coinfection from this high number of death compared with other continents is in Africa which is 12 million(1).-

In Countries like Africa the prevalence of HIV is high so in this population tuberculosis (TB) is a leading cause of morbidity and mortality, and the first presenting sign in the majority of acquired immune deficiency syndrome (AIDS) patients. It is also the most common presenting illness among people living with HIV, including those who are taking antiretroviral treatment (ART). Despite major reductions with ART, however, risk of TB remains high in Africa(7).

WHO has reported in 2017 an estimated 10.0 million people (range, 9.0–11.1 million) developed TB disease globally from this 90% were adults (aged ≥15 years), 9% (range, 7.9–11%) of the incident TB cases in were among people living with HIV and 72% live in Africa and a total of 1.3 million deaths by TB is recorded. The severity of national epidemics of TB varies widely among countries, there were fewer than 10 new cases per 100 000 populations in most high-income countries, but 150–400 per 100 000 in most of the 30 high TB burden countries most of the countries are in Africa(1).

Sub Saharan Africa region, is an area of high TB/HIV related morbidity and mortality in the world. Therefore, it needs multi-sectoral collaboration to control TB / HIV co-infection. Ethiopia is one of Sub-Saharan countries in which the dual burden of TB/HIV co-infection has severely hit(8).The 2015-2016 report of national TB/HIV surveillance from a total of 7,411 newly enrolled in HIV pre-ART care, the majority 7113 (96%) of them were screened for TB at initial

visit in Ethiopia. Of the total HIV positive clients, who were screened for TB at initial visit, active TB was detected on 9.1% of them, the active TB prevalence after enrollment in HIV care ranges from 5.0% in Afar to 14.2% in Harari and 10.3% in Addis Ababa This number is high compared with 2013 which showed 4.5%(6).

From the 2018 WHO report in 2017 the 30 high TB burden countries HIV positive TB incidence is estimated to be 766 thousand Ethiopia being one of the 30 countries a total of TB incidence is estimated to be 172 thousand from this HIV positive TB incidence is 12 thousand and HIV positive TB mortality is 3.6 thousand, HIV prevalence in incident TB is 7.2% Rates per 100 000 populations and HIV positive TB incidence is 7% or 7272(1).

According to a systematic review done in Ethiopia on the Prevalence of TB/HIV coinfection and its associated factors; revealed that The pooled prevalence of TB / HIV Co-infection was 25.59% it indicates that the magnitude of TB /HIV co-infection in Ethiopia is increasing and deserves special attention, this review also identified a significant association between low CD4 counts, advanced WHO stage for the dual infection and conclude that this study include the low number of studies from rural areas on prevalence and associated factors in Ethiopia that are available for analysis. Even though we included articles in different parts of the country, still the representativeness of the population is not as such strong(8).

WHO Estimates the number of incident TB cases attributable to five risk factors that contribute to the TB epidemic in 2017 This estimation has a considerable variation among countries and also variation in which factors need to be prioritized as part of national efforts to reduce the burden of TB disease. Ethiopia being one of the 30 high TB burden country HIV infection is the third major risk for developing active TB infection next to Diabetes and undernourishment being the first risk factor accounting more than 60% of cases. Smoking and alcohol are also identified risk factors for TB in the country(1).

Finding from study done onDeterminant Factors Associated with Occurrence ofTuberculosis among Adult People Living with HIV after Antiretroviral Treatment Initiation in Addis Ababa, Ethiopia reviled that the independent predictors of tuberculosis were patients with WHO stage III or IV have higher risk of developing TB than those with WHO stage I or II, in addition,

patients having a hemoglobin level of <10 mg/dl have 2.4 times higher risk of developing TB than those patients having hemoglobin level <12.5 mg/dl and other factors likelow level of education was not associated with TB, Smoking was not identified as risk factor for the development of TB in this study in multivariate analysis, history of asthma was not associated with TB. Family history of TB it did not have an independent effect on the occurrence TB, number of people living together in the household (over Crowding)this study did not find the association between TB and number of people in the household and ownership of the house in this study didn't show statistical difference between those whohad house and those who hadn't(7).

From a previous study done in Western Ethiopia Being divorced/widowed, not attending formal education, being underweight (BMI < 18.5 kg/m2), having history of diabetic mellitus, and being in advanced WHO HIV/AIDS clinical staging, were determinant factors associated with TB/HIV co-infection(9).

A study done on the Risk Factors of Active Tuberculosis in People Living with HIV/AIDS in Southwest Ethiopia conclude that a low level of education, poor housing conditions which is a proxy of low socioeconomic status was associated with active TB, BMI less than 18.5 kg/m2, hemoglobin level less than 10.0 g/dl, a CD4 lymphocyte count less than 200 cells/μL, a WHO clinical stage IV, not taking ART, an infection with helminthes, a history of contact with a TB patient in the family and living in a house made of mud wall were independently associated with the occurrence of active TB. But factor like smoking was not associated with active TB(10).

Many studies are done in TB HIV coinfection and indicate that certain HIV infected people develop TB, while the others do not so that being HIV positive is not a mere factor for being infected with TB, there are various distal and proximal risk factors that leads to TB/HIV coinfection and this factors varies contextually and there is inconsistency of results in different studies. Therefore, the aim of this study is to assess the distal and proximal risk factors of active TB in PLHIV who are on ART follow up at Harar government hospitals, Ethiopia 2019.

1.3 Significance of the Study

Nurses have a key role in prevention of certain risk factors that lead to occurrence of a disease. Also the nursing care plan involves risk assessment plan on its prevention. The outcome of the study will give information on the risk factors that lead to active tuberculosis in people living with HIV, to health care workers to plan for prevention program. So the staff nurses, the nurse managers, the hospital administrators' efforts for the prevention of active TB on HIV by planning different methods of intervention. Nurses can provide health education, to a patient after identifying the risks. The study can also contribute as literature for future risk factor of active tuberculosis in people living with HIV studies.

CHAPTER TWO

2. LITERATURE REVIEW

2.1 Prevalence and consequence of TB and HIV

According to the UNAID report of 2017 global HIV statistics 39.6 range of (31.1 million-43.9 million) people globally live with HIV are at high risk for developing active tuberculosis (11)And in the same year there were an estimated 10.0 million people (range, 9.0–11.1 million) developed TB disease globally from this 1.3million death occur. Among the total TB death, TB/HIV coinfection accounts 300,000 deaths(1). those globally. So this estimation put high number of adults live with HIV will develop TB (12).

According to WHO report globally in 2017, 6.7 million people with tuberculosis (TB) were notified to national TB programs (NTPs) and reported to WHO from this 60% of notified TB patients had a documented HIV test result, up from 58% in 2016 and representing a 23-fold increase since 2004. In the WHO African Region, where the burden of HIV associated TB is highest, 86% of TB patients had a documented HIV test result. A total of 464 633 TB cases among HIV-positive people were reported globally of these, 84% were on antiretroviral therapy(1).

Globally, the number of TB deaths among HIV-positive people has fallen by 44% since 2000, from 534 000 (range, 460 000–613 000) in 2000 to 300 000 (range, 266 000–335 000) in 2017, and by 20% since 2015. Most of this reduction was in the WHO African Region. In several high TB burden countries, the number of deaths caused by TB among HIV-positive people has fallen substantially in recent years (1).

WHO recommended Systematic symptom screening for TB among people living with HIV is an essential component of the HIV care package, together with linkage to diagnostic services, as necessary. In 2017, 92 countries reported annual data on the number of TB cases notified among those newly enrolled in HIV care (up from 90 countries in 2016). In total, 8% of the 1.5 million people who were reported to be newly enrolled in HIV care in 2017 were diagnosed with TB. In Most Africancountries TB HIV burden is still high, Ethiopia being one of the sub-Saharan African country TB HIV burden is high and the country is also listed under the WHO high TB

HIV burden countries in seventh place with estimated number of TB/ HIV cases of 12,000 range (8.6-17) thousand or rate of 12 (8.2-16) per 100,000 populations from this number mortality of TB/HIV is also estimated to be 3.6,000 (2.5-5) thousand or 12(8.2-16) rate per 100,000 populations also from a total of 39 126 number of people newly enrolled in HIV care, notified as a TB case 2 375 or 6.1 percent from newly enrolled in HIV care(1).

A systematic review and meta-analysis done in Addis Ababa revealed The pooled prevalence of TB / HIV Co-infection was 25.59% (95% CI (20.89%±30.29%) and conclude that the magnitude of TB /HIV co-infection in Ethiopia is increasing and deserves special attention (13).

2.2 Risk factors of active TB among HIV

Risk factors of active tuberculosis among people living with HIV presents a massive challenge to the control of both HIV and TB Since The relation between TB and HIV is strong and TB is often the first clinical indication that a person has an underlying HIV infection and, as a result, TB services can be a critical entry point for HIV prevention, care, and treatment (14).

From review of the relevant literatures, it is evident that the risk of tuberculosis among PLHIV is high than HIV negative people.so HIV/AIDS should be screened for TB. But, in the presence of the risk factors, intensified screening is highly recommended during follow up of treatment. In addition, increasing coverage of INH and cotrimoxazole preventive therapy is necessary to reduce the overall risk of TB among HIV patients and base-line CD4+ lymphocyte count, history of injectable drug use, antiretroviral therapy, body mass index, anemia, and educational status were some of the contributing factors for TB in HIV patients(7, 15).

Varieties of studies showed that knowing risk factors of active TB among HIV patients plays the dominant role to control mortality and morbidity as the result of the diseases. For HIV patients to care for them self and protect them self from the identified risks early screening and knowing the risks plays an important role. Most of reviewed literatures indicate that most of the risk factors of active TB among HIV are related with the patient health status like WHO stage 3 & 4, CD4 count < 200, Hgb< 10g/dl, previous history of latent TB, Body mass index <18.5kg/m2are the common identified risk factors for the development of active TB among HIV patients who are on ART follow up. Review of literatures showed that death of HIV patients by TB is high so more

researches are need to be done on this area to determine the risks of active TB among HIV(9, 13).

2.2.1 Host related risk factors

A study done in Cambodia to determine the incidence and risk factors for early (after ≤6 months of ART) and late (after 6 months of ART) incident TB indicate that the risk of late TB was mainly determined by HIV treatment response and TB associated with being underweight while on ART, of those developing TB, 179 (6.0%) patients were diagnosed with early TB and 134 (4.5%) with late TB, corresponding with a rate of 13.5 and 2.0 per 100 patient-years respectively so this study indicate that time of ART initiation is one determinant factor for occurrence of TB among PLHIV(16).

A study done in Germany on Tuberculosis among people living with HIV/AIDS in 2011 to assess the long-term incidence and risk factors conclude that patients originating from Sub-Saharan Africa, with low CD4+ cell count or high viral load at enrollment were at increased risk of TB even after ART initiation. As patients might be latently infected with *Mycobacterium* tuberculosis complex, early screening for latent TB infection and implementing isoniazid preventive therapy in line with available recommendations is crucial(17).

A systematic review done in china on Co-infection of tuberculosis and parasitic diseases in humans in 2012 most common parasite species are concurrent with Mycobacterium tuberculosis and being HIV positive has impact on co-infection of TB and parasites. Pulmonary tuberculosis and parasitic diseases were shown to be risk factors for each other in this review(18).

A study done in Albania to assess the characteristics of TB in the HIV/AIDS patients find that TB is a common respiratory complication with high mortality rate in HIV/AIDS patients. The level of CD4+ count is predictive factor for clinical manifestation and prognosis of HIV. Also TB/HIV predominated in males -88.8%, which is similar with another study in Albania, so in Albania, more men than women are diagnosed with HIV and TB and die from it like in most of the world, Smoking further raises the risk of contracting TB in HIV-positive persons. HIV infected smokers have higher respiratory symptoms and risk of mortality, when compared to non-smokers in this study, education level is a risk factor for active TB among HIV/AIDS persons(19).

A study done in south Africa on the colliding epidemics of tuberculosis, tobacco smoking, HIVand COPD had identified association between tobacco smoking with TB and HIV; were by smoking prevents pathogen-specific expansion and activation of CD4+ T-cells and reduces IFN-coproducing adenoid-specific CD4+ and CD8+ T-cell numbers it also attenuate host defense mechanisms include oxidative stress at the site of infection and impairment or mechanical disruption of cilia function in the tracheobronchial tree. Althoughtobacco smoking can be associated with HIV infection through poverty and high risk behavior, it also appears to be an independent and important risk factor for contracting HIV andHIV is driving the TB epidemic(20).

Finding from a study done from 2014-2015 in south Africa on The prevalence and determinants of active tuberculosis among diabetes patients concluded that the prevalence of active TB among DM patients was 4–fold higher than the national prevalence; suggesting the need for active TB screening, particularly if hemoptysis is reported and the need for further research to determine how best to screen for active TB in high–risk/HIV population groups and settings(21).

Another study from south Africaa five year follow up study to assess the long term incidence and risk factors of Tuberculosis among HIV-infected patients receiving ART found Risk of TB was independently associated with CD4 cell count < 100 cells/ml, WHO stage 3 or 4 disease and age < 33 years or younger age were identified risk factors for Tuberculosis among HIV(22).

According to a study done in Lagos Nigeria on factors associated with TB/HIV co-infection among drug sensitive tuberculosis patients managed in a secondary health facility from the 334 records of patients reviewed, the proportion of patients with TB/HIV co-infection was 21.6%. The odds of having TB/HIV co-infection was 2.7 times higher among patients above 40 years than patients less than 25 years so this study identified age as one associated factor for TB/HIV coinfection (23).

A study done in Nigeria to know the factors associated with Prevalent Tuberculosis Among Patients Receiving Highly Active Antiretroviral Therapy in Tertiary Hospital reviled that prevalence of active TB was 7.7%(26/339) among HIV-infected patients who had received HAART and those factors independently associated with prevalent TB were being women 65.8%

(222/339), mean age was 41.1 (10.0) years, baseline CD4 <200cells/µl, previous history of TB, and current hemoglobin <10 g/dl.(24).

Finding from a study done on the Prevalence and Risk Factors of Active TB among Adult HIV Patients Receiving ART in Northwestern Tanzania from a total, 391 patients enrolled in the study a total of 43 (11.0%) participants developed TB while receiving ART which was independently associated with male gender, being in the WHO clinical stage 3 and 4, baseline CD4 count <200 cells/µl are factors that are independently associated with active TB development among adult HIV patients receiving ART(25).

A study done on Prevalence and associated factors of TB/HIV co-infection among HIV Infected patients in Amhara region, Ethiopia, from a total of 571 HIV positive study participants enrolled. smoking, Patients with CD4 T-lymphocytes count less than 200 cells/µl, and patients in WHO clinical stage IV and those who drink alcohol were 2.26 times more likely to develop TB than those who did not drink(26).

A study done at Shashemene Referral Hospital in West Arsi, on Prevalence and Factors Affecting the Development of Active-Tb among HIV-Positive Patients a total of 309 HIV infected patient medical records containing required information were reviewed. The most important associated factor for development of TB in HIV/ AIDS patients is CD4 cell count less than 200 cells/mm3 at which is 5.803 times more likely to develop TB than those who had CD4 count between 200 and 350 cells/mm3, while having CD4 cell count less than 200 cells/mm3 were 40.381 times more likely to develop TB than those who had CD4 count between 351 and 500 cells/ mm3,Study participants with secondary School educational level were 3.64 times and tertiary School educational level 4.01 times more likely to develop TB than illiterate, But being male is not associated with HIV related TB in this study(27).

A 4 years' retrospective study in Northeastern Ethiopia to assess the proportion of TB/HIV co-infections and associated factors among patients on directly observed treatment short course in three health centers find that of the total 990 TB patients enrolled in the study, 98.2 % were screened for HIV; of these, 24.3 % were co infected with TB and HIV. The odds of having TB/HIV co-infection were 3.4 times higher among the age group of 25–45 years compared to older (≥45 years) age TB patients, The proportion of TB/HIV co-infection among women was

relatively higher in the study, and from 236 co-infected patients, 71.2 % took co-trimoxazole preventive therapy and 76.3 % took antiretroviral treatment which means being on ART and takingco-trimoxazole preventive therapy has protective effect(28).

Finding from southern part of Ethiopia in Arba Minch town a Five-Year Retrospective Follow-Up Study on the Incidence and Predictors of Tuberculosis among HIV/AIDS Infected Patients identified there is Relatively high incident tuberculosis cases among HIV infected patients and history Cigarette smokers, household with family size of 3 - 4, baseline WHO clinical stage III and IV and hemoglobin level of <10were important predictors (risk factors) of tuberculosis among HIV infected patients (15).

Another study done in Arba Minch town on Prevalence of Pulmonary Tuberculosis and Associated Factors Among HIV Positive Patients Attending Antiretroviral Therapy found that factors that are independently associated with TB among HIV are Age 18-30, Sex being Female, Presence of TB in Family, CD4 Count <200/μland 200-500/μl, nonsmokers are identified factors in this study (29).

Unmatched case-control study was conducted in Western Ethiopia: on the Determinants of Tuberculosis Infection among Adult HIV Positives Attending Clinical and identified Being divorced/widowed, not attending formal education, being underweight (BMI < 18.5 kg/m2), having history of diabetic mellitus, and being in advanced WHO HIV/AIDS clinical staging, were determinant factors associated with TB/HIV co-infection. Having a separate kitchen AOR showed protective role. And the study concludes that for most of these determinants interventions can be made at individual and institutional levels, whereas, factors like education and nutrition need societal level integrations (9).

Finding from the Northeast part of Ethiopia on Incidence and Predictors of Tuberculosis among Adult People Living with HIV/AIDS in Afar Public Health Facilities indicated that multiple risk factors can predict the incidence of TB among PLHIV on HAART and Pre HAART era. This study found that having past TB treatment history or HIV infected individuals with Past TB history had 2.3 times high risk to develop TB as compared with HIV individuals with no past TB history, Patients with BMI of <18.5 at baseline was 1.62 times higher risk of developing TB as compared to adults with BMI≥18.5 at base line, similarly this study found that patients with Hgb

level of <10 and 10-12.5 at base line were 2.00 and 2.54 times higher risk of developing TB than those having Hgb level >12.5 at base line so Hematologic complications were risk factors for the incidence of TB among PLHIV(30).

A case control study in southwest Ethiopia on the risk factors of active tuberculosis in people living with HIV/AIDS identify risk among cases and controls using the distal and proximal determinants and found that most of the proximal variables like: male gender, a body mass index less than 18.5 kg/m2, hemoglobin level less than 10.0 g/dl, a CD4 lymphocyte count less than 200 cells/μL, a WHO clinical stage IV, not taking antiretroviral treatment, an infection with helminthes, a history of contact with a tuberculosis patient in the family, and living in a house made of mud wall and from the distal determinants a low level of education, were independently associated with the development of active tuberculosis in people living with HIV/AIDS (10).

According to a study done in public hospitals and health centers in Addis Ababa, Ethiopia: to identify the Determinant Factors Associated with Occurrence of Tuberculosis among Adult People Living with HIV after Antiretroviral Treatment showed that higher proportion of male patients develop TB compared to female patients, Study subjects who were bedridden and ambulatory by their functional status were more likely to develop TB compared to working status, baseline WHO clinical stage III or IV had higher risk of developing TB. As well individuals with hemoglobin level ,10 mg/dl are more likely to develop TB than individuals with hemoglobin level > 12.5 mg/dl. Having opportunistic infection at ART initiation, were independently associated with increased risk of TB occurrence. But occupational status, smoking, alcohol intake, family history of TB, sex, lived other place, number of people living in the house hold and CD4 cell count lost their statistical significance in the multivariate analysis in this study(7).

2.2.2 Environment related risk factors

Finding from a study done in southern part of Ethiopia in Arba Minch town a Five-Year Retrospective Follow-Up Study on the Incidence and Predictors of Tuberculosis among HIV/AIDS Infected Patients a hospital based study identified there is Relatively high incident tuberculosis cases were established among HIV infected patients living in household with family

size of 3 - 4 with AOR: 2.26, so from the factors identified as an important predictors of tuberculosis among HIV infected patients one is number of families in the house(15).

Unmatched case-control study was conducted in Western Ethiopia: on the Determinants of Tuberculosis Infection among Adult HIV Positives Attending Clinical care and identified having a separate kitchen showed protective role in this study population(9).

A case control study in southwest Ethiopia on the risk factors of active tuberculosis in people living with HIV/AIDS identify risk among cases and controls using the distal and proximal determinants and found that from the proximal environmental variables living in a house made of mud wall were independently associated with the development of active tuberculosis in people living with HIV/AIDS(10).

2.2.3 socioeconomic risk factors

A study done in Albania to assess the characteristics of TB in the HIV/AIDS patients find that TB is a common respiratory complication with high mortality rate in HIV/AIDS patients. And education level is one risk factor for active TB among HIV/AIDS persons. More than 70% of the patients with tuberculosis in the study population had 0-8years of education, with regard to the structure of occupations, TB-HIV patients have been predominated in the unemployed and workers group in this study(19).

Finding from a study done in Nigeria to know the factors associated with Prevalent Tuberculosis Among Patients Receiving Highly Active Antiretroviral Therapy in Tertiary Hospital reviled that prevalence of active TB was 7.7% (26/339) among HIV-infected patients who had received HAART and from those factors independently associated with prevalent TB were living in lower social class(24).

A study done on Prevalence and associated factors of TB/HIV co-infection among HIV Infected patients in Amhara region, Ethiopia from a total of 571 HIV positive study participants enrolled. Being single, patient who did not have their own home are more likely to develop TB in this study(26).

A study done at Shashemene Referral Hospital in West Arsi, on Prevalence and Factors Affecting the Development of Active-Tb among HIV-Positive Patients from a total of 309 HIV

infected patient medical records containing required information were reviewed. The most important associated factor for development of TB in HIV/ AIDS patients in those participants with secondary School educational level were 3.64 times and tertiary School educational level 4.01 times more likely to develop TB than illiterate in this study(27).

Unmatched case-control study was conducted in Western Ethiopia: on the Determinants of Tuberculosis Infection among Adult HIV Positives Attending Clinical and identified Being divorced/widowed, not attending formal education, are risks. And the study concludes that for most of these determinants interventions can be made at individual and institutional levels, whereas, factors like education need societal level integrations so more focus on education need to be given according to this study(9).

A case control study in southwest Ethiopia on the risk factors of active tuberculosis in people living with HIV/AIDS identify risk among cases and controls using the distal and proximal determinants and found that from the distal determinants a low level of education, were identified as independently associated with the development of active tuberculosis in people living with HIV/AIDS(10).

Finding from a study done on Determinants of Tuberculosis Infection among Adult HIV Positives Attending Clinical Care in Western Ethiopia indicate that from a total of 357 participants three hundred twenty-seven (91.6%) were urban and find association in the bivariate analysis between active TB and coming from urban area(9).

2.3Conceptual frame work

This conceptual framework is adopted from previous literature(10)that has similar topic and little modificationis made. It helps to identify the distal and proximal risk factors of active TB among PLHIV who have started ART. It represents set of interrelated concepts that are believed to be associated with active Tuberculosis in PLHIV. This framework provides guidance for the study. In the diagram below, arrows indicate of proposed linkages among a set of concepts believed to be related to active TB among PLHIV. Those factors grouped as proximal they directly affect the outcome variable were as the distal risks they have a magnifying effect on the proximal risks so that their effect is indirect to the outcome variable.

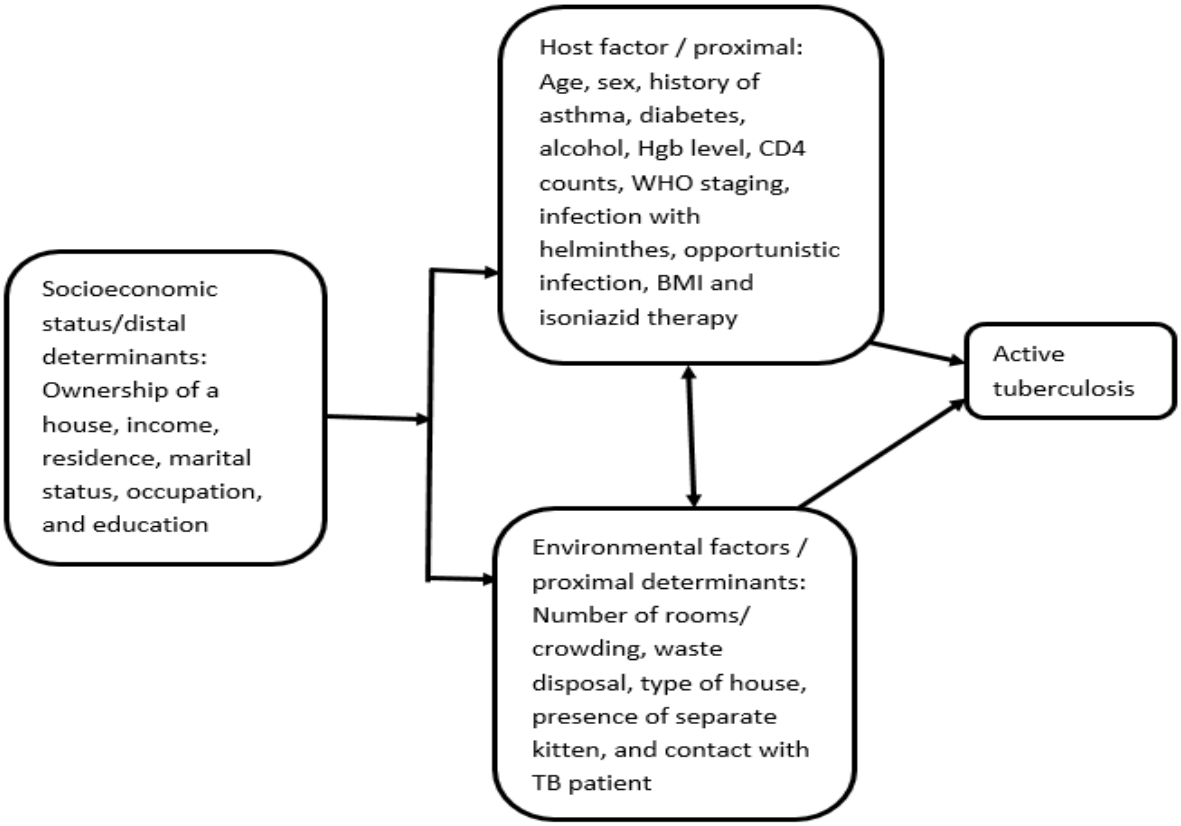

Figure 1: Conceptual frame work of Risk factors of active tuberculosis in people living with HIV(10)

CHAPTER THREE

3. OBJECTIVES OF THE STUDY

3.1 General objective

• To assess the risk factors of active Tuberculosis among People living with HIV on ART follow up at Harar government hospitals, Ethiopia, 2019.

3.2 Specific objective

- To assess the proximal risk factors of active tuberculosis among People living with HIV on ART follow upat Harar government hospitals, Ethiopia, 2019.
- To assess the distal risk factors of active tuberculosis among People living with HIV on ART follow up at Harar government hospitals, Ethiopia, 2019.

CHAPTER FOUR

4. METHODOLOGY

4.1 Study area

The study was conducted in government hospitals in Harar Ethiopia, 2019. Harar is located 526 km away from the capital, Addis Ababa in the eastern direction. It is one of the most popular historical towns with a projected total population of 203,438 with M: F=102,369:101,069 (31) in 2010.

4.2 Study design

Institution based unmatched case control study design was conducted to assess risk factors of active tuberculosis among PLHIV who are on ART follow up. This study design is selected because it can identify risk factors that leads to development of active TB among PLHIV by grouping the participants in to cases and controls. Those Study subjects categorized as cases (PLHIV who have developed active TB infection) and controls (PLHIV with no active TB), data on the selected variables was collected at a single point in time. The collected data was used to describe as well as to compare groups.

4.3 Study period

The study period was from March 13/03/2019 to May 15/04/2019 during the routine working hours of the hospitals.

4.4 Source population

• All People living with HIV who are on ART follow upat Harar, Ethiopia, 2019.

4.5 Study population

• All People living with HIV who areon ART follow up at Harar government hospitals, Ethiopia, 2019.

4.6 Eligibility Criteria

4.6.1 Inclusion Criteria

For Cases

- People living with HIV who are >18 years of age and started ART treatment for at least 6 months and have follow up at the study site were included in this study.
- Cases are people living with HIV who developed TB after ART initiation and on anti TB treatment in the last 6 months before data collection.

For controls

- People living with HIV who are >18 years of age and started ART treatment for at least 6 months and have follow up at the study site were included in this study.
- Controls are people living with HIV who did not develop active TB after ART initiation.

4.6.2 Exclusion Criteria

- Those who are severely ill and hospitalized.
- Not confirmed as TB and those with extra pulmonary TBwere excluded from the study.
- Pretested participants.

4.7 Sample size determination and sampling technique

4.7.1 Sample size determination

The sample size is calculated using Epi Info version 7.2.2.6 software first major risk factors are identified from different studies in most literatures being in WHO clinical stage III $ IV, CD4< 200, Hemoglobin<10, Body Mass Index<18.5(9, 10) are commonly identified risks. SO considering WHO clinical stage III & IV as independent predictor and it give as a large sample size using the parameters proportion of WHO clinical stage III and IV among the cases 63.9% and controls 45.8%(9)5% significance level, power of 80%, a case to control ratio of 1:2 and by using the two proportion formula. The calculated sample size is 291 by adding 10% non-response rate the resulting minimum sample size is 321 (107cases and 214 controls).

Table 1: Sample size calculation to assess risk factors of active tuberculosis among people living with HIV on ART at Harar government hospitals,2019

Variable	Proportion of cases	Proportion of controls	Odds ratio	Power	Confidence level	Case to control ratio	Sub total	Add 10% non-response
Hemoglobin < 10	25.9	9.1	8.1	80%	95%	1:2	195	215
WHO stage III $ IV	63.9	45.8	2.09	80%	95%	1:2	291	321
Body mass index<18.5	56.3	25.2	2.35	80%	95%	1:2	99	109
CD4< 200	50.6	17.9	4.3	80%		1:2	83	91

4.7.2 Sampling technique

First, the hospitals were assessed weather they have adequate cases or not and included in the study to get adequate number of cases. Identification of cases and controls was done by the principal investigator through the help of the ART and TB registries. Both cases and controls were selected randomly at their follow up period using TB and ART registry list.All PLHIV on ART who fulfilled inclusion criteria were included in the study, with the control to case ratio of 2:1. I.e. for each case two controls.

4.7.3 sampling procedure

In the three government hospitals in Harar a total sample of 321was allocated proportionally to these three hospitals.

Table 2 sampling procedure to allocate sample size to Harar government hospitals

Selected hospitals	cases	Controls
Hiwot Fana	N= 260 n= 55	N= 2000 n= 104
Jagula hospital	N=170 n= 34	N= 1500 n= 78
Police hospital	N=90 n=18	N=600 n=32

4.7.4 Operational definitions

- **Controls:** Are people living with HIV who did not develop active TB and have ART follow up at Harar government hospitals, Ethiopia, 2019.
- **Cases:** Are people living with HIV who have developed active TB while on ART follow up at Harar government hospitals, Ethiopia, 2019.
- **Active tuberculosis:** Refers those individuals who are declared to have pulmonary tuberculosis clinically or with laboratorial confirmation, the diagnosis is made by the physician, Smear positive pulmonary tuberculosis (PTB) diagnosed if one sputum smear examination positive for Acid Fast Bacilli (AFB) by direct microscopy. And smear negative pulmonary tuberculosis (PTB) diagnosed if at least two sputum specimens negative for AFB and radio graphical abnormalities were consistent with active tuberculosis and decision by a clinician to treat with a full course of anti-tuberculosis chemotherapy.
- **Body mass index:** it is one definition of malnutrition and shows the nutritional status of an individual obtained by dividing weight of an individual with height square and classified as less than 18.5 kg/m2 indicate that there is nutritional problem and greater than 18.5 Kg/m2 indicate no nutritional problem.
- **Hemoglobin level**: it is measured labratoricaly and classified based on WHO classification <10g/dl, 10-12.5g/dl, > 12.5g/dl.
- **Baseline WHO Staging**: HIV staging by WHO that is obtained at the time of ART initiation.
- **Diabetes**: those individuals who are declared to have diabetes mellitus after diagnosed by the physician labratoricaly and started treatment.
- **Asthma:** those individuals who are declared to have bronchial asthma after diagnosed by the physician.
- **Crowding index:** is obtained by dividing the number of individuals living in the house with the number of rooms that the house have and classified as index < 1, 1-2, > 2.
- **ART center:** Refers to a clinical center in which antiretroviral treatment for PLHIV is given.

- **Distal risk factors:** Refers for those factors such as socio-economic status that contribute to the development of TB indirectly and this factors have amplifying effect they can affect many different sets of proximal causes.
- **Proximate risk factors:** Refers for those factors that increase exposure to the infectious agent and act directly to cause the diseases.
- **Host factors:** Are those proximal factors that are directly related to the person health who is under the study.
- **Environmental factors:** Are proximal factors that are outside of the study participant's body.

4.8 Variables

4.8.1 Dependent Variable

• Active tuberculosis among PLHIV

4.8.2 Independent Variables

Proximal factors are two types

1, Host factor: Are Age, sex, history of asthma, diabetes, alcohol, hemoglobin, CD4 counts, WHO staging, infection with helminthes, and BMI

2, Environmental factors: consisted of factors like contact history with a TB patient in the family, type of wall of a house, presence of a separate kitchen, availability of a waste disposal system, and finally crowding in the house.

Distal factors: The distal factors are socioeconomic status containing information concerning residence, ownership of a house, marital status, educational status, employment and monthly income.

4.9 Data collection tool and procedure

4.9.1 Data collection instrument

Interviewer administered, pre-tested, validated, standardized questionnaire that were used in local researches was used(10). The instrument comprised fourparts: Part one is Host related proximal factors, Part two is environment related proximal factors, Part three is socioeconomic status which is distal factors, Part four is patient document review under host related factors.

4.9.2 Pre-test

The questionnaire was pre-tested on 16 HIV patients on follow up visit in Hiwot Fana hospital at Harar to assure quality of translation to Amharic and necessary correction and amendments were made.

4.9.3 Data quality Assurance

To assure data quality, training, and orientation was given for the data collectors by the principal investigator. Additionally, on each data collection day, the collected data were reviewed and checked for its completeness by principal investigator and appropriate design and sampling procedures was applied. Moreover, the exclusion criteria were considered.

4.9.4 Data processing and analysis

The entire returned questioners were checked for completeness and clarity, cleaned manually, coded and entered in to Epi data 3.1 and exported to SPSS version 24 statistical packages for further analysis and cleaned, edited and analyzed by the principal investigator. Frequencies and proportions were used to describe the study population in relation to relevant variables. Bivariate analysis was performed to examine the effect of each variable of interest on the risk of TB. Crude odds ratios and their 95% confidence intervals (CIs) were estimated using binary logistic regression, with TB as an outcome. To identify confounding factors and to measure the independent effects of each exposure variable on occurrence of tuberculosis, a multivariate logistic regression model was used with the variables having a p-value, < 0.25 in the bivariate analysis.To decidewhether the model adequately describes the data, theHosmer Lemeshow test which indicates a poor fit if thesignificance value (p) is less than 0.05 and good fit greater than0.05. Here, in this study the model adequately fits the data since p-valueis 0.71.

4.9.5 Ethical consideration

Formal letter wasbeing obtained from Research Ethics Committee of Addis Ababa University Collage of Health Science School of Nursing and Midwifery and it wasbeing submitted to the selected government hospitals Hararin order to obtain formal ethical clearance. Participation was voluntary and information was collected by the staff members working in the unit anonymously after obtaining written consent from each respondent by assuring confidentiality throughout the data collection period. In order to maintain confidentiality, the participants were assured that the obtained information would not made available to anyone who was not directly involved in the study and their names was not written on the questionnaire they interviewed.

4.9.6 Dissemination of the result

Finally, the findings of the study will be presented to Addis Ababa University, College of Health Science School of Nursing and Midwifery as partial fulfillment of Master's degree in Adult Health Nursing and will be communicated to HararGovernmentHospitals. The findings will also be presented in different seminars, meetings, and workshops as well as further effort will be made to publish the findings on peer reviewed journal. Hard and soft copies will be made available in the library of AAU, for graduate students as well as for other researchers and readers.

CHAPTER FIVE

5. RESULT

5.1 Proximal characteristics of study participants

Of 321 participants selected, three hundred one study subjects responded one hundred one (94.4%) cases and two hundred (93.5%) controls with over all response rates of 93.8%. From this 201 (66.8%) females and 100(33.2%) were males respectively.

The mean age of participants was 38.95 so the number of participants below the mean age were 138 and 163 above the mean; were as median for age was 40.00,Standard deviation (SD=±10.34)more proportions of case and control patients were in the age group of 38 and above. Also in this study there were more females than males, two hundred one (66.8%) from this sixty-nine (22.9%) of cases were females.

History of asthma among controls accounts twenty (6.6%) and cases thirty (10.0%) also fourteen(4.7%)of controls and twelve(4.0%) 0f cases are with history of diabetes mellitus. Thirty-three (11.0%) of cases and nineteen(6.3%) controls have previous history of smoking cigar rate, also those that had never use alcohol were 206 (68.5%) so majority of participants in this study had never used alcohol.

Majority of controlsor one hundred seventy-seven (58.8%) are in the WHO clinical stage 1 & 2 were as the cases 51 (16.9%) were in WHO clinical stage 3 and 4 at the time ART initiation also out of 200 controls all the two hundred (66.4%) and all 101 of the cases (33.6%) had taken isoniazid preventive therapy at the time ART initiation. Of the total two hundred controls one hundred fourth five (48.2%) had CD4 count ≥499 but onlyforty-one(13.6%) of cases had CD4 ≥499. More than half of the cases (21.6%) had BMI < 18.5Kg/m^2 and only seventeen (5.6%) of the controls had BMI <18.5Kg/m^2 . Majority of controls and cases had a hemoglobin level of ≥12.5, two hundred seven (68.7%) and only twenty-two (7.3%) 0f controls had <10, were as more cases than controls had < 10 of hemoglobin, twenty-six (8.6%).

Thirty-seven (12.3%) cases have history of infection with helminths and thirty-three (11.0%) 0f controls have history of infection with helminths so more cases had helminths infection than

controls. presence of opportunistic infection other than tuberculosis were seen among controls, seventy- four (24.6%) and cases sixty-two (20.6%).Crowding index was calculated by dividing number of people living in the house with number of rooms and find that most of cases and controls were between 1-2 index,one hundred fifty (49. 9%).Majority of controls does not have contact with TB patient, one hundred ninety (63.1%) but, twenty-seven (9.0%) cases have history of contact.

From the controls one hundred twenty-four (41%) and seventy-one (23.6%) of caseshave a waste disposal system, when we see the composition of the wall among controls one hundred nineteen (39.5%) and sixty-eight (22.6%) cases had wall made of mud & wood. IN addition to this sixty-five of controls (21.6%) and thirty-seven (12.3%) of cases does not have a kitchen separated from the main house.

Table 3. proximal characteristics of study participants in Harar,2019

Independent variables		Case f	(%)	Control f	(%)
Age	18-35	38	12.6	36	12.0
	>=36	63	20.9	164	54.5
Sex	Male	32	10.6	68	22.6
	female	69	22.9	132	43.9
History of bronchial	Yes	30	10.0	20	6.6
asthma	No	71	23.6	180	59.8
History of Diabetes	Yes	12	4.0	14	4.7
mellitus	No	89	29.6	186	61.8
History of smoking cigar	Never	68	22.6	181	60.1
rate	previously	33	11.0	19	6.3
History of drink alcohol	Never	64	21.3	142	47.2
	previously	37	12.3	58	19.3
CD4 count	1.00	60	19.9	55	18.3
	2.00	41	13.6	145	48.2
Body mass index	< 18.5	36	12.0	17	5.6
(Kg/m^2)	>= 18.5	65	21.6	183	60.8
Hemoglobin level	< 10	26	8.6	22	7.3

	10-12.49	18	6.0	28	9.3
	≥ 12.5	57	18.9	150	49.8
Base line WHO Stage	Stage 1 & 2	50	16.6	177	58.8
	stage 3 & 4	51	16.9	23	7.6
infection with	Yes	37	12.3	33	11.0
helminthes	No	64	21.3	167	55.5
opportunistic infection	Yes	62	20.6	74	24.6
	No	39	13.0	126	41.9
Is the Kitchen separated	Yes	64	21.3	135	44.9
	No	37	12.3	65	21.6
Known TB patient in	Yes	27	9.0	10	3.3
	No	74	6	190	63.1
Crowding index	< 1	23	7.6	84	27.9
	1-2	64	21.3	86	28.6
	>2	14	4.7	30	10.0
Waste disposal	Yes	71	23.6	124	41.2
	No	30	10.0	76	25.2
Wall of the house	Mud & wood	68	22.6	119	39.5
	Cement & stone	33	11.0	81	26.9

5.2 Distal characteristics of study participants

From the distal determinants one is income so one hundred forty-six (48.5%) of controls in this study have ≥1600 Birr on a monthly base were as sixty (19.9%) of cases income was ≥1600.One hundred thirty-seven of patients were married from this more controls are married than cases (97(32.2%),40(13.3%)) also the majority of participants were urban dwellers. IN addition to this majority of controls own a house, one hundred sixty-five (54.5%) and forty-nine (16.3) of the cases have their own house. The result on educational status showed a large proportion of participants 83(27%) attended secondary education followed by attend primary which accounts seventy-seven (25.5%). Regarding the occupation of respondents, majority were unemployed that accounts one hundred ninety-two (63.8%) and one hundred nine (36.3%) respectively.

Table 4. Distal characteristics of study participants in Harar, 2019.

Independent variable		Casef	(%)	Control f	(%)
Marital status	Married	40	13.3	97	32.2
	Single	38	12.6	52	17.3
	Widowed	14	4.7	25	8.3
	divorced / separated	9	3.0	26	8.6
Educational status	No formal education	46	15.3	32	10.6
	primary education	20	6.6	57	18.9
	secondary education	19	6.3	64	21.3
	Tertiary education	16	5.3	47	15.6
Occupation	Employed	36	12.0	73	24.3
	Unemployed	65	21.6	127	42.2
Income	< 1600	41	13.6	54	17.9
	≥1600	60	19.9	146	48.5
Owner ship of house	Yes	49	16.3	165	54.5
	No	52	17.3	35	11.6
Residency	Urban	76	25.2	186	61.8
	Rural	25	8.3	14	4.7

5.3 proximal factors associated with Tuberculosis

The bivariate analysis showed that age group has association with the occurrence of tuberculosis and those participants whose age is 18-35 are 2.75 times at risk (COR=2.75 (1.60-4.72). Even though there are more males in the case group than females sex is not associated with tuberculosis COR=1.11 (0.66-1.85). Those Patients with history of asthma were at higher risk to develop TB (COR= 3.08 (2.03-7.13)), also patient with known history of diabetes mellitus are 1.79 times at risk (COR=1.79(2.03-7.13). Alcohol use does not associate with TB (COR=1.42 (0.85-2.35) but, smokers are 4.62 times at risk than those who never smoke (COR=4.62(2.46-8.68).

Those participants who lived with a known TB patient were 6.93 times at risk (COR=6.93 (3.20-15.03), were as a separate kitchen does not associate with tuberculosis (COR=1.20 (0.73-1.98)and Crowding index as well, either those with <1(COR= 0.58(0.27-1.29) index or 1-2, (COR=1.58 (0.78-3.25). In addition, wall of house is made (COR= 1.40 (0.85-2.32), and waste disposal system(COR=0.69 (0.41-1.15) were not associated with occurrence of TB.

Most of host related factors are associated with TB those patients with history of opportunistic infection were 2.71 times at risk (COR=2.71 (1.65-4.43), and patients with history of helminths infection are 2.93times at risk (COR=2.93(1.69-5.07) than those with no history. Cases are more likely to have BMI <18.5Kg/m^2 (COR=5.962 (3.136-11.335), CD4 200-499 (COR= 3.858 (2.331-6.387),) also those with hemoglobin level of < 10 are 3.11 times at risk (COR= 3.11 (1.63-5.93), but no association between Hgb level of 10-12.49g/dl (COR=1.69 (0.869-3.293) with tuberculosis. Majority of cases and controls were in WHO stage 3 & 4 at baseline but baseline WHO staging was not associated with tuberculosis in this study (COR=0.82(1.06-0.68).

Table 5. Proximal Factors associated with active tuberculosis, Harar, Ethiopia 2019

Independent variables		Case f(%)	Control f(%)	COR 95% CI	P-Value
Sex	Male	32	68	1.11 (0.66-1.85)	0.687
	Female	69	132		
Age	18-35	38(12.6)	36(12.0)	2.75 (1.60-4.72)	0.000*
	≥ 36	63(20.9)	164(54.5)	1	
History of DM	Yes	12(4.0)	14(4.7)	1.79 (2.03-7.13)	0.159*
	No	89(29.6)	186(61.8)	1	
History of smoking	Never	68(22.6)	181(60.1)	1	
	Previously	33(11.0)	19(6.3)	4.62 (2,46-8.68)	0.000*
History of alcohol use	Never	64(21.3)	142(47.2)	1	
	Previously	37(12.3)	58(19.3)	1.42 (0.85-2.35)	0.179

TB patient in the	Yes	27(9.0)	10(3.3)	6.93 (3.20-15.03)	0.000*
family	No	74(24.6)	190 (63.1)	1	
CD4 count	200-499	60(19.6)	183(60.8)	3.86 (2.33-6.39)	0.000*
	≥500	41(13.6)	145(48.2)	1	
Base line WHO stage	Stage 1 & 2	33(11.0)	68(22.6)	1	
	Stage 3 & 4	68(22.6)	132(43.9)	0.82(1.06-0.68)	0.818
Wall of the house	Mud and wood	68(22.6)	119(39.5)	1.40 (0.85-2.32)	0.187
	Stone and cement	33(11.0)	81(269)	1	
Kitchen separated	Yes	64(21.3)	135(44)	1	
	No	37(12.3)	65(21)	1.20 (0.73-1.98)	0.475
Helminths infection	Yes	37(12.3)	33(11.0)	1	
	No	64(21.3)	167(55.5)	2.93 (1.69-5.07)	0.000*
Hemoglobin (g/dl)	<10	26(8.6)	22(7.3)	3.11(1.63-5.93)	0.001*
	10-12.49	18(6.0)	28(9.3)	1.69 (0.87-3.29)	0.122*
	≥12.5	57(18.9)	150(49.8)	1	
Opportunistic infection	Yes	62(20.6)	74(24.6)	2.71(1.65-4.43)	0.000*
	No	39(13.0)	126(41.9)		
Body mass index	<18.5	36(12.0)	17(5.6)	5.96(3.14-11.34)	0.000*
(Kg/m^2)	≥18.5	65(21.6)	183(60.8)	1	
History of Asthma	Yes	30(10.0)	20(6.6)	3.80(2.03-7.13)	0.000*
	No	71(23.6)	180(59.8)	1	
Waste disposal	Yes	71(23.6)	124(41.2%)	1	
	No	30(10.0)	76(25.2%)	0.69(0.41-1.15)	0.156

Crowding index	1	23(7.6%)	84(27.9%)	0.59(0.27-1.29)	0.183
	1-2	64(21.3%)	86(28.6%)	1.60(0.78-3.25)	0.199
	>2	14(4.7%)	30(10.0%)	1	

Key: COR (Crude Odds Ratio)
*there is association if p-value <0.25
1(reference category)

5.4 Distal factors associated with tuberculosis

From the distal determinants residency is associated with active TB, patient who came from urban were 4.37 times higher risk (COR=4.37 (2.16-8.86), marital status as well those who were single are 1.77 times at risk (COR= (1.77 (1.02-3.09), but being divorced/separated, (COR=0.84 (0.36-1.95) and widowed 1.36 (0.64-2.88)were not associated with tuberculosis. Educational status is also another distal determinant that is associated with TB those who did not have formal educationwere 4.22 times at risk (COR=4.22 (2.05-8.17) but attending primary education (COR=1.03(0.48-2.21), secondary and above (COR= 0.87 (0.41-1.87) were not associated with tuberculosis.

Income is associated with tuberculosis those participants with monthly income <1600 were 1.85 times at risk (COR= 1.85 (1.12-3.06), but factors like occupation (COR= 1.08 (0.63-1.71) and ownership of a house (COR=0.91 (0.54-1.50) were not associated with tuberculosis.

Table 6. Distal factors associated with active tuberculosis, Harar Ethiopia 2019

Independent predictors		Case f (%)	Control f (%)	COR95% CI	P-Value
Marital status	Married	40(13.3)	97(32.2)	1	
	Single	38(12.6)	52(17.3)	1.77 (1.015-3.09)	0.004*
	Widowed	14(4.7)	25(8.3)	1.36 (0.64-2.88)	0.424
	Divorced/separated	9(3.0)	26(8.6)	0.84 (0.36-1.95)	0.684
Educational status	No formal Education	46(15.3)	32(10.6)	4.22 (2.05-8.17)	0.000*
	Primary education	20(6.6)	57(18.9)	1.03 (0.48-2.21)	0.983
	Secondary education	19(6.6)	64(21.3)	0.87 (0.41-1.87)	0.726
	Tertiary education	16(5.3)	47(15.6)	1	
Ownership of house	Yes	32(10.6)	68(22.6)	0.91 (0.54-1.50)	0.687
	No	69(22.9)	132(42.9)	1	
Occupation	Employed	36(120)	73(24.3)	1.08 (0.63-1.71)	0.888
	unemployed	36(120)	127(42.2)	1	
Income	< 1600	41(13.6)	54(17.9)	1.848(1.115-3.062)	0.017*
	≥ 1600	60(19.9)	146(48.5)	1	
Residency	Urban	76(25.2)	186(61.8)	4.370(2.156 8.859)	0.000*
	Rural	25(8.3)	14(4.7)	1	

Key: COR (Crude Odds Ratio)
*there is association if p-value <0.25
1(reference category)

5.5Multivariable analysis: factors independently associated with active tuberculosis

To identify independent factors for the developing of active tuberculosis, a multivariable logistic regression model was done with the variables having a p-value, < 0.25 in the bivariate analysis. So, some variables remained independent predictors for the occurrence of TB after controlling the other factors from this factors:

Marital status is one of the independent risk, from the distal determinants those who were single are 4.47 times at risk (AOR=4.47;95%CI:(1.04-19.27) than married ones. Educational status is also identified as an independent risk those who did not attend formal education were 3.78 times at risk (AOR=3.78; 95% CI (1.29-18.84) than those who have attended tertiary and above.

The others host related proximal factors identified as independent risks was BMI < 18.5Kg/m^2 are6.11 times at higher risk (AOR=6.11; 95%CI:2.71-18.84) than those with BMI ≥ 18.5Kg/m^2 , also those with CD4 cell count 200-499 are7.15 times higher risk (AOR=7.15 95%CI:2.28-16.36) than those with CD4 ≥18.5. Smoking is also another independent risk, those participants with previous history of smoking are 7.75 times at risk than those who never smoke (AOR= 7.75; 95% CI:2.27-26.50).

But, factors like age, history of asthma, diabetes, alcohol use, hemoglobin level, helminths infection, opportunistic infection, crowding index, income and contact with known tuberculosis patient loss their statistical significance in the multivariate analysis.

Table 7. Factors independently associated with active tuberculosis, Harar Ethiopia 2019

Variable	Control f	Case f	COR 95% CI	AOR 95% CI	P-Value
Marital status					
Married	97	40	1	1	
Single	52	38	1.77 (1.02-3.09)	4.47 (1.04-19.27)	0.044**
Widowed	25	14	1.36 (0.64-2.88)	1.38 (0.28-6.74)	0.688
separated/Divorced	26	9	0.84 (0.36-1.95)	1.02 (0.28-3.80)	0.972
Educational status					
No formal Education	32	46	4.22 (2.045-8.17)	3.78 (1.29-18.84)	0.016**
Primary education	57	20	1.03 (0.48-2.21)	0.51 (0.14-1.85)	0.307
Secondary education	64	19	0.87 (0.41-1.87)	1.79 (0.54-5.98)	0.344
Tertiary education	47	16	1	1	
BMI (Kg/m^2)					
< 18,5	17	36	5.96 (3.14-11.34)	6.11 (2.28-16.36)	0.000**
≥18.5	183	65	1	1	
CD4					
200-499	183	36	6.93 (3.20-15.03)	7.15 (2.71-18.84)	0.000**
≥ 500	145	65	1	1	
History of smoking					
Never	181	68	1	1	
Previously	19	33	4.62 (2.46-8.68)	7.75 (2.27-26.50)	0.001**

Key: ** Statistically significant if
p-value < 0.05, AOR (Adjusted odds ratio), 1(reference category)

CHAPTER SIX

6. DISCUSSION

This case-control study has identified several determinant factors that are grouped as proximal and distal for the occurrence of TB among people living with HIV enrolled on ART in Harar. Most of the host related proximal factors are risks for the occurrence of active TB among people living with HIV.

From the distal determinants marital status (Being single) is identified as an independent risk for TB those who are single are 4.47 times at risk than married this result is consistent with other reports from Amhara region(26) found that marital status as an independent risk those who are single were 2.17 times at risk so based on this knowledge those individuals who are unmarried (single) are younger than married persons and may have unstable life or move from one place to another in search of jobs that they can have different sexual partner.

Also this study has identified being divorced/ separated, widowed, were not associated with tuberculosis, which contrasts with finding from Western Ethiopia (9)that states being married had a protective effect over TB and those who are divorced/ separated are 3.02 times at risk and conclude that TB is one cause for marriage disruption this difference could be due to small number of divorced/ separated participants in both cases and control group of this study.

Many studies have identified educational status as one independent risk for TB which is similar with this study finding that those participants who did not have formal education were 3.78 times at risk and the majority of participants who have developed active TB did not have formal education in this study, this finding is in line with previous studies from inside the country; western Ethiopia (9),South West Ethiopia(10) and an Albanian study from Europe (19). So from this a conclusion is made that most of individuals who did not have a formal education are not aware of the disease process and failed to take precautionary measures than the educated once this could be the one reason why those who had no formal education are at risk.

In contrast to this, finding from West Arsi (27) states that those who attend primary and above are at higher risk (AOR=4.01) than illiterates, this could be due to a methodologic difference between this two studies.

Studies on risk factors of TB on HIV had identified BMI less than 18.5Kg/m^2 as an independent risk factor which is similar with finding in this study; those participants with BMI < 18.5Kg/m^2 are 6.11 times at risk also Northeast Ethiopian(30),Western Ethiopia(9)findingssuggests that low body mass index which explains undernutrition is significantly associatedwith TB infection. Based on this knowledge low body mass index which is proxy of malnutrition mightbe due to loss of appetite or reduced intake due to anorexia, oral and esophageal candidiasis with painful swallowing (odynophagia) and increased losses of iron and zinc from the gastrointestinal tract, and also urinary losses of vitamin A, in addition to this malabsorption of fat and carbohydrates are common early at ART initiation so this all abnormalities fail to overcome the bodies increased need which leads to HIV wasting syndrome or progression to AIDS stage of the disease(32). That is characterized by immune suppression, morbidity, and mortality through activation of latent tuberculosis to active TB disease which makes tuberculosis the most common cause of death in people living with HIV and HIV disease can worsen nutritional status.

Congruent findings have been reported in-country and outside of the country that CD4 count is an independent risk for TB those patients with CD4 200-499 are 7.15 times at risk, studies from Albania, South Africa, West Arsi, Arba Minch, West Ethiopia and southwest(7, 10, 19, 20, 27, 29)studies have used patients' CD4 cell counts to assess immune suppression and found that a lower CD4 cellshows how much damage has been done to your immune system.HIV virus targets CD4 cells and a low CD4 count (less than 500)indicate that the patient are at higher risk to opportunistic infection(33) ,one of the most common opportunistic infection in people living with HIV is tuberculosis. IN addition to this weakness in the immune system can activate the progression of latent tuberculosis to active TB disease.

Individuals who involve themselves in smoking are at risk to TB. Since HIV infected smokers have higher respiratory symptoms, when compared to non-smokers which is concluded in most literatures inside and outside the country (15, 19, 20, 26, 29) based on this previous studies and finding of this study, which is those participants who had previous history of smoking are 7.75 times at risk than who never smoke and justify that smoking can increase the risk of contracting TB since it can reduce the immune response and smokers are with respiratory complication & symptoms than nonsmokers also there is a high risky behavior among them.IN addition to this science suggests that when mycobacterium tuberculosis enters the lung the first line defense is by

macrophages that engulf and break it down, preventing TB infection but this macrophages will be clogged up with smoke particles so that they could not respond to infection (defective macrophages)(34). Due to this those who had previous history of smoking are at higher risk in contracting active TB disease.

But according to a case control studies in Addis Ababa(7), Western Ethiopia (9) and southwestern Ethiopia (10), smoking was not associated with active TB This could be due to the high prevalence of smokers in our study population. There could also be a social desirability bias whereby smokers denied their smoking status in this previous studies.

Strength and Limitation of the study

Strengths of the study

- Use validated structured standardized questionnaire
- High response rate
- similar studies are conducted in the area but it is the first to be done in the study area since it is with high prevalence, it can contribute a lot as a literature for future studies.

Limitations of the study

- Because of the nature of the study design, and data collection approaches, social desirability bias is unavoidable.
- Secondly, recall bias is expected since some of the variables were asked retrospectively.

Conclusion

This study had identified marital status, educational status,smoking, BMI < 18.5, CD4,as independent factors from this most of factors associated with TB infection on HIV are host related So, health workers should becautious when a patient has lower CD4 counts, and BMI at the initiation of ART this factors can be prevented by having adequate nutritional intake, regular monitoring ad evaluating side effects. Furthermore, the hospitals should open TB/HIVco-infection units independent of tuberculosis and ART clinics.

Recommendation

For the hospitals

- The hospital administration should stress on educating clients more during follow up periods about the risk factors of active tuberculosis.
- The hospitals should prepare training and educational materials on nutritional care and support for people living with HIV.
- Hospitals should develop guideline for food aid practices.
- Hospitals Should open TB/HIV co-infection units.
- Risk factors of active TB Should be incorporated in the health education program of the hospital.

For health care professionals

- They should educate patients individually about how the patients prevent occurrence of TB.

For the patients

- Patients should adhere to all TB/ HIV educations provided by health care providers.
- Patients should continue to update their knowledge and follow their health status.

For future researchers

- Future researchers should be conduct since there is inconsistency of results among research's conducted in different regions of Ethiopia.

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ANNEXES

Annex I: Training manual

Tile: Risk factors of active tuberculosis among people living with HIV who are on art follow upat Harar Government Hospitals, Ethiopia, 2019.

Introductions: This training manual has helped the data collectors and supervisors the research team to be familiar with words and sentences used in the questionnaire and to know the Purpose of the study**,** the method of data collection, confidentiality of participant's information, how to solve problems encountered during data collection, contents of the questionnaires. It also helped on how to perform supervision and how to control data quality.

Objectives of the research**:** To assess risk factors of active tuberculosis among people living with HIV who are on ART follow up at Harar Government Hospitals, Ethiopia, 2019.

Purpose of the training:

- To familiarize the data collectors & supervisors with unfamiliar words and sentences used in the questionnaires.
- To adopt data collectors & supervisors with techniques to be followed in data collection and supervision procedures
- To enable data collectors& supervisors in resolving problems that occurs during data collection.

Methods of training: Discussion of data collection tool

Responsibility of research team members:

Principal investigator: control the overall activities of the study

Supervisors: monitor for the correctness of data collection at data collection places

- Monitor for consistency and completeness of data at data collection places
- Monitor for availability of necessary supplies for the Data collection
- Ensure data quality at place of data collection

Data collectors:

- Handle necessary supplies to perform the study
- Perform the Data collection

• Communicate with supervisors and principal investigator for solving problems which are beyond their capacity.

Training program for data collectors and supervisors

Total time taken for training will be only one day

Table 8. training manual for data collectors

Time (local tome)	**Activities**
2:30-4:00AM	Well come, objectives, training over view
4:00-4:15AM	Tea break
4:15-6:00AM	Over view of survey methodology ,key aspects of survey methodology ,role and responsibilities of personnel's
6:00-7:00 AM	Lunch
7:00-8:30AM	Data collection procedure ,preparation for data collection, procedure of data collection, solving problems faced during data collection, what to do at the end of data collection
8:30AM-845AM	Tea break

ANNEX II: Subject Information Sheet (English version)

Hello. My name is ---------- and I am data collector of the study conducted by Lidya Zerihun who is master's student at Addis Ababa university school of aliened health science and she is conducting this research forpartial fulfillment of Master's degree in adult health nursing. We appreciate your participation in this study and The information you will tell us will be important for us to know the risk factors of active tuberculosis among PLHIV and to prevent those risk factors to perform the appropriate intervention that help as to reduce mortality and morbidity related to TB among PLHIV. This questionnaire doesn't take more than 20-30 minute to complete.

Name of advisors 1. Dr. Erdaw Teachable 2. Mr. Tadesse Bedada (Ph.D. fellow)

Name of the organization: Addis Ababa University, College of Health Sciences, School of Nursing and Midwifery.

Name of the Sponsor: Addis Ababa University

Title of the Research Project: Risk factors of active tuberculosis among People living with HIV who are on ART follow up at Harar Government Hospitals, Ethiopia, 2019.

Introduction: Information sheet, consent and assent form will be prepared for PLHIV who are visiting ART center atHarar Government Hospitals, Ethiopia, 2019who will be volunteer to participate in this research project.

Purpose: To assess the risk factors of active Tuberculosis among People living with HIV on ART at HararGovernment Hospitals, Ethiopia, 2019.The information that you will tell us are very important for not only the successful accomplishment of the study but also for producing relevant information which will help in improving the provision of service for PLHIV which focused on giving care to all PLHIV who are at risk and I will provide research results to concerned body for intervention.

Procedure: In order to achieve the above objective, information which is necessary for the study will be taken from PLHIV who are on ART follow up from those who have HIV with no active tuberculosis and those PLHIV develop active TB. Responses will be completely confidential.

Risk: We hope you will participate in the study for the sake of the Benefit of the research result we are sure there is no risk in participating in this research project.

Benefits: there may not be direct benefit to you but your Participation is necessary for us in assessment of the risk factors of active Tuberculosis among People living with HIV on ART follow up which will help to improve the service delivered to patients who are on ART follow up and You will not be provided any incentive or payment to take part in this project.

Alternative Procedures You may choose not to participate in this study and it will not affect the health care that will be provided to you.

Confidentiality: The information collected from this research project will be kept confidential and all records and other information obtained will be kept strictly confidential and your protected health information will not be used without permission. All data collection tools will be identified by number or otherwise coded to protect any information that could be used to identify you.

Number of Participants: 321 people living with HIV age > 18 years with case to control ratio of 1:2

Voluntary Participation: It is up to you to decide whether to takes part in this study or refusal to participate. Research has no penalty or loss of benefits to which you otherwise entitled. This will not affect your relationship with the investigators. If you are voluntary to give information for the study, you can show your willingness by saying “yes”.

1. If yes, proceed to the next page 2. If no, thank you, and skip to the next participant

Name of data collector _____Signature of interviewer: -------Date: ----------/--------/---

If you have questions, complaints or concerns about this study, you can contact the principal investigator.

Address of the principal investigator:
Lidya Zerihun Cell Phone; +251912767670
Email address:lidyazerihun76@gmail.com.
IRBEthics Review Board: Department of nursing and midwifery, phone 251-157116.

Annex III: Consent form (English version)

In undersigning this document, I am giving my consent to participate in the study entitled as "Risk factors of active tuberculosis among People living with HIV who are on ART at Harar Government Hospitals, Ethiopia, 2019" I have been informed that the purpose of this study is to assess risk factors of active tuberculosis among People living with HIV who are on ART follow up at Harar Government Hospitals, Ethiopia, 2019.

I have Understood that participation in this study is entirely voluntarily. I have been told that my answers to the questions will not be given to anyone else and no reports of this study ever identify me in anyway. I have also been informed that my participation or non-participation or my refusal to answer questions will have no effect on me. I understood that participation in this study does not involve risks. I understood that Lidya Zerihun is the contact person if I have questions about the study or about my rights as a study participant.

Respondent's signature_____

Interviewer

Name_____Signature_____Date_____

ANNEX IV: Questionnaires (English Version)

ADDIS ABABA UNIVERSITY COLLAGE OF HEALTH SCIENCE

SCHOOL OF NURSING AND MIDWIFERY

POST GRADUATE STUDY

Questionnaire ID No----------

Direction for Data Collectors: Put (√) mark on the boxes in front of options provided.

This questionnaire is designed to assess risk factors of active tuberculosis among People living with HIV who are on ART follow up at Harar Government Hospitals, Ethiopia, 2019

Part I- Host related proximal risk factors

S/No.	Question	Response
01	How old are you?	……....years
02	Sex?	1, male 2, female
03	Do you have history of Bronchial Asthma?	1, Yes 2, No
O4	Do you have history of Diabetes mellitus?	1, Yes 2, No
05	Do you have history of smoking cigar rate?	1, Never 2, Previously 3, Currently
06	Do you have history of drinking alcohol?	1, Never 2, Previously 3, Currently

Part II Environmental related proximal risk factors

S.No	Questions	Response
11	Residency?	1, Urban 2, Rural
12	How many number of rooms does your house have?	**……..**
13	How many number of families living in the house?	**……**
14	Do you have a waste disposal system?	1, Yes 2, No
15	From what the Wall and floor of your house is made?	**…….**
16	Is the kitchen separated from the main house?	1, Yes 2, No
17	Is there a known TB patient in the family?	1, Yes 2, No

Part III-Socioeconomic status or distal risk factors

S.No	Questions	Response
21	Do you have your own house to live?	1, Yes 2, No
22	What is your Marital status?	1, Married 2, Single 3, Divorced 4, Widowed 5, Separated
23	What is your Educational status**?**	1, illiterate 2, Read and write 3, Attend Primary (1-8) 4, Attend Secondary school (9-12) 5, College and above
24	What is your occupation?	1, House wife 2, Merchant 3, Government employee 4, Private employee 5, Daily laborer 6, Others (specify----------
25	How much is your Monthly income in Ethiopian Birr?	…….Birr

Part IV-Medical record review from host related factors

S.No	Questions	Findings
31	Hemoglobin (g/dl)	**……** Base line
32	CD4 lymphocyte count	……. Base line
33	WHO clinical staging	**……** Base line
34	Weight in KG and height current	……Base line ……
35	Isoniazid preventive therapy	1, Yes 2, No
36	Infection with helminths	1, Yes 2, No
37	Presence of opportunistic infection	1, Yes 2, No

Thank you for your participation.

Annex V: Information sheet (Amharic Version)

የጥናቱአጠቃልይምንነትማብራሪያ

በአዲስአበባዩኒቨርሲቲጤናሳይንስኮሌጅየነርሲንግእናሚድዋይፈሪትምህርት ክፍልየድህረምረቃመርሃግብር

እንደምን አደሩ/ዋሉ?

ሥሜ_____ እባላለው፤ በአዲስ አበባ ዩኒቨርሲቲ፣ ጤና ሳይንስ ኮሌጅ፣ ነርሲንግና ሚድዋይፍሪ ትምህርት ክፍልየአዋቂዎች ጤና የ2ኛ ዓመት የማስትሬት ድግሪ ተመራቂ ተማሪ ለሆነቸዉ ሊዲያ ዘሪሁን ጥናት የመረጃ ሰብሳቢ ነኝ እርሷምበአሁኑ ሰዓት በሀረር በሚገኙየተመረጡ የመንግስት ሆስፒታሎች ውስጥከአችአይቪ ቫይረስ ጋር በሚኖሩ ሰዎች ላይ ስለሚከሰተው የነቀርሳ በስታ አጋላጭ ሁኔታዎችን ለመለየት በማጥናት ላይ ነች፡፡ እርሷም የአዋቂዎች ጤና አጠባበቅ ነርስንግ ሁለተኛ ዲግሪን በከፊል ለማሟላት ይህንን ጥናት ታካሂዳለች፡፡ሆኖም በዚህ ጥናት ውስጥ ያለዎትን ተሳትፎ እናደንቃለን እርስዎም የሚነግሩን መረጃየነቀርሳ / ቲዩበርክሎዝ በሽታ ከቫይረሱ ጋር በሚኖሩ ሰዎች ላይ መከሰት እና በዚሁ ምክኒያት የሚመጠአደጋዎች,እና ተያያዥ ምክንያቶችን በመለየትተገቢውን ጣልቃ ገብነት ለማካሄድ በተጨማሪም በነቀርሳ አችአይቪ ቫይረስ ጋር በሚኖሩ ሰዎች ሚከሰት ህመም እና ሞት ለመቀነስ ይረዳናል ሆኖም ይህንን መጠይቅ ለማጠናቀቅ ከ 20 እስከ 30 ደቂቃዎች የበለጠ ጊዜ አይፈጅም::

የአማካሪ ስም፡-ዶ / ር አርዳው ተችበል , እና አቶ ታደሰ በዳዳ (እጩ ዶ / ር)
የድርጅቱ ስም፡-አዲስ አበባ ዩኒቨርሲቲ፣ የጤና ሳይንስ ኮሌጅ፣, የነርሲንግ እና አዋላጅ ነርሲንግ ትምህርት ቤት፣ የነርሲንግ እና አዋላጅ ነርሲንግ ትምህርት ክፍል.
የደጋፊ ስም:- አዲስ አበባ ዩኒቨርሲቲ

የጥናትና ምርምር ርእሰ፡- በ 2019 ሀረር ዉስጥ በሚገኙ የመንግስት ሆስፒታሎችውስጥ ከአችአይቪ ቫይረስ ጋር በሚኖሩ ሰዎች እና በክትትል ላይይሉ ስለሚከሰተው የነቀርሳ በስታ አጋላጭ ሁኔታዎች፡፡

መግቢያ:- ይህ የመረጃ ወረቀት እና የፈቃድ ቅፅ የተዘረጋዉ **ዓላማ:-** ይህ ጥናት የተዘጋጀው በ 2019 በሀረር ዉስጥ በሚገኙ የመንግስት ሆስፒታሎችውስጥ **ከአችአይቪ ቫይረስ ጋር በሚኖሩ ሰዎች እና በክትትል ላይይሉ ስለሚከሰተው የነቀርሳ በስታ አጋላጭ ሁኔታዎች፡፡**

እርሰዎ ሚነግሩን መረጃ ለዚህ ጥናት ስኬት ብቻ ሳይሆን በተጨማሪም **ከአችአይቪ ቫይረስ ጋር ለሚኖሩ ሰዎች ለነቀርሳ በሽታ መጋለጥ ምክንያት በማወቅ ተገቢውን እንክብካቤእና ትምህርት ለመስጠትየሚያግዙ መረጃዎችን ያስገኛል፡፡**

የአሰራር ስርዓት፡-ከላይ የተጠቀሰውን አላማለማሳካትከአችአይቪ ቫይረስ ጋር ከሚኖሩ ሰዎች እና ከአችአይቪ ቫይረስ እና ነቀርሳ በሽታ ጋር የሚኖሩ ሰዎች ለጥናቱ ጠቃሚ የሆኑ መረጃዎች ይሰበሰባሉ፡፡

ስጋት: ለጥናቱ ውጤት ጥቅም ሲባል በጥናቱ ውስጥ እንደሚሳተፉ ተስፋ እናደርጋለን እና እርግጠኛ ነን በዚህ ጥናት ላይ በመሳተፍ ምንም ስጋት አይነት የለውም፡፡

ጥቅማጥቅሞች:- ለርስዎ ቀጥተኛ ጥቅም ላይኖርዎት ይችላል ነገር ግን የርስዎ ተሳትፎ ለእኛ **ከአችአይቪ ቫይረስ ጋር በሚኖሩ ሰዎች እና በክትትል ላይይሉ ስለሚከሰተው የነቀርሳ በስታ አጋላጭ ሁኔታዎች በማወቅ የሚሰጠዉን ህክምና አግልግሎት ለማሻሻል ይጠቅመናል እና** በዚህ ጥናት በመሳተፈዎ ምንም አይነት ክፍያ አይኖረዉም፡፡

ሚስጢራዊነት:- ሁሉም ከእርስዎ የተገኙ መረጃዎች እና ሌሎች መረጃዎች በጥብቅ ሚስጥራዊ ሆነዉ ይቀመጣሉ ደግሞም ሁሉም የመረጃ መሰብሰቢያ መሣሪያዎች በቁጥር ወይም በሚስጥር ቁጥር ተለይተው ይታወቃሉ፡፡

በፈቃደኝነት ላይ የተመሰረተ ተሳትፎ:- በጥናቱ ውስጥ ለመሳተፍ ፈቃደኛ ያልሆነ ማንኛውም ሰው ያለመሳተፍ መብት ኣለው; እንዲሁም ቅጣት ዎይም ጥቅም ማጣት የለዉም፡፡. እርስዎ ለጥናቱ መረጃ ለመስጠት ፈቃደኛ ከሆኑ "አዎን" ብለው በመናገር ፈቃደኝነትዎን ማሳየት ይችላሉ::

በጥናቱ ለመሳተፍ ፈቃደኛ ትሆናላችሁ? 1. አዎ 2. አይደለም

1. አዎ ከሆነ, ወደ ሚቀጥለው ገጽ ይቀጥሉ 2. አይደለም ከሆነ, አመሰግናለሁ, እና ወደ ሚቀጥለው ተሳታፊ ይለፉ

የመረጃ ሰብሳቢዉ ስም---------- የቃለመጠይቅ ጠያቂዉ ፊርማ ------- ቀን:----------/ወር------/አ.ም------

ስለዚህ ጥናት ጥያቄዎች፣, ቅሬታዎች ወይም ስጋቶች ካሉዎት ዋናዋን ተቆጣጣሪ ሊዲያ ዘሪሁን ማነጋገር ይችላሉ::

የስልክ ቁጥር = 0912767670

የኢሜል አድራሻ: lidyazerihun76@gmail.com

ANNEX VI: Consent Form (Amharic Version)

የስምምነት ቅጽ

አዲስ አበባ ዩኒቨርሲቲ፤ጤና ሳይንስ ኮሌጅ፤ነርሲንግ ትምህርት ክፍል፤ድህረ ምረቃ ፕሮግራም

እኔ ለዚህ ጥናት የስምምነት ፊርማዬን ስሰጥ፤የዚህ ጥናት ዓላማ በደንብ የተብራራልኝ ሲሆን የጥናቱንም ዓላማ ተረድቻለሁ፡፡ በዚሁ ጥናት ላይ መሳተፍ በሙሉ ፈቃደኝነት ላይ የተመሰረተ መሆኑን በሚገባ የተረዳሁ ሲሆን በማንኛውም ጊዜ ከጥናቱ ራሴን የማግለል መብት እንዳለኝ አውቄአለሁ፡፡ ስለሆነም የምሰጠው መረጃ እስከተጠበቀ ድረስ በዚህ ጥናት ለመሳተፍ ተስማምቻለሁ፡፡ በጥናቱ ስሳተፍ በኔ ላይ ምንም አይነት ጉዳት እንደሌለው በግልጽ ተረድቻለሁ፡፡በዚህ ጥናት ለመሳተፍ ስምምነቴን ስገልፅ ለምጠቀው ጥያቄ በእውነት ላይ የመሰረተ መልስ ለመስጠት የተስማማሁ መሆኔን አረጋግጣለሁ፡፡በመብቱ ዙሪያም ሆነ ስለ ጥናቱ መንኛውንም ያልገባኝን ጥያቄ መጠየቅ እንደምችል ተገልጾልኛል፡፡

የመረጃ ሰጪ ፊርማ _____ቀን _____

የተጀመረበት ሰዓት _____ ያለቀበት ሰዓት_____

የጠያቂው ስም _____ፊርማ_____ቀን_____

የተቆጣጣሪ፤ስም_____ፊርማ_____ቀን_____

የመጠይቁ ውጤት

1. **ሙሉ በሙሉ የተሞላ**

2. **ያልተስማሙ**

3. **በከፊል የተሞላ**

Annex VII: Questionnaire (Amharic Version)

አዲስ አበባ ዩኒቨርሲቲ፤ጤና ሳይንስ ኮሌጅ፤ነርሲንግ ትምህርት ክፍል፤ድህረ ምረቃ ፕሮግራም

መጠይቅ(ከእንግሊዘኛየተተረጎመ)

ይህመጠይቁግለሰብይህ የመረጃ ወረቀት እና የፈቃድ ቅፅ የተዘረጋዉ ዓላማ:- ይህ ጥናት የተዘጋጀው በ 2019 አዲስ አባባ ዉስጥ በሚገኙ የመንግስት ሆስፒታሎችውስጥ ከአችአይቪ ቫይረስ ጋር በሚኖሩ ሰዎች እና በክትትል ላይይሉ ስለሚከሰተው የነቀርሳ በስታ አጋላጭ ሁኔታዎችለማጥናትየተዘጋጀቅፅነዉ።።

ለመረጃሰብሳቢዎችመመሪያ፡በጥያቄዎቹፊትለፊትበተዘጋጀዉሳጥንየ"√ "ምልክት ያድርጉ።።
ክፍልአንድ፡ ከአካል ጋር የተገናኙ አጋላጭ ሁኔታዎች

ተ.ቁ	ጥያቄ	መልስ
01	እድሜዎ ስንት ነዉ?	……..አመት
02	ፆታ?	1. ወንድ 2.ሴት
03	የመተንፈሻአካል በሽታ ታሪክአለዎት?	1. አዎ 2. የለም
O4	የስኳርበሽታሪክአለዎት?	1. አዎ 2. የለም
05	ሲጋራያጨሳሉ?	1. አዎ 2. የለም
06	አልኮልይጠጣሉ?	1. አዎ 2. የለም

ክፍል 2፡ ከአካባቢ ጋር የተገናኙ አጋላጭ ሁኔታዎች

ተ.ቁ	ጥያቄ	መልስ
11	የቤትዎክፍል ምንያህልቁጥርአላቸው ?	……..
12	በቤቱውስጥየሚኖሩምንያህልቤተሰቦችአሉ ?	……
13	የቆሻሻማስወገጃስፍራአለዎት ?	1. አዎ 2. የለም
14	አዎካሉየት?	……
15	የቤትዎ ግድግዳእናወለልከምን የተሠራ ነው?	……
16	ወጥቤትዎከዋናውቤትይለያል?	1. አዎ 2. የለም
17	በቤተሰብውስጥየታወቀየቲቢህመምተኛአለን?	1. አዎ 2. የለም

ክፍል 3፡ ከማህበራዊ እና ኦኮኖሚ ጋር የተገናኙ አጋላጭ ሁኔታዎች

ተ.ቁ	ጥያቄ	መልስ
21	የራስህቤትአለህ?	1. አዎ 2. የለም
22	የጋብቻሁኔታዎምንድነው?	1,ያገባ 2.ነጠላ 3. የሞተበት/ባት 4. የተፋታ/ታች 5. ተለያይተዉየሚኖሩ
23	የትምህርትደረጃዎምንድነው?	1. ማንበብ እና መጻፍ እማይችል 2. የመጀመሪያ ደረጃ (1-8) 3. የሁለተኛ ደረጃ (9-12) 4. ኮሌጅ እና ከዚያ በላይ
24	ሥራዎምንድንነው ?	1. የቤት አመበቤት 2. ነጋዴ 3. የመንግስት ሰራተኛ 4. የግል ሰራተኛ 5. የቀንሰራተነኛ 6. ሌላ ግለጹ ----------
25	የወርገቢዎምንያህልነው ?	……በኢትዮጵያብር

ክፍል 4-ከካርድ የሚወሰድ ከአካል ጠንካት ጋር የተያያዘ መረጃ

ተ.ቁ		ውጤት
31	ሄሞግሎቢን (g /dl)	……መሰረታዊ
32	የሲ.ዲ 4 የሊምፍቆብቆጠራ	……መሰረታዊ
33	የዓለምየጤናድርጅት ክልኒካል ደረጃ	……መሰረታዊ
34	ክብደት እናቁመት	……,በኪሎ ግራም ……ማትር
35	የመከላከያህክምናወስደው ካወኩ	1. አዎ 2. የለም
36	በመርገጫዎችመበከል ካለ	1. አዎ 2. የለም
37	ተያያዝ በሽታዎች ካሉ	……..

ስለተሳትፎዎ እናመሰግለናለን