ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

Assessment of the Role of Patient's Knowledge about Tuberculosis on Treatment Adherence in Public Health Facilities in Yeka Sub City, Addis Ababa

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April 2020 Addis Ababa, Ethiopia

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Research Thesis Submitted To Addis Ababa University, College Of Health Science, School Of Public Health, As a Partial Fulfillment ofthe Requirements forthe Degree of Master of Public Health

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April 2020 Addis Ababa, Ethiopia

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DECLARATION

I, Bikile Gedefa declare that this thesis is my original work in partial fulfillment for the requirement forthe Degree of Master of Public Health. All sources of material used for this thesis work and all people and institution who gave support during this thesis work are fullyacknowledged.

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ABBREVIATION AND ACRONYM

AFB	Acid Fast Bacilli
ART	Anti-Retroviral Therapy
CFR	Case Fatality Rate
CI	Confidence Interval
DOTS	Directly Observed Treatment Short Course
DST	Drug Sensitive Test
GHC	Global Health Committee
HBC	High Burden Country
HIV	Human Immunodeficiency Virus
LTBI	Latent TB Infection
MDG	Millennium Development Goals
MDR -TB	Multidrug-Resistant Tuberculosis
MMAS	Morisky Medication Adherence Scale
NSL	Nifas Silk Lafto
PHC	Primary Health Care
SDG	Sustainable development Goals
TB	Tuberculosis
TB (RR-TB)	Rifampicin Resistant Tuberculosis
TSR	Treatment Success Rate
US	United State
WHO	World Health Organization
XDR - TB	Extensive-Drug Resistance Tuberculosis

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ABSTRACT

Background

Tuberculosis is among major public health problems throughout the world and leading cause of death among curable infectious disease. The World Health Organization lists Ethiopia as one ofthe 30 high burden tuberculosis, tuberculosis/HIV and multidrug resistant tuberculosis countries in 2018. Strengthening tuberculosis patient's knowledge about tuberculosis and treatment are believed to improve tuberculosis treatment adherence. Studies on the role of patient's knowledge on tuberculosis treatment adherence are limited.

Objective: The objective of this study was to assess the role of patient's knowledge about tuberculosis on treatment adherence in public health facilities in Yeka Sub city, Addis Ababa, 2019

Methods: A facility based cross sectional study was conducted in Yeka sub city, Addis Ababa. Data were collected from sample of 256 patients receiving tuberculosis treatment. Mean score described knowledge about tuberculosis as good or poor when above and below the mean respectively, while adherence to tuberculosis treatment was measured using MoriskyMedication Adherence Scale (MMAS) with eight item scoredata were analyzed using SPSS version 20 for window.

Results: The result showed that 36.7% (95%CI: 30.9-42.6) of tuberculosis patients havegood knowledge about tuberculosis,while 28.9% (95%CI: 23.8-34.8) have good knowledge about tuberculosis treatment. Tuberculosistreatment adherence level was79.3 % (95%CI: 74.2-84). Patients who have good knowledge about tuberculosis disease were 2.7 times (AOR =2.7, 95% CI: 1.04-7.3) more likely to adhere to tuberculosis treatment compared to those with poor knowledge. Study participants who have good knowledge about tuberculosis treatment were no significant difference compared to those who have poor knowledge (AOR= 0.6, 95%CI: 0.20-1.78).

Conclusion and recommendation: The level tuberculosis treatment adherence observed in this study is comparable with a previous study conducted in Addis Ababa. The study showed that respondents who had good knowledge about tuberculosisare more likely to adhere to tuberculosis treatment. Thus, implementation of comprehensive interventions, focusing on knowledge of tuberculosis patients about tuberculosis disease and transmission of tuberculosis, is important to enhance tuberculosis treatment adherence.

Keywords: Tuberculosis; knowledge;adherence; Addis Ababa; Ethiopia

1. INTRODUCTION

1.1. Back Ground

Tuberculosis (TB) is among major public health problems throughout the world and leading cause of death among curable infectious diseases(1).According to global tuberculosis report 2018, tuberculosis caused an estimated 1.3 million deaths (range 1.2-1.4million) among HIV negative people and additional 300,000 deaths from TB among HIV positive people.An estimated 10.0million people, equivalent to 140 cases per 100 000 population developed tuberculosis during the same period. There were cases in all countries and age groups, but overall 90% were adults, (aged ≥15 years), 64% wereMale, 9% were people living with HIV(72% in Africa) (2).

Globally, the proportion of people who developed TB and die fromthe disease was 16% in 2016, this needs to fall to 10% by 2020, to reach the first milestones of the end TB strategy(2). The average rate of decline in the TB incidence rate was 1.4% per year in 2000 to 2016, and 1.9% between 2015 and 2016, this also needs to accelerate to 4-5% per year by 2020 to achieve the milestones for reductions in cases and death set in End TB strategy(3).

Ethiopia has achieved the 50% reduction of most of the Millennium Development Goals (MDG) targets related to TB(4). However, the declines of TB incidence and prevalence rates have been comparably slow. The 2018 Global TB report of the World Health Organization lists Ethiopia as one of the 30 high burden TB,TB/HIV and MDR-TB countries with an estimated incidence of 164/100 000 population TB(5). The rate of MDR TB was estimated to be 2.3 % of new TB cases and 17.6% of previously treated TB cases(6). Despite a remarkable progress, Ethiopia has to overcome several challenges to achieve the end TB targets of reducing TB mortality by 90% and TB incidence by 80% by 2030(7).

Tuberculosis isacurable disease if treatment is received quicklyand appropriately. Thus,rapid and accurate diagnosis and the use of effective TB treatments are priority tools not only for minimizing morbidity and mortality , but also for reducing the spread of TB among the population(8).TB patients who are not cured pose a serious risk for both individuals and community causing challenge to effective TB control(9).

Treatment non-adherence has several socioeconomic impacts. For example, it can increase duration of treatment (10) and hospital bed occupancy rate , economic depletion , dependency and induction of mental illness(11). It is a complex phenomenon that is influenced by a wide range of interacting factors(12). In previous studies, patients related factors, including feeling better, forgetfulness, lack of knowledge on the benefits of completing a treatment course, running out of drugs at home, distance to the health facility, HIV seropositivity, alcohol abuse, use of herbal medication, stigma and male gender were significantly associated with nonadherence to TB treatment(10, 11).

In Ethiopia patient counseling and education is not wellorganized in TB care adversely affecting the quality of care and desired treatment outcomes(13). A study conducted among community members in Northwestern Ethiopia indicates that knowledge of tuberculosis was low. Study conducted elsewhere in Ethiopia gave an idea about misconception on cause, mode of transmission and prevention of tuberculosis. The knowledge of patients were found to be influenced by the level of education , area of residence and having education at health Institutions(14, 15).

Study conducted among tuberculosis patients in Southern Ethiopia has shown that non adherence was found among patients who equated disappearance of symptoms of tuberculosis with cure (16). Lack of family support was also reported as a reason for non-adherence in study conducted in tertiary teaching hospital, South West Ethiopia(17). Lack of awareness about importance of treatment completion was another identified reason for non-adherence(18).

There is a need for ongoing psychological support from the clinician and close relative in order for the patient on tuberculosis treatment to adhere to the treatment(19). Patient who fully understand their disease and its treatment are more likely to complete their treatment, therefore health workers are required to discuss with the patient the diagnosis and treatment prior to starting tuberculosis treatment(20).

The prevention of transmission of tuberculosis primarily benefit from patient adherence to the prescribed tuberculosis regimens. Importantly, treatment adherence has been identified as a major driver of the overall cost effectiveness of a tuberculosis program (21).Current WHO reports show that considerable tuberculosis patients failed after several treatments. Many relapsed after completion of treatment and many developed MDR-TB(22). A recent clinical trial showed that, tuberculosis patients taking HRZE with $<90\%$ adherence had 5.6 times increased risk of tuberculosis recurrence(19). As treatment, supervision alone is not likely to be sufficient to ensure good tuberculosis treatment out comes, additional treatment adherence intervention need to be provided.

1.2. Statement of the problem

Tuberculosis has created huge challenges to health and development worldwide. According to global tuberculosis report 2018, tuberculosis caused an estimated 1.3 million deaths (range 1.2-1.4million) among HIV negative people and additional 300,000 deaths from TB among HIV positive people(23).

Sub Saharan countries shared the greatest burden of the disease(24). Although tuberculosis treatment has,decreased tuberculosis related mortality and morbidity, a number of patients still die after the start of tuberculosis and others fail to be cured by first line drugs resulting in drug resistant tuberculosis. Study conducted in referral hospitals of Addis Ababa showed that there has been increasing trend of multidrug resistant cases in recent years (25).

Non-adherence toTB treatment is the persistent problem throughout the world, including the developing and developed countries. In developing countries it is as high as up to 60%(17).Studies showed in Ethiopia non adherence up to 26%(26) and in Addis Ababa 19.5% of patients on tuberculosis treatment fail to adhere to their treatment(11).Major reasons identified for tuberculosis non adherence in different studies conducted in Ethiopia were,forget fullness ,distance from health facilities, lack of money ,alcohol intake, feeling better and lack of knowledge(11, 22, 26-28).Studies conducted in different parts of Ethiopia also showed that there was poor knowledge of patients about tuberculosis(29, 30). Improved knowledge is believed to play a great role in tuberculosis treatment adherence and good adherence contribute to cure for tuberculosis , improve quality of life for the tuberculosis patients and prevent the development of drug resistant tuberculosis(31).

Although, previous studies identified different factors affecting treatment adherence,the role of patient's knowledge about TB and tuberculosis treatment on treatment adherence remained unexamined.

Therefore, this assessment is designed to fill the gap by identifying the role of different aspects of patients' knowledge about TB and tuberculosis treatment on treatment adherence.Hence, identifying key factors influencing patients' adherence helps the efficacy of tuberculosis control program.

Unless we give attention to patient knowledge about their disease(TB) and tuberculosis treatment the prevention activities alone might not bring the intended outcome of the program, that the government of Ethiopia is planning to achieve the end TB targets of reducing TB mortality by 90% and TB incidence by 80% by 2030(4).

1.3 Significance of the study

The reason for importance of such study is to improve the overall achievement of tuberculosis control program, which have been running by different heath facilities in the country by giving scientific evidence on role of knowledge about tuberculosison treatment adherence.

Once findings identified, then targeted strategies to address them will be formulated to improve quality of care for TB patient. Study also seek to contribute to policy makers' ideas when formulating laws guiding TB treatment and also recommendations to implementers for enhancing TB prevention and control strategies and suggest further studies in identified gaps. The action will improve patient's treatment adherence and decrease development of drug resistant TB.

2. LITERATURE REVIEW

2.1.Burden of Tuberculosis

Tuberculosis is the ninth leading cause of death worldwide and the leading cause from single infectious agent, ranking above HIV/AIDS(32). In 2016, there were an estimated 1.3 million TB deaths among HIV negative and additional 374,000 deaths among HIV positive people(23).

Among high burden countries, six countries accounted for 60% of the new cases: India, Indonesia, China, Nigeria, Pakistan and South Africa(23). While Ethiopia is 10^{th} among 22 High HBC (high burden countries) of TB with 200,000 new TB cases WHO 2014 (4). In 2016/17, 116,105 all forms TB cases were reported nationally making a TB case notification rate of 123 per 100,000 populations. Out of notified all forms of TB cases, 40% of the cases were bacteriological confirmed new andrelapse, new clinically diagnosed were 29 %, and 31% were extra pulmonary new TB cases. Previously treated TB cases account for 4.2% of the total TB cases detected (3).While, 11,823 cases TB were detected in Addis Ababa in 2016 according to report from the Addis Ababa health bureau(33).

2.2.Knowledge of patients about tuberculosis and its treatment

Knowledge isdefined as, human beings' understanding about reality through mental correspondence, personal experience and emotional affection with outside objects and situations. It make up one key factor integral to change a person's behavior increasing understanding the truth and has been associated with healthy behaviors and more favorable out comes for patient(9) .

Knowledge about tuberculosis refers to, the basic and correct understanding of the disease, including the cause of the disease, signs and symptoms of disease, mode of transmission and preventive methods. Knowledge of the infectiousness of TB is the basis for individuals taking protective measures to avoid becoming infected, or transmitting it to others for those with active disease(34).

Knowledge about tuberculosis treatment is having clear information and understanding about the right medications, duration, and side effect of the medications. It also includes, knowing advantages of regularly taking and completing the full course of treatment(19).

Study conducted in the US, among US born blacks showed that 80% of the respondents had good knowledge about tuberculosis, high knowledge was associated with ,younger age , completion of high schools, recall that a provider discussed about what TB medicines (34).

A cross sectional study conducted in Nigeria showed that proportion of individual who heard of TB was 74.7%(35). The proportion of individuals who reported that TB was curable was 76.9%. About 63.1% thought that TB could be spread through the air when coughing or sneezing; 36.5% of individuals reported that TBcould be spread through sharing utensils; The proportions of individuals who thought TB could be spread through food, sexual contact, and mosquito bites were 11%, 5.0%, and 0.8% respectively(35).

Study conducted in India, to assess the positive impact of knowledge about tuberculosis and its treatment on treatment adherence revealed, majority of study participants (62.2%) did not know the cause of their disease(36). Patients having good knowledge about the infectiousnessof TB were 1.76 times more treatment adherent. Similarly, good knowledge about spread of TB, curability, importance of regular treatment and treatment duration were significantly associated with adherence. Good knowledge about TB in this study was associated to education and socio economic status(36).

Study in Zambia to describe knowledge, attitude and compliance with tuberculosis treatment, showed that half of the respondents (49%) had average knowledge of TB treatment(37). Majority of respondents (89%) had positive attitude towards TB treatment(37).

Study conducted in Nepal showed, majority of the respondents knew that tuberculosis is a curable disease(38). Tuberculosis patientswere found to be conscious about duration of treatment. Regarding Knowledge for consequences of incomplete treatment, 25% of respondents answered disease may attack again and only 7.3% of the patients were aware that incomplete treatment will develop drug resistant tuberculosis(38).

Study in South Africa identified at least two thirds of the sample achieved a mean composite TB knowledge score(39). It also highlight the fact that better socio-economic status, higher levels of education and income, gender (being male),employment,learning about TB through media are associated with better TB knowledge(39).

Study in Pakistan has also highlighted serious deficiencies in the knowledge of TB patients about their disease(40). Study also showed misconceptions regarding TB were widespread in country due to lack of knowledge and diagnosis of TB was kept hidden from family and friends(40).

A cross sectional study conducted among patients with tuberculosis in Northwestern Ethiopia, to assess the knowledge of tuberculosis patients attending tuberculosis treatment, this study indicated a knowledge gap about tuberculosis(30). Only 14.7% of patients had overall correct knowledge about Tuberculosis. Among the study subjects do not knew specifically about their diagnosis 91% were age below 45 years, 56.8% were males(30).

Another cross sectional study conducted in Shashemene to assess community knowledge about tuberculosis and its treatment showed that, there was higher proportion of overall knowledge about tuberculosis (58.8%)(15). Lower tuberculosis knowledge wasseen among uneducated participants. Knowledge regarding the treatment of disease with modern medicine was also higher. The causative agent of tuberculosis was little known (90.2% did not know the causative agent), the curability tuberculosis was well known(98.98%)(15).

A study done in Holeta town revealed respondent's fundamental knowledge about general signs and symptoms of tuberculosis and its treatment(41). About 34.0% of the study participants know tuberculosis causative agent is bacteria, poor knowledge about TB transmission was reported in this study (21.8%).Majority of the study participants disagree that TB is ordered by god punishment,while sixteen agree(41).

Study conducted in Eastern Amhara also showed that there were deficient or unaware of difference in symptoms of tuberculosis among respondents(29). Majority of respondents defined as tuberculosis was curable disease, and at the same time majorityof respondents worried,feared and stigmatized if they had TB (29).

Study conducted on knowledge and practice of TB patients on TB and its Treatment in Alamata district ,Tigray region, Northeast Ethiopia identified the overall knowledge of study participants was about TB was 36.5%(1). When participants were interviewed about the consequence of stopping anti-TB drugs, 36.5% were able to answer at least two consequences(1).

2.3.Tuberculosis treatment adherence

Adherence to treatment involves taking medication properly,making and keeping health care appointments,or self-managing other behaviors that influence the onset, course or prognosis of an illnesses; and success is determined by adherence behavior(9) .

A study conducted in Moroccan Region, to assess impact of knowledge and Attitude on treatment adherence showed that the main reason for not completing treatment was the impression of being better (20).In study, there were no significant differences of knowledge of symptom of TB among adherent and non-adherent. However, a significant difference revealed on knowledge about contagious and transmission among adherent and non-adherent. Adherent patients were more informed by health care workers about their disease (20).

A study conducted in China on non-adherence to anti-tuberculosis treatment among internal migrants with pulmonary tuberculosis in Shenzhen showed that 34.7% of the patents did not adhere to the treatment and lack of knowledge about the treatment and long travel time to health facilities were most significant factors associated with high rate of treatment non adherence(42).

A study conducted in Kenya to assess patient factors influencing adherence to anti-tuberculosis medication in Ngoro sub county hospital, showed that Majority of clients (50%) misses at least two visits before coming back for treatment(10).poor relation with health provider, drug side effect ,level of information, alcohol intake were factor affecting the patient adherence to TB treatment (10).

Study conducted in Indonesia, to assess relationship of attitude and perception with adherence treatment in tuberculosis patients found that 55%of patient's adherent to treatment(43). Patient with positive attitude had 3.7 times as much adherent to TB treatment. The study also revealed no correlation between socio demographic and TB treatment adherence(43).

Another study conducted in Argentina to identify the socio-demographic characteristics of patients and the treatment characteristics that influence non-adherence to anti-tuberculosis treatment showed that patients at risk of non-adherence to anti tuberculosis treatment were, those living in poverty and facing barriers to health care access.(21).

Study conducted on adherence to medications amongst tuberculosis patients in a tertiary health institution in South East Nigeria, showed that 7.2% had never failed to take their anti-TB drugs while 25.8% agreed that they had failed to take their drugs(31). The major reasons for failure to take drugs were no money for transport to collect new drugs and forgetfulness of the respondents. The factors which influenced drug adherence were educational qualification, average monthly income, and receiving HIV drugs(31) .

A study conducted in Tigray, Northern Ethiopia to assess adherence to anti-tuberculosis treatment in health facilities providing anti tuberculosis treatment revealed that, 91.6% of TB patients were adherent to anti-tuberculosis treatment(27). Patients were less adherent during the intensive phase (89.1%) than during the continuation phase 93%. Good knowledge about TB prevention were the only variables that were independently associated with being adherent(27).

A study conducted to assess anti-TB drug non adherence and associated factors among TB Patients attending TB clinics in Arba Minch Governmental Health Institutions, Southern Ethiopia showed that the overall calculated non adherence was 67 (24.7%)(22). Reasons for non-adherence of anti-TB drugs is the waiting time at the health facility distance to the health facility and anti TB drug side effect(22).

A study conducted in Sidama zone, to assess patient satisfaction on tuberculosis serviceand adherence to the treatment identified that, 26% of respondents had poor adherence to their TB treatment(26).Most common reasons for treatment non adherence were; absence of drug, distant from health facilities , pill burden, fear of drug interaction, (depression, want to avoid drug side effect ,busy work (26).

Cross sectional study done in North East Ethiopia to assess adherence to anti-tuberculosis treatment and treatment outcomes among tuberculosis patients in Alamata district, showed, the overall adherence rate to anti-TB treatment was 88.5%. The main reasons for the non-adherent patients were forgetting to take medication, being away from home, drug side effects, being unable to go to the health facilities on the date of appointment and being hospitalized. Proportion of non-adherence was high among alcohol users and smokers. The default rate was 1.8%(13).

Study conducted to assess the prevalence and factors associated with anti-tuberculosis treatment non-adherence, in public health care facilities in South Ethiopia identified, prevalence of anti TB treatment non adherence was 24.5% and poor knowledge about their disease and its treatment , exposure to health information at every visit ,distance from health facilities were factors identified for poor adherence (26).

Study conducted in Addis Ababa to assess the effect of psychosocial factors and Patients' Perception of tuberculosis treatment non-adherence showed that, 19.5 % failed to adhere, while 80.5% of respondents adhere to tuberculosis treatment ART status, economic status, alcohol use, perceived barrier and psychological distress are associated with non adherence(11).

Summary of the literature:

According to my review from different literatures conducted on tuberculosis patient's knowledge and adherence related issues, the overall correct knowledge about TB was poor except in few areas. Majority of the study participants did not know about their disease. Factors identified for poor knowledge according to the literatures were; education, socio economic status, age, having health education at each visit, history of known cure, spouse and religion. Adherences to TB treatment were also poor in different areas. Distance from health facilities, filling better, pill burden, drug side effect, low socio economic, education, busy work, unemployed, alcohol intake and elderly men were among mostly identifiedfactors for non-treatmentadherence. While, few studies identified knowledge as a factor for non-adherence.

3. Conceptual framework

This conceptual framework wasdeveloped based on the existing literature review on patients, knowledge about tuberculosis, and treatment adherence. The framework was used to develop study tools .The outcome is tuberculosis treatment adherence, while the exposure variable is knowledge about tuberculosis and its treatment given the presence of other exposure factors.

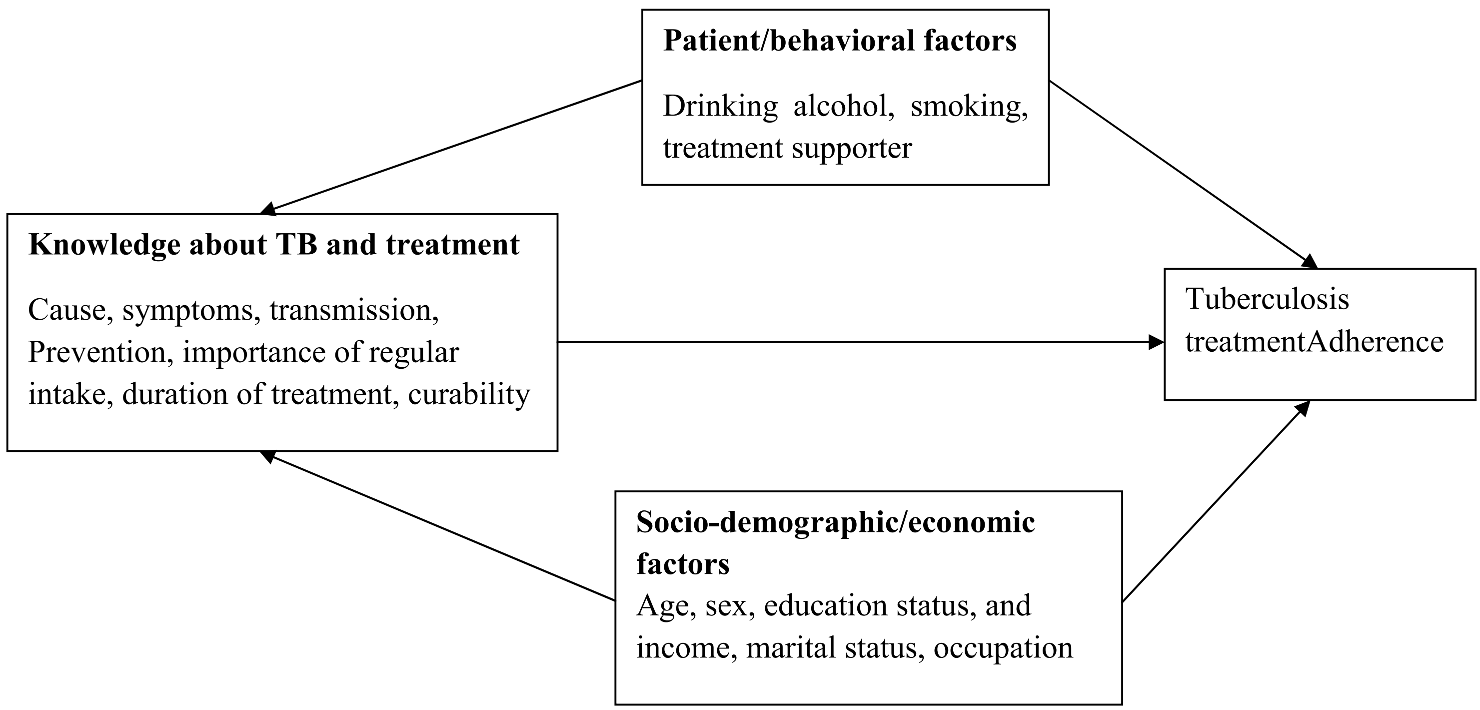

FIGURE 1 CONCEPTUAL FRAMEWORK DEVELOPED BASED ON LITERATURE REVIEW

4 OBJECTIVE

4.1.General Objective

To assess the role of patient's knowledge about tuberculosis ontreatment adherenceamong TB patients inpublic health facilities of, Yeka Sub city, from April to May 2019

4.2.Specific Objective

- To assess patient's knowledge about tuberculosis among TB patients in Yeka Sub city public health facilities
- To assess patient's adherence among TB patients in Yeka Sub city public health facilities
- To assess association of patients knowledge about tuberculosis with treatment adherence among TB patients in Yeka Sub city public health facilities

5 METHODS

Study area

The study was conducted in Addis Ababa, the capital city of Ethiopia. In Addis Ababa, there are ten sub cities and 117 woreda's containing eight governmental hospitals and 100 publichealth centers. The city has high population density and total population of approximately 3,515,678, and the Yeka Sub city is populated with 454,850 with 15 public health centers and two governmental hospitals almost all are providing tuberculosis treatment services. There were 983, tuberculosis cases registered during July 2017 to June 2018.

5.1.Study design

A facility based cross sectional study design was employed.

5.2.Source of population

All tuberculosis patients on tuberculosis treatment in Public health facilities in Yeka sub city, Addis Ababa

5.3.Study Population

Sampleof adult tuberculosis patient who are on ant tuberculosis treatment in TB clinic of public health facilities in Yeka sub city and are on treatment for at least two weeks during studyperiod.

5.4.Inclusion criteria

Tuberculosis patients above or equal to 18 years of age regardless of the site of infection, tuberculosis smear positivity or HIV status and have taken tuberculosis medication at least for two weeks.

5.5.Exclusion criteria

Severely ill patients, mentally unstable and those unable to communicate were excluded

5.6.Sample size

The required sample size was determined using a single population proportion formula, by considering the following assumptions:-Prevalence of treatment adherence is equal to 80.5% (11) and knowledge of tuberculosis 15% (30).Assuming 5% marginal error (d), 95% confidence level (alpha = 0.05). Using the above-mentioned criteria calculated sample size for knowledge was 196 and for adherence 241, for this study the one with greater sample size were selected.

$$N = \frac{\left(\frac{Z\alpha}{2}\right)^2 P(1-P)}{d^2}$$

$$N = \frac{(1.96)2(0.805)(1-0.805)}{(0.05)2} = 241$$

Where:

Z = 1.96 with 95% of confidence interval

P = prevalence of tuberculosis treatment adherence (80.5%)

d = margin of sampling error tolerated (0.05)

n = the required sample size

By adding 10%, non-response rate the total sample size required for the study was 265

5.7.Sampling procedure

All sub cities in Addis Ababa were listed and Yeka sub city was selected among the ten sub cities found in Addis Ababa since it is the only sub city having 15 health centers. Tuberculosis patients weresampled from the15 health centers and one public hospital providing TB treatment services in the sub city. The numbers of patients studied from each health facility wereallocated proportionate to patient load in the selected facilities at the beginning of the study. Random sampling was used to select study participants.

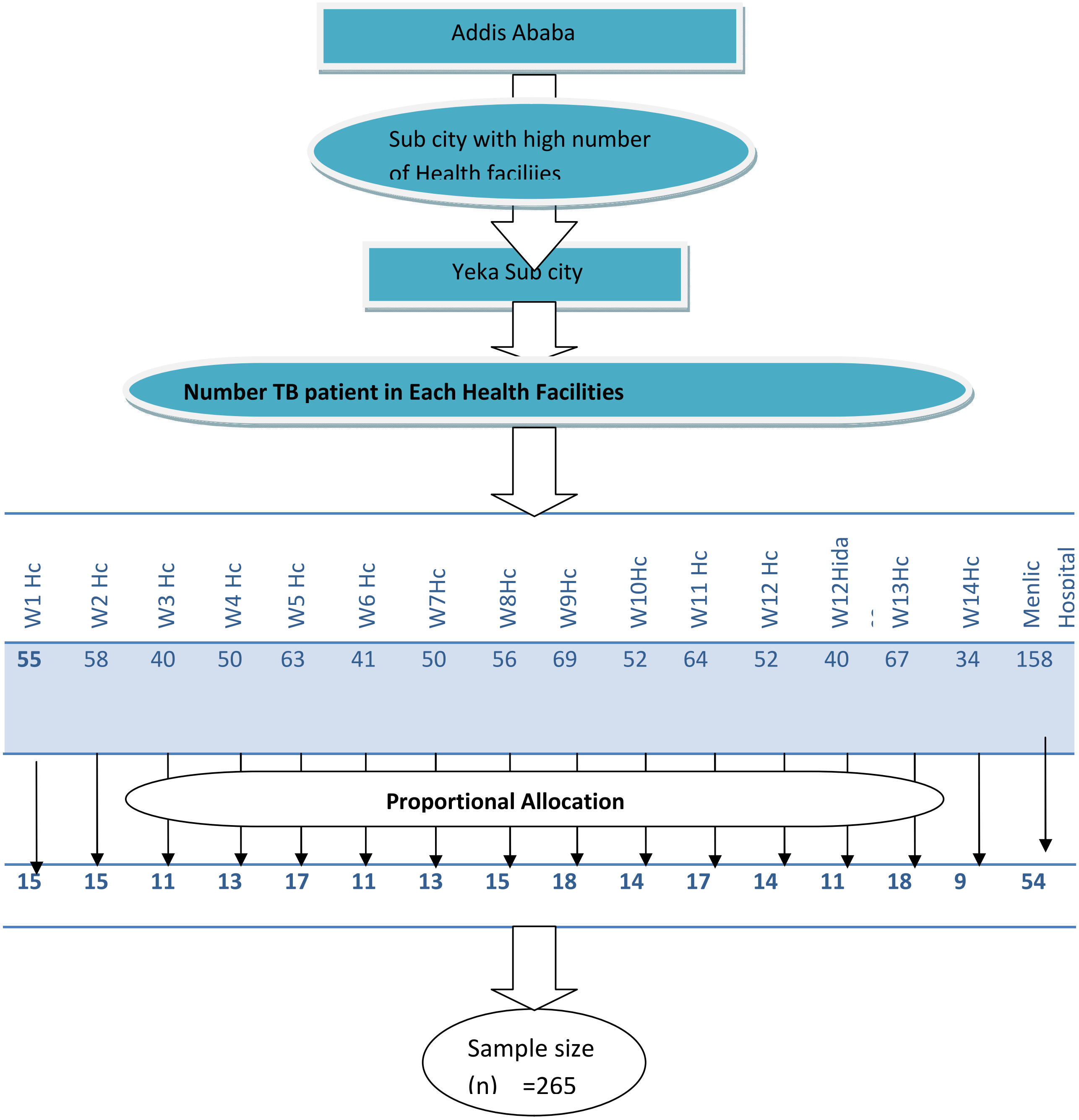

FIGURE: 2 SCHEMATIC PROCEDURE OF SAMPLING TECHNIQUES AMONG TB PATIENTS IN YEKA SUB CITY, ADDIS ABABA, ETHIOPIA, 2019.

5.8. Data collection tool and procedure

The data collection tool was prepared in English after reviewing related literatures and then translated to Amharic language, which was pre-tested with TB patients in one public health center, outside of the study site. The questionnaire contained information on demographic data, knowledge about TB and its treatment, behavioral risk factors for smoking and alcohol and Adherence measurement scores.Exit interview technique was used to collect data by three enumerators, two nurses and one supervisor trained by the investigator. The trainingincluded technique of interviewing and terminologies. Data werecollected at the facilities every day until the allocated number for each institution was attained.

5.9.Variables

5.9.1. Dependent Variable

Tuberculosis treatment adherence

5.9.2. Independent Variable

1. Knowledge about tuberculosis disease
   - Cause of tuberculosis
   - Transmission of tuberculosis
   - Symptom of tuberculosis
   - Prevention of tuberculosis

2. Knowledge about tuberculosis treatment
   - Curability of tuberculosis
   - Duration of tuberculosis treatment
   - Importance of regular tuberculosis treatment for cure

5.9.3. Other exposure factors

1. Socio demographic status (Age, sex, educational status, marital status)
2. Socio economic status (monthlyincome, occupation)
3. Patient /behavioral risk factors (smoking, alcohol drinking)
4. Treatment supporter

5.10. Operational Definition

Knowledge about tuberculosis disease: - knowledge is information that an individual is aware of it. In the context of this study, knowledge was measured based on the ability of patients tocorrectly identify and respond to cause, mode of transmission, symptoms and possible ways of prevention of tuberculosis. The composite score was divided into two using mean obtained from data.Individuals who have scored above the mean were categorized as having good knowledge and those who scored equal to or below the mean were classified as having poor level of knowledge(15).

Knowledge about tuberculosis treatment: -is knowing reasons for treatment, duration of treatment,curability and side effect of tuberculosis treatment.The composite score was divided into two using mean obtained from data.Individuals who have scored above the mean were categorized as having good knowledge and those who scored equal to or below the mean were classified as having poor level of knowledge(15).

Adherence –Adherence to treatment is extent to which a person's behavior agreed with recommendations from a health care provider in respect to taking medicines. In this study, adherence to medication was measured by validated instrument developed by Morisky Medication Adherence Scale (MMAS) an eight (8) item score with original binary response option (yes and no). Respondents were categorized as adherent with a score of greater than or equal to six and non-adherent with a score of less than six.(22, 44).

Treatment Supporter –are individuals who support patient to take his/her medicines.The main role of treatment supporter is to make sure that the patient takes the TB drugs regularly, on schedule, for the full duration of the treatment. In this study treatment supporter is patient's family or relatives who can take the responsibility to remind the patient to take his /her medicines, encourage patients to continuecoming for TB treatment and not to miss their schedule.If unable to find the patient or convince the patient to continue the treatment, contact the health facility for help without delay(45).

5.11. Data quality Assurance

The questioner was prepared in English, translated in to Amharic, and translates back to English to keepconsistency of the question and increase understandingwith the respondents. The sample of questioner was pre-tested on 5% of tuberculosispatients out of the study area(in NSL woreda06HC in 13 tuberculosis patients). The pre-test was done to ensure clarity, wording and logical sequence and skip pattern of the questioner.Training was given to data collectorsand supervisor on objective of the study, technique and procedures followed during interview.

5.12. Data Processing and Analysis

The collected data werecoded, cleaned, entered and validated using Epi data version 4.1 and exported to SPSS version 20 for data analysis. Descriptive statistics with mean, frequency and percentage were used to describe and summarize quantitative data. The outcome variables were categorized as adherent and non-adherent. Treatment adherence was measured using a Morisky Medication Adherence Scale-8 (MMAS-8) that consisted of eight items with a scoring scheme of “yes” =0 and “No” =1 for the first seven items and for the last item a five point Likert scale of “Never”, “Once in a while”, “Sometimes”, “Usually” and “Always.” In this Likert scale, values ranging from 0 to 1 were given at a specified interval of 0.25 with “0” were given for “Never” and “1” were given for “Always.”The level of adherence was determined according to the score resulting from the sum of all the correct answers with a maximum score of eight. For the purpose of data analysis, the original three categories of adherence were re- categorized in to two. Accordingly, high and medium adherence were re-assigned as adherent with a score of greater than or equal to six and low adherence was regarded as non-adherent with a score of less than six.

Knowledge of patients weremeasured by mean score. Each correct answers have one point and incorrect and do not know responses have zero point and scored by mean cut off points.The composite score was divided into two using mean obtained from data. Individuals who have scored above the mean were categorized as having good knowledge and those scored equal or below the mean were classified as having poor level of knowledge.

Bivariate analyses were performed to compare adherence witheach independent variable. Crude odds ratio was calculated to evaluate the association between a single independent variable and the dependent variable. Association detected at p value less than 0.25at bivariate analysis were included in multiple logistic regressions to control confounders and then Adjusted odd ratio was used to determine the strength of association at 95% CI was used to decide the presence of statically significant association between the explanatory variable and outcome variables.

5.13. Ethical Consideration

The study received ethical approval from Addis Ababa School of Public Health Research Ethical Committee.Permission was obtained from responsible persons of selected health facilities.The study participants were explained about the objective of the study. It was explained that participating the study was voluntary and they had the right to refuse to participate and that was not affectedany way. It was also made clear that they had right to withdraw from the study at any stage of participation. It was made known to them that there were no direct benefits or risks in participating. Assurance of confidentiality of the information was given and explained that the information was to be used for the intended purpose only. Again, participants were made aware that they were not be identified by name in any dissemination reports or publications resulting from this study.Finally, it was made clear that this research was entirely for academic purposes.

Dissemination of the result

This thesis findingwill be submitted to the College of Health Sciences at Addis Ababa University. Then, the copies of the report finding will bedisseminated to Addis Ababa City Administration Health Bureau, Addis Ababa public health research and emergency management core process,and Yeka Sub-city Health Bureau. It will also be shared with non-government organization and other interested body and soft copies of the research report submit to the University library.

6. Results

Socio demographic characteristics of TB patients

From 265 study participants,256 of them were involved in the study this would make the response rate of 96.6%.Of those 157(61.3%) were male(Table 1). The mean age of study participants was 37 years and eighty-nine (34.8%)were in the age range between 35-44 years. 34% of study participants attended primary school, while 23.4% did not attended formal school. Forty-two (16.4%) of study participants were housewife(Table 1). Seventy-seven (30.1%) of the participants were daily labors. Of study participants 85(33.5%) were never married. One hundred thirty-three (52%) participants had treatment supporters (Table 1). Mean monthly income of participants was 1,445.00 Ethiopian Birr. Two hundred twenty-seven (88.7%) participants had never smoked and 216(84.4%) never drank alcohol before.

TABLE1. SOCIO-DEMOGRAPHIC AND BEHAVIORAL CHARACTERISTICS OF TB PATIENTS IN YEKA SUB CITY, ETHIOPIA, 2019

Variables		Frequency	Percent
Age of respondents (years)	18 -24	30	11.7
	25-34	80	31.2
	35-44	89	34.8
	45-54	36	14.1
	≥ 55	21	8.2
Sex of respondents	Male	157	61.3
	Female	99	38.7
Educational Status	Yes	196	76.6
	No	73	23.4
Level of school attended	No formal education	60	23.4
	Primary	87	34
	Secondary	63	24.6
	More than secondary	46	18
Marital status	Never marr ed	85	33.3
	Married	102	39.8
	Divorced	40	15.6
	Widowed	29	11.3
Occupational status	House wife	42	16.4
	Government/private Employed	68	26.6
	Self employed	43	16.8
	Daily laborer	77	30.1

	Student	21	8.2
	Others	5	1.9
Monthly income	0-600	67	26.2
	601-1200	92	35.9
	1201-3200	88	34.4
	Above 3201	9	3.5
Treatment Supporter	Yes	133	52
	No	123	48
Smoking Status	Yes	19	7.4
	No	237	92.6
Alcohol intake status	Yes	28	10.9
	No	228	89.1

Knowledge of TB patients about the cause of tuberculosis:

One hundred ninety(74.2 %) did not know the cause of tuberculosis (Table 2). One hundred fifty (58.6%) told that the cause of TB was cold weather, 68(26.6%) mentionedshortage of food, 54(21.1%) mentioned workload as cause of TB (Table 2). Other perceived causes like exposure to dust (4.3%), alcohol drinking (0.4%), cigarette smoking (3.1%), and lack of hygiene (0.4%), exposure tosun light (0.4%) were also mentioned.

Knowledge of TB patients about sign and symptom of tuberculosis:

Two hundred two (78.9%) mentioned cough more thantwo weeks, 167(65.2%) mentioned fever whereas night sweats and chest pain were mentioned 154(60.2%), 57(22.3%) respectively (Table 2). Other signs and symptoms mentioned by participants were, body swelling (1.5%), fatigue (2.3%), joinpain (0.4%), and loss of sleep (0.4%).

Knowledge of TB patients about transmission of tuberculosis:

Two hundred twenty one(86.3 %) mentioned spread of tuberculosis was through air when coughing or sneezing while seventy one (27.7%) told sharing drinking utensils and twenty-eight (10.9%) drinking raw milk as mode of spread of tuberculosis(Table 2). Fifteen (5.9%) of respondents mentioned blood contact with TB patients.

Knowledge of TB patients about prevention of tuberculosis:

One hundred seven (41.8%) of respondents responded that it was possible to prevent the risk of developing tuberculosis while 79(30.9 %) of respondents did not know (Table 2). Regarding method of prevention, majority 214(83.6%) (Table 2) of respondent mentioned covering mouth while coughing /sneezing while others mentioned not spitting out open everywhere106(41.4%), Ventilating the room81(31.6%),taking TB drug properly 54(21.1%),separating room for TB patients 37(14.5%).Participants also mentioned closing window (1.2%), keeping hygiene (0.8%) and avoiding sex (1.9%).

About 89.5% of study participants mentioned that tuberculosis may cause death if not treated and 29.7% of participants mentioned untreated patient might continue transmitting TB in community(Table2). Others mentioned paralysis (1.5%), bed ridden (0.4%), and take long time to be cured (0.8%).

Regarding patient's knowledge about organ that TB could affect, lung wasmentioned by 68.1%of participants, bone (23.1%), lymph node (23.8%) and skin (8.2%). One hundred and sixty eight (65.6%) of participants were on intensive phase and eighty-seven (34.1%) on continuation phase of treatment (Table 2). With regard to curability of tuberculosis two hundred and fifty three(98.8%) of participants had no doubt about curability of tuberculosis,two (0.8%) did not know and one respondent mentioned TB could not be cured (Table 2). Majority (93.4%) of study participants knew the duration of tuberculosis treatment. Two hundred thirty nine (93.4%) of study participants mentioned the exact duration of TB treatment, while 6.6% did not know the duration of tuberculosis treatment(Table 2).Majority (85.2%) of study participants knew regular treatment was important for cure. Seventy-six (61.3%) mentioned consequences of drug discontinuation might result development of MDR_TB.

TABLE 2.KNOWLEDGE OFTB PATIENTS ABOUT CAUSES AND SYMPTOM OF TUBERCULOSIS, IN YEKA SUB CITY, ETHIOPIA, 2019.

Variables		Frequency	Percent
Cause of TB	Bacteria /germ	66	25.8
	Cold weather	150	58.6
	Shortage of food	68	26.6
	Work load	54	21.1
	Others*	22	8.6
Symptoms	Cough ≥2weaks	202	78.9
	Fever	167	65.2
	Night sweat	154	60.2
	Chest pain	57	22.3
	Loss of appetite	95	37
	Weight loss	68	26.6
	Blood in sputum	44	17.2
	Others**	12	4.6

TABLE3.KNOWLEDGEOF TB PATIENTS ABOUT PREVENTION AND TRANSMISSION OF TUBERCULOSIS IN YEKA SUB CITY, ETHIOPIA, 2019.

Variables		Frequency	Percent
Transmission of TB	Through air when coughing or sneezing	221	86.3
	Shared drinking utensils	71	27.7
	Drinking raw milk	28	10.9
	Blood contact with TB patients	15	5.9

Possible to prevent risk of developing TB infection	Yes	107	41.8
	No	70	27.3
	Don't know	79	30.9
Method of preventing transmission of TB to others	Covering mouth while coughing/Sneezing	214	83.6
	Not spitting out open every where	106	41.4
	Ventilating the room/Open windows	81	31.6
	Taking TB drugs properly	54	21.1
	Separating room for TB patients	37	14.5
	Others***	10	3.9

- ✓ Since more than one responses are possible total percentages exceed 100 %

*Others include:-exposure to dust, alcohol, cigarette, lack of hygiene, exposure to sun light

** Others include: -body-swelling, fatigue, joint pain, loss of sleep.

*** Others include :-Closing window, avoiding sex, keeping hygiene

Table 4. Knowledge of TB patients about curability, duration, and organ affected by tuberculosis in Yeka Sub city, Ethiopia, 2019

Variables		Frequency	Percent
TB could be cured with medication	Yes	253	98.8
	No	1	0.4
	I don't know	2	0.8
Duration of TB treatment	6months	239	93.4

	Less/above 6months	17	6.6
Phase of treatment	Intensive phase	168	65.6
	Continuation phase	88	34.4
Regular treatment is important for cure	Yes	192	75
	No	8	3.1
	I don't know	56	21.9
Drug discontinuation leads to MDR_TB	Yes	76	29.7
	No	33	12.9
	I don't know	147	57.4
Organ affected by TB	Lung	177	68.1
	Bone	61	23.8
	Lymph node	61	23.8
	Skin	21	8.2

OVERALL,LEVELKNOWLEDGE OF TB PATIENTS ABOUT TUBERCULOSIS AND ITS TREATMENT

The overall knowledge of study participants about TB wascomputed as composite measure of knowledge about the cause of TB, transmission of TB, signs and symptoms of TB, prevention of TBand severity of thedisease. While, the overall knowledge of study participants about tuberculosis treatment was computed as a composite measure of knowledge about curability of tuberculosis,duration of treatment and importance of regular treatment.The composite score was dichotomized using mean obtained from data (that is mean for knowledge of TBis 7 and mean for knowledgeof TB treatment = 6). Individual score above the mean were categorized as good knowledge and those blow/equal to the mean categorized as poor knowledge. Accordingly, one hundred sixty two

36.7% (95%CI: 30.9-42.6) and seventy-four 28.9 %(95%CI: 23.8-34.8) ofparticipants had good level of knowledge about tuberculosis and its treatment respectively.

TABLE 5.OVERALL KNOWLEDGE OF TB PATIENTS ABOUT TUBERCULOSIS AND ITS TREATMENT IN YEKA SUB CITY, ETHIOPIA, 2019.

Variable		Frequency	Percent
Knowledge about Tuberculosis disease	Good	94	36.7
	Poor	162	63.3
Knowledge about tuberculosis treatment	Good	74	28.9
	Poor	182	71.1

Level of Tuberculosis treatment Adherence among TB patients

The level of tuberculosis patient adherence was measured using Morisky Medication Adherence Scale-8 (MMAS-8). Is a simple tool used to help identify barriers to medication adherence.The degree of adherence was determined according to the score resulting from the sum of all the correct answers with a maximum score of eight. Accordingly, the overall tuberculosis treatment adherence in this study was 79.3 %(95%CI: 74.2-84).

TABLE 6. LEVEL OF TUBERCULOSIS TREATMENT ADHERENCE AMONG TB PATIENTS IN YEKA SUB CITY, ETHIOPIA, 2019.

Variable		Frequency		Percent
Adherence	Adherent	203		79.3
	Non adherent	53		20.7
	Total	256		100.0

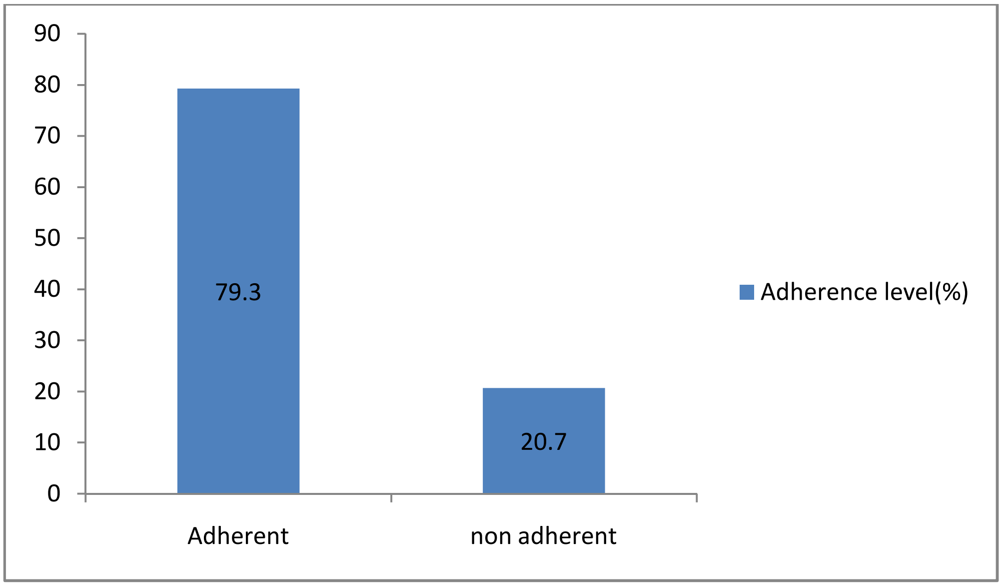

FIGURE 3.TUBERCULOSISTREATMENTADHERENCE LEVEL AMONG TB PATIENTS IN YEKA SUB CITY, ETHIOPIA, 2019

Tuberculosis treatment adherence with different aspects of knowledge of TB and treatment:

Bivariateanalysis: Bivariate and multivariate analysis were done to assess association between independent variables and outcome variable. Accordingly in bivariate analysis, participant's knowledge about tuberculosis and tuberculosis treatment has significant associated with treatment adherence.When come toindividual independent variables, knowledge about cause of tuberculosis, transmission, prevention, severity of tuberculosis. Knowledge about duration of tuberculosis treatment, knowing advantage of regular treatment for cure and side effect of tuberculosis treatment. Age of respondents, formal school attendance, level of education,occupation status, monthly income, alcohol drinking and smoking status(Table: 7) were found to have statisticallysignificant association with tuberculosis treatment adherence.

Respondents who had good knowledge about tuberculosis were 3.2 times (COR=3.2, 95%CI: 1.4-7.5), more adherent when compared to those who had poor knowledge about tuberculosis. Regarding knowledge of tuberculosis treatment respondents who had good knowledge about tuberculosis treatment adhere 3.5 times (COR=3.5, 95%CI: 1.6-7.6) more than those with poor knowledge about tuberculosis treatment.

Looking at respondents knowledge about cause of TB,thosewho knew the cause of tuberculosis as bacteria were 3.3 times (COR=3.3, 95%CI: 1.33-8.1), more likely to adhere when compared to those who did not knew the cause of tuberculosis. When we seeknowledge about transmissionof tuberculosisthose who knew modes oftuberculosis transmission were eight times (COR=8, 95%CI: 4.1-15.8) more likely to adhere to tuberculosis treatment(Table7). Looking to prevention methods respondents who knew tuberculosis prevention methods were 2.1 times (COR=2.14, 95%CI: 1.2 -4) more adherent to tuberculosis treatment when compared to those who did not know the prevention methods. In terms of severity of tuberculosis disease those who knew severity of tuberculosis disease were 7.5 times (COR=7.55, 95%CI: 3.2-4.4) more likely to adhere to tuberculosis treatment.

As shown in table 8, respondents who knew the duration of tuberculosis treatment 3 times (COR=3,95%CI:1.1-8.1), who knew importance of regular treatment for cure 4 times (COR= 4 ,95%CI: 1.9-8.5), who knew side effect of tuberculosis treatment 3 times (COR= 3 ,95%CI:1.4-6.5) more likely to adhere to tuberculosis treatment.

Respondents in age range of 25 to 34 were 6 times (COR= 6.295%CI:2.2-17.9) more likely to adhere to tuberculosis treatment when compared to age of 55 years and above.There was no significant difference between male and female study participants on tuberculosis treatment adherence (COR=0.9, 95%CI: 0.51-1.8:8) (Table: 8).Widowed participants were 80% (COR=0.2, 95%CI: 0.50-0.80) less likely to adhere to tuberculosis treatment when compared to those who were never married. Study participants who attended secondary and above level of education were 3 times (COR=3,95%CI: 1.1-7.7) more likely to adhere when compared to those who had no formal education.

Having treatment supporter had no significant difference, compared to reference category with treatment adherence (COR=0.9, 95%, CI: 0.52-1.75). Participants who did not smoke and did not drink alcohol had 6 times (COR=6.4, 95%CI:2.4-16.8) and 3 times (COR=3.4, 95%CI: 1.5-7.8) more likely to adhere to tuberculosis treatment respectively when compared to those who smokeand drinkalcohol.Study participants with monthly income category 1201 to 3200 birr adhere 2.6 times (COR=2.57, 95%CI: 1.12-5.9) more likely when compared to reference category.

TABLE7. BIVARIATE ANALYSIS RESULTS OF ASSOCIATION OF PATIENT'S KNOWLEDGE ABOUT TB AND ITS TREATMENT WITH TREATMENT ADHERENCE IN YEKA SUB CITY, ETHIOPIA, 2019

Variables		Adherence		COR (95%CI)
		Adherent	**Non adherent**	
		No (%)	No (%)	
Age of respondent	18-24	24(22.6)	6(11.3)	4.4(1.3-15.1)
	25-34	68(33.5)	12(22.6)	6.2(2.2-17.9)
	35-44	75(36.9)	14(26.4)	5.9(2.1-16.5)
	45-54	26(12.8)	10(18.8)	2.9(0.93-8.8)
	>= 55	10(4.9)	11(20.8)	1
Sexof respondents	Male	123(61.5)	34(60.7)	1
	Female	77(38.5)	22(39.3)	0.9(0.51-1.80)
Educational status	Yes	156(78)	37(66.1)	1.5(0.81-2.9)
	No	44(22)	19(33.9)	1
Level of school attended	No formal school	45(22.5)	18(32.1)	1
	Primary	61(31)	23(41.1)	0.90(0.43-1.9)
	Secondary	54(27)	9(16.1)	2.9(1.10-7.70)
	Above secondary	40(20)	6(10.7)	3(1.0-9)
Marital status	Never married	70(34.5)	15(5.9)	1
	Married/living	84(41.4)	18(4.0)	0.93(0.44-1.98)

	together			
	Divorce	35(17.2)	5(9.4)	1.00(0.47-2.13)
	Widowed	14(6.9)	15(28.3)	0.2(0.50- 0.80)
Occupation	Daily laborer	54(27)	23(41.2)	1
	House wife	31(15.5)	11(19.6)	1.2(0.52-2.3)
	Govt/private Employed	55(27.5)	13(23.2)	2.1(0.98-4.9)
	Self Employed	41(20.5)	2(3.6)	18(2.3 -21.38)
	Student	16(8)	5(8.9)	1.36(0.45-4.16)
	Others	3(1.5)	2(3.6)	0.64(0.10-4.08)
Monthly in come	0-600	49(24.5)	18(32.1)	1
	601-1200	68(34)	24(42.9)	1.10(0.54-2.26)
	1201-3200	75(37.5)	13(23.2)	2.57(1.12-5.9)
	Above 3201	8(4)	1(1.8)	2.9(0.34-25.2)
Treatment supporter	Yes	104(52)	29(51.8)	0.96(0.522-1.75)
	No	96(48)	27(48)	1
Smoking	Yes	8(4)	11(19.6)	1
	No	192(96)	45(80.4)	6.4(2.4-16.8)
Alcohol	Yes	16(8)	12(21.4)	1
	No	184(92)	44(78.6)	3.4(1.5-7.8)

Cause of TB	Mentioned	60(29.6)	6(11.3)	3.3(1.33-8.1)
	Not mentioned	143(70.4)	47(88.2)	1
Symptoms of TB	Mentioned	129(63.9)	35(66)	0.92(0.5-1.73)
	Not mentioned	73(36)	18(34)	1
Transmission	Mentioned	178(87.7)	25(47.2)	8(4.1-15.8)
	Not mentioned	25(12.3)	28(52.8)	1
Prevention	Mentioned	140(69)	27(50.9)	2.14(1.16-4)
	Not mentioned	63(31)	26(49.1)	1
Duration TB of treatment	6months	193(95.1)	46(86.8)	3(1.06-8.1)
	Above/below 6months	10(4.9)	7(13.2)	1
Phase of treatment	Intensive phase	131(64.9)	37(68.8)	1
	Continuation phase	71(35.1)	17(31.2)	1.25(0.65-2.4)
Regular treatment is important for cure	Yes	160(89.5)	32(60.4)	4(1.97-8.51)
	No	43(21.2)	21(39.6)	1

Overall Knowledge about TB	Good	85(41.9)	9(17)	3.2(1.4-7.5)
	Poor	118(41.9)	44(17)	1
Overall Knowledge about TB treatment	Good	67(33.0)	7(13.2)	3.5(1.6-7.6)
	Poor	136(67.0)	46(86.8)	1

Multivariateanalysis: Those variables with p value <0.25 in bivariateanalysis were taken to multivariate analysis. Homer-lemeshow test was checked. Multicollinearity was also checked by variance inflation factor (VIF). Based on above-mentioned criteria those variables included in multivariate were age of respondents, ever attended formal school, level of education, occupation, marital status, monthly income, alcohol and smoking status, knowledge about cause of TB, transmission, prevention, severity of TB, duration of tuberculosis treatment, knowledge of advantage of regular treatment for cure, side effect of TB treatment andover all knowledge about tuberculosis and treatment.

Respondents in the age range of 35 to 44 years were 5 times (AOR=5,95%CI: 1.28-19.9) more likely to adhereto tuberculosis treatment as compared to age range of 55 and above. On the other hand, there was no statisticallysignificant association between age range of 18to 24 yearsand age range of 45 to 54 years as compared to reference category (AOR =2.4,95%CI:0.28-21.2) and (AOR=4,95%CI:0.9 - 19.5) respectively.

In terms of employment status, self-employed respondents were 6 times (AOR= 6, 95%CI: 1.2-2.5) more adherent to tuberculosis treatment as compared to reference category. There was no statistically significant association between governmental/private employed (AOR=1.1295%CI: 0.16-7.5), students (AOR=1.4, 95%CI: 0.16-7.5) and others (AOR=3.4, 95%CI: 0.22-6).

Respondents who did not smoke had 6 times (AOR= 6.3, 95%CI: 1.5 - 25) more likely to adhere to tuberculosis treatment as compared to those who smoke cigarette and the association was statistically significant.

Holding other factors constant, respondents with good knowledge of tuberculosis disease had 2.7 times (AOR =2.7, 95% CI: 1.04-7.3) more likely to adhere to tuberculosis treatment when compared to those with poor knowledge. While those with good knowledge about tuberculosis treatment had no significant difference as compared to reference category (AOR= 0.6,95%CI: 0.20-1.78).

Patients who had knowledge about tuberculosis transmission were six times more likely to adhere to tuberculosis treatment (AOR=6.7, 95% CI 2.56-17.7). While, those who had knowledge about severity of the disease were eight times (AOR=8.02, 95% CI (2.03-31.6) more likely to adhere when compared to those who had no knowledge about severity and transmission of tuberculosis.

TABLE8. MULTIVARIATE ANALYSIS RESULTS OF ASSOCIATION OF PATIENTS OVERALLKNOWLEDGE OF TB ANDITS TREATMENT WITH TREATMENT ADHERENCE IN YEKA SUB CITY, ETHIOPIA, 2019.

Variables		Adherence		AOR (95%CI)
		Adherent	**Non adherent**	
		No (%)	No (%)	
Age of respondent	18-24	24(22.6)	6(11.3)	2.4(0.28-21.2)
	25-34	68(33.5)	12(22.6)	4(0.9.-19.5)
	35-44	75(36.9)	14(26.4)	5(1.28-19.9)*
	45-54	26(12.8)	10(18.8)	4(0.9-17)
	>= 55	10(4.9)	11(20.8)	**1**
Educational Status	Yes	156(78)	37(66.1)	0.73(0.17-2.9)
	No	44(22)	19(33.9)	1

Level of school attended	No formal school	45(22.5)	18(32.1)	1
	Primary	61(31)	23(41.1)	0.58(0.12-2.7)
	Secondary	54(27)	9(16.1)	1.5(0.21-11.5)
	Above secondary	40(20)	6(10.7)	0.88(0.09-8.1)
Marital status	Never married	70(34.5)	15(5.9)	1
	Married/living together	84(41.4)	18(4.0)	0.72(0.22- 2.3)
	Divorce	35(17.2)	5(9.4)	1.6(0.34-8.1)
	Widowed	14(6.9)	15(28.3)	0.32(0.07-1.40)
Occupation	Daily laborer	54(27)	23(41.2)	1
	House wife	31(15.5)	11(19.6)	0.72(0.05-10.6)
	Gov't/privateEmployed	55(27.5)	13(23.2)	1.12(0.16-7.5)
	Self Employed	41(20.5)	2(3.6)	6(1.2-2.5)*
	Others	3(1.5)	2(3.6)	3.4(0.22-6)
Monthly in come	0-600	49(24.5)	18(32.1)	1
	601-1200	68(34)	24(42.9)	1.09(0.32-3.6)
	1201-3200	75(37.5)	13(23.2)	0.70(0.11-4.2)
	Above 3201	8(4)	1(1.8)	0.49(0.02-10)
Smoking Status	Yes	8(4)	11(19.6)	1
	No	192(96)	45(80.4)	6.3(1.57-25)*
Alcohol intake status	Yes	16(8)	12(21.4)	1

	No	184(92)	44(78.6)	1.7(0.51-5.9)
Knowledge about TB	Good	60(29.6)	6(11.3)	2.8(1.04-7.3)*
	Poor	143(70.4)	47(88.2)	1
Knowledge about TB treatment	Good	178(87.7)	25(47.2)	0.6(0.2-1.78)
	Poor	25(12.3)	28(52.8)	1

TABLE 9. MULTIVARIATE ANALYSIS RESULT OF ASSOCIATION OF DIFFERENT ASPECTS OF PATIENT'S KNOWLEDGE ABOUT TUBERCULOSIS AND ITS TREATMENT WITH TREATMENT ADHERENCE AMONG TB PATIENTS IN YEKA SUB CITY, ETHIOPIA, 2019.

Variables		**Adherence**		**AOR (95%CI)**
		Adherent	**Non adherent**	
		No (%)	No (%)	
Age of respondent	18-24	24(22.6)	6(11.3)	2.6(0.17-25.0)
	25-34	68(33.5)	12(22.6)	3.8(0.64-22.0)
	35-44	75(36.9)	14(26.4)	2.9(0.58-14.8)
	45-54	26(12.8)	10(18.8)	2.6(0.47-14.6)
	>= 55	10(4.9)	11(20.8)	**1**
Educational Status	Yes	156(78)	37(66.1)	1.58(0.35-7.1)
	No	44(22)	19(33.9)	1
Level of school attended	No formal school	45(22.5)	18(32.1)	1
	Primary	61(31)	23(41.1)	0.47(0.08-2.5)
	Secondary	54(27)	9(16.1)	0.94(0.09-9.1)
	Above secondary	40(20)	6(10.7)	0.52(0.04-6.1)
Occupation	Daily laborer	54(27)	23(41.2)	1
	House wife	31(15.5)	11(19.6)	0.72(0.05-10.6)
	Gov't/privateEmployed	55(27.5)	13(23.2)	1.12(0.16-7.5)
	Self Employed	41(20.5)	2(3.6)	6(1.2-2.5)
	Student	16(8)	5(8.9)	1.4(0.30-6.6)

	Others	3(1.5)	2(3.6)	3.4(0.22-6)
Marital status	Never married	70(34.5)	15(5.9)	1
	Married/living together	84(41.4)	18(4.0)	0.89(0.25-3.1)
	Divorce	35(17.2)	5(9.4)	3(0.50-18.6)
	Widowed	14(6.9)	15(28.3)	0.26(0.05-1.40
Monthly in come	0-600	49(24.5)	18(32.1)	1
	601-1200	68(34)	24(42.9)	1.1(0.27-4.8)
	1201-3200	75(37.5)	13(23.2)	0.71(0.08-6)
	Above 3201	8(4)	1(1.8)	0.38(0.01-11)
Smoking status	Yes	8(4)	11(19.6)	1
	No	192(96)	45(80.4)	3.6(0.76-17)
Alcohol intake status	Yes	16(8)	12(21.4)	1
	No	184(92)	44(78.6)	2.18(0.55-8.7)
Cause of TB	Mentioned	60(29.6)	6(11.3)	2.8(0.71-11.2)
	Not mentioned	143(70.4)	47(88.2)	1
Transmission	Mentioned	178(87.7)	25(47.2)	7.0(2.6-17.6)*
	Not mentioned	25(12.3)	28(52.8)	1
Prevention	Mentioned	140(69)	27(50.9)	1.10(0.41-2.7)
	Not mentioned	63(31)	26(49.1)	1
Severity of the disease	Mentioned	192(94.6)	37(69.8)	8(2.1-32.4)*
	Not mentioned	11(5.4)	16(30.2)	1

Duration TB of treatment	6months	193(95.1)	46(86.8)	3.6(0.74 -17.4)
	Above/below 6months	10(4.9)	7(13.2)	1
Regular treatment is important for cure	Yes	160(89.5)	32(60.4)	1.2(0.41-2.90)
	No	43(21.2)	21(39.6)	1

* Significant at Multivariate analysis

7. Discussions:

The results of present studyshowed that 74.2% of study participants did not knew the cause of tuberculosis disease. 86.3% of study participants knew spread of tuberculosis was through air when coughing. The study also identified the over knowledge of tuberculosis knowledge and level of treatment adherence. Respondents who had good knowledge about tuberculosis adhere more to tuberculosis treatment.

Thefinding of this study indicatedoverall knowledge of study participantwas 36.7%. This was comparable with previous study conducted in Northern part of Ethiopia (36.5%) (1).But lower as compared to study conducted in South Africa (72%)(28),this difference might be due to study participants addressed.Most of participants South Africa were high school completed.Tuberculosis treatment adherence level in this study found nearly similar with study conducted in Addis Ababa (80.5%) (31), Arba Minch(75.2%)(22)and South east Nigeria(74.2%)(31).However, level of treatment adherence in this study was found to be lower when compared to previous study conducted in Tigray (91.6%)(27).This difference might be due to difference in adherence measurement techniques used. Visual analogue scale of measurement (assess adherence for the whole duration of TB treatment rather than specific times) and self-report was used previous study.

On the other hand, higher level of adherence was observed in current study compared to the adherence level reported from Indonesia (55%) (43).This difference on adherence level is most probably due to differences in adherence measurement techniques(alpha cronbach) and the study measured treatment adherence level during intensive phase only, previous evidence showed that patients were less adherent during intensive phase than during continuation phase(43).

In the current study,participants who have goodknowledge about tuberculosis were more likely to adhere totuberculosis treatment which is consistent with study conducted inChina and Indonesia(12, 43).Another important finding aspect noted in this study waspatients who haveknowledge about tuberculosis transmission and severities of tuberculosis disease weremore adherent to tuberculosis treatment. Similarly a facility based study done among TB patients in India revealed that patients having good knowledge about spread of TB were significantly associated with treatment adherent (36). Study in Ethiopia showed knowledge about tuberculosis prevention was associated with being adherent (13), however,in current study knowledge about prevention has no association with treatment adherence.

Respondents agerange of 34 to 45 were more likely to adhere to tuberculosis treatment compared to those age above or equal to 55 years of age.This finding is not consistent with study done in Indonesia which revealed that socio demographic factors had no correlation with tuberculosis treatment adherence (43). In this study,respondents who did not smoke more likely to adhere to tuberculosis treatment, which supports the findings of previous study conducted in Kenya (10).

Regarding knowledge about cause of TB, this finding indicates that the respondents had inadequate information about Mycobacterium tuberculosis (25.8%)as a disease-causing agent. Instead majority of the respondents mentioned cold weather(58.6%), food shortage (26.1%), workload (21.1%) which was comparable with previous studies conducted in another part of Ethiopia(15,20,30).

According to these finding respondents had adequate awareness aboutmode transmission of tuberculosis (86.3%), signs and symptoms, method of prevention (83.6%)and duration of tuberculosis treatment (93.4 %). This finding is agreement with the results of study conducted inPakistan an (40).According to this finding there were also numerous misconceptions about the cause and transmission like dust, alcohol, smoking ,sexually, sharing clothes and sharing foods this study also agree with study conducted in Bangladesh(46) and other part of Ethiopia(29).

Several study explained that majority of respondents defined TB as curable disease (15, 29,30,38) this study also reported similar findings, about 98% of study participants in this study mentioned TB as curable disease. In this study 93.4% of study participants knew the exact duration of ant TB treatment this finding agreed with study conducted in Moroccan(20).

Other important finding in this was knowledge of patients about importance of regular TB treatment and consequence of incomplete treatment.About 75% of study participants were aware about importance of regular treatment for cure, this finding was comparable with study conducted in India (36), while only29.7% knew incomplete treatment will cause drug resistant TB. This finding was higher when compared to study conducted in Nepal(38).

8. Conclusions

The level tuberculosistreatmentadherence observed in this study is comparablewith previous study conducted in Addis Ababa.Over all knowledge of patients about tuberculosis is lower as compared to study conducted in South Africa.The study showed respondents who have good knowledge about tuberculosis are more likely to adhere to tuberculosis treatment. The study also showedthat respondents who have good knowledge about severity of tuberculosis are more likely to adhere to tuberculosis treatment. Age of respondents and smoking status are associated with tuberculosis treatment adherence. Respondents who have knowledge about tuberculosis transmission were more likely to adhere to tuberculosis treatment. Respondents had inadequate knowledge about tuberculosis causing agent. Majority of study participants had adequate knowledge about tuberculosis transmission and curability of tuberculosis if treatments were taken properly. Majority of study participants also know duration of tuberculosis treatment.

9. Recommendations

- Regular health education and counseling on the disease and treatment should be provided to the patients on tuberculosis disease and treatment while on TB treatment and initiation to bring considerable change in knowledge about TB.
- More emphases should be given on teaching patients about transmission and severity of tuberculosis disease and it would be better to establish proper information, education and communication with patients that indicate the level of severity of the disease.
- A package of treatment adherence interventions should be offered to patients on tuberculosistreatment these include:tracer, materialsupport, psychologicalsupport, and staff training.
- There is need for health workers to better understand of individual patients, particularly those that influence adherence and to consider these when developing teaching strategies to enhance assimilation of information.

Limitations**:**

- This study was not supported by qualitative study, which could provide additional information about the level of knowledge of the study participants about TB, treatment adherence and role of knowledge on treatment adherence. The study was limited to one sub city.

10.References:

1. Gebrehiwet. Knowledge and Practice of TB Patients on TB and its Treatment in Alamata District Tigray Region Northeast Ethiopia. Pulmonology and respiratory medicine. August 2017.

2. World Health Organization Global Tuberculosis Report. Geneva; 2018.

3. World Health Organization Global Tuberculosis Report Geneva 2017.

4. Amare D, Yohannes A , Kebede D, Tariku D et al. Tuberculosis Burden in Ethiopia from 1990 to 2016: Evidence from the Global Burden of Diseases from 2016 study Ethiop J Health Sci. September 2018;28 (5).

5. Federal minisry of Health. Health sector transformation plan-I Annual performance report. Ethiopia: Federal Ministry of Health; 2016/17.

6. Solomon A , Hailay G. Prevalence of Multidrug-Resistant Tuberculosis and Associated Factors in Ethiopia. Hindawi Journal of Pathogens. 2018:8.

7. Fekadu L, Osberg M, Makayova J,Mingkwan P,Chin D. Increasing Access to Tuberculosis Services in Ethiopia: Findings From a Patient-Pathway Analysis. The Journal of Infectious Diseases. 2017; 7.

8. Ethiopia. Federal ministry of health, Tuberculosis Leprosy and TB/HIV Prevention and Control Programme. 4. ed. Addis Ababa: 2008.

9. Africa Health department, Adherence Guidlines for HIV, TB and Non communicable Diseases Republic of South Africa Health Department February, 2016.

10. Oyugi O, Kweri J, Malik N, Bett K, Biego C. Patient factors influencing adherence to anti-tuberculosis medication innjoro sub county Hospital, Nakurucounty, Kenya. International Journal of Scientific and Research Publications. May 2017;7(5).

11. Habteyes T, Davoud S, Azar T, Saeed Y, Luche E,et al. The Effect of Psychosocial Factors and Patients' Perception of Tuberculosis Treatment Non-Adherence in Addis Ababa, Ethiopia. Ethiop J Health Sci. September 2017; 27(5).

12. Bagoes W, Maartje D, Marieke W. Factors that influence treatment adherence of tuberculosis patients living in Java, indonesia. Dove Medical Press Ltd. August 2009.

13. Gebrehiwet T, Mengistu L. Adherence to Anti-tuberculosis treatment and treatment outcomes among tuberculosis patients in Alamata District, northeast Ethiopia. Bio Med Centeral 2015:11.

14. Ahmed E , Mulualem A, Adinew D, Zelalem Y, Kassu D. Assessment of Patients' Knowledge, Attitude, and Practice Regarding Pulmonary Tuberculosis in Eastern Amhara Regional State, Ethiopia. The American Society of Tropical Medicine and Hygiene. 2013;88(4):788.

15. Fikru M , Tariku L, Zenebe H. Assessment of community knowledge about TB and its treatment in rural areas of Shashemene ,Southern Ethiopia Journal of Public Health and Epidemiology. March 2015;7(3).
16. Estifanos Biru Shargie BL. Determinants of Treatment Adherence Among Smear-Positive Pulmonary Tuberculosisn Patients in Southern Ethiopia. PLoS MEDICINE. February 2007;4(2).
17. Misganu D, Desta H. Patients' adherence to anti-tuberculosis medicines and associated factors for non-adherence at a tertiary teaching hospital, South West Ethiopia. Gaziantep Medical Journal 2016;22(2):62.
18. Tadele T, Temesgen B,Hailay A. The prevalence and factors associated for anti-tuberculosis treatment non-adherence among pulmonary tuberculosis patients in public health care facilities in South Ethiopia. BMC Public Health 2017:10.
19. Bruce V. Thomas RS. Adherence and TB: Backgroundandcontext.
20. Nabil T , Mohammed B, Chakib N. The impact of knowledge and attitudes on adherence to tuberculosis treatment in a Moroccan region. Pan African Medical Journal. 2012.
21. Arrossi SH, María G, Adriana R, Silvina. Predictive factors of non-adherence to tuberculosis treatment in the metropolitan area of Buenos Aires, Argentina Universidad Nacional de Lanús. November 2012.
22. Addisu G M, Kalid S , Kiberalem B ,Asfaw M ,Abubeker Z, et al. Assessment of Anti-TB Drug Nonadherence and Associated Factors among TB Patients Attending TB Clinics in Arba Minch Governmental Health Institutions, Southern Ethiopia. Hindawi Tuberculosis Research and Treatment. 2018:7.
23.World Health Organization. Global tuberculosis report. Geneva: 2017. 147 p.
24. Mohammed A, Saeed A, Mahfoudh A, Khalid S, Adel H,et al. . Knowledge of Tuberculosis and Influencing Factors among New Pulmonary Tuberculosis Patients in Yemen. Journal of Pharmacy Practice and Community Medicine. 2018; 4 (4).
25. Dereje A , Mohammed A, Sibhatu B. Epidemiology of anti-tuberculosis drug resistance patterns and trends in tuberculosis referral hospital in Addis Ababa, Ethiopia. BMC Research Notes. 2012:6.
26. Zekariyas N YG, Tadese T. Patient satisfaction on tuberculosis treatment service and adherence to treatment in public health facilities of Sidama zone South Ethiopia. BMC Health Services Research. 2013:8.

27. Kiros K, Desalegn F,Tesfay M, Klinkenberg E, Mulugeta. Adherence to anti-tuberculosis treatment in Tigray, Northern Ethiopia. International Union Against Tuberculosis and Lung Disease December 2014; 4.
28. Tadele W, Temesgen B, Hailay G. The prevalence and factors associated for anti-tuberculosis treatment non-adherence among pulmonary tuberculosis patients in public health care facilities in South Ethiopia. BMC Public Health 2017;17:10.
29. Ahmed E, Mulualem A, Adinew D, Zelalem Y, Kassu D. Assessment of Patients' Knowledge Attitude and Practice Regarding Pulmonary Tuberculosis in Eastern Amhara Regional State, Ethiopia. American Society of Tropical Medicine and Hygiene. February, 2011.
30. Mekonnin A. Knowledge about tu berculosis a mong patients attending tuberculosis treatment in Northwestern Ethiopia. Ethiop J Health Sci January 2007;17.
31. Chika F, Emmanuel C, Azuike1, John O, Ugoji ,et al. Adherence to Drug Medications amongst Tuberculosis Patients in a Tertiary Health Institution in South East Nigeria. International Journal of Clinical Medicine 2015;6.
32.Federal ministry of health, Health Sector Transformation Plan HSTP 2015/16 up to 2019/2010th ed. Ethiopia 2014.
33. Federal ministry of health. Health sector transformation plan-i,Annual performance report. Ethiopia 2016/17.
34. Meredith M, Dolores J, Paul W, Yael H, Rachel A. Knowledge and Attitudes About Tuberculosis Among U.S.-Born Blacks and Whites with Tuberculosis. J Immigr Minor Health. October 2015;17(5).
35. Agho E, Hall J,Ewald. Determinants of the Knowledge of and Attitude towards Tuberculosis in Nigeria. International Center For Diarrhea Disease reasearch. 2014
36. Priya Y, Atul D, Kulkarni, Sulabha V, Akarte , et al. Positive impact of knowledge about tuberculosis and its treatment on treatment adherence among new smear�positive tuberculosis patients in ward E of Mumbai, Maharashtra, India. International Journal of Educational and Psychological Researches 2016;2(1):30.
37. Mweemba P, Siziya S, Chipimo P, Cristenson K, Johansson E. Knowledge, Attitude and Compliance with Tuberculosis Treatment, Lusaka, Zambia. Medical Journal of Zambia. 2008;35.
38. Bhatt P, Shrestha B. Knowledge of tuberculosis treatment – A survey among tuberculosis patients in (dots) program in Nepal. saarc j tuber lung dis HIV/AIDS 2010;VII(2): 10-4.

39. Pamela N, Demetre L,, Yoliswa N, Nwabisa B ,Gadija K, et al. Predictors of knowledge about tuberculosis: results from SanhaneS I, national, cross-sectional household survey in South Africa. BMC Public Health. 2016;16:12.
40. Javaid A, Amna Z, Madiha B, Syed H, Nadeem R. Knowledge, Attitude and Misconceptions regarding Tuberculosis in Pakistani Patients. J Pak Med Assoc. May 2006;56.
41. Tilahun B. Assessment of Knowledge, Attitude and Practice of Tb Transmission and Prevention among the Communities in Holeta Town. Epidemiology international journal. May 02, 2018;2:7.
42. Ying T, Yunxia W,Yanhong G,Xiaoxv Y, Angui Z, et al . Non-adherence to anti-tuberculosis treatment among internal migrants with pulmonary tuberculosis in Shenzhen, China. BMC Public Health 2015;15:6.
43. Noni N , Dian D, Rina A, Ivana A. Relationship of attitudes and perceptions with adherence in treatment of pulmonary tuberculosis patients in medan, Indonesia Asian J Pharm Clin Res. 2018;11(1).
44. Yassine M , Awada S, Rachidi S, Zein S, Bawab W , et al. Evaluation of medication adherence in Lebanese hypertensive patients. Journal of Epidemiology and Global Health. 2016.
45. Monique munz K. A Guid for Tuberculosis Treatment Supporters. Geneva, Switzerland: World Health Organization; 2002.
46. Saria T, Anamul H. Patient’s Knowledge and Attitude towards Tuberculosis in an Urban Setting. Hindawi Publishing Corporation Pulmonary Medicine 2012:5.

11: ANNEXES:

Annex 1: Participant's Information Sheet

Title of the research project: Assessment of the role of patient's knowledge about Tuberculosis on treatment adherence in Yeka Sub city, Addis Ababa

Name of Principal investigator: BikileGedefa

Name of the organization:Addis Ababa University college of Health Sciences School of Public Health

Introduction: knowledge about Tuberculosis is the ability of patients correctly identify and respond to cause ,mode of transmission ,signs and symptom s ,possible ways of prevention of Tuberculosis and knowing reason for treatment, duration of treatment and consequences of stopping treatments.Different studies in Ethiopia showed that there is limited knowledge about the cause, mode of transmission and symptoms and appropriate treatment of tuberculosis. This information sheet and consent form was prepared for the selected public health facilities. The aim of the form is to make the above concerned body clear about the purpose of the research work, data collection procedures and get permission to work the research.

Aim of the study: The aim of this study was to assess the role of patient's knowledge about Tuberculosis on treatment adherence in Yeka Sub City, Addis Ababa

Procedure: To come up with the above-mentioned findings, data was collected using pretested and structured Amharic version questionnaire via face-to-face interview of the study participants. Data was be collected by two -health professionals and one supervisor after one day of training. Principal investigator to check the completeness of questionnaires during data collection.

Risk and/or Discomfort: we do not anticipate any harm resulting from the study, but there was a time the respondents has to spend in order to answer questions

Benefits: The study have no direct benefit for one who participated in this study. However, the indirect benefit of the research for the participant and all other patient in the service is clear. This is because if program planners are preparing predicted plan there is a benefit for patient in the program of getting appropriate care and service

Study Period: August 2018 -June 2019

Confidentiality: To keep the confidentiality of the patients, the information collected from this study kept confidential and information reviewed about the patients by this study is stored in a file, without name. Investigator use number codes to the record during the review. The information gathered is not accessible to anyone except the principal investigator and locked with appropriate locks/password

Person to contact: The research project proposal was reviewed and approved by Addis Ababa public health research and emergency management core process. If in case you want to know more information about the research and its undertakings, you can contact through the address below.

Investigator's name and address:

Bikile Gedefa (BSc)

Mobile:+251 923666364 Addis Ababa city administration yeka sub-city health woreda 10 heath center.

Email address: gbikilegedefa12@gmail.com

Advisor's name and Address:

1. Ayele Belachew, Addis Ababa University, School of Public Health, Addis Ababa Mobile:- +25913306792

   Email address: kelayab@gmail.com
2. Mengistu Worku (MPH-HI), Addis Ababa University, School of Public Health, Addis Ababa Mobile:- +25913593241

   Email address: newmany@gmail.com

Permission: Lastly but not least, you are kindly requested to permit and forward your permission to concerned body in your organization so that the researcher can get cooperation from the selected public health facilities and Addis Ababa health bureau.

Annex 2: English version informed consent sheet and questioners

Study information sheet

Addis Ababa University School of Public Health, a study was to assess the role of patient's knowledge about tuberculosis on treatment adherence in Public health facilities in Yeka sub city, Addis Ababa. Hello, my name is --------------. I am working with BikileGedefa who is doing a research as partial fulfillment for the requirement of MPH at Addis Ababa University College of Health Science School of Public Health.

Currently I am here & I would like to have discussion with you and gather information on level of knowledge and adherence of TB patients on TB. It takes 20 minutes, though it seems long time the study helps to improve behaviors by generating information about knowledge and attitude in relation with treatment adherence .

Your name will not be asked and unique identification is not required. You do not have to discuss issues that you do not want to. If you want to withdraw from the study any time along the discussion process, you will not be obliged to continue or give reasons for doing so. Refusing to participate or withdrawing from the study along the process will not have any consequences on you and the services provided to you. I would like to appreciate your help in responding to this interview. If you have any question or anything that is not clear please direct to BikileGedefa, Addis Ababa University College of Health sciences school of public health. Call phone 0923666364,Email:gbikilegedefa12@gmail.com. If you are clear with the information provided and agree to participate, please sign on the consent form attached.

Consent Form

I, the undersigned individual am oriented about the objective of the study. I have informed that all of my information will be kept confidential and used solely for this study. In addition, I have been well informed that my name will not be asked and unique identification is not required. I have the right not to discuss issues that I do not want to. If I want to withdraw from the study any time along the discussion process. I will not be obliged to continue or give reasons for doing so. However, my agreement to participate in this study is with the assumption that, the information that I provide during the discussion will help greatly to decrease the burden of the disease.

Signature ------------------- Date -------------------

Questionnaire ID: ------------------ Name of facility/hospital -------------------------date: / /

ENGLISH QUESTIONNAIRE

Part One: Socio- Demographic and behavioral status of the Patient

No	Questions	Response
101	Age of respondent in completed years	………
102	Sex of Respondent	1.Male 2.Female
103	Have you ever attended formal school?	1. Yes 2. No
104	The highest level of school attended?	1. No formal education 2. Primary 3. Secondary 4. Above secondary
105.	Occupation	1. House wife 2. Employed gov't/Private 3. Self-employee 4. Daily laborer 5. Student 6. Others
106	Average monthly income in Ethiopian birr	……… birr
107	Marital Status	1 Never Married 2.Married/living together 3.Divorsed/separate 4.Widowed
108	Have you ever smoked cigarette for the last 6 months?	1. Yes 2. No

109	Have you ever drunk Alcohol for the last 6 months?	1. Yes 2. No
110.	Do you have treatment supporter?	1. Yes 2. No

Part Two. Questions Related to Knowledge of patients about TB

<table>
<tr><th>No</th><th colspan="2">Questions</th><th colspan="2">Responses</th></tr>
<tr><td>201</td><td colspan="2">Have you heard about the disease called TB?</td><td colspan="2">1. Yes 2. No</td></tr>
<tr><td>202</td><td colspan="2">Where you did first got the information?</td><td colspan="2">1.Television/radio
2.Health worker
3. Posters/leaflets
4. Community events
5. News paper
6. Internet
7. Others</td></tr>
<tr><td>203.</td><td colspan="2">Do you know anyone who has TB disease, diagnosed by health worker at health facilities?</td><td colspan="2">1. Yes 2. No</td></tr>
<tr><th rowspan="2"></th><th colspan="2" rowspan="2">Questions</th><th colspan="2">Options</th></tr>
<tr><th>Mentioned</th><th>Not mentioned</th></tr>
<tr><td rowspan="5">204.</td><td rowspan="5">What do you think is the cause of tuberculosis?</td><td>1.Bacteria /germ</td><td>1</td><td>0</td></tr>
<tr><td>2.Cold weather</td><td>1</td><td>0</td></tr>
<tr><td>3.Shortage of food</td><td>1</td><td>0</td></tr>
<tr><td>4.Work load</td><td>1</td><td>0</td></tr>
<tr><td colspan="3">8.Other specify…………………………………………..</td></tr>
</table>

	Questions		Options	
			Mentioned	Mentioned
205	What are the symptoms of tuberculosis?	1. Cough ≥2weaks	1	0
		2. Fever	1	0
		3. Night sweat	1	0
		4. Chest pain	1	0
		5. Loss of appetite	1	0
		6. Weight loss	1	0
		7. Blood in sputum	1	0
		8.Other specify………………………………………………..		
	Questions		Options	
			Mentioned	Mentioned
206	How is tuberculosis transmitted?	1. Through air when coughing or sneezing	1	0
		2. Shared drinking utensils	1	0
		3. Drinking raw milk	1	0
		4. Blood contact with TB patients	1	0
		8.Other specify………………………………………………..		
207	Is it possible to prevent risk of developing TB infection?		1. yes 2.No 9. I don't know	
	Questions		Options	
			Mentioned	Mentioned
208	If yes, what are of preventing risk of	1. Taking medications that can reduce risk of developing TB infection	1	0

	developing TB infection?	2. Immunization	1	0
		3. Pasteurization of cow milk	1	0
		4.Balanced nutritional intake	1	0
		8.Other specify……………………………………………..		
	Questions		**Options**	
			Mentioned	Mentioned
209	How could a person with tuberculosis prevent the spread of TB to others?	1. Not coughing /sneezing in front of other People/covering mouth	1	0
		2. Not spitting outing the open everywhere/ Spit in a container with cup	1	0
		3. Ventilating the room/open windows	1	0
		4. Taking drugs properly	1	0
		5. Separating room for TB patients	1	0
		8.Other specify……………………………………………..		
	Questions		**Options**	
			Mentioned	Mentioned
210	Which organs do you think are affected by TB?	1. Lung	1	0
		2. Bone	1	0
		3. Lymph node	1	0
		4. Skin	1	0
		8.Other specify……………………………………………..		

Part Three: Questions Related to Knowledge of patients about TB Treatment

<table>
<tr><th>No</th><th colspan="2">Questions</th><th colspan="2">Responses</th></tr>
<tr><td>301</td><td colspan="2">Do you think TB could be cured with medications?</td><td colspan="2">1. Yes 2. No 9. DK</td></tr>
<tr><td>302</td><td colspan="2">What is the duration of anti TB medication?</td><td colspan="2">….month</td></tr>
<tr><td>303.</td><td colspan="2">How many weeks have you been on medication untiltoday?</td><td colspan="2">………</td></tr>
<tr><td>304</td><td colspan="2">Do you think that a patient with tuberculosis who is already treated and cured can spread tuberculosis?</td><td colspan="2">1. Yes 2. No 9. DK</td></tr>
<tr><td rowspan="2"></td><td colspan="2" rowspan="2">Questions</td><td colspan="2">Options</td></tr>
<tr><td>Mentioned</td><td>Not mentioned</td></tr>
<tr><td rowspan="3">305.</td><td rowspan="3">What do you think about the outcome of patient with TB if not treated?</td><td>1.Continue transmitting the disease in the community</td><td>1</td><td>0</td></tr>
<tr><td>2.Death</td><td>1</td><td>0</td></tr>
<tr><td colspan="3">8.Other specify……………………………………………..</td></tr>
<tr><td>306</td><td colspan="2">Drug discontinuation leads to MDR –TB?</td><td colspan="2">1. Yes 2. No 9. DK</td></tr>
<tr><td>307</td><td colspan="2">Do you believe that regular TB treatment intake is important for cure?</td><td colspan="2">1. Yes 2. No 9. DK</td></tr>
<tr><td>308</td><td colspan="2">Do you think that TB medications have side effects?</td><td colspan="2">1. Yes 2. No 9. DK</td></tr>
<tr><td rowspan="2"></td><td colspan="2" rowspan="2">Questions</td><td colspan="2">Options</td></tr>
<tr><td>Mentioned</td><td>Not mentioned</td></tr>
<tr><td rowspan="3">309</td><td rowspan="3">If yes, what are the side effects of tuberculosis medications you know?</td><td>1. vomiting and diarrhea</td><td>1</td><td>0</td></tr>
<tr><td>2. head ache and dizziness</td><td>1</td><td>0</td></tr>
<tr><td>3. Skin rash</td><td>1</td><td>0</td></tr>
</table>

		4. Numbness of feet and hands	1	0
		5. Urine color change	1	0
		8.Other specify…………………………………………..		
310	Did you experience any side effects when you were taking TB treatment?		1. Yes 2. No	
311	If yes, Which one did you experienced? (Specify)		………………	
312	Have you taking drug other than TB medications?		1. Yes 2. No	
313	If your answer is yes, for what purpose did you take?		………………	

Part Four: Questions Related to Tuberculosis treatment Adherence by using Medication adherence score MAS = 8-items

No	Questions	Responses
401	Did You sometimes forget to take your pills?	1. Yes 2. No
402	People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past 2 weeks, were there any days when you did not take your medicine?	1. Yes 2. No
403	Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?	1. Yes 2. No
404	When you travel or leave home, do you sometimes forget to bring along your medicine?	1. Yes 2. No
405	Did you take all your medicine yesterday?	1. Yes 2. No
406	When you feel like your symptoms are under control, do you sometimes stop taking your medicine?	1. Yes 2. No

407	Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?	1. Yes 2. No
408	How often do you have difficulty remembering to take all your medicine?	1.Never/rarely 2.Once in a while 3.Sometimes 4. Usually 5. Always

Annex 3: Amharic version informed consent sheet and questioners

የተሳትፎመጠየቅያቅፅ

ጤናይስጥልኝ ……………………………………. እባላለዉ፡፡

አሁንእዚህከእርስዎጋርበመገኘትስለቲቢያለዎትንዕዉቀትአመለካከትናስህክምናዉከትትልመወያየትናመረጃመሰብሰብእፈልጋለዉ፡፡ይህንንመረጃለመሰብሰብ 20 ደቂቃቢወስደምሚገኘዉለወደረጃለወደፊቱስለቲቢያለዉንእዉቀትአመለካከትየህክምናክትትልእዉቀትአመለካከትየህክምናክትትልእና በዚህላይተፅእኖየሚያመጡነገሮችንለማሻሻልየሚረዳመሆኑንበመገንዘብነዉ፡፡

በለዚህቃለምልልስለመሳመተፍስሞዎትንመግጽናሌሎችየግልመለያመዉሰድአያስፈልገኝምከእኔጋራሊወያዩባቸዉባልፈለጉባቸዉነገሮችዙሪያዉይይቱንእንዲቀጥሉአይገደዱም፡፡ቃለምልልሱንበፈለጉትጊዜማቋረጥይችላሉ፡፡ራሰዎንከቃለምልልሱሂደትለማግለልበማንኛዉምግዜቢወስኑእንዲቀጥሉምሆነለማቋረጥየፈጉበትምክንያትእንዲገልጹአይገደዱም፡፡

በጥናቱላይለመሳተፍፍቃደኛአለመሆንወይምጥናቱንአቋርጦመዉጣትበእርሶላይየሚፈጥረዉአንዳችነገርአይኖሪም፡፡ሆኖምግንእርስዎየሚሰጡንመረበጃየቲቢታማሚዎችስለቲቢያላቸዎንእዉቀትናአስተያትያለዉአስተዋጾየጎላነዉ፡፡በዝህቃለምልልስፍቃደኛቢሆኑልኝምስጋናየከፍየለነዉ፡፡ጥያቄካለዎትወይምየተሰጠዉማብራርያግልጽያልሆኔነገርካለቢቅሌገደፋስልክቁጥር 0923666364 ወይምኢሜልአድራሻ gbikilegedefa12@gmail.com ለማብራራትምሆነለመመለስዝግጁነኝ፡፡የተሰጥዎትንማብራርያከተረዱናበጥናቱለመሳተፍፍቃደኛከሆኑእባክዎንለዚህወረቀትጋርበተያያዘዉየስምምነትመግለጫላይፊርማዎንያሳርፉ፡፡

የስምምነትማረጋገጫቅጽ

እኔበፊርማየበስተመጨረሻዉመስመርላይየሚገኘዉግለሰብየዚህጥናትኣላማተገልጾልኛል፡፡በተጨማሪምእኔየሚሰጠዉመረጃለዚህጥናትብቻእንደምዉልናበሚስጠጥርእንደሚያዝተገልጾልኛል፡፡

በዚህጥናትለመሳተፍስምናሌላየግልአድራሻመግለጽእንደሚያስፈልገኝተረድቻለዉ፡፡ከዚህተጨማሪምመወያየትስለማልፈልጋቸዉጉዳዮችላይእንድወያይወይምመመለስየማልፈልጋቸዉንጥያቄዎችእንድመልስእንደማልገደድናበጥናቱላለመሳተፍመወሰንምበፈለኩትጊዜበቃለምልልሱተሳታፊነቴንማቋረጥእንደምችልናሳቋርጥምለማቋረጥየፈለኩበትንምክንያትለማስረዳትእንደማልጠየቅእንዲሁምለጥናቱለመሳተፍፍቃደኛአለመሆኔወይንምነጥናቱሂደትላይተሳታፊከሆንኩበኋላአቋርጬመዉጣቴበኔላይየሚደርሰዉአንዳችምተጽኖንደለሌተረድቻለሁ፡፡

ሆኖምእኔበዚህጥናትላይተሳታፊለመሆንስማማበሚገኘዉጠቃሚመረጃየቲቢነሽታእደረሰያለዉንጫናለመቀነስየሚረዳመሆኑንተስፋለማድረግነዉ፡፡

ፊርማ………………………… ቀን…………………………….

የአማርኛመጠየቅ፤ ክፍልአንድ፤አጠቃላይየተጠያቂዉመግለጫ

ኮድ	**መጠይቅ**	**አማራጭመልስ**
101.	እድሜበአመት	………………
102.	ጾታ	1. ወንድ 2. ሴት
103.	ትምህርትተምረዋል ?	1. አዎ 2. አልተማርኩም
104.	ያጠናቀቁትከፍተኛየትምህርትደረጃስንትነዉ	1. የቀለምጠምህርትያልተማረ 2. የመጀመርያደረጃ 3. ሁለተኛደረጃ 4. ከዝያበላይ
105.	ሥራዎ	1. የቤእመቤት 3. መንግስት/የግልተቀጣሪ 4 .የግልስራ 5. የቀንሰራተኛ 6. ተማሪ 7. ሌሎች
106	የወርገቢዎበእትዮጵያብር	…………
107.	የጋብቻሁኔታ	1. ያላገባ 2. ባለትዳር

		3. የተለያዩ/ የተፋቱ 4. ባለቤትዎየሞተ/ የሞተች
108.	በዚህስድስትወርዉስጥሲጋራአጭሰዉያዉቃሉ?	1.አዎ2. አላዉቅም
109.	በዚህስድስትወርዉስጥአልኮልያለዉመጠጥጠጥተዉያዉቃሉ?	1. አዎ 2. አላዉቅም
110	ለህክምናየሚያግዘዎትሰዉአለ	1. አለ 2.የለም

ክፍልሁለት፤ የቲቢታካሚዎችበበሽታዉላይያላቸዉእዉቀትለመለካትየቀረበጥያቄ

ኮድ	**መጠይቅ**	**አማራጭመልስ**	
201.	ቲቢስለሚባለዉበሽታሰምተዉያዉቃሉ?	1. አዎ 2. አላዉቅም	
202	መረጃዉንከየትአገኙ/ሰሙ?	1. ከሬዲዮ/ ከተሌቪዢን 2. ከጤናባለሙያዎች 3. ከፖስተሮችናበራሪፅፎች 4. ከህዝብግንኙነቶች 5. ከጋዘጣ 6 ከኢንተርኔት 8. ሌላካሌይጥቀሱ.........	
203.	በቲቢየተያዘ/ች ሰዉንያዉቃሉ?	1. አዎ 2. አላዉቅም	
	መጠይቅ	**አማራጭ**	
		ተጠቅሶዋል	አልተጠቀሰም

204.	የቲቢመነሻ/ምክንያትምንድንነዉ? ከታችከተዘረዘሩትዉስጥከተጠቀሰ ;ቁጥር 1 ን ካልተጠቀሰደግሞቁጥር 2 ን አክብብ /ቢ	1. ረቂቅበሽታተህዋስያን/ጀርም	1	0
		2.ብርዳማ አየርሁኔታ	1	0
		3.የምግብ እጥረት	1	0
		4.የስራ ጫና	1	0
		ሌላካለይጥቀሱ		
	መጠይቅ		**አማራጭ**	
			ተጠቅሶዋል	አልተጠቀሰም
205	የቲቢበሽታምልክቶችምንምንናቸ ዉብለዉያስባሉ?	1.ከሁለት ሳምንትያለፌሳል	1	0
		2.የሰዉነት ሙቀትመጨመር	1	0
		3.ማታ ማታላብ	1	0
		4 የደረትዉጋት	1	0
		5.የምግብ ፍላጎትመቀነስ	1	0
		6.ክብደት መቀነስ	1	0
		7.ደም የቀላቀለአክታ	1	0
		8 ሌላካለይጥቀሱ……………………………………………..		
	መጠይቅ		**አማራጭ**	
			ተጠቅሶዋል	አልተጠቀሰም
206	የቲቢበሽታከታመመዉሰዉ ወደጤነኛሰዉእንዴትሊተላ ለፍይችላል?	1.በሳልና በትንፋሽ	1	0
		2.የመጠጫ እቃዎችንአብሮበመጠቀም	1	0
		3.ያልፈላ ወተትበመጠጣት	1	0

		4.በቲቢ ታማሚደምንክኪ	1	0
		8.ሌላ ካሌይጥቀሱ		
207	በቲቢበሽታየመዝአድልንመከላከልይቻላል ?		1. አዎ 2. አይቻልም9. አላዉቅም	
	መጠይቅ		አማራጭ	
			ተጠቅሶዋል	አልተጠቀሰም
208	መልስዎአዎከሆነቲቢንእንደ ትመከላከልቻላልብለዎስባሉ ?	1.በቲቢ የመያዝአድልንምቀንሱመዲሃንትበመዎሰድ	1	0
		2. ህፃናትበማስከተብ	1	0
		3. ወተትአፍልተበመጠጣት	1	0
		4.የአመጋገብ ሁነታቺንንማስተካከል	1	0
		8.Other specify…………………………………………..		
	መጠይቅ		አማራጭ	
			ተጠቅሶዋል	አልተጠቀሰም
209	የቲቢታማሚየሆነሰዉ ቲቢወደሌላሰዉእንዳ ያስተላልፍምንማድረ ግአለበትብለዉያስባሉ ?	1.ሰዎች ፊትላለማሳል / ላለማስነጠስ/አፍንመሸፈን	1	0
		2.በየሜዳ ላይላለትፋት/ እቃዉስጥበመትፋት	1	0
		3.መኖርያ ቤትዉስጥነፋሻማአየርእንዲገባማድረግ/መስኮትመከፈት	1	0
		4.የቲቢ መድሃኒትበአግባቡመዉሰድ	1	0
		5.የቲቢ ታካሚለብቻቤትመለየት	1	0
		8.ሌላ ካሌይጥቀሱ……………………………………………..		
	መጠይቅ		አማራጭ	
			ተጠቅሶዋል	አልተጠቀሰም
210	ቲቢየትኛዉንየሰዉነት	1.ሳምባ	1	0

	አካልያጠቃልብለዉያ ስባሉ ?	2.አጥንት	1	0
		3.እጢዎችን	1	0
		4.ቆዳን	1	0
		8.ሌላ ካሌይጥቀሱ…………		

ክፍልሶስት፤ የቲቢታካሚዎችበህክምናዉላይያላቸዉእዉቀትናየህክምናሁነታለመለካትየቀረበጥያቄ

ኮድ	መጠይቅ		አማራጭመልስ	
301	የቲቢበሽታታክሞመዳንይችላልብለዉያስባሉ?		1.አዎ 2. አይችልም 9. አላዉቅም	
302	የቲቢየህክምናለምንያህልግዜነዉ		.........ወር	
303.	የቲቢየህክምናከጀመሩስንትግዘሆኖዉታል ?		………	
304	የቲቢታካሚመድሃንቱንበትክክልወስዶከዳነበኋላቲቢንማተላለፍይችላልብለዉያስባሉ?		1. አዎ2አይችልም9. አላዉቅም	
	መጠይቅ		አማራጭመልስ	
			ተጠቅሶዋል	አልተጠቀሰም
305.	በቲቢየተያዘሰዉባይታክምዉጤቱ ምንሊያስከትልይችላልብለዉያስባሉ?	1.ህብረተሰቡ ዉስጥቲቢንማስተላለፉንይቀጥላል	1	0
		2.ሞት	1	0
		8.ሌላ ካሌይጥቀሱ…………………		
306	የቲቢንመዳንትማቋረጥመድሓኒትንለተላመደቲቢያጋልጣል ;ባሌዉያስባሉ?		1.አዎ 2.አደለም 9.አላዉቅም	
307	የቲቢመድሓኒትንሳያቋርጡ/በትክክልመዉሰድለመዳንወሳኝነዉ ;ባሌዉያስባሉ?		1.አዎ 2.አደለም9.አላዉቅም	
308	የቲቢመድሃንትየጎንዮሽህመሞችሊያስከትልይችላል ;ባሌዉያስባሉ??		1. Yes 2. No 9. DK	
	መጠይቅ		አማራጭመልስ	

			ተጠቅሶዋል	ተጠቅሶዋል
309	መልስዎአዎከሆነምንአይነትየጎንዎ ሽ ህመሞችንያዎቃሉ?	1.ተቅማጥና ትዉከት	1	0
		2.የራስ ምታትናማዞር	1	0
		3.የቆዳ ላይሽፍታ	1	0
		4.የእጅና እግርመደንዘዝ	1	0
		5.የሽንት ቀለምመቀየር	1	0
		8.ሌላ ካሌይጥቀሱ………………………………………………………………..		
301	እርስዎየቲቢመድሃኒትየጎንዮሽችግርአጋጥሞትያዉቃል ?		1. Yes 2. No	
311	መልስዎአዎከሆነየትኛዉየጎንዎሽህመምአጋጥሞትያዉቃል ? ይጥቀሱ		………………	
312	ከቲቢመድኀኒትዉጭየሚወሰዱትመድኀኒትአለ?		1. አለ 2. የለም	
313	መልሰዎአለከሆነለምንድንነዉየሚወስዱት		……………	

ክፍልአራት ፤ ሞሪስኪመድኃኒትንበታዘዘዉመሰረትበአግባቡስለመዉሰድመለኪያ- 8

ኮድ	መጠየቅ	አማራጭመልስ
401.	አንዳነድገዜመዲኃኒተዎንረስተዉሳይወሰዱቀርተዉያዉቃሉ?	1. አዎ 2. አላዉቅም
402.	ሰዎችአንዳንድጊዜከመርሳትዉጭባሉትየተለያዩምክኒያቶችመድኀኒታቸዉንሳይወሰዱይቀራሉ፡፡ባለፉትሁለትሳምንታት፤ መድኀኒትዎንሳይወስዱየቀሩበትቀናቶችነበሩ?	1. አዎ 2. የለም
403.	ሐኪምዎንሳይነግሩ፤መድኀኒትዎንእየወሰዱህመመዎሲባባስ፤መድኀኒትዎንአቐርጠዉያዉቃ	1. አዎ

	ሉ?	2. አላዉቅም
404.	በጉዞምክንያትወይምከቤትዎአርቀዉሲጋዙ፤ አንዳንድጊዜመድኀኒትዎን (ወደጉዞዉ) ረስተዉሳይወስዱትያዉቃሉ?	1. አዎ 2. አላዉቅም
405.	በትላንትናዉዕለትሁሉንምመዳኀኒትዎትንወስደዉታል	1. አዎ 2. አልወሰድኩም
406.	ህመመዎሲሻለዎት (የህመምስሜቶችሲጠፉ) አንዳንድጊዜመድኀኒተዎንአቁርጠዉየዉቃሉ?	1.አዎ 2. አላዉቅም
407.	በየቀኑመድኀኒትሙዉሰድ፣ ለአንዳንድሰዎችምቾትአይሰጣቸዉም፡፡እርሰዎበየቀኑ፣እንዲሁምአንድምስአትሳያዛንፉመድ ኀኒትዎንበመዉሰደዎ፣የመሰላቸትስሜትተሰምቶዎትያዉቃል?	1. አዎ 2. አያዉቅም
408.	መድሀኒትዎንአስታዉሰዉለመዉሰድምንያህልይቸገራሉ	1. በጭራሽአልቸገርም 2.ከእለታት አንዳንድጊዜ 3.አንዳንድጊዜ 4.አብዝሀኛዉንጊዜ 5.ሁልጊዜይቸግረኛል

ግዜዎንስለሰጡንእጅግበጣምእናመሰግንዎታለን !

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