

**PREVALENCE AND ASSOCIATED FACTORS OF ANTI-TB TREATMENT
NON-ADHERENCE AMONG PULMONARY TUBERCULOSIS PATIENTS IN
PUBLIC HEALTH CARE FACILITIES IN DAWURO ZONE, SOUTH WEST
ETHIOPIA**

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Prevalence and Associated Factors of anti-TB Treatment Non-Adherence
among Pulmonary Tuberculosis Patients in public health care facilities in
Dawuro Zone, South West Ethiopia

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Abstract

Background: *Non-adherence to treatment remains a major obstacle to efficient tuberculosis control in developing countries. Patients' adherence to their medication regimens and sputum re-examination was influenced by the interaction of a number of factors. High adherence of patients to their treatment and successful follow up is the major mechanism to prevent the emerging of multi drug-resistance and extensive drug-resistant form of tuberculosis.*

Objective: *The main objective of this study was to estimate prevalence and assess the associated factors of anti-tuberculosis treatment non-adherence among pulmonary tuberculosis patient in public health care facilities, Dawuro Zone, South Nation Nationality Peoples Region.*

Methods: *A cross-sectional study on 261 patients receiving anti-tuberculosis treatment was conducted. Patients were directly interviewed and clinical data were collected from registration book. In addition, in-depth interview was conducted on 10 participants to supplement quantitative data. Patients who had missed 10% of their total prescribed doses of TB drugs were considered as non-adherent. To identify independent predictors of treatment non-adherence, multivariate logistic regression was used.*

Result: *Among total pulmonary tuberculosis patients, 24.5% of patients had missed more than 10% of their total prescribed dose of medication. In multivariate analysis, knowledge of disease and its treatment (AOR=4.6, 95%CI=1.4-15.6), travelling cost to get treatment (AOR=4.7 95%CI=1.7-13.4), availability of health education at every visit (AOR=3, 95% CI=1.1-8.4) and distance of treatment center from individual home (AOR= 5.7, 95%CI=1.9-16.8) were positively associated with treatment non-adherence. The in-depth interviews similarly indicated that financial burdens, distance of treatment center and lack of awareness were potential factors accounted for non-adherence.*

Conclusion: *Prevalence of treatment non-adherence was higher in study area. More emphasis should be given to improve patient's adherence by resolving such contributing factors for treatment non-adherence. Making tuberculosis treatment services more accessible to users, organizing counseling and health education sessions at the treatment center improve patient's treatment adherence status.*

Key words: *Non-adherence, tuberculosis, Dawuro*

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ACRONYMS

- ❖ AIDS: Acquired Immunodeficiency Syndrome
- ❖ AOR: Adjusted Odds Ratio
- ❖ ART: Anti-Retroviral Treatment
- ❖ BPR: Business Process Re-engineering
- ❖ CDR: Case Detection Rate
- ❖ CI: Confidence Interval
- ❖ COR: Crude Odds Ratio
- ❖ CPT: Co-trimoxazole Preventive Therapy
- ❖ CR: Cure Rate
- ❖ DOTS: Directly Observed Treatment Short-course
- ❖ EHNRI: Ethiopian Health and Nutrition Research Institute
- ❖ EPTB: Extra Pulmonary Tuberculosis
- ❖ FMOH: Federal Ministry Of Health
- ❖ HAART: Highly Active Anti retro Viral Therapy
- ❖ HBC : High-Burden Country
- ❖ HIV: Human Immunodeficiency Virus
- ❖ MDR: Multi Drug Resistance
- ❖ NTLCP: National Tuberculosis and Leprosy Control Program
- ❖ PCP: Pneumocystis Carinii Pneumonia
- ❖ PTB +ve :Smear Positive Pulmonary Tuberculosis
- ❖ PTB: Pulmonary Tuberculosis
- ❖ PTB-ve :Smear Negative Pulmonary Tuberculosis
- ❖ SNNPR: South Nation Nationality Peoples Region
- ❖ SSC: Sub Saharan Country
- ❖ TB: Tuberculosis
- ❖ WHO: World Health Organization
- ❖ X-DR : Extensive Drug Resistant

1. INTRODUCTION

1.1 Back ground

Tuberculosis is a major public health problem throughout the world. About one third of the world's population is estimated to be infected with tubercle bacilli and hence at risk of developing active disease. According to the WHO Global TB Report 2011, there were an estimated 9 million annual incident cases of TB globally, from the total 9 million incidence TB case, about 26% occurred in Africa in 2010 (1, 2). According to national tuberculosis control in health department of South Africa in 2006 an estimated incidence case was 940 per 100,000 population this indicates the problem is more sever in developing countries compared with 139 cases per 100,000 globally (3). WHO report 2008 also indicated that the prevalence all form of TB in Nigeria, Uganda and Kenya per 100,000 were 615,561 and 334 respectively (4). Under 15 years Children TB incidence accounts 1million (11%) from total global tuberculosis burden and of these 75% of these occurs in the 22 high-burden countries (1, 2, 5). According to WHO global facts of tuberculosis report, the number of people who died from TB decreased to 1.4 million in 2010, including 350,000 people with HIV. The same report revealed that TB was among the three greatest causes of death among women aged 15-44, 320,000 women died from TB in 2010 (2).

Ethiopia stands 8th place in the HBC rank based on estimated number of cases. The incidence of TB in Ethiopia is estimated to be 152 and 341 per 100,000 populations for new smear positive pulmonary and all forms of TB respectively in 2007 (6, 7). The prevalence of Tuberculosis of all forms in the same period is estimated at 546 per 100,000 populations (6). According to the WHO global TB report 2011, there were an estimated 220,000 (261 per 100,000) incident cases and the prevalence of TB was estimated to be 330,000 (394 per 100,000) in Ethiopia in 2010. The same report showed that, there were an estimated 29,000 deaths (35 per 100,000) due to TB, excluding HIV related deaths, in Ethiopia during the same period. According to health and health related indicators of the FMOH, in 2009/10 tuberculosis was the second cause of death in Ethiopia (1). During the year 2010/11, a total of 159,017 TB cases were notified in Ethiopia. Among this 159,017 total TB cases, 151,866 (95.5%) were new TB cases of all forms. The

proportion of new smear-positive, smear negative and EPTB among all new cases is 32.7%, 34.8%, and 32.5% respectively (1). In Ethiopia, among new pulmonary TB and retreated pulmonary TB cases notified in 2010, there were an estimated 1600 and 580 MDR TB cases, respectively (1). Drug-resistant TB is a man-made problem, largely being the consequence of human error as a result of individual or combination of factors related to management of drug supply, patient management, prescription of chemotherapy, and patient non-adherence (8). According to SNNPR Health department annual performance report, about 24554 all form of TB cases were registered in 2009.

1.2 Statement of Problem

Adherence is interchangeably used with the term compliance in describing the extent to which patients follow the recommendations of their healthcare provider on medication, diet and life style modifications to ensure favorable clinical outcomes (9). In global tuberculosis control program, patient non-compliance with treatment protocols affects the success of anti-tuberculosis campaigns and the health of patients (10). Non-adherence refers to absence of adherence and includes taking an incorrect dose, taking medications at incorrect times, not taking prescribed doses of medication, interrupting or stopping therapy before the recommended duration (9). Optimal treatment outcome of tuberculosis treatment needs at least 90% patient adherence for their treatment and recommended follow-up. A case control study done in China indicated that interruption of treatment was strongly associated with non-cure (OR = 8.7, 95 % CI 3.9 - 18.4) (11). Poor adherence to treatment is common despite various interventions aimed at improving tuberculosis treatment completion worldwide (12). In many countries globally, the adoption of Directly Observed Treatment (DOT) has been associated with reduced rate of drug resistance, relapse and treatment failure. But its impact in reducing incidence TB has been limited by patient's non-adherence to DOTS (12). Various studies showed that many people with TB do not complete their six-month course of TB medications, thereby putting themselves at risk of relapse and developing MDR& X-DR form of TB. They are also risk for their communities (13). A cross sectional comparative study done in china between October 2008 and January 2009 showed that 9.4% of patients reported having taken less than 90% of the drug from total doses prescribed. The same study revealed that on average 9.4% (range: 0%-21.0%) of TB patients missed more than 10% of the number of prescribed doses (14). Another study

done in India showed that about 16% of patients were non-adherent to the anti-TB therapy due to various reasons (8). Similarly another study conducted in the same country indicated that overall proportion of treatment non-adherent was 12.2 % and approximately half of non-adherent patients interrupted their treatment intermittently (missed a total of more than 10% of all doses) and 50% stopped treatment before receiving 90% of their prescribed course of treatment (15). Various studies revealed that, the problem of non-adherence is also significant in Africa. A retrospective cohort study done in Cameroon based on hospital registration revealed that treatment success rate was 68.4% and the cumulative incidence of treatment discontinuation was 20% overall and among this, smear-positive pulmonary tuberculosis patients accounts about 19.4% (16). Another cross-sectional study in South Africa also indicated similar findings; from the total 255 patients 121 (47.5%) patients did not complete their TB treatment (17).

As other countries, Ethiopia subscribed to the internationally accepted World Health Organization (WHO) strategy for TB control and the DOTS programme was implemented since 1997(1). In addition, the country has adopted the WHO recommended tuberculosis treatment regimes. Although treatment duration for new TB patients was revised and previous 8 month treatment schedule was reduced to 6-months (1, 7, 18) but significant numbers of patients interrupt their treatment before completing and medical follow-up as national implementation guide line recommendation for various reasons. Five year retrospective analysis of the profile in Northwest Ethiopia revealed that, 18.3% of the patients were not completed their treatment and treatment success rate was also unsatisfactorily low (19). Another cohort Study done in South Ethiopia showed that about one-fifth of the registered PTB cases failed to complete treatment and 20% of the patient interrupts their treatments in intensive phase and continuation phase. From those, about 91% of the patients interrupt at intensive phase of the treatment; 77% of patient completes their treatment success fully (20).

Majorities of research done in Ethiopia focused on already defaulted patient and there is no research focused to reason out why patients missing their daily dose and associated factors before completely defaulting from the treatment. Drug interruption for long period may result poor treatment outcome including non-cure and contributing for emergence of MDR and X-MDR form of TB.

The management of drug resistance tuberculosis is costly and the treatment outcome is not good compared with drug susceptible form. This is another challenge, particularly for developing countries TB control program. Numerous studies revealed that factors such as expense, knowledge about the disease, and social and economic factors may play a role in patients' refusal to comply with treatment (10). Lack of a comprehensive and holistic understanding of barriers and facilitators of treatment adherence is currently a major challenge to finding effective solutions for treatment interruption (21).

Therefore, the aim of the current study is to estimate the prevalence of non-adherence and identifying the reasons why patients missing their prescribed daily dose and interrupts before completing their treatment.

2. LITERATURE REVIEW

2.1 Over view of DOTs program

In 1994 WHO launched that the Directly Observed Treatment, Short-course (DOTS) Strategy, which is the brand name of the internationally recommended strategy for TB control, the DOTS strategy ensures that infectious TB patients are identified and cured using standardized drug combination (7). Ethiopia applied DOTS strategy since 1997. In addition, the country has adopted the WHO recommended tuberculosis treatment regimes. Ethiopia has revised the treatment duration for new TB patients in such a way that, the previous 8 months treatment schedule reduced to 6-months (1, 7, 18). In many countries globally, the adoption of Directly Observed Treatment (DOT) has been associated with reduced rate of treatment failure, relapse and drug resistance. However, its impact in reducing TB incidence has been limited by non-compliance to DOT, which occurs when patients do not turn up for treatment at the health facility or community DOT point (12).

Adherence is critical for successful TB control. Patients who do not adhere to their treatment regimen remain infectious longer, take longer to complete treatment and are more likely to relapse or develop drug resistance than patients who do adhere. Drug-resistant TB is a man-made problem, largely being the consequence of human error as a result of individual or combination of factors related to management of drug supply, patient management, prescription of chemotherapy, and patient adherence (22). DOTS program promote proper case detection good patient treatment adherence rational diagnosis and providing standard medication. So it considered as the best weapon against MDR (7). But many people with TB do not complete their six-month course of TB medications, thereby putting themselves at risk of relapse and themselves and their communities at risk of multidrug-resistant and extensively drug-resistant forms of TB (13). A proportion of patients stop treatment before completion, for various reasons. So, strict adherence to both treatment and medical follow up should be ensured to cure the patients and prevent the development of drug-resistant TB (23).

2.2 Prevalence of TB treatment non- adherence

Patient compliance is a key factor to tuberculosis treatment success and treatment out come. Patients interrupt and stop the treatment due to different reasons. Strict adherence to treatment should be ensured to cure the patients and prevent the development of drug-resistant TB (6). Different studies indicated that, globally the prevalence of anti-TB treatment non-adherence is very significant. A cross-sectional study done in India indicated that about 16% of TB patients were non-adherent for their treatment (8). Another cross sectional comparative study conducted in China between October 2008 and January 2009 showed that, 9.4% of patients reported having taken less than 90% of the drug doses prescribed. The same study revealed that on average 9.4% (range: 0%-21.0%) of TB patients missed more than 10% of the number of prescribed doses (14). The prevalence of this problem is also high in Africa including Ethiopia. A cross-sectional study done in South Africa reported that, about 47.5% of TB patients were interrupted their treatment before completing (17). In Ethiopia the exact prevalence of non-adherence is not known, but a cohort study conducted in south Ethiopia reported that 20% of TB patient were not completed their six month treatment (20).

Sputum re-examination during treatment is important to monitor patient's response for therapy and it helps for early detection and management of any indicators of poor treatment out come. It is also important to prevent non-adherence to treatment including defaults and base for deciding patient's treatment out come. National tuberculosis guideline recommends three time sputum re-examination during treatment follow up at specific time in each treatment regimen and phases (1). Most of the patients are not follow this recommendation for various reasons. A comparative cross-sectional study conducted in China revealed that, about 17.6% patients did not have all sputum re-examinations (14). In Ethiopia the problem is assumed to be similar but there is no written evidence about its prevalence.

2.3 Factors associated with treatment non-compliance or treatment non-adherence

- Patients' adherence to their medication regimens was influenced by the interaction of a number of factors, which affecting patient's treatment adherence either positively or negatively. These various factors may include socio-demographic and

socio economic factors, health service factors, personal factors, behavioral factors and medication related factors.

2.3.1 Socio-demographic and economic factors

Socio-demographic and socioeconomic variations of TB patients affect their adherence to treatment and medical advises including regular sputum re-examination and follow-up care. A cross-sectional study done in china showed that patients, who were illiterate (OR= 2.38, 95%CI: 1.37-4.13), divorced/widowed (OR= 2.42, 95%CI: 1.30-4.52), lacked health insurance OR=1.89, 95%CI: 1.07- 3.32) and migrants (OR=1.98, 95%CI: 1.03-3.83) were more likely to be non-adherent (15). Another retrospective cohort study using Brazilian Disease Notification System data from 2005 to 2010 showed that older patients were at lower risk of interrupting treatment, the older the patients the lower the association with defaulting (OR 0.98; p 0.001). The same study revealed that each year of life reduced non-compliance by 2% and also males showed 45% greater risk of default (24). Unlike the above, a quantitative cross-sectional study in Nepal reported that younger TB patient were more adherents than the old age, patients age 15-34 year had significantly high percent of compliance compared to old age (p 0.02) (25). A cross-sectional study in India indicated that rates of non-adherence were 18% and 12% among men and women respectively, but the difference was not statistically significant (p=0.09) (8). A study conducted in the Southern Region of Ethiopia reported that, males were more likely to default than females (11.9% vs. 10.2%, P= 0.04) (26). A case control study in Kenya showed that male gender (OR 1.43; 95% CI 1.15-1.78) were independently associated with default (27). Patient educational level also another socio-demographic factor associated with their treatment compliance and has significant effect on treatment outcome. A case control study in Kenya showed that, among 55.8% who had education lower than secondary level, the majority (71.4%) were defaulters and only 43.2% were good adherents (27). Also a cross-sectional study in Nepal revealed that adherence proportion was high among the higher education group compared with illiterate (13.1% & 4%, p 0.019) (28). Study done in China showed that, high proportions of illiterate patients were non-adherent and the association was also significant (OR: 2.42; 95% CI: 1.25-4.67 and p 0.008) (15). Other important factors are patient's income and employment status which also have a great role on treatment and follow up. A quantitative cross-sectional stud in Nepal reported that patient who had high

family income had higher proportion of compliant with DOTS, the association was also statistically significant ($p = 0.02$) (25). Other case-control study in Nepal revealed that poor socio economic status such as low status occupation and employment status, low annual income and burden of travel cost to reach the treatment facility has significant association with treatment adherence (29).

2.3.2 Patient related factors

Patient related factors represent the availability of resources, knowledge, attitudes, beliefs, perceptions and expectations of the patient towards tuberculosis and its treatment. These factors can influence patient treatment adherence.

Patients knowledge, attitudes, and beliefs about the disease TB, its treatment, and patient interpretations of illness and wellness, can act as a “filter” for the information and treatment offered by the health services (21). Patients’ interpretations of illness and wellness may also affect adherence in that they may consider themselves cured when they no longer have TB symptoms (37). A cross sectional study in India, Anand district showed 15.8% & 10.5% of patients interrupt their treatments due to feeling better during treatment and lack of knowledge about various aspects of TB and its treatment respectively and about 48 % of patients thought they were cured (30). Also cross-sectional study done in Palpa district of Nepal reported that more than half of non-compliance was associated with poor knowledge and perceptions towards the tuberculosis and its treatment. The same study reported that patients with high level of knowledge about the disease were more adhered for their treatment compared with patients with low knowledge about the disease and its treatment (78 % and 51.3% respectively, $p = 0.02$) (25). Another study done India showed that the reasons for not taking medication for 10.5% non-compliance were lack of knowledge about various aspects of TB and its treatment (31). A cross-sectional study conducted in Andara Kavango region of Namibia reported that among non-adherent patients 27% were interrupted their treatment due to feeling better (12). Similar study in Morocco indicated that, 72.9% of non- adherent patient’s reported that ‘feeling better’ as the first reason for their interruption (32). Other cross-sectional study in Nepal stated these facts, about 84% non- adherent patients were interrupted treatment soon after they felt better and/or around two months after initiating chemotherapy (28).

Drug side effects and toxicity has negative effect on patient's treatment adherence. Various studies showed that, some of the patients were complaining that adverse drug reaction and fear of the risks of adverse drug reactions leads them to interrupt their treatment. A cross-sectional study done in china stated/reported that about 37.8%, 15.9% and 15.9% patients were listed adverse reactions to anti-tuberculosis drugs, long course regimen and worry about dangers of drugs respectively as the reason for non-adherence (15). Another cross-sectional study done in India also revealed that, about 20.26% of non-compliance was due to fear of adverse drug reactions (30). A case control study done in China revealed that, about 42% of non-adherent patients were due to drug related problems (11). Study done in Morocco indicated, about 9.4% non-adherent patients were reported "feeling better" as the reason for their interruption before cure (32).

Patients with co-morbidity are forced to take medications for both or more problems concomitantly, but this has negative effect on their treatment adherences. Cross-Sectional study done in Tercha hospital reported that only 79.2% patients were adherent for TB medication among patient with TB and HIV infection (33). Patients are also become non-adherent due to number of anti-TB medication itself. A cross-sectional study conducted in China stated that, about 15.9% of non-compliant patients were reported long course regimen and large dose of drugs as reason for their interruption (15).

2.3.3 Behavioral factors

Patient behavior has a great role on their treatment adherence and regular medical follow up. Alcohol consumption and smoking during treatment period affect patient treatment adherence negatively (8). Un published cross-sectional Study in Namibia indicated that among patients who had drunk alcohol, 58% did not complete TB treatment or were non-compliant, compared to 42% patients in the same non-compliant group who had not drunk any alcohol. This study also revealed that among non-compliant 31% had smoked in previous six month and 26% were non-smoker (12). Other case-control study in Kenya also reported that recurrent use of alcohol (alcohol abuse) and consequently forgetting to take drugs and eventually defaulting was cited by 7.5% of defaulting patients and the association of alcohol use and non-adherence was significant(OR 4.97; 95% CI 1.56-15.9) (27). Also study done in South India showed that, 27% ($p < 0.001$) patient who use alcohol during treatment were defaulted. But a cross-sectional study done in Mbarara Hospital Uganda

reported that there was no association between smoking, drug abuse and non-adherence to their treatment (34). In some areas, fear of social stigma is one of contributing factors for patients to interrupt their treatment. A cross-sectional study done in China stated that majority of patients responded that stigma was one of the reason for interruption of treatment (15). Another case-control study in Kenya also indicated that stigma towards TB is associated with defaulting from treatment (OR 2.28; 95% CI 1.35 -3.7) (27).

2.3.4 Health service factors

Health service factors including the convenient TB clinic opening times, waiting time at the TB clinic, the attitude of the health worker at the clinic (patient-provider relationship), distance and cost of getting to the clinic, availability of medicines at the clinic and the DOT status affects the compliance of patient for their treatment and medical follow up (12,21). Different studies revealed this fact. A cross-sectional study done in India showed that missing treatment due to lack of drug availability was also significantly associated with non-adherence (OR=5.6, 95% CI:1.8-15). The same study also stated that about 8% of non-adherent patients missed treatment due to non-availability of drugs at DOTs site (8). Another study conducted in Nepal showed that 28 % of non-adherent patients reported inconvenient opening time of DOTS clinic as the reason for interrupting the treatment (28). Physical accessibility of health care facility also affects the adherence of patients for their treatment. Long distance may increase the indirect cost for patient, like transportation cost and loss of working time. Cross-sectional study conducted in India stated that travel related factors were major determinants of non-adherence among the newly diagnosed patients. This study also stated that several travel-related problems, long distances to the DOTS center and loss of time during travel were mainly related to non-adherence (8). A cross-sectional study conducted in Andara Kavango region of Namibia reported that among, 31% non-adherent patients were provided that distance of treatment facility as a reason for their treatment interruption (12). A study conducted in South Ethiopia indicated that physical access to health care service was one of the factors associated with treatment non-completion in addition to patient's age and level of education. This study revealed that distance from home to treatment center was significantly associated with treatment non-completion (p 0.001) and it also stated that, 52% defaulter were travel more than 10 km (20).

A cross-sectional study in Nepal stated that travelling time was strongly associated with better compliance. Among TB patient who took less time, about 74.2% were adhered to the treatment. Other cross-sectional study in the same country reported that patient traveling less than 10minutes for treatment were highly adhered than patient travel more than 30min,36.2 & 32.3,p<0.001(25,28).

Patient treatment supporter and social support from family and their relatives has main role in patient treatment completion and its outcome. Patient who has support and supervisor during their treatment has highly adherent and has good treatment out come. A cross-sectional study done in Nepal revealed that, presence of community treatment supporter has positive association with good treatment adherence (p 0.001). The same study also stated that, 73% of patient who meet their treatment supervisor were adhered for their treatment compared with only 47.8% among those who did not meet (25). Comparative cross-sectional study done in Indonesia showed that half of the elderly and low educated people had to stop treatment due to lack of social support or no treatment observer that checked if they take their medication, bring them to the hospital or collected new medication from the hospital (35). A cross-sectional study done in South Africa revealed that 31.6% and 28.3% of the defaulters did not know the duration of treatment and did not know the consequences of treatment interruption respectively. This may indicate the presence of poor patient-provider relationship and also highlights poor communication and a lack of support during the treatment period (17).

Summary of study design reviewed

Majority (approximately 40%) of the studies reviewed used descriptive cross-sectional study design followed by case-control and prospective cohort study design. Some of studies were used prospective recorded review and small proportion of them used qualitative study designs. Only one study was used cross-sectional design with both qualitative and quantitative methods.

Based on results of previous study reviewed five groups of factors were identified for current study to explain anti-tuberculosis non-adherence. The review of literatures helped to take into account some important variables in current study and in selection of study method in current study.

Major strength:-

- ❖ The response rate was high, on average more than 90%
- ❖ Majority of the studies used adequate sample
- ❖ The results were clearly presented with separating as the patients treatment phase. This helps to avoid confusion about confounding due to duration of patients stay on treatment.

Major weakness:-

- ❖ Some cross-sectional studies, not interviewed patients who were lost from follow up even those were included in their sample.
- ❖ Characteristics of non- respondents were not clearly stated in majorities of studies

Conceptual frame work

This conceptual frame was developed by reviewing different literature and based on scientific facts. It shows different factors contributing for TB patient not to adhere to their treatment and medical follow up.

The concepts of socio-demographic and socio-economic factors are the variation in socio-demographic characteristics and poor socio- economic status affects patient adherence for both treatment and follow up. Patient related factors, 'patient' including all pulmonary TB patients irrespective of their treatment status, and 'factors' are which related to patient him/her knowledge ,feeling and their ways of interpreting things. Another factors included in this conceptual frame are health service factors; these are factors related with service delivery and include physical accessibility, availability of medication in the facility and patient-provider relationship and others. The assumption is poor supply of medication, poor patient-provider relation and long distance for patient can contributes for non-adherence. Behavioral factors are also another factors included in this conceptual frame. Its concept in this study, "behavior" is used to denote what the TB patients do or refrain not to comply with treatment.

The message of this conceptual framework is patients' adherence to their medication regimens was influenced by the interaction of a number of the factors, including socio-demographic variation, poor socio economic status, patient knowledge about the disease and its treatment and their feeling and also their personal behaviors.

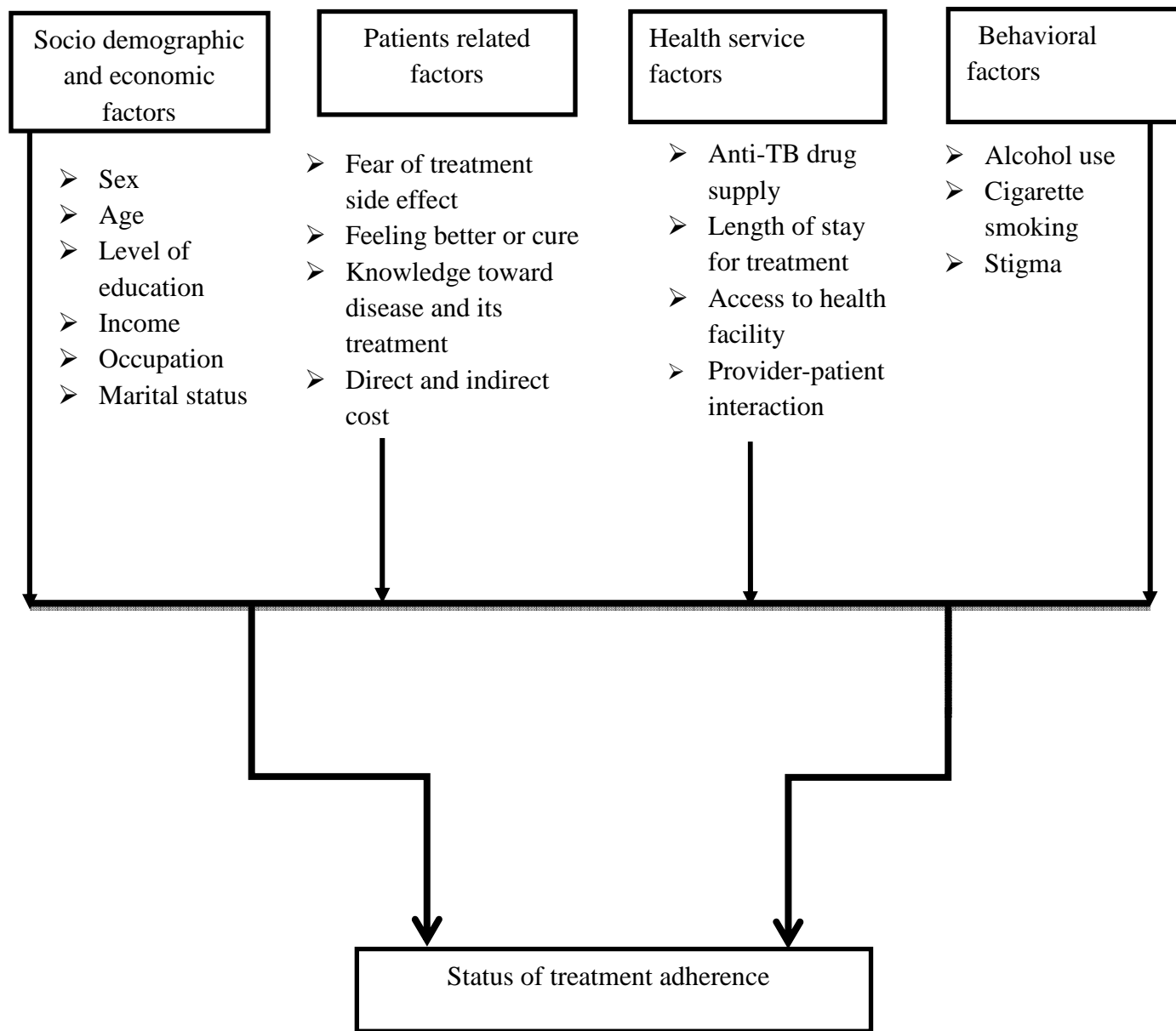


Figure 1 Conceptual frame work for factors associated with non-adherence to anti-TB treatment among pulmonary TB patients.

Source: Developed after reviewing literatures and scientific facts by principal investigator.

Significance of the study

In many countries globally, the adoption of Directly Observed Treatment has been associated with reduced drug resistance, relapse and rate of treatment failure. However, its impact in reducing tuberculosis incidence has been influenced by non-adherence of patients to their treatment and medical follow-up. Poor adherence to anti-tuberculosis drug made a great threat in tuberculosis control and prevention program. Non-adherence contributes for the newly emerging multi drug- resistance/extensive drug-resistance tuberculosis globally. This problem is the big challenge for resource limited countries because detection and its management need more resources and its treatment outcome is also result in high failure rate compared with drug sensitive tuberculosis. So the prevention of multi drug resistance can only be achieved through proper tuberculosis case detection, rational diagnosis, provision of standard treatment and, above all, successful follow up and high patients adherence .

Clearly an efficient Directly Observed Treatment program is the best weapon to prevent multi drug resistance tuberculosis (7) but many people with tuberculosis do not complete their six-month course of tuberculosis medications for various reasons. Lack of a comprehensive understanding of facilitating and inhibiting factors for treatment adherence is currently a major obstacle to finding effective solutions for treatment non-adherence (21). Therefore, the aim of this study is to estimate prevalence of non-adherence and identify factors associated with treatment non-adherence among pulmonary tuberculosis patients in public health care facilities. The results may contribute for policy makers and health departments at different level to develop targeted and evidence based strategies to prevent interruption of treatment before patient completely defaulting from treatment. Hereby improve treatment outcome, reduce development of multi-drug resistance and extensive drug resistance form of tuberculosis and recurrence of tuberculosis and it is also serve as input for further study on this area.

3. OBJECTIVES

3.1 General objective

- ✓ To assess prevalence and factors associated with anti- tuberculosis treatment non-adherence among Pulmonary Tuberculosis Patients in public health care facilities in Dawuro zone SNNPR South West Ethiopia.

3.2 Specific objectives

- ✓ To estimate the prevalence of treatment non-adherence
- ✓ To identify socio-demographic and economic factors associated with tuberculosis treatment non-adherence.
- ✓ To identify health service related factors associated with tuberculosis treatment non-adherence
- ✓ To identify patient related factors associated with TB treatment non-adherence
- ✓ To asses behavioral factors associated with TB treatment non-adherence

4. METHODS & MATERIALS

4.1 Study area and period

The study was conducted in Dawuro zone public health care facilities including hospital and health centers. This zone is one of the Zones in SNNPR, located South West of Ethiopia 500 km from Addis Ababa, 275 from regional City Hawassa and of 144 from Jimma. The zone has 5 woreda and one city administration. Based on central statistics agency report of 2007, the projected total population in 2012/13 is 582,552. In the zone there are one General hospital, 21 health center and 175 health posts, from which DOTs service provided in 17 health centers and one General hospital. Currently health posts are not providing DOTs service in the study area. Totally 404 all type of health professionals including specialists serving in all health facilities in the zone. The potential health coverage of the zone was 91%. Data were collected from February 21st to April 25th 2013.

4.2 Study design

Institution based cross-sectional study design with both quantitative and qualitative methods was employed

4.3 Populations

4.3.1 Source Population

The source populations were all TB patients following DOTS program in public health care facilities providing DOTS therapy.

4.3.2 Study population

The study populations were PTB patients registered 6 month before data collection time on new and previously treated patient treatment regime.

4.4 Inclusion and exclusion criteria

4.4.1 Inclusion criteria

- Patients \geq 15 years of age receiving anti-TB treatment at the DOTS centers
- Confirmed pulmonary TB patients by laboratory or radiologic investigations or both
- Patients who are on new patient regimen and previously treated patient regimen

- New patient received at least one month of treatment

4.4.2 Exclusion criteria

-Patients on MDR treatment regimen

-Patients too ill to be interviewed

4.5 Sample size determination and sampling procedure

4.5.1 Sample size determination

All DOT centers were included in the study and sample size was calculated by using single population proportion formula. With assumption of prevalence of patient non-adherence to TB treatment is 20%, patients who were interrupted their treatment or patients who not complete their treatments success-fully in SNNPR (20) and 95% confidence level with 5% precision.

$$n = \frac{(z\alpha/2)^2 \times pq}{d^2}$$

Where:

$Z\alpha/2$ = Standard normal score at 0.05 level of significance

n= Minimum optimum sample size

p= Proportion of patient interrupting their treatment (20%)

d = Margin of error (5%)

q=1-p

The calculated sample size was 246 & with 10% possible non-response rate added and the final sample size was 271. For qualitative data, one hospital and two health centers were included. From each health facility TB clinic, one health worker working in TB clinic was interviewed. Four TB patients who are not included in quantitative study and three health extension worker were interviewed. Totally 10 individuals are participated in qualitative study.

4.5.2 Sampling technique

The total Sample size was allocated to all public health facility providing DOTs service proportionately based on number of TB patient in the DOT unit, and then the study participants were selected by simple random sampling using registration book as sampling frame. For qualitative study the participants were selected purposively.

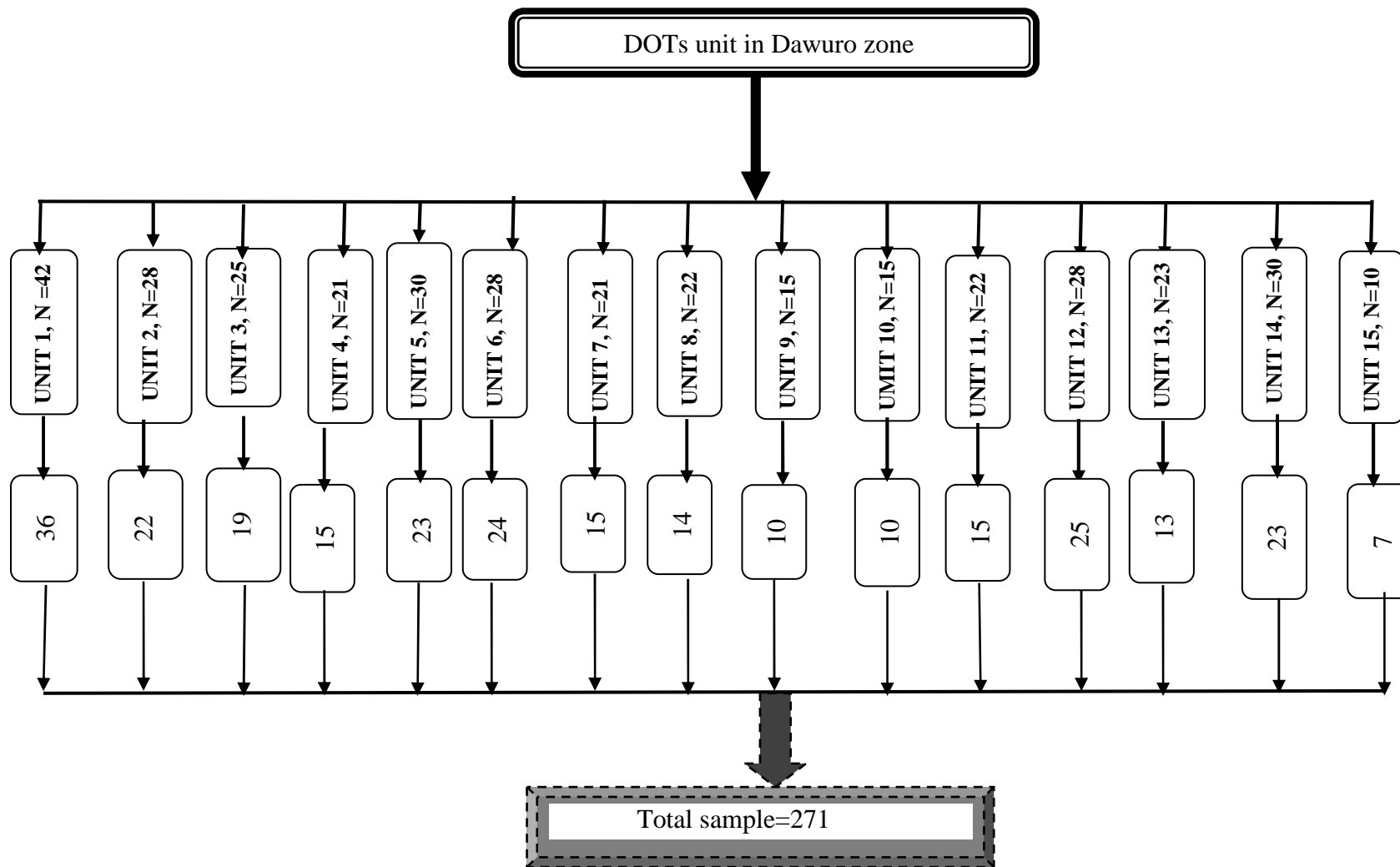


Figure 2 Schematic presentation of sampling

NB. No case was selected from three DOTS center during study period because of cease in those center not fulfilling inclusion criteria

4.6 Variables:

4.6.1 *Dependent variable:*

- Status of anti-TB treatment adherence

4.6.2 *Independent variables*

- Socio demographic and economic factors
 - ❖ Sex
 - ❖ Age
 - ❖ Level of education
 - ❖ Income
 - ❖ Occupation
 - ❖ Marital status
- Health service factors
 - ❖ Anti-TB drug supply
 - ❖ Length of stay for treatment
 - ❖ Access to health facility
 - ❖ Provider-patient interaction
- Patient related factors
 - ❖ Fear of treatment side effect
 - ❖ Feeling better or cure
 - ❖ Knowledge & belief towards TB and its treatment
 - ❖ Direct and indirect cost
- Behavioral factors
 - ❖ Alcohol use
 - ❖ Cigarette smoking
 - ❖ Stigma

4.7 Data collection procedure

Both quantitative and qualitative methods were employed. Quantitative data were collected by using pre-tested semi-structured questionnaire prepared after review of relevant literature. Pre-test was conducted on 5% of sample, patients registered before study period and those who were not included in actual study.

The questionnaire comprises socio demographic and socio economic factors, treatment related factors, behavioral factors, patient knowledge towards tuberculosis and its treatment related questions and patients general information regarding the treatment.

Data were obtained by direct interviewing of patients and clinical information's were obtained from TB registration. Six data collectors and three supervisors were participated after two days training on the objective of the study, method of data collection & content of questionnaire. Data were collected at working time of health facilities while the patient visiting TB clinic to collect their medication or for follow-up. Study subject who lost from follow-up were interviewed at home. Qualitative data were collected through interviewing purposively selected TB clinic health worker, patients and health extension workers/professionals using in-depth interview guide line focusing on problem related to current TB control program and possible reason for treatment non-adherence.

4.8 Data processing

Data were checked, cleaned and edited for completeness, outliers and missing values and it was double entered using EpiData version 3.1. Quantitative data were analyzed by Statistical Package for Social Sciences version (SPSS) 16.0. Associations between factors and non-adherence were estimated by computing odds ratios (ORs) and their 95% confidence intervals (CIs). To identify in dependant predictors of treatment non-adherence, multivariable logistic regression was considered. For final model, the standard approach for variable selection, back ward likelihood ratio test was used. Using p-value <0.25 was considered as criteria to enter variables in multivariable logistic regression model. P value < 0.05 was considered as statistically significant in multivariable logistic regression. Multicollinearity was checked by VIF for all candidate variables and absence of multicollinearity problem was confirmed. Before using the final model, model goodness was checked by Hosmer and Lemeshow test and the model found to be fit to predict in dependant factors of anti-TB treatment non-adherence(p=0.62).

Qualitative data were analyzed by thematic analysis technique and presented descriptively. The summery result of quantitative data were presented descriptively by frequency tables, graphs and charts and also analytically presented by adjusted odds ratio and confidence interval.

4.9 Data quality assurance

Diploma nurse data collectors and degree holder nurse and health officer supervisors were trained for two days on the objective of the study, method of data collection & content of questionnaire. Data were checked for completeness, accuracy, and consistency by supervisors & principal investigator after the data collection on daily base. Double entry verification was employed to assure quality of data. The questionnaire was prepared first in English and translated into Amharic and retranslated back to English to check for consistency. The questionnaire was pre-tested on 5% of patients who were registered before data collection period, to identify the clarity of question, sequence of questions, and gap on data collector and also to familiarize the data collectors with instruments. Those patients participated in pretest were not included in actual study.

4.10 Ethical Consideration

Ethical rules approval and clearance was obtained from Ethical Review Board (ERB) of Jimma University College of Public Health and Medical Sciences. Official cooperation letters were obtained from Dawuro Zone Health Department to respective hospital and health centers. Informed consent was obtained from the study participants by informing the purpose of the study and confidentiality of result prior to data collection.

4.11 Dissemination of findings

The findings of this study will be presented to JU, distributed to Dawuro Zone Health Department, respective hospitals and health centers, other organizations working on DOTs program in the zone. The findings will also be presented in different seminars, meetings and workshops and published in a scientific journal.

4.12 Operational definition

- ❖ Non-adherence:- any patient belonging to either intensive or continuation phase of either new or retreatment regimen who missed 10% or more of the total prescribed dose of TB drugs (either consecutive or sporadic doses)(15). For sputum follow up, patient who missed one and more sputum test will be considered as non-adherent.
- ❖ Good adherent: A patient was defined to have good adherence to treatment if the proportion of actual doses taken of those prescribed was at least 90%.
- ❖ Knowledge: defined in this study, from total knowledge related question, if the patients correctly respond less than 60% categorized as having poor knowledge, 60-75% categorized as having faire knowledge and greater than 75% as having good knowledge (25).
- ❖ Defaulter: Patients who patients have received one month or more and interrupted treatment for more than 8 consecutive weeks.
- ❖ Return after default: A patient previously recorded as defaulted from treatment and returns to the health facility with smear-positive sputum.
- ❖ New: Patients have never had treatment for TB, or have taken anti-TB drugs for less than one month.
- ❖ Previously treated: Patients have received one month or more of anti-TB drugs in the past, may have positive or negative bacteriology and may have disease at any anatomical site.
- ❖ Relapse: A patient declared cured or treatment completed of any form of TB in the past, but who report back to the health facility and is now found to be AFB smear-positive or culture positive.
- ❖ Treatment failure: A patient who, while on treatment, is smear-positive at the end of the fifth month or later, after commencing. Treatment failure also includes a patient who was initially sputum smear-negative but who becomes smear-positive during treatment at two months or later
- ❖ Other: A patient who does not fit in any of the above mentioned categories

5. RESULTS

5.1 Result of quantitative study

5.1.1 Scio-demographic and socio economic profile of the respondents

A total of 261 patients, of whom 36 were from hospital and 225 patients were from health centers with response rate of 96.3% were found valid and all were included in analysis of quantitative study. Information collected from 10 study subjects were not included in the analysis due to change of residence, accidental death and incompleteness of components of questions. Of total 261 patient 140(53.6%) and 121(46.4%) were male and female respectively. The mean age of the respondent was 31(\pm 11.6) years. In terms of marital status, the majority of respondents 170(65.1%) were married followed by 80(30.7%) single. One hundred thirty one (50.2%) of patients follow orthodox religion and the rest 125(47.9%) were protestant, while catholic accounts least. Majority of the respondents 245(93.9%) were Dawuro followed by 10(3.8%) were Wolayta by ethnicity. Among the total patient included in this study majorities, 112(42.9%) were unable to read/ write or illiterate while only 7(2.7%) had preparatory education. The study showed that monthly income of the respondents, 21.5%, 23.5%, 28.2% and 26.8% were in the 1st quartile 2nd quartile, 3rd quartile and 4th quartile respectively (Table 1).

Table 1 Socio-demographic and economic characteristics of pulmonary TB patients in Dawuro Zone public health care facilities, South West Ethiopia, 2012/2013.

Characteristics	Number	Percent
Sex		
Male	140	53.6
Female	121	46.4
Age(years)		
15-24	85	32.6
25-34	80	30.7
35-44	54	20.7
≥45	42	16.0
Marital status		
Married	170	65.0
Single	80	30.7
Widowed	7	2.7
Divorced	3	1.2
Separated	1	0.4
Religions		
Orthodox	131	50.2
Protestants	125	47.9
Catholic	5	1.9
Ethnicity		
Dawuro	245	93.9
Wolayta	10	3.8
Others**	6	2.3
Educational status		
Illiterate	112	42.9
Able only to read/write	26	10.0
First cycle	58	22.2
Second cycle	36	13.8
Preparatory	7	2.7
College/university	22	8.4
Occupational status		
Housewife	85	32.6
Farmer	79	30.3
Student	57	21.8
Government employee	31	11.9
Others*	9	3.4
Monthly income		
1 st quartile	33	21.5
2 nd quartile	36	23.5
3 rd quartile	43	28.2
4 th quartile	41	26.8

*Merchants, house maid, non-government organization employee ** Amhara, Kambata and Hadeya

Table 2 Clinical profile of pulmonary Tuberculosis patients in public health care facilities in Dawuro Zone South West Ethiopia, 2012/2013

Characteristics	Numbers	percent
Disease classification		
Pulmonary TB positive	157	60.2
Pulmonary TB negative	104	39.8
Patients category		
New	256	98.0
Treatment failure	2	0.8
Relapse	2	0.8
Return after default	1	0.4
Treatment phase		
Intensive phase	163	62.5
Continuation phase	98	37.5
Treatment regimen		
New patient treatment regimen	256	98.1
Retreatment patient regimen	5	1.9
HIV status		
Sero-positive	232	88.9
Sero-negative	8	3.1
Unspecified	21	8.0

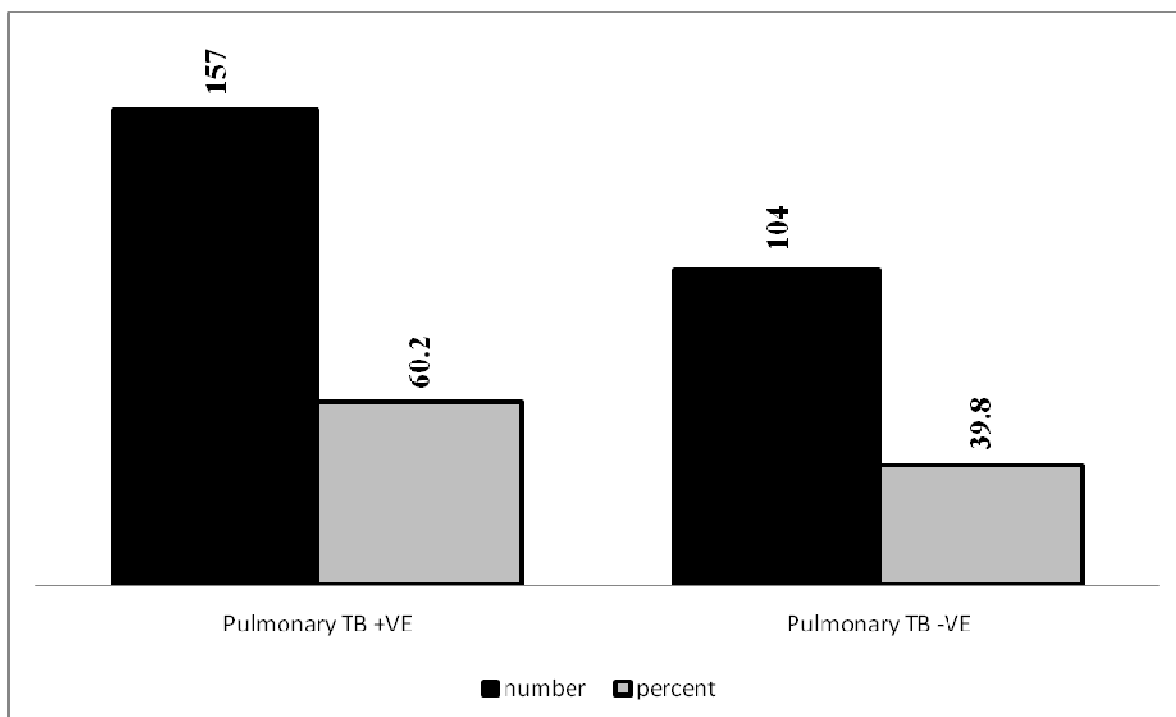


Figure 3. Disease classifications of pulmonary TB patients in Dawuro Zone public health care facilities, Dawuro, South West Ethiopia, 2012/2013

Table 3. Distribution of treatment adherence status based on sex, disease classification and treatment phase among pulmonary TB patients in Dawuro zone public health care facilities, 2012/2013

Characteristics	Adherents		Non- adherents	
	Numbers	%	Numbers	%
Sex				
Male	104	74.3	36	25.7
Female	93	76.9	28	23.1
Disease classification				
Pulmonary TB positive	121	77.1	36	22.9
Pulmonary TB negative	76	73.1	28	26.9
Treatment phase				
Intensive phase	63	66.3	32	33.7
Continuation phase	134	80.7	32	19.7

5.1.2. Prevalence of treatment non-adherence

Among the total study participants, 64(24.5%) were non-adherent for their anti-tuberculosis treatment in study area. As shown in table 3, 25.7% male and 23.1% were non-adherents for their treatment. Nearly half of non-adherent patients interrupted their treatment during intensive phase of treatment. Of these, 256 (98%) were new patients and 5(2%) were retreated. The non-adherent proportion among new and previously treated patients was 23.8% and 60% respectively. The result showed that, 124(47.5%) were collect their treatment daily from health facilities during intensive phase or treated with direct observation by health care provider and 5.4 % took drugs without external supervision. The study also showed that 22.9% of pulmonary TB positive and 26.9% of pulmonary TB negative patients were non-adherent for their treatment (Table 3).

The main reasons for non-adherences mentioned by respondents are: 61.6% felt better, 56.2% distance of treatment center from individual home and 38.4% lack of money for transportation were among reasons mentioned by non-adherent patients (Table 4).

In ordered to improve treatment adherence and to prevent development of drug resistance, national tuberculosis control program guideline follows globally accepted DOTS strategies and it recommends every TB patients should have to take their medication under direct observation of health care provider during intensive phase of treatment(1,2). However, the result of this study indicated that about 53% of pulmonary tuberculosis patients were not

collecting their medication daily from health facilities during intensive phase. This result was supported by qualitative study.

Twenty four year female TB clinic nurse from bale health center said *“To decrease the burdens of patients and to encourage them, sometimes we give 2-3 days medication to home. I know guide line doesn’t recommend this”*

Concerning sputum re-examination, from total 100 pulmonary TB positive patients who were in continuation phase, 22(22%) were missed at least one or more sputum re-examination after diagnosis. Majorities, 52(29.7%) of non-adherent respondents for sputum re-examination stated that, distance and lack of awareness about importance of sputum re-examination or health care providers not informed them about the importance of re-examination as major reason. The result of qualitative finding is also support the above figure *“Treatment adherence of patient in our facilities is relatively good, but majority of patients do not return back for sputum re-examination particularly for 5th and 6th month check up.”*

TB clinic nurse from hospital

“As I stated earlier, most of patient come from distant kebeles, due to this majorities not return back for sputum re-examination even they not collect their medication correctly after completion of intensive phase. Sometimes we send their medication with their families or relatives”

TB clinic nurse from health centers

Table 4. Reasons for treatment non-adherence mentioned by non-adherent pulmonary TB patients in public health care facilities in Dawuro zone, South West Ethiopia, 2012/ 2013

Reason for non-adherence	Frequency	Percent
Felt better	45	61.6
Distance of treatment site	41	56.2
Lack of money for transportation	28	38.4
I forget it	17	23.3
Absence of drug in the facility	11	15.1
Medication side effect	7	9.6
Pill burden	6	8.2

5.1.3 Accessibility of DOTS center

In terms of accessibility of treatment center, 199(76.2%) respondents get service within 10km, while the rest should travel more than 10km. Those traveling more than 10km were likely to become more non-adherents (Fig 4). Among the respondent, 141(54%) and 120 (46%) of patients traveling less than 60 min and greater than 60 min respectively to get DOTS center. About 208(80.4%) of the respondents simply walk to get health facilities, the rest 25 (9.6%) and 26(10%) were using their own transport including horse and public transportation during their follow up respectively.

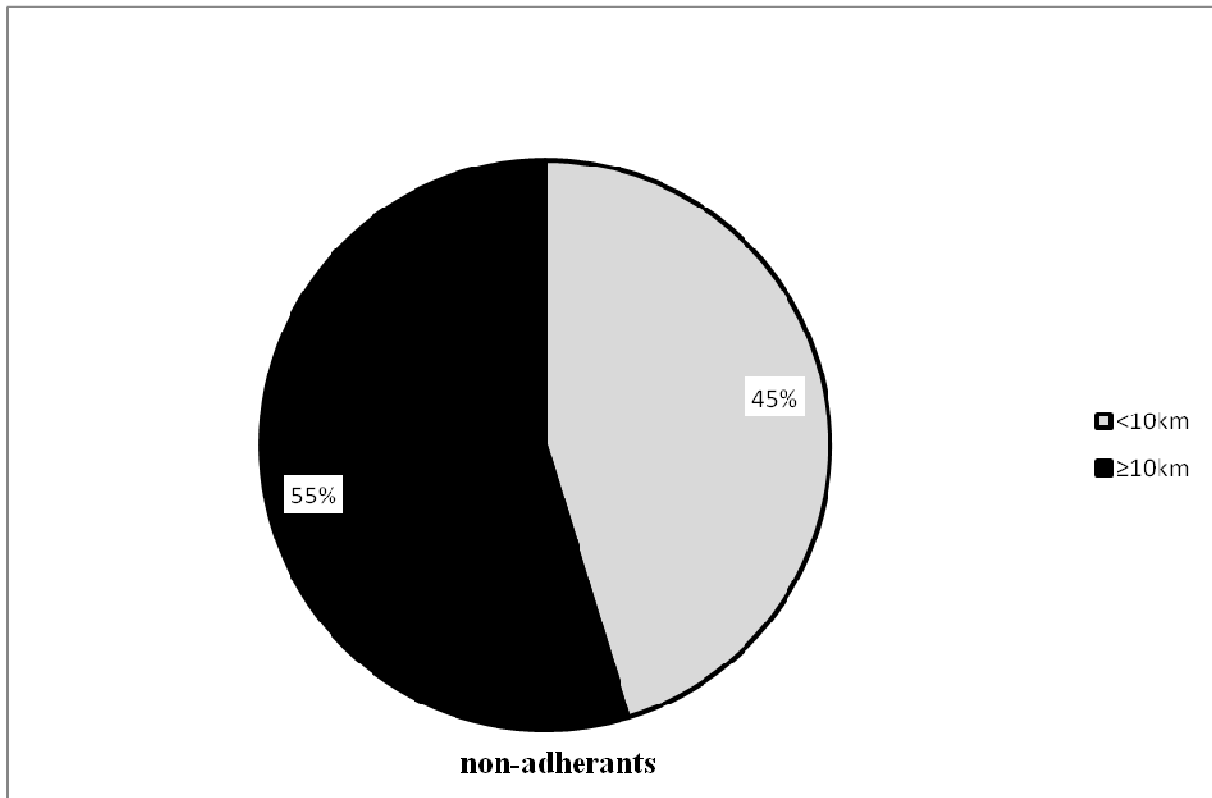


Figure 4 .Distribution of treatment non-adherence among pulmonary TB patients traveling more than 10km and less than 10km to get treatment center in public health care facilities in Dawuro Zone, south west Ethiopia,2012/2013

Table 5. Bivariate analysis of socio-demographic and economic factors of treatment non-adherence of pulmonary TB patients in public health care facilities in Dawuro zone, south west Ethiopia, 2012/2013.

Variables	Adherents Numbers (%)	Non-adherents Numbers (%)	COR(95%CI)	P value
Sex				
Female	93(76.9)	28(23.1)	1	
Male	104(74.3)	36(25.7)	1.2(0.7-2.0)	0.6
Age (years)				
15-24	67 (78.8)	18(21.2)	1	
25-34	60(75.0)	20(25.0)	1.2(0.6-2.6)	0.6
35-44	39(72.2)	15(27.8)	1.4(0.7-3.2)	0.4
≥45	31(73.8)	11(26.2)	1.3(0.6-3.1)	0.5
Marital status				
Single	63(78.8)	17(21.2)	1	
Married	126(74.1)	44(25.9)	1.3(0.7-2.5)	0.4
Divorced& widowed	8(72.7)	3(27.3)	1.4(0.3-5.8)	0.7
Religions				
Orthodox	100(76.3)	31(23.7)	1	
Others*	97(74.6)	33(25.4)	1.1(0.6-1.9)	0.8
Ethnicity				
Dawuro	186(75.9)	59(24.1)	1	
Others **	11(68.8)	5(31.2)	1.4(0.5-4.3)	0.5
Educational status				
Formal education	101(82.1)	22(17.9)	1	
Non-formal education	96(69.6)	42(30.4)	2.1(1.1-3.6)	0.02
Occupational status				
Gov. employee	28(90.3)	3(9.7)	1	
Housewife	62(72.9)	23(27.1)	3.5(0.9-12.3)	0.05
Farmers	52(65.8)	27(34.2)	4.9(1.4-17.3)	0.02
Others***	55(83.3)	11(16.7)	1.9(0.5-7.2)	0.4
Monthly income				
1 st quartile	33(63.5)	19(36.5)	3.4(1.2-9.4)	0.02
2 nd quartile	23(63.9)	13(36.1)	3.3(1.1-9.9)	0.03
3 rd quartile	29(67.4)	14(32.6)	2.8(1.0-8.3)	0.06
4 th quartile	35(85.4)	6(14.6)	1	

* Protestant, catholic **Amhara, Wolayta, Kambata, Hadeya. *** Merchants, House maid

Table 6. Bivariate analysis of predictors of anti-TB treatment non-adherence of pulmonary TB patients in public health care facilities, Dawuro Zone, South west Ethiopia, 2012/ 2013.

Variables	Adherents No (%)	Non-adherents No (%)	COR(95%CI)	P Value
Treatment supporter				
Present	181(77.0)	54(23.0)	1	
Absent	16(61.5)	10(38.5)	2.1(1.0-4.9)	0.087*
Type of transportation				
Walking	173(83.2)	35(16.8)	1	
Use own transport	11(44.0)	14(56.0)	6.3(2.6-15.0)	<0.001*
Use public transport	11(42.3)	15(57.7)	6.7(2.9-15.9)	<0.001
Attitude of care providers				
Care friendly	180(78.3)	50(21.7)	1	
Care unfriendly	17(54.8)	14(45.2)	3.0(1.4-6.4)	0.01*
Patient taking alcohol				
No	186(76.9)	56(23.1)	1	
Yes	11(57.9)	8(42.1)	2.4(0.9-6.3)	0.07*
Patient has supervisor				
Yes	177(77.0)	53(23.0)	1	
No	5(35.7)	9(64.3)	6.0(1.9-18.7)	0.002*
Health education at every visit				
Yes	130(88.4)	17(11.6)	1	
No	67(58.8)	47(41.2)	5.4(2.9-10.1)	<0.001*
Medication side effect				
Absent	176(77.9)	50(22.1)	1	
Presents	21(60.0)	14(40.0)	2.3(1.1-4.9)	0.025*
Current treatment phase				
Continuation	134(80.7)	32(19.3)	1	
Intensive	63(66.3)	32(33.7)	2.1(1.2-3.8)	0.01*
Other medication				
Absent	190(76.9)	57(23.1)	1	
Present	7(50.0)	7(50.0)	3.3(1.1-9.9)	0.03*
Knowledge				
Good	107(89.9)	12(10.1)	1	
Fair	41(87.2)	6(12.8)	1.3(0.5-3.7)	
Poor	49(51.6)	46(48.4)	8.4(4.1-17.2)	<0.001*
Distance of DOT center				
<10km	171(85.5)	29(14.5)	1	
≥10km	26(42.6)	35(57.4)	7.9(4.2-15.1)	<0.001*
Traveling time				
<60min	122(86.5)	19(19.5)	1	
≥60min	75(62.5)	45(37.5)	3.9(2.1-7.1)	<0.001*
Any cost to get treatment				
No	143(92.9)	11(7.1)	1	
Yes	54(50.5)	53(49.5)	12.7(6.2-26.2)	<0.001*

*variables entered to multivariable logistic regression model

5.1.4. Factors associated with anti-TB treatment non-adherence

In this study patients miss their medication due to various factors. These factors were categorized as socio-demographic and economic factors, patients related factor, health service related factors and patients behavioral factors.

Socio-demographic and economic factors

The study showed that among socio-demographic and economic characteristics: educational status, occupational status and respondent's monthly income were associated with treatment non-adherence. Patients who had non-formal education were more likely to become non-adherent. Also farmers were more likely to become non-adherents to their treatment. Monthly income was also found to be risk factor for treatment non-adherence. Patients whose monthly income was less than 150ETB (in 1st quartile) were more non-adherents for their anti-TB medication (Table 5).

Patients related factors

In our study, treatment supervisor during taking medication was one of associated factors for treatment non-adherence. Patients taking their medication without external supervisor were more likely to become non-adherent compared with those having supervisors. Patient's knowledge towards the disease and its treatment was another patient related factors associated with treatment non-adherence. Patients with poor knowledge become more likely become non-adherents. Also presence of direct and indirect cost to get treatment was associated with missing medication (Table 6).

Health service related factors

Among health service related factors: distances of treatment center, traveling time, mode of transportation, health education at every visit and care provider attitude were associated with treatment non-adherence.

Patients traveling more than 10km were more likely become non-adherents compared with those traveling less than 10km. Traveling time was associated with anti-TB treatment non-adherence. Patients traveling more than one hour to get treatment center become more non-adherents (Fig 5). Mode of transportation was associated with missing anti-tuberculosis treatment. Patients who use public transportation and using own transportation including horse were more likely to become non-adherent. Patient-provider relationship was also another health service related factors associated with treatment non-adherence. Patients

who were treated as unfriendly by health care providers were more non-adherents compared with patient treated friendly at treatment centers (Table 6).

Among patient's behavioral factors, patients who taking alcohol during treatment period were more non-adherents but its association were not statistically significant (Table 6).

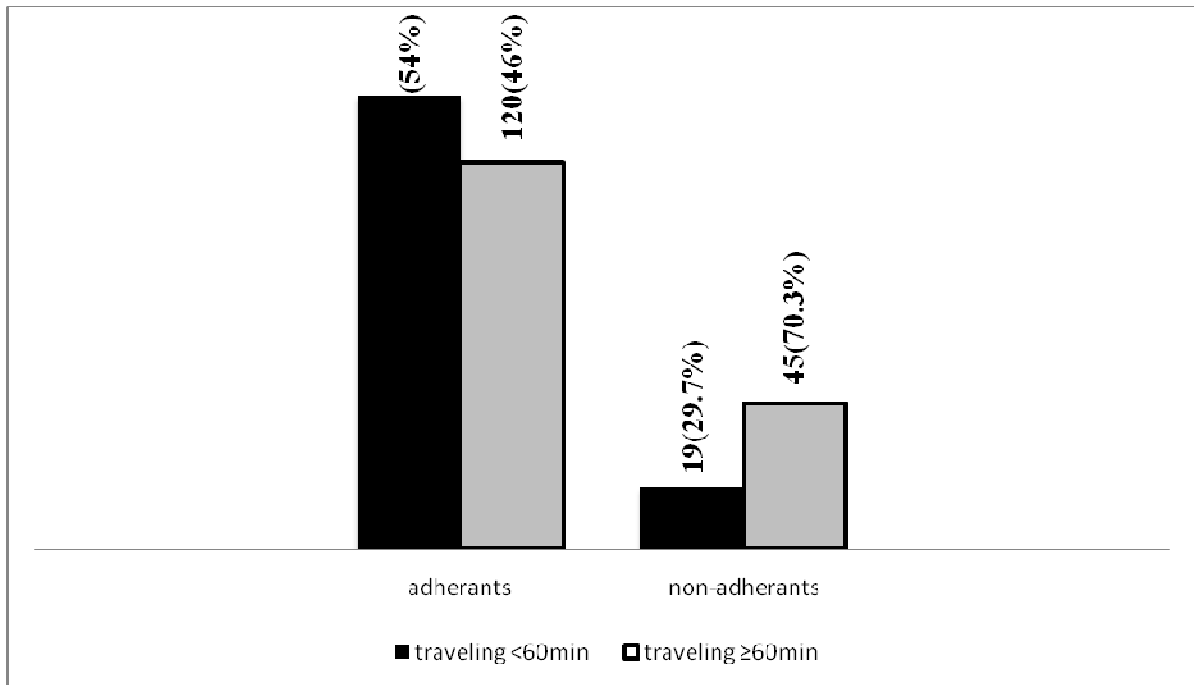


Figure 5. Treatment Non-adherence based on patients travelling time to get treatment center of pulmonary TB patients in public health facilities Dawuro Zone , south west Ethiopia, 2012/2013

5.2 Summary result of qualitative study

An in-depth interview was carried out to obtain qualitative information on problems of current tuberculosis controlling program, status of patient's adherence to anti-TB medication and main reason for their interruption. Ten subjects were successfully interviewed using in-depth interview guide line. Three TB clinic nurse from health facilities, three health extension worker from different kebele and four patients were participated. The mean age of respondents was 28.5 (std.7) year. The main findings from qualitative study were:

Concerning the current problem of TB controlling program almost all TB clinic nurse agreed the current system is good and absence of serious problem. But all of respondents

were commented that, the existence of treatment center only at hospital and health center as main challenge of the program successes particularly patients follow up.

Regarding to supply all TB clinic nurses were agreed that, supplies of medication and materials like registration book was improved compared to previous situation, except they faced some shortage of drug at transition period from RH to EH. Majorities of health worker complained shortage of laboratory reagent for AFB.

“Supply of anti-TB medication is adequate and no shortage but the big challenge is supply of laboratory reagent. Sometimes patients miss sputum re-examination due to shortage of reagent.”

Health care providers were agreed that the status of patient’s adherence relatively good compared with previous health care provision system because BPR shorten the waiting time at treatment center and DOTS center are open at weekend even some time patient can collect at night, but all patients are not complete without interruption.

Concerning reason for treatment interruption, all health care providers and health extension workers mentioned that distance of DOTS center, lack of awareness about importance of treatment completion and high transportation cost as main reasons.

“ against the national tuberculosis guideline, to decrease the distance burden and traveling cost, we give at least two day medication to home during intensive phase”

TB clinic nurse

Another TB clinic nurse from health center said that *“Some patients are not known the importance of treatment completion and dangers of treatment interruptions.”*

Almost all patients were raised that distance of DOTS center, high transport cost and lack of money to cover this cost as the main reason for treatment interruption.

As good solution, health worker and health extension worker strongly suggested that providing good health education at dots site every visit and the service should be near to the communities.

“To improve the patient’s treatment adherence, health post should provide the DOTS service. Health extension workers provide family planning service including injectable, so why not DOTS service?” Hospital TB clinic nurse

All patients were suggested that service should be available at near health care facilities including health post to improve status of treatment adherence.

Independent predictors of anti-TB treatment non-adherence

To identify independent predictors of treatment non-adherence, multivariate logistic regression was considered. Seventeen variables, those having p value <0.25 were included in multivariable logistic regression.

Finally knowledge of tuberculosis patients about diseases and its treatment, distance of DOTS center from individual residence, direct and indirect cost to get treatment and absence of health education at every visit were found to be independently associated factors of anti-TB treatment non-adherence (Table 7).

The study showed that no socio-demographic and economic factors were significantly associated with treatment non-adherence. However, educational status and monthly income of respondent were associated with missing of medication in bivariate analysis. Also study showed that, patients whose monthly income less than 150ETB(in 1st quartile) were three times non-adherents compared with patients with monthly income greater than 400ETB (in 4th quartile) (Table 5).

Knowledge of patients towards tuberculosis and its treatment was significantly associated with treatment interruption or treatment non-adherence. As shown in table 7, Patients with poor knowledge about the disease and its treatment were 4.6 times more non-adherent compared with having good knowledge (AOR=4.6 95%CI=1.4-15.6).

Physical accessibility of treatment center was found to be predicting factors of anti-TB treatment non-adherence. Patients who traveling more than 10km to get treatment center were 5.7 times more non-adherents compared those traveling less than 10km (AOR= 5.7, 95%CI=1.9-16.8 & P=<0.01) (Table 7). In bivariate analysis, mode of transportation and traveling time were associated with treatment non-adherence but in multivariable analysis they were not significantly associated.

Financial burden was also found to be predicting factor of treatment non adherence. Patients who had any cost to get treatment become 4.7 times more non-adherent compared with patients whom hadn't cost to get it (AOR=4.7, 95%CI 1.7-13.4, P<0.01).

Absences of health education or health information at every visit were another health service related factors found to be predictors of treatment non-adherence. Patients who had not received health education at every visit were three times more likely to become non-adherents compared with those received health education at DOTS center

(AOR=3.07,95%CI=1.1-8.4, P<0.05) (Table 7). Poor patient and provider relation was also positively associated with treatment non-adherence in bivariate analysis (Table 6).

Table 7. Multivariable Logistic regression model to identify independent predictor's of treatment non-adherence of pulmonary TB patients in public health care facilities in Dawuro Zone, South west Ethiopia, 2012/2013

Variables	Adherents No (%)	Non-adherent No (%)	COR(95%CI)	AOR(95%CI)
Educational status				
Formal education	101(82.1)	22(17.9)	1	1
Non-formal education	96(69.6)	42(30.4)	2.1(1.1-3.6)	0.6(0.2-2.4)
Occupational status				
Gov. employee	28(90.3)	3(9.7)	1	1
Housewife	62(72.9)	23(27.1)	3.5(0.9-12.3)	1.8(0.3-11.9)
Farmers	52(65.8)	27(34.2)	4.9(1.4-17.3)	1.7(0.2-19.6)
Others***	55(83.3)	11(16.7)	1.9(0.5-7.2)	1.3(0.2-7.2)
Monthly income				
1 st quartile	33(63.5)	19(36.5)	3.4(1.2-9.4)	2.4(0.5-11.8)
2 nd quartile	23(63.9)	13(36.1)	3.3(1.1-9.9)	1.6(0.3-8.1)
3 rd quartile	29(67.4)	14(32.6)	2.8(1.0-8.3)	3.2(0.6-16.5)
4 th quartile	35(85.4)	6(14.6)	1	1
Treatment supporter				
Present	181(77.0)	54(23.0)	1	1
Absent	16(61.5)	10(38.5)	2.1(1.0-4.9)	2.8(0.6-12.3)
Knowledge				
Good	107(89.9)	12(10.1)	1	1
Fair	41(87.2)	6(12.8)	1.3(0.5-3.7)	3.8(0.7-20.4)
Poor	49(51.6)	46(48.4)	8.4(4.1-17.2)	4.6(1.4-15.6)
Attitude of care providers				
Care friendly	180(78.3)	50(21.7)	1	1
Care unfriendly	17(54.8)	14(45.2)	3.0(1.4-6.4)	1.2(0.3-5.9)
Traveling time				
<60min	122(86.5)	19(19.5)	1	1
≥60min	75(62.5)	45(37.5)	3.9(2.1-7.1)	1.7(0.5-5.1)
Patient taking alcohol				
No	186(76.9)	56(23.1)	1	1
Yes	11(57.9)	8(42.1)	2.4(0.9-6.3)	1.2(0.1-11.5)
Patient has supervisor				
Yes	177(77.0)	53(23.0)	1	1
No	5(35.7)	9(64.3)	6.0(1.9-18.7)	0.5(0.04-5.9)
Education at every visit				
Yes	130(88.4)	17(11.6)	1	1
No	67(58.8)	47(41.2)	5.4(2.9-10.1)	3.0(1.1-8.4)
Medication side effect				
Absent	176(77.9)	50(22.1)	1	1
Presents	21(60.0)	14(40.0)	2.3(1.1-4.9)	1.7(0.4-7.1)

Current treatment phase				
Continuation	134(80.7)	32(19.3)	1	1
Intensive	63(66.3)	32(33.7)	2.1(1.2-3.8)	1.7(0.6-4.5)
Other medication				
Absent	190(76.9)	57(23.1)	1	1
Present	7(50.0)	7(50.0)	3.3(1.1-9.9)	6.1(1.0-36.9)
Distance of DOT center				
<10km	171(85.5)	29(14.5)	1	1
≥10km	26(42.6)	35(57.4)	7.9(4.2-15.1)	5.7(1.9-16.8)
Travelling cost				
No	143(92.9)	11(7.1)	1	1
Yes	54(50.5)	53(49.5)	12.7(6.2-26.2)	4.7(1.7-13.4)
Type of transportation				
Walking	173(83.2)	35(16.8)	1	1
Use own transport	11(44.0)	14(56.0)	6.3(2.6-15.0)	2.7(0.5-15.0)
Use public transport	11(42.3)	15(57.7)	6.7(2.9-15.9)	4.8(0.9-25.0)

Bold = indicates statistically significant variables

6. DISCUSSION

Anti-TB treatment non-adherence results unfavorable treatment outcome and it contributes for the emerging of MDR and X-DR form of tuberculosis. Medically for good treatment outcome, one should not miss more than one dose per week. Our study tried to estimate prevalence of anti-TB treatment non-adherence and predicting factors for non-adherence.

Prevalence of anti-TB treatment non-adherence in our study was 24.5% which was higher compared to study conducted in, China (9.4%), Cameroon (20%) and Ethiopia (20%) (14, 16, 20). This might be due to presence of community based treatment supporter in countries other than Ethiopia and study setting difference. It was lower compared with 47.5% of patients interrupt their medication in South Africa, Eastern Cape Province (17). This might be due to difference in study period.

In current study patients Knowledge on tuberculosis and its treatment was strongly associated with treatment non-adherence. Patients with poor knowledge about the disease and its treatment were 4.6 times more likely to be non-adherent compared with those having good knowledge (AOR=4.6 95%CI=1.4-15.6 &p=0.01). The possible explanation might be patients with poor knowledge don't worry about the danger and the complication of treatment interruption. This result is supported by qualitative finding.

A 23 year health extension worker from Essera woreda said that *"I was asked last week one pulmonary TB patient about danger of tuberculosis medication interruption because she interrupted her medication for more than one week, but completely she did not know about danger of drug interruption and duration of treatment, these may be another reason."*

Another TB clinic nurse from health center said that *"Some patients are not known the importance of treatment completion and dangers of treatment interruptions; this is also another reason for patients missing their medication."*

Physical accessibility of DOTS center found to be a predictor for anti-TB treatment non-adherence in our study. Patients who traveling more than 10km to get treatment center were 5.7 times more likely to be non-adherent compared with those traveling less than 10km (AOR= 5.7, 95%CI=1.9-16.8 & P=<0.01).This finding was in line with finding of cross-sectional study conducted in India, Andara Kavango region of Namibia, China and

study conducted in southern part of Ethiopia ($p < 0.001$) (8, 12, 15, 20). Accessibility might be related with indirect cost, mainly high transportation cost and long traveling time result lost from work. But the result is inconsistent with study conducted in China province and Nepal (0.11 & $p = 0.61$) respectively (14, 28). This might be due to the accessibility difference of DOT centers and availability of transportation. Current finding was also supported with qualitative finding.

A 23 year old health extension worker from Arusi balla kebele said that *“We are working in collaboration with Bale health center. We are following patients in our catchment area, providing health education and sometimes home based counseling. But all patients are complaining distance of health facility or DOT center”*

A 32 year farmer pulmonary TB positive patient from Gessa health center also said that *“Patients like me, who come from long distance can’t complete the treatment even who having good income. If possible, the treatment should be at near health post. For example our health post is very close to me. Due to the absence of this access, we are forced to travel this long distance.”*

Absence of health education at DOTS site at every visit was significantly association with treatment non-adherence. Our study finding confirmed that, among non-adherent patients, 47(73.4%) was not received health education at DOTS center every visit. Patients who had not received health education at every visit were three times more likely to be non-adherents compared with those received health education at DOTS center (AOR=3.07, 95% CI=1.1-8.4, $P < 0.05$). This finding was in line with study conducted in Palpa District, Nepal (25). This is might be due to absence of health education related with poor awareness about disease and its treatment. In fact health education can raise individual awareness.

In our study, presence of travelling cost to get anti-TB treatment was found to be another predictor factors for treatment non-adherence. Majorities, 53(82.8%) among non-adherent participants were responded that, they had direct and indirect cost to get treatment center. Patients who had traveling cost to get treatment 4.7 times more likely to be non-adherent compared with patients whom hadn’t cost to get the treatment (AOR=4.7, 95%CI 1.7-13.4, $P < 0.01$). This finding was consistent with study conducted in Indonesia in which, 30% of patients that resided in rural areas had to pay a substantial amount of money for transportation to treatment centers (35). This might be due to patients in rural area had low

monthly income and they give priority to fulfill their basic needs rather than paying for transportation and related cost during treatment. Because, currently, TB treatment and its laboratory investigation were free of any cost in Ethiopia in all anti-TB treatment and diagnostic centers. The result was inconsistent with study conducted in South Africa (41). The possible explanation is accessibility of transportation and closeness of DOT center for users. The current result also supported by finding of qualitative study. A 24 year female TB clinic nurse “patients are complaining high transportation cost to return daily for treatment particularly during intensive phase.”

“To tell the truth, I missed at least one week medication because of lack of money for transportation.”

Patients from health center

A 45 year old female non-adherent patient “I started treatment before one month, with in this period I missed more than one week medication. Because the minimum transport cost is more than 50 ETB. So how can I afford this daily? This is the main reason why I missed the medication”

Another 32 year old male patient said that “I know all the services including diagnosis and treatment of tuberculosis is free, but the problem is high transportation cost. Look I was paid 30 ETB at this morning for Bajaj.”

Strength and limitations of the study

Strength

- Using both quantitative and qualitative methods of data collection

Limitation

- Some study subjects may interrupt the treatment for long period, this may subject to recall bias.
- Data were collected through direct interview of patient, this may subject to social desirability bias.

7. CONCLUSION AND RECOMMENDATIONS

7.1. Conclusion

In conclusion this study tried to estimate prevalence of anti-tuberculosis treatment non-adherence and predicting factor for non-adherence. In study area, the prevalence of treatment non-adherence was higher. Physical accessibility of treatment center, knowledge of the disease and its treatment, burden financial burden to get treatment center and absence of health education session at DOTS center every visit were main factors for treatment non-adherence. In our study patients behavioral factors were not associated with treatment non-adherence.

7.2 Recommendation

Health sector at different level particularly regional health bureau and Dawuro zone health department should give more attention to ensure anti-TB treatment more accessible to users. In addition DOTS center care provider should educate patients at every visit about disease and its treatment. In general, making TB treatment service more accessible to users, organizing counseling and health education/health information sessions at the DOTS clinic improve patient's treatment adherence status.

Further researches should be conducted to assess the treatment outcome of those patients who missed more than 10% of treatment.

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Annexes:

English version questionnaire

Informed Consent Form for Quantitative survey questionnaires:

My name is ----- I am working as a data collector temporarily for post graduate student of Jimma University College of Medical Science. The objective of the present study is to assess factors affecting tuberculosis treatment adherence among new pulmonary TB patients in public health care facility.

During the interview you will be asked some short questions about your background, knowledge about the disease and treatment etc. Your answers will be recorded on a survey questionnaire. No personal identifiers will be attached/ recorded to the interview. All the data obtained will be kept strictly confidential by using only code numbers.

Your participation in the study is upon purely voluntary basis. The interview will be conducted individually and will take 15-20 minutes. During the interview (discussion) period, if you feel inconvenient, you can interrupt and clarify inconvenience, appoint to other time or even withdraw any time after you get involved in the study. Your honest and genuine participation in responding to the questions prepared is very important & highly appreciated. If you agree to participate in this study I will interview you.

Would you be willing to participate? Yes No

If yes, proceed. If no, thank and stop here. _____ (Signature of interviewer certifying that respondent has given Informed consent verbally).

General instruction: Circle the correct number which contains the answer from answer box or put the answer on the space provided.

PART I: Patients Demographic and Socio- economic information

NO	Questions	Answer	Remark
101	Sex	1. Male 2. Female	
102	How old are you? (in year)	_____years	
103	What is your marital status	1.Single 2.Married 3.Divorced 4.Widowed 5.Separated	
104	What is your religion?	1. Orthodox 2. Protestant 3. Catholic 4. Muslim 5. Other Specify_____	
105	What is your ethnicity?	1. Dawuro 2. Wolayta 3. Amhara 4. Hadeya 5. Kambata 6. Other specify_____	
106	What is your Educational Status	1. Unable to read and write 2. Only able to read and write 3. 1 st cycle(1-4 grade) 4. 2 nd cycle (5-8 grade) 5. Secondary or above(above grade 9)	
107	What is your Occupation?	1. House wife 2. Government employee 3. Farmer 4. House maid 5. Daily laborer 6. Student 7. Other.(Specify)_____	
108	What is your monthly income (ETB)?	_____birr.	

PART II: Patients clinical information

NO	Questions and Filters	Answer	Remark
201	Disease Classification (Tick appropriately according to treatment card or TB register)	1. PTB+ Ve 2. PTB-Ve 3. Not indicated/specified	
202	Patient classification based on case definition on registration or log book.	1. New 2. Return after default 3. Relapse 4. Failure 5. Others 6. Not specified	
203	Category of treatment regimen	1.New patient regimen 2.Re-treatment regimen 3.Not specified	
204	Treatment phase currently	1. Intensive phase 2. Continuation phase	
205	For how long the patient stayed on treatment?(count the days from registration book &write in days)	_____days.	Start from 1st day of registration
206	Was the patient sputum examination done according to national TB patients follow up protocol?	1. Yes 2. No	
207	If “NO” for Q 206, at which month they missed?	1. At 2 nd month 2. At 3 rd 3. At 5 th month 4. At 6 th month 5. At 8 th month 6. Not done at all	More than One answer is possible
208	Was the patient received all daily anti TB drug as prescribed for date?	1. Yes 2. No	
209	If not collected all daily dose, for how many day the patient missed his /her medication?	_____days	Count total missed dose from registration
210	HIV Status (as indicated on TB treatment card or TB register)	1. Positive 2. Negative 3. Not Known/indicated	

PART III- Treatment and medication Related Questions

NO	Questions	Answer	Remark
301	Did you taking other medicines besides tuberculosis Treatment?	1. Yes 2. No	
302	If “Yes” Q 301, which medicines was you patient taking?	_____ _____ drugs	
303	Did you collect all prescribed drug without interruption?	1. Yes 2. No	
304	If “NO” for Q 303, for how many total days you missed your medication from the course?	For _____ days.	
305	What is your reason for missing the treatment or daily doses?	1. Felt better or cure 2. Medication side effect 3. Pill burden 4. Distance of DOTs site 5. Absence of medication in the facility 6. Lack of money for transport 7. In convenient opening time of health facility 8. I forgot it 9. other(specify)_____	More than One answer is possible
306	Did you experience any side effects when you were taking TB treatment?	1. Yes 2. No	
307	If “Yes” to Q306, which side effects did you experience?	1. Diarrhea & Vomiting 2. Headaches and dizziness 3. Skin rush 4. Numb feet or hands 5. Yellow eye 6. Painful limbs 7. Urine colure change 8. Other	More than One answer is possible

PART IV: Health service related questions

NO	Questions	Answer	Remark
401	From where you collect your medication?	1. Hospital 2. Health centers 3. Health posts	
402	How much distance do you travel to collect your TB medication (Km)	_____ km.	
403	How much time it take to reach health care facility(in minute)	_____ minute.	
404	What type of transportation you use to get health facility?	1. On foot 2. Own vehicle 3. Bus 4.other(specify)_____	
405	How much does it cost you to get to the health facility (in ETB)	_____ birr.	
406	How much time do you usually wait at the TB clinic before being attended?	_____ hours	
407	What would be the most convenient TB clinic opening times for you? (local time)	_____	
408	How would you rate the attitude of staff who attended you at the health facility?	1. Very friendly 2. Friendly 3. Indifferent 4. Unfriendly 5. Very unfriendly	
409	Do you collect your medication from health facility daily for first 2 month	1. Yes 2. No	
410	If for Q409 'YES' when you collect?	1. Every third day 2. Every week 3. Every 15 day 4. Every month 5. other(specify)_____	
411	Do you get health education in every visit in DOTS center?	1. Yes 2. No	

PART V: Behavioral and treatment supporter related questions

NO	Questions	Answer	Remark
501	Have you smoked cigarettes during your treatment period?	1. Yes 2. No	
502	Did you drink alcohol During your treatment period frequently?	1. Yes 2. No	
503	Do you have a Treatment Supporter?	1. Yes 2. No	
504	If yes for Q503, Who support you during your treatment period?	1. Family 2. Friends 3. Health extension workers 4. Other	More than One answer is possible
505	If yes for Q503 What kinds of support did you get?	1. Financial 2. Accompanying to the treatment center 3. Encouragement and advocacy 4. Information about the disease 5. Sharing work load 6. Nutritional 7. Transportation 8. Other(specify)	
506	Who supervised you when you were taking your TB medicine? (DOT Status)	1. Family member 2. Health Worker at the facility (hospital/Health center.). 3. Health extension worker 4. Community member 5. Other(specify) 6. None.	More than One answer is possible
507	Does the health worker inform you about the importance of sputum checkup post diagnosis?	1. Yes 2. No	
508	If your answer is YES for Q506, when you do it?	1. At 2 nd month 2. At 3 rd month 3. At 5 th month 4. At 6 th month 5. At 8 th month 6. I don't know	More than One answer is possible

PART VI: Knowledge related questions

NO	Questions	Answer	Remark
601	What are the major symptoms of TB?	<ol style="list-style-type: none"> 1. Coughing with sputum 2. Coughing for over 3 weeks 3. Blood in sputum 4. Loss of appetite 5. Night sweating 6. Pain in the chest 7. Weight loss 8. Other (specify)_____ 9. I don't know 	More than one answer is possible
602	Do you know the possible cause of TB?	<ol style="list-style-type: none"> 1. Yes 2. No 	
603	If "Yes" for Q 602, what is the possible cause of TB?	<ol style="list-style-type: none"> 1. Bacteria 2. Viruses 3. Parasite 4. Smoking of 	
604	Is TB infectious?	<ol style="list-style-type: none"> 1. Yes 2. No 3. Don't know 	
605	If "yes" for Q604, how is TB transmitted? (Multiple answer is possible)	<ol style="list-style-type: none"> 1. Through the air when coughing of infected person 2. Through blood 3. Through handshake with an infected person 4. Sexually transmitted 5. Sharing food with infected person 6. You're born with it 7. Other (specify) _____ 8. I don't know 	
606	Do you think TB is preventable?	<ol style="list-style-type: none"> 1. Yes 2. No 3. I don't know 	
607	If "Yes" for Q 605, how one can prevent TB?	<ol style="list-style-type: none"> 1. Avoidance of TB patients can prevent TB infection 2. By taking a healthy diet and doing a lot of physical activities 3. By avoiding alcohol and other drug abuse 4. By living in ventilated residences 	

608	Do you think TB is curable?	<ol style="list-style-type: none"> 1. Yes 2. No 3. Don't know 	
609	If "Yes" for Q608, How long should a patient take TB treatment before s/he is cured?	_____weeks	
610	When TB patient can stop their treatment?	<ol style="list-style-type: none"> 1. After completing full course 2. Any time if he/she feel better 3. When cough stopped at any time 4. After declaring cured by health workers 5. I don't know 	
611	Do you know dangers of untreated TB	<ol style="list-style-type: none"> 1. Yes 2. No 	
612	Do you know dangers and consequence of irregular and incomplete treatment?	<ol style="list-style-type: none"> 1. Yes 2. No 	

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In-depth interview guide line for TB clinic physicians and nurses

1. In your observation, what are the main problems of current TB control program?
What do you suggest to improve the problem? (Why?)
2. How do you evaluate the current supply of medication and reagent necessary for TB diagnosis and management?
3. How do you evaluate the patient adherences on their TB treatment regimens?
4. In your facility all TB patients registered on DOTs program collect their medication without any interruption?
5. In your facility, all TB patients registered on DOTs program return back for sputum re-examination according to national TB control program protocol?
6. In your opinion, what are the possible reasons for patient non adherences towards their medication and sputum re-examination?
7. How can we improve patient's treatment adherence or prevent TB patients from stopping/ interrupting their medication and sputum re-examination?

Thank you for your participation!

In-depth Interview guideline for health extension Workers or professionals

1. How do you evaluate the patient adherences on their TB treatment and sputum re-examination?
2. In your opinion, why do TB patients interrupt their TB treatment and not follow the sputum re-examination?
3. What are the common problems related to TB patient management?
4. What do you think major causes of these problems?
5. What do you think the possible interventions to solve the problem?
6. How can we improve patient's treatment adherence or prevent TB patients from stopping/ interrupting their medication and sputum re-examination?

Thank you for your participation!

In-depth Interview guideline for TB patients

1. When you started your ant-TB treatment?
2. When you collect your medication for the first two month or during intensive phase of treatment?
3. Did you take all prescribed daily dose of medication without missing or interrupting? If ‘not” what was your reasons for missing or interrupting your medication?
4. Who supervise or support you during taking your medication?
5. Did you re-examine sputum after diagnosis during treatment according to protocol? If not what was your reasons?
6. In your opinion, what solution you suggest to prevent drug interruption or non-adherence for?

Thank you for your participation!

ጂማ ዩኒቨርሲቲ የህብረተሰብ ጤና እና ህክምና ሳይንስ ኮሌጅ

የጥናት መረጃ መስጫ የስምምነት ቅጽ

መግቢያ

ጤና ይስጥልኝ ስሜ----- ይባላል። የምሰራው ለጂማ ዩኒቨርሲቲ የህብረተሰብ ጤና እና ህክምና ሳይንስ ኮሌጅ

ድህረ-ምረቃ ተማሪ ለሆነው እንዴ ጊዜያዊ መረጃ ሰብሳቢ በመሆን ነው።

የጥናቱ ዓላማ፡-

የዚህ ጥናት ዋና ዓላማው የቲቢ ህመማን በጤና ባለሙያ የታዘዘላቸውን የህክምና መድኃኒት እና ክትትል በአግባቡ እንዳይወስዱ እና እንዳይከታተሉ እድሁም የሚያቋርጡበትን ምክንያቶችን ማጥናት ነው።

በዚህ ቃለመጠይቅ ወቅት እርሶ ስለ ቲቢ በሽታ እና ህክምና ያሎትን ግንዛቤ፣ የመድኃኒት አወሳሰድዎን እንድሁም የህክምና አመለካከት እና የመሳሰሉ ጥያቄዎችን ይጠየቃሉ፤ መልሶትም ለጥናቱ በተዘጋጀው የመጠየቂያ ቅጽ ላይ ይመዘገባል። አንድ አንድ ግላዊ ጥያቄዎችን በሚጠየቁበት ወቅት መጥፎ ስሜት ሊሰማዎት ይችላል፤ ነገር ግን በዚህ መጠይቅ ውስጥ ስም ና እርሶን ለመለየት የሚያገለግል ነገር አይፈጸምም። ሁሉም መረጃ የቁጥር ኮድ በመጠቀም በጥንቃቄ እንደሚያዝ ልገልጽሎት እወዳለሁ።

በዚህ ጥናት ላይ የሚያደርጉት ተሳትፎ ሙሉ በሙሉ በፍቃደኝነት ላይ የተመሰረተ ነው። ከዚህ ጥናት የምናገኘው መረጃ የቲቢ ህመማን መድኃኒትንና የህክምና ክትትል በአግባቡ እንዲከታተሉ እና የቲቢ በሽታ መከላከያ እና መቆጣጠሪያ ፕሮግራምን በማሻሻል መድኃኒት የሚያቋርጡ ህመማን እንዳይኖሩ በማድረግ መድኃኒት የተላመደ የቲቢ ዓይነት እንዳይፈጠር ለማድረግ እንደ ግብዓት ይጠቅማል።

መጠይቁ የሚካሄደው በግል ስሆን ከ15-20 ደፈጃል። መመለስ ያልፈለጉትን ጥያቄ እንዲመልሱ አይገደዱም። በሂደቱ ላይ በጥናቱ ላለመካፈል በማንኛውም ወቅት መወሰን ይችላሉ። ነገር ግን ሁሉንም ጥያቄዎች እንዲመልሱልን እናበረታታለን። ግልፅ ያልሆነ ነገር ካለ ሊጠይቁን ይችላሉ። ስለትብብርዎ በጣም አመሰግናለሁ። ከዚህ ቀጥሎ በጥናቱ ለመሳተፍ መስማማትዎን ለማረጋገጥ የሚከተለውን የስምምነት ቅጽ አነብሎታለሁ።

የስምምነት ቅጽ፡-

ተመራማሪው የጥናቱን ዓላማ በሚገባ አስረድተውኛል። በተጨማሪም በጥናቱ ያለመሳተፍና በማንኛውም ጊዜ ለማቋረጥ ያለኝን መብት ገልጽውልኛል። በዚህም መሠረት በጥናቱ ለመሳተፍ ሙሉ ፈቃደኛ መሆኔን አረጋግጣለሁ።

ተጠያቂው ተስማምቷል?

አዎ አልተስማማም

የጠያቂው ፊርማ-----ቀን-----

የተጠያቂው ፊርማ-----ቀን-----

አጠቃላይ መመሪያ፡- ትክክለኛውን መልስ የያዘውን አማራጭ ይክበቡ ወይም መልሱን ከፊት ባለው ባዶ ቦታ ላይ ይጻፉ።

ክፍል አንድ፡- የህመምተኛው ማህበራዊ እና ምጣኔ-ሀብታዊ መረጃ

ተ.ቁ	ጥያቄ	መልስ	ምርመራ
101	ጾታ	1. ወንድ 2. ሴት	
102	ዕድሜዎ ስንት ነው?(በዓመት)	_____ዓመት	
103	የትዳር ሁኔታ	1.ያላገባ 2.ያገባ 3.የተፋቱ 4.ባል/ሚስት የሞተበት/ባት 5.የተለያዩ	
104	ሐይማኖት	1. ኦርቶዶክስ 2. ፕሮቴስታንት 3. ካቶልክ 4. ሙስሊም 5. ሌላ ከሆነ ይጥቀሱ-----	
105	ብሔርዎ	1. ዳውሮ 2. ወላይታ 3. አማራ 4. ሀድያ 5. ከምባታ 6. ሌላ ከሆነ ይጥቀሱ-----	
106	የትምህርት ደረጃ	1. ያልተማረ 2. መጻፍና ማንበብ የሚችል 3. 1ኛ ሳይክል 4. 2ኛ ሳይክል 5. መስናዶ (11ኛ-12ኛ) 6. ከ12ኛ በላይ	
107	የሥራ ሁኔታ	1. የቤት እመቤት 2. የመ/ሠራተኛ 3. አርሶአደር 4. የቤት ሠራተኛ 5. የቀን ሠራተኛ 6. ተማሪ 7. ሌላ ይጥቀሱ-----	
108	ወርሃዊ ገቢዎት በብር ስንት ነው?	-----ብር	

ክፍል ሁለት:- የህመምተኛውን ህክምና የሚመለከት መረጃ

ተ.ቁ	ጥያቄ	መልስ	ምርመራ
201	የህመም ምድብ መዝገቡን ወይም የህክምና ካረዱን በመመልከት በአግባቡ ምልክት ያድርጉ	1. የሳንባ ቲቢ ፖዘትቭ 2. የሳንባ ቲቢ ነጋትቭ 3. በመዝገቡ ላይ ተለይቶ ያልተመዘገበ	
202	በመዝገቡ ላይ በተጻፈው የህመም መግለጫ መሠረት የበሽተኛው ምድብ	1. አዲስ 2. ካቋረጠ በኋላ የተመለሰ 3. ያገረሸበት 4. ህክምናውን ብጨርሰም ያልዳነ 5. ሌላ 6. በመዝገቡ ላይ መግለጫ የሌለው	
203	የሚወስደው የህክምና ምድብ	1. አዲስ በሽተኛ ህክምና ምድብ 2. ድጋሚ በሽተኛ ህክምና ምድብ 3. በመዝገቡ ላይ መግለጫ የሌለው	
204	በአሁኑ ጊዜ የሚወስደው የህክምና ደረጃ	3. ኢንተንሲቭ ፐዘ 4. ኮንቱኔንሽን ፐዘ	
205	ህመምተኛው በህክምና የቆየባቸው ቀናት ስንት ናቸው?	_____ ቀናት	መጀመሪያ ከተመዘገበበት ቀን ጀምሮ
206	የቲቢ ህመምን መከታተያ በሚያዘው መሠረት የአክታ ምርመራ ተደርጓል?	3. አዎ 4. አይደለም	
207	ለጥያቄ ቁጥር 206 መልሱ አይደለም ከሆነ የስንተኛው ወር ምርመራ አልተደረገም?	1. የሁለተኛ ወር 2. የሶስተኛ ወር 3. የአምስተኛ ወር 4. የስድስተኛ ወር 5. የስምንተኛ ወር 6. ሁሉም አልተሰሩም	
208	ህመምተኛው የታዘዘለትን መድሀኒት ሳያቋርጥ ወስዷል?	1. አዎ 2. አይደለም	
209	ሁሉንም ቀን ካልወሰደ ለምን ያህል ቀናት መድኃኒቱን ሳይወስድ ቀን?	_____ ቀናት	በሽተኛው ያልወሰደበትን ቀናት ከመዝገቡ ላይ ይቁጠሩ
210	በመዝገቡ ላይ የተገለጸው የበሽተኛው የኤች አይ ቪ / ኤድስ ምርመራ ውጤት	1. የኤች አይ ቪ / ኤድስ ቫይረስ በደሙ ያለበት 2. የኤች አይ ቫ / ኤድስ ቫይረስ በደሙ የሌለበት 3. አልተገለጸም	

ክፍል ሶስት፡-ከህክምናና ከመድሃኒት ጋር ተያያዥነት ያላቸው ጥያቄዎች

ተ.ቁ	ጥያቄ	መልስ	ምርመራ
301	ከቲቢ ህክምና መድሃኒት በተጨማሪ ሌላ መድሃኒት ይወስዳሉ ?	1. አዎ 2. አይደለም	
302	ለጥያቄ ቁጥር 301 መልስዎ አዎ ከሆነ የምን ህክምና መድሃኒት ይወስዳሉ?	የ----- -----	
303	የታዘዘልዎትን መድሃኒት ምንም ሳያቋርጡ ወስደዋል?	1. አዎ 2. አይደለም	
304	ለጥያቄ ቁጥር 303 መልስዎ አይደለም ከሆነ ለስንት ቀናት ሳይወስዱ ቀሩ?	ለ-----ቀናት	
305	በምን ምክንያት ነው ህክምናውን ወይም የየቀኑን መድሃኒት ሳይወስዱ የቀሩ?	1. የተሻለኝ ስለመሰለኝ 2. በመድሃኒቱ ጎንዮሽ ጉዳት ምክንያት 3. በክኒኑ ብዛት ምክንያት 4. በርቀት ምክንያት 5. ስመጣ መድሃኒት በጤና ተቋም ባለመኖሩ 6. የመጓጓዣ ገንዘብ በማጣት 7. የህክምና ጣቢያው የስራ ሰዓት ምቹ ባለመሆኑ 8. በመርሳት 9. ሌላ ካለ ይጥቀሱ-----	
306	መድሃኒቱን በሚወስዱበት ጊዜ የጎንዮሽ ጉዳት አጋጥሞት ያውቃል?	1. አዎ 2. አይደለም	
307	ለጥያቄ ቁጥር 306 መልስዎ አዎ ከሆነ የትኞቹ የጎንዮሽ ጉዳቶች አጋጥሞት?	1. ተቅማጥና ትውከት 2. ራስ ምታትና ማዘር 3. የቆዳ ላይ ሽፍታ 4. የእጅና እግር መደንዘዝ 5. ዐይን ቢጫ መሆን 6. የእጅና እግር መለብለብ 7. የሽንት ቀለም መቀየር 8. ሌላ ከሆነ ይጥቀሱ----- -----	ከአንድ በላይ መልስ መመለስ ይቻላል

ክፍል አራት፡- የጤና አገልግሎትን የሚመለከቱ ጥያቄዎች

ተ.ቁ	ጥያቄ	መልስ	ምርመራ
401	መድሀኒት የሚወስዱት ከየት ነዉ?	1. ከሆስፒታል 2. ከጤና ጣቢያ 3. ከጤና ኬላ	
402	የቲቢ መድሀኒት ለመወሰድ ምን ያህል ኪሎ ሜትር ይጓዛሉ?	-----ኪ.ሜ	
403	ጤና ተቋም ለመድረስ የሚወስድቦት ጊዜ በደቂቃ ስንት ይሆናል?	-----ደቂቃ	
404	ጤና ተቋም ለመሄድ የሚጠቀሙት መጓጓዣ ምንድን ነው?	1. በእግር 2. በግል ተሽከሪካር 3. በህዝብ መጓጓዣ 4. ሌላ ከሆነ ይጥቀሱ	
405	ወደ ጤና ድርጅት ለመድረስ ለመጓጓዣ ምን ያህል ብር ያስከፍላል?	1. በጣም ቅርብ ስለሆነ በእግር ስለሚሄድ ምንም ክፍያ የለውም 2. -----ብር	
406	የቲቢ ህክምና መስጫ ክፍል መድኃኒትዎን ለመወሰድ ምን ያህል ሰዓት ይጠብቃሉ?	_____ ሰዓት	
407	ለእርስዎ የቲቢ ህክምና መስጫ ክፍል በየትኛው ሰዓት ክፍት ቢሆን ይመረጣል ይላሉ?	ከ----- እስከ----- ሰዓት	
408	የቲቢ ህክምና የሚሰጡ የጤና ባለሙያዎች በቲቢ ህመማን ላይ ያላቸውን አመለካከት እንዴት ይመዘናሉ?	1. በጣም እንደ ጓደኛቸው አድርገው ይመለከታሉ 2. እንደ ጓደኛቸው አድርገው ይመለከታሉ 3. በተለየ መልኩ ይመለከታሉ 4. ከጓደኝነት በራቀ መልኩ ይመለከታሉ 5. በጣም ከጓደኝነት በራቀ መንገድ ይመለከታሉ	
409	ለመጀመሪያ 2 ወራት በየቀኑ የሚወሰደውን መድኃኒትዎን ሳያቋርጡ ይወስዱ ነበር?	1. አዎ 2. አይደለም	
410	ለመጀመሪያ 2 ወራት የህክምና መድኃኒትዎን ከጤና ድርጅት መቸ መቸ ይወስዳሉ?	1. በየቀኑ 2. በየሦስት ቀን 3. በየሣምንት 4. በየ 15ቀን 5. በየወሩ 6. ሌላ ከሆነ ይጥቀሱ-----	
411	የቲቢ ህክምና መስጫ ተቋም በሄዱበት ወቅት የጤና ትምህርት ይማሩ ነበር?	1. አዎ 2. አይደለም	

ክፍል አምስት:-ፀባይ/ ባህሪ እና የህክምና ድጋፍን የሚመለከቱ ጥያቄዎች

ተ.ቁ	ጥያቄ	መልስ	ምርመራ
501	ህክምናውን በሚወስዱበት ወቅት ያጨሱ ነበር?	1. አዎ 2. አይደለም	
502	ህክምናውን በሚከታተሉበት ወቅት በተደጋጋሚ አልኮል መጠጥ ይጠጡ ነበር?	1. አዎ 2. አይደለም	
503	ህክምናውን ሲወስዱ ድጋፍ ወይም እገዛ የሚያደርግሎት አለ?	1. አዎ 2. አይደለም	
504	ለጥያቄ ቁጥር 503 መልስዎ አዎ ከሆነ ወይም እገዛ የሚያደርግሎት ማን ነው?	1. ቤተሰብ 2. ጓደኛ 3. የጤና ኤክስተንሽን ባለሙያ/ሠራተኛ 4. ሌላ ከሆነ ይጥቀሱ-----	
505	ለጥያቄ ቁጥር 503 መልስዎ አዎ ከሆነ ምን ዓይነት ድጋፍ/እገዛ ያገኛሉ?	1. የገንዘብ 2. ወደ ጤና ድርጅት ስሄድ አብረውኝ በመሄድ 3. ህክምናውን እንድቀጥል የማበረታታት 4. ስለ በሽታው ጠቃሚ መረጃ በመስጠት 5. የሥራ ጫናን በመጋራት 6. ምግብ በማቅረብ 7. ትራንስፖርት በማመቻቸት 8. ሌላ ካለ ይጥቀሱ-----	
506	መድሃኒቶችን በሚወስዱበት ጊዜ ክትትል የሚያደርግሎት ማን ነው?	1. የቤተሰብ አባላት 2. የጤና ባለሙያ 3. የጤና ኤክስተንሽን ባለሙያ/ሠራተኛ 4. ህብረተሰብ 5. ሌላ ካለ ይጥቀሱ----- 6. ማንም የለም	
507	በህክምናዎ ወቅት የጤና ባለሙያዎች በየጊዜው የአክታ ምርመራ ማድረግ ጥቅም ነግረዎታል?	1. አዎ 2. አይደለም	
508	ለጥያቄ ቁጥር 504 መልስዎ አዎ ከሆነ መቶ መቶ / በስንተኛው ወር የአክታ ምርመራ አደረጉ?	1. በ2ኛው ወር 2. በ3ኛው ወር 3. በ5ኛው ወር 4. በ6ኛው ወር 5. በ8ኛው ወር 6. አላውቅም	

ክፍል ስድስት :- ግንዛቤን የሚመለከቱ ጥያቄዎች

ተ.ቁ	ጥያቄ	መልስ	ምርመራ
601	ዋና ዋና የቲቢ በሽታ ምልክቶች ምንድን ናቸው?	<ol style="list-style-type: none"> 1. አክታ ያለው ሳል 2. ከ3 ሳምንት በላይ የሚቆይ ሳል 3. ደም ያለው አክታ 4. የምግብ ፍላጎት መቀነስ 5. ማታ ማታ ማላብ 6. የደረት ህመም 7. የክብደት መቀነስ 8. ማታ ማታ ማቶክስ 9. ሌላ ካለ ይጥቀሱ_____ 10 አላውቅም 	
602	የቲቢ በሽታ መንስኤ ምን እንደሆነ ያውቃሉ?	<ol style="list-style-type: none"> 3. አዎ 4. አይደለም 	
603	ለጥያቄ ቁጥር 602 መልስዎ አዎ ከሆነ መንስኤው ምንድን ነው?	<ol style="list-style-type: none"> 1. ባክቴሪያ 2. ቫይረስ 3. ጥገኛ ትላትል 4. ስጋራ/ትንባሆ ማጨስ 5. ሌላ ካለ ይጥቀሱ_____ 	
604	የቲቢ በሽታ ከሰው ወደ ሰው ይተላለፋል?	<ol style="list-style-type: none"> 1. አዎ 2. አይደለም 3. አላውቅም 	
605	ለጥያቄ ቁጥር 604 መልስዎ አዎ ከሆነ መተላለፊያ መንገዱ ምንድን ነው ?	<ol style="list-style-type: none"> 1. ህመምተኛውን ሲያስለው ወይም ሲያስነጥሰው 2. በደም ንኪኪ 3. በመጨባበጥ 4. በግብረ-ስጋ ግኑኝነት 5. ከህመምተኛው ጋር አብሮ በመብላት 6. ህመሙ ስንወለድ አብሮ ይወለዳል 7. ሌላ ካለ ይጥቀሱ_____ 8. አላውቅም 	
606	የቲቢ በሽታን መከላከል ይቻላል?	<ol style="list-style-type: none"> 1. አዎ 2. አይደለም 3. አላውቅም 	
607	ለጥያቄ ቁጥር 605 መልስዎ አዎ ከሆነ መከላከያ መንገዶቹ ምንድን ናቸው?	<ol style="list-style-type: none"> 1. የቲቢ በሽተኛን በማስወገድ/በማግለል 2. ጥሩ ወይም ጤናማ ምግቦችን በመመገብና ስጋራት በመስራት 3. መጠጥንና ሌሎች ሱስ አምጪ መድሃኖችን/ዕጾችን በመተው 4. በቂ አየር በሚገባበት/በሚዘዋወር ቤት በመኖር 	
608	የቲቢ በሽታ የሚድን በሽታ ነው ብለው ያምናሉ?	<ol style="list-style-type: none"> 1. አዎ 2. አይደለም 3. አላውቅም 	
609	ለጥያቄ ቁጥር 608 መልስዎ አዎ ከሆነ ለምን ያህል ጊዜ መወሰድ አለበት?	<p>-----</p> <p>ቀናት/ሳምንታት/ወራት/ዓመት</p>	

610	የቲቢ ህክምና መውሰድ መቆም ያለበት መቻላቸው ነው?	<ol style="list-style-type: none"> 1. በእጅ ያለው መድሃኒት ሲያልቅ 2. ህመምተኛው የመሻል ስሜት ስለማው በማንኛውም ጊዜ 3. ማሳሉ ስያቆም 4. በህክምና ባለሙያ መዳኑ ስረጋገጥ 5. አላውቅም 	
611	የቲቢ በሽታ ካልታከሙት የሚያስከትለውን አደጋ/ጉዳት ያውቃሉ?	<ol style="list-style-type: none"> 1. አዎ 2. አይደለም 	
612	ቲቢ ህክምና መቆራረጥና ሳይጨርሱ ማቆም የሚያስከትለውን ችግር/ጉዳት ያውቃሉ?	<ol style="list-style-type: none"> 1. አዎ 2. አይደለም 	