

**Quality of Directly Observed Treatment Strategy of
Tuberculosis in Public Health Facilities in Dessie
City Administrative Zone, Amhara Region,
Northeast Ethiopia**

By

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**A thesis to be submitted to Jimma University, College of Public Health and
Medical Sciences, Department of Health Services Management, as Partial
Fulfillment of the Requirements for the Degree of Master of Health Care
and Hospital Administration (MHA)**

September 2013

Jimma, Ethiopia

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Abstract

Background: Quality of care is an important aspect of health care system that is given a priority especially providing quality of care for tuberculosis patient is crucial in prevention and control of disease. Despite highly effective anti TB agents for tuberculosis treatment, its burden was not decreased because of the emergence of fabricated epidemic of MDR-TB. Responses to this emergency cannot be achieved without adequate focus on improving quality of care.

Objective: To assess the quality of directly observed Treatment strategy of Tuberculosis in public health facilities of Dessie city administrative zone, Amhara Regional State.

Methods: The study was conducted at Dessie city administrative zone in eight public health facilities using a cross-sectional study design from June to July 2013. The sample size of 112 TB patients and 295 patients' records were selected with simple and systematic random sampling technique. Pretested questionnaires were used to collect data. Data was checked, entered and analyzed using SPSS version 16.0 software. Logistic regression analysis was used to identify the effect of explanatory variable on the outcome variable. Variables, which showed association in multivariate analysis was considered as final predictors. Ethical clearance was obtained from Jimma University and the official letter was delivered to Dessie City administrative zone health department.

Results: The study shows only 24 % of the tuberculosis treatment service is achieved from expected and 53.7% were satisfied. Staff refreshing training and supportive supervision are neglected issue. Statically significant associations were observed between treatment success rate with conformity to drug regimens during intensive (AOR=0.04, 95% CI: 0.01, 0.91) & continuation phase (AOR=0.05 95% CI: 0.01, 0.5) of therapy smear adherence (AOR=10.42, 95% CI: 1.33, 81.46). Patients' sex (AOR=0.13, 95% CI: 0.03, 0.49), distance from health facilities, (AOR=0.20, 95% CI: 0.05, 0.76) waiting time to get clinician (AOR=0.10, 95% CI: 0.02, 0.43), availability of prescribed drugs and other related services (AOR=0.20, 95% CI: 0.06, 0.68) and being respected at time of treatment (AOR=0.1395% CI: 0.02, 0.48) were final predictors of patients' satisfaction.

Conclusion: The overall tuberculosis treatment service status in all dimensions is poor. The care settings do not have sufficient amount of supplies and materials. Care providers are loosely adhered to national TB treatment protocol. The dimensions of outcome quality indicators are not "satisfactory". All program coordinators and care providers at different levels should act accordingly to resolve weakness in all quality dimensions.

Acknowledgements

I would like to express my deepest gratitude to my advisors Mr. Shimeles Ololo and Mr. Fikru Tafese for their valuable and constructive assistance and meticulous comments on my thesis and their candid advice and friendly approach.

My sincere appreciation is also extended to Jimma University, College of Public Health and Medical Sciences, Department of Health Services Management for giving me a chance to do this thesis.

My appreciation goes to the data collectors and supervisors whose excellent work enabled this study to be successfully completed.

I would also like to thank, all clients who were interviewed during data collection for their valuable time and cooperation.

Finally, I would like to acknowledge Dessie city administrative zone health department as well as study health institutions for giving me the required information and necessary documents.

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Abbreviations

AFB: Acid Fast Bacilli

AIDS: Acquired Immunodeficiency syndrome

ART: Antiretroviral Therapy

CI: Confidence interval

COR: Crude odds ratios

DOT: Directly observed treatment

DOTS: Directly observed treatment short course

EPTB: Extra Pulmonary Tuberculosis

FMOH: Federal Ministry of Health

HIV: Human Immunodeficiency Virus

IEC: Information Education and Communication

MDR-TB: Multi -drug resistant tuberculosis

MHA: Masters in Health Care and Hospital Administration

PLWHA: People Living with HIV/AIDS

NTP: National Tuberculosis Control Program

PTB: Pulmonary Tuberculosis

RH: Combined Rifampicin –and Isoniazid

RHE: Combined Rifampicin –and Isoniazid-Ethambutol

RHZE: **Combined** Rifampicin –and Isoniazid-Pyrazinamide Ethambutol

Rx: Treatment

SAS: sign and symptom

SNNPR: Southern Nations Nationalities and Peoples Region

SPSS: Statistical Package for Social Sciences

STM: Streptomycin

TB/Tb: Tuberculosis

TLCP: Tuberculosis and Leprosy Control Program

WHO: World Health Organization

XDR-TB: Extensively Drug Resistant tuberculosis

Chapter One: Introduction

1.1. Background

Tuberculosis (TB) is a chronic infectious disease caused by mycobacterium tuberculosis, an acid-fast bacillus. The main source of infection is untreated smear-positive pulmonary TB patient discharging the bacilli. It mainly spreads by airborne route when the infectious patient expels droplets containing the bacilli. It is also transmitted by consumption of raw milk containing mycobacterium bovis (1). Globally it is among the three fatal infectious diseases (1). Though it affects people of all age and sex, poverty, malnutrition, overcrowding and more recently, HIV/AIDS make some groups more vulnerable to develop the disease (2). Eighty percent of TB burden is concentrated in 22 countries. From 22 high TB burden countries, 9 is from Africa. More than 65% of TB cases and deaths occurred in African according to 2012 annual report of World Health Organization (WHO) (3). Ethiopia ranks 16th in the world and 3rd in Africa from list of high burden TB countries (1, 3). She also ranks 18th in multi drug resistance tuberculosis (MDRTB) prevalence having 2,200 cases (4).

In 1994 the WHO together with the International Union against Tuberculosis and Lung Disease (IUATLD) launched the DOTS strategy to fight TB. Within a decade, almost all countries had adopted the strategy and 50 million patients had been treated; but except few countries, considerable achievements were not gained on TB control activities (2). Ethiopia had adopted this strategy since 1995 with the objective of reducing tuberculosis mortality and morbidity (1). To reach to DOTS' objectives WHO stressed on service quality as main part of the DOTS strategy (2).

Quality has different meaning to different people. The most comprehensive yet the simplest definition of quality is “Doing the right thing, right, in a right way”. It has different dimensions like technical performance, effectiveness of care, efficiency of service, safety, and access, interpersonal relations, continuity of services and comfort infrastructure (5).

1.2. Statement of the problem

Morbidity and mortality from TB slightly declined since late 1990s due to implementation of DOTS. Except few countries no much progress were seen. It is still one of the world's major causes of fatal infectious diseases. Currently, the most serious aspect of drug resistance TB epidemic had been emerged (1, 2). In our country, the disease is still the third cause of morbidity and fourth cause of mortality according to the 2011 report of MOH (4). It was also the fourth leading cause of morbidity and the sixth cause of total admission in Amhara region (5). Even service is free of charge and health facilities are physically accessible, people with tuberculosis treatment get difficulty to complete their course of treatment (1). For example, 14 % of patients were lost from treatment follow up in 2012 in the Dessie city administrative zone, which was by far below WHO standards (6).

Poor quality care have deleterious effect on the safety and effectiveness of the drugs, adherence to treatment, users' satisfaction and continuity of care and treatment; besides it hampers expansion and utilization of the services (7, 8, 9). In spite of the fact that TB control activities were carried out, in 90% of the health facilities, nothing had been done to evaluate the quality of DOT services. Few studies about DOT service quality in other region of the country show that quality of TB treatment services are not fully addressed at different aspects. But in our locality, nothing is known about the status of TB treatment service quality. Thus, assessing the quality of DOT of TB treatment services in the study area would identify the existing gaps and challenges, provide recommendations to tackle them timely.

Chapter Two: Literature Review

2.1. Tuberculosis Control Program

In 1993 WHO declared TB as global emergency. After one-year 'DOTS' strategy was launched. In 2006, the 'Stop TB strategy' because of the new emerging challenges of HIV/AIDS and MDRTB was also was launched (2). Since 1995, Ethiopia had adopted 'DOTS' strategy focusing on interrupting transmission of the TB infection(1).Service quality is also considered as a means in achieving this intended DOTS' target(8).

2.2. Quality Assessment

A good quality means meeting minimal standards of care (9). Quality can refer to technical quality of care to the non-technical aspects of services such as clients` waiting time, staff attitudes and to programmatic elements such as policies, infrastructures, access and management (10). However, quality has different meanings; assessing quality is systematic identifications of level service provision status currently producing. It includes collecting and analyzing of data that provides information about level of adherence to established guidelines and standards, problems encountered that limits adherence and opportunities for quality improvement through audit, supervisory assessment, self-assessment or other methods (11).

There are different models of quality evaluation methods but in this study, we used the Donabedian's model. It has three elements: structure, process and output parameters from which inferences can be drawn (12). He defined structure as, "the tools and resources that providers of care have at their disposal and the physical and organizational setting where they work (the way a health care system is set up and the condition under which it is provided)", process as" the set of activities that occur within the health facilities, practitioners and patients, where judgment of quality may be made either by direct observation or by reviewing recorded information (the activities that constitute health care like treatment, prevention and education)" and outcome as "the change in patient's current and future health status that can be attributed to antecedent health care" (13).

2.2.1. Structural Assessment

Structural measures include the resources in the health system, describing the setting in which care occurs and the capacity of that setting to provide service. It includes health professional's

health service characteristics, infrastructures, equipment and the surrounding environment (14). The Donabedian's model "assumes in its component structure that high quality of care could be delivered only if the human and material resources are allocated and if the infrastructure and working environment are adequate" (13).It is used to decide whether care is provided under conditions favorable for good health care or not and it is actually relatively the easiest method of quality assessment(14).The WHO and FMOH recommended adequate supply of drugs and equipment to be part and parcel of programmatic activities at each level of TB control program where, health facilities have to order for delivery of TB drugs and supplies (1,3).A study conducted in china indicated that a regular supply of essential anti-tuberculosis drugs besides sustained political commitment & standardized treatment practices reduces TB prevalence by 30% (15).The success of infectious disease control program is often depend on availability and distribution of health resources as well as efficient utilization of them in the health organization (8,9). The WHO advocates "strong health system to be a prerequisite for delivering and sustaining service provision" (2). A qualitative study conducted ,in Italy, identified three categories of barriers to effective TB control among which organizational factors; such as the availability of diagnostic services and of sufficient resources were the main one (16).

A facility based cross-sectional study conducted in Jimma Zone also indicated that only 60% of the studied facilities had sufficient laboratory supply and only 50% of the facilities have waiting area for their patients (17). Similarly, a facility based cross sectional study in Afar region state revealed that 78% of the studied facilities did not utilize TB control supplies properly (18). The world health organization TB epidemic control committee had also identified the following constraints in the control of TB; financial shortages, human resource problems, regular drug & supply problems and lack of public awareness (3). Evaluation report of TB leprosy control program of Federal Minister of Health indicted that high turnover of staffs at the service delivery level; inadequate supervision by all levels, lack of mechanisms for defaulter tracing, frequent interruptions in the supplies & drugs, laboratory supplies, absence of adequate training and IEC materials were the main problems that affect quality of TB control activities (19).

2.2.2. Process Assessment

Process quality assessment denotes what is actually done to and for the patients in giving and receiving care. It includes the technical aspects of the provided services like provider-client

interaction, adherences to protocols or guidelines in the provision of care, timely services, adequacy of information and the technical performance of the provider (20). That is to say patient's activity in seeking care and carrying it out and practitioner's activity in making a diagnosis and recommending or implementing treatment (21). Studies of the process of care can lie on direct observations or review of medical records (22). The national TBL manual strongly recommends proper recording and reporting of TB control activities as one element in the processes of TB program management, where all TB control activities have to be recorded and reported (1). However, a cross sectional study conducted in SNNPRS indicated that about 26.8% of TB patients got treatment without any documented evidences (23). Similarly, from a cross-sectional quantitative study conducted in Jimma Zone and Afar Region showed that 23% and 88% TB patients were not registered to trace defaulters respectively (17,18).

Strong interpersonal relation, which shows trust, respect, courtesy, responsiveness, empathy, effective listening, and communication between providers and patients are one dimension of quality through which a client centered services can be rendered (24).

However, a study conducted in Jimma zone, Afar regional state as well as SNNPR, indicated that poor relations between health-care providers and patients resulted in rejection of public health-care (17, 18, 23). A study conducted in Italy also indicated that inadequate communication between the patient and provider is the major barrier besides, economic and geographic barriers (16). Additionally, lack of service integration, poor interpersonal communication, long waiting time, and lack of resources including human resources had been the main system barriers in TB control activities (25). A study conducted in Tigray indicated that delay in seeking health care, low case detection rate, poor quality in diagnostic procedures (non-adherence to the national guideline) were the major challenges of TB control program (26). The cross sectional studies in different countries also indicated that higher defaulting rate was observed among those TB patients who said they were uncertain that their treatment would work (24,27).

2.2.3. Outcome Assessment

Outcome quality parameters measure relevant health care outcomes of TB: survival rate, treatment success rate, and patient satisfaction level which are the results of the process of patient care and of the timely availability of the necessary inputs (1, 3). Institutional based cross-sectional study conducted in Jimma zone indicated that 69.1% smear positive patients

successfully completed their treatment and about half of them were cured (17). Similarly, a cross-sectional study in Afar Regional state indicated that 41.6% of TB patients completed their treatment, and 5% were cured (18). Even though satisfaction level varies according to knowledge and prior experiences of patients, it has been recognized as one component of quality assurance, "equating high level of satisfaction with high level of quality of care" (28). A study conducted in Jimma zone indicated that the common causes of patient dissatisfaction were unavailability of health personnel during working hour, interruption and lack of drugs and other supplies were the main ones 65% of the study patients replayed (29).

Generally, quality is measured as a scale or degree rather than as a binary phenomenon, it encompasses many aspects and dimensions. It can be observed from an individual as well as population perspective. It can be measured in terms of structure, process and outcome, depending on type and the specialty of the services (30, 31).

This study mainly focused in all components (structural, process and outcome) of TB care using Donabedian's quality assessment model in health care system against agreed quality criteria developed by team of public health experts based upon WHO standards. Availability or presence of adequate ventilated separate TB treatment room, separate specimen collection area, power supply, tap water supply ,gender specific latrine, waiting area, service hour, staff training, quality assurance mechanism, active defaulter tracing mechanism, regular supervision and review meeting, essential anti TB agents, laboratory reagents, IEC materials, medical equipment and furniture in the facility were used as structural quality criteria, while patient to provider interaction and communication ,health worker adherence to treatment guideline , recording and reporting were used as process quality criteria and treatment success rate and patient satisfaction were used as outcome quality measurement criteria (12,17,22,26).

2.3 Conceptual frame work

The conceptual framework was adapted from Donabedian's model for quality of TB care. It viewed healthcare delivery within the continuum of service, which began with structures fulfilled through processes, and ended with outcomes.

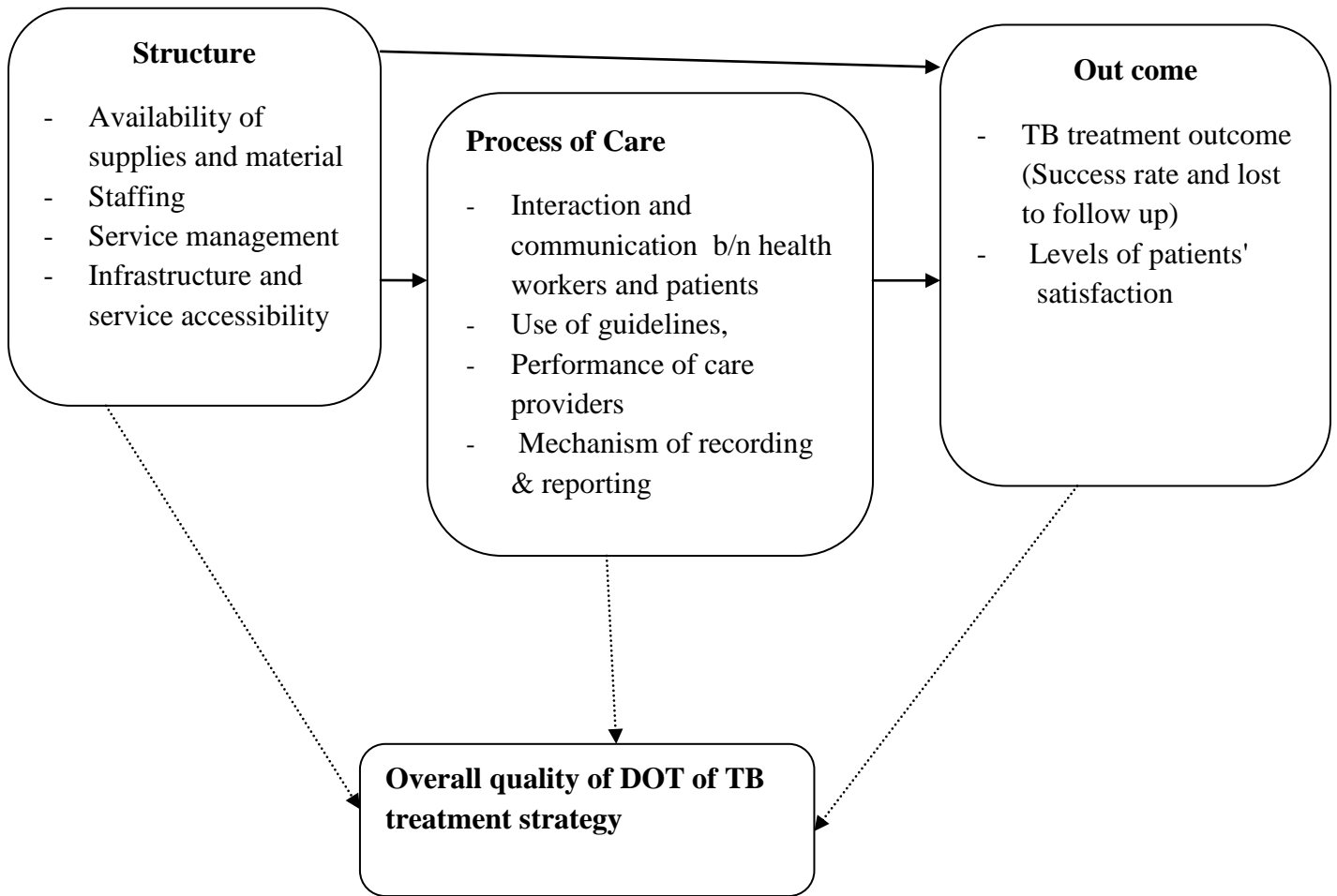


Fig 1. Adapted conceptual framework from Center for Human Services modified with Donabedian's quality of health care model for study of DOTS services.

Chapter Three: Significance of the Study

Despite the fact that Ethiopia is focusing to expand TB control program, little is known about the status of service quality. The country's plan to respond to the TB emergency cannot be achieved without adequate focus on improving quality of care (1,3). Hence, to fill these gaps and in view of the national tuberculosis control program, scientific evidence is needed for the uncovered service quality.

Quality assessment has been considered as one element of quality assurance, which looks for sources of problems in a system and process (32).

This study would provide valuable information for those working on TB control activities and researchers.

- ☞ It can identify major constraints in TB treatment strategy since no such studies were undertaken in the study area as far as the PI knowledge concerned
- ☞ Further, knowing the existing quality of DOTS service in the zone will help those stakeholders to take timely measures and lessons for the improvement of the program
- ☞ It can also serve as base line information for other similar studies that may be conducted in the future.

Chapter Four: Objectives of the Study

4.1 General Objective

- 1) To assess the quality of directly observed Treatment of Tuberculosis in public health facilities in Dessie City Administrative Zone, Amhara Regional State.

4.2 Specific Objectives

1. To assess the structural quality of TB treatment in Dessie City Administrative Zone public health faculties.
2. To assess the process dimension of quality of TB treatment in public health facilities in Dessie City Administrative Zone.
3. To assess the outcome dimension of quality of TB treatment in public health facilities in Dessie City Administrative Zone.
4. To assess determinants of TB treatment success rate and patient satisfaction on DOT service provision in Dessie City Administrative Zone.

Chapter Five: Methods and Materials

5.1. Study Area and Period

The study was conducted in Dessie City Administrative Zone in Amhara Regional State Northeast Ethiopia from June 20 to July 20, 2013. The City has common boarders with Tehuledere district in the North, Dessie Zuria district in the West, Kalu, and Kutaber district in the South and Northeast respectively. It is among one of the three metropolitan towns in Amhara regional state. Total area of the zone is 16,800 hectares. The total population was 195,887. Among these, 97,748 (49.7%) were female inhabitants. It has 16 kebeles. It is capital city of south Wollo zone. It is located 401 km away from Addis Ababa in the Northeastern direction, and 475 km away from the Regional capital, Bahir Dar in the southeast direction. There were six hospitals (2 public and 3 private), six health centers and five higher private clinics, making the potential health service coverage of the town 100%. Eighty percent of the public health facilities (2 hospital and 6 health centers) were providing both diagnostic and treatment services to tuberculosis. On average 1000, TB patients are diagnosed and treated annually.

5.2. Study Design

The design was facility based cross-sectional study.

5.3. Population

5.3.1. Source Population

The sources populations were all public health facilities, head and care providers, TB patients currently on treatment and all TB patients who had been treated in the public health facilities in the town in one-year period preceding to the survey.

5.3.2. Study Population

The study populations were only diagnostic and treatment public health facilities, all head and care providers, all TB patients on the intensive phase of TB treatment and medical records of TB patients who were treated in the previous one-year preceding to the study period.

5.3.3. Sampling Frame

The sampling frame used for the study was all health facilities , list of TB patients on the intensive phase of treatment, and TB registration book.

5.3.4 Study Unit

The study units were randomly selected medical records of TB patients who were treated in previous year, and those who were on the intensive phase of DOTS during the study period.

5.3.5. Inclusion and Exclusion Criteria:

Inclusion

- Health facilities provided both diagnosis and treatment of TB.
- TB patients who were on the intensive phase of treatment during data collection period.
- TB patients' medical records whose treatments were completed in between May 30/2012 and July 01/2013.

Exclusion

- Seriously ill TB patients not able to respond to the interview.

5.4. Sample Size and Sampling Procedure

5.4.1. Sample size determination

5.4.1.1. For Observation and providers interview

TB control activities in the eight public health institutions were observed, and heads as well as TB care providers in the respective health facilities were interviewed.

To determine the number of observation for process of care, we used rule of thumb in sampling for quality of care study, which states, if the number of units are very large (500-1000) take a 10% sample, if it is medium size (100-500), take a 20-30% sample, and if it is very small (less than 50), take 30%-50% of the sample (12, 23). Hence 30% from a sampling frame of 112 TB patients with in the intensive phase of treatment from selected facilities, i.e. 32 patients-provider interactions sessions were observed to assess service element.

5.4.1.2. TB register review

The sample size for unit TB review was estimated based on Single population proportional survey formula. The formula:

$$n = \frac{(Z\alpha/2)^2 P (1-P)}{(D)^2}$$

Where, P= proportion of Tuberculosis patients received quality treatment service process.

Since there was no such aggregate data P was taken 0.5 to get maximum sample size.

CI=confidence interval at 95% $\left(Z_{\alpha/2} = 1.96\right)$

D=allowable error of 5%

$$\text{Hence, } N1 = \frac{(1.96)^2 * 0.5 * 0.5}{(0.05)^2}$$

$$N1 = 383$$

Since total source population was less than 10,000 population, finite population proportion correction formula of sample size i.e.: $NF = \frac{n_i}{1 + (n_i/N)}$ (n_i is the minimum sample and N is total source population = 1290)

$$NF = \frac{n}{1 + \frac{N_i}{N}} = \frac{384}{1 + \frac{384}{1290}} = 295$$

The required patients' list from TB register was 295. This sample was selected proportionally from each selected facility. The patients' record was selected by using simple random sampling techniques.

5.4.1.3. Exit interview

The sample size for exit interview was estimated based on single population proportion (p).

The formula: $n = \frac{(Z_{\alpha/2})^2 P(1-P)}{(D)^2}$

Where n is sample size, P (proportion of TB patient satisfaction with TB treatment service quality) & D is the margin of error. The value of P was taken from a study conducted in Sidama zone, 90% of the respondents satisfied with TB treatment service (28).

D=5% for expected margin of error CI=95% confidence level $\left(Z_{\alpha/2} = 1.96\right)$

$$N = \frac{(1.96)^2 * 0.9 * 0.1}{(0.05)^2} = 138$$

The required sample size was 138. With 10% non-response rate = 14

Therefore total sample size $N = 152$, but our total source population was less than 10,000 population, we used finite population proportion correction formula: $NF = \frac{ni}{1 + (ni/N)}$ (Ni is the minimum sample and N is total number of TB pt now on treatment during data collection time = 626

$$NF = \frac{ni}{1 + \frac{ni}{N}} = \frac{152}{1 + \frac{152}{626}} = 123$$

The required sample size of TB patient on the intensive phase $N = 123$.

However, actual number of TB patients on the intensive phase of DOTS was 112. Hence, exit interview was collected from all 112 patients in the eight selected public health facilities.

5.4.2 Sampling Techniques

From the listed public health facilities, two hospitals and six health centers that provided both diagnosis and treatment of TB were selected as the final study sites.

The facilities were from hospitals (Dessie, and Boru Meda hospital) from health centers (Dessie Buanbuha, Segnogebeya, Tita, Boru-selase and Gerado).

The structural dimension of quality of care was assessed in all facilities by observing the facilities themselves and interviewing heads of the institution and TB clinics care providers. The structural aspects of the services in this study includes (the presence of trained TB care providers, a separate TB treatment unit, daily outpatient TB care, availability of supplies, furniture, medical equipment and supervisory support) .

The process dimension of quality of care was also assessed by observing care providers at TB clinics by using observational checklists. The process of care observed in this study (provider-client interaction, information exchange between providers etc) was observed in all selected facilities. Therefore, 32 observation sessions were done for newly diagnostic patients during data collection periods.

To assess the outcome component of service quality (patient satisfaction and treatment success rate) patient exit interview and their record were audited.

Exit interview were employed for those patients consecutively that fulfilled the inclusion criteria right after the treatment completion until all TB patients were interviewed in each study facility. The sample size was all existing TB patients. The 295 TB patients' record was proportionally allocated to the eight health institutions based on previously treated TB patient load for reviewing records. Then the required patients' records from each health institutions were selected by systematic random sampling techniques.

Table1: Sample size and types of assessments for quality of DOTS service in Dessie City administrative zone, 2013.

Name of Selected Health Facilities	TB Patients load		Sample size needed for different assessment			
	Previous treated	Currently <u>no</u> of patients On Rx	Exit interview	Record review	Observation of facility	Observation of care
Dessie Hospital	217	81	18	44	1	5
Boru Hospital	189	73	13	41	1	4
Dessie HC	211	83	12	43	1	4
Buanbuha HC	143	74	14	34	1	4
Segnogebye HC	161	78	14	37	1	4
Tita HC	152	83	15	35	1	4
Gerado HC	98	73	12	29	1	3
Boruselase HC	119	81	14	32	1	4
Total	1290	626	112	295	8	32

5.5. Data Collection Procedure

Before data collection, questionnaires and checklist which were developed in English was translated into Amharic and retranslated to English to check its consistency. The Amharic version was used because it makes ease the communication of data collectors with respondents. Then all data collection tools were pre-tested with 7 exit interview, 10 record reviews, and 3 observation session at Haik health centre 30km from Dessie town. Inconsistency in questionnaires and checklists during pretest was rearranged before main data collection. Interview guide for data collectors and checklist for supervisors were prepared. Before interviewing, the individuals were informed about the purpose of the interview and asked for verbal consent then interview was conducted in a private setting at the health facility after the patients take drug and being stable. During data collection, supervision was conducted on daily basis. On each data collection day, all the collected data was reviewed by supervisors & principal investigator.

5.5.1 Developing Data Collection Tools

Tools were developed for each data-collection methods.

For observation

Observation and inventory checklist were employed to get data for structural and process dimension of quality of TB care such as facility infrastructure, supplies and service provision status. The tools were adapted from TBL manual and published literatures with some modifications (1,17,18).

For record review

The data collection tools was checklist, which was developed from TBL manual (1)The checklist had 19 items /patient name, age, sex, weight, address of patient, TB number, start date of intensive phase, 1-3 sputum smear microscopy, category of treatment, type of TB, drug administered during intensive and continuation phase and treatment outcome.

For exit interview

A structured questionnaire was used for exit interview with patients after the completion of their treatment. It was adopted from published literatures (17,32). The tool provides lists of alternatives to the patients. Its content was patient's socio-demographic characteristics, interpersonal relationship between the patient and health care provider, availability of adequate resources and services, effectiveness of care (the extent to which care deliveries & its intended

outcomes), and adequacy of information was included in the interview. Each study participant was asked to tell his/her level of satisfaction.

5.5.2. Personnel Recruitment and Training

Two 12 graduates for exit interview and two diploma holder nurses for observation and record reviewing, and two health officers for supervision were recruited from non selected health facilities. Data collectors and supervisors were trained on objective of the study and how to collect data using the above-mentioned tools for two days (one day for training and one day for pre-testing).

5.5.3. Data Collection Method

Data were collected through observing, reviewing TB registries, & face to face interviewing.

5.5.3.1. Structural dimension of quality Assessment

Data on the structural quality criteria, developed by team of public health experts based upon DOTS strategy (17, 22, 26) were collected by observations using national Tuberculosis and Leprosy Control Programme performance monitoring inventory checklist and interview with facilities' head and TB clinics care providers.

5.5.3.2. Process dimension of Quality Assessment

Trained health professionals (nurses) were assigned to assess the process dimension of care by making 33 observation sessions using checklists on some TB control activities like whether health education on TB was given in the health facility, time at which TB clinics opened (functioning) and flow analysis of patients waiting time from their entrance till exit in the selected health institution were made. The other observation was carried out for; adequacy of information given to TB patients, patient is participation in decision-making process, the level of provider-patient interaction.

5.5.3.3. Patients' Satisfaction Level Assessment

Data on patients' satisfaction were collected by face-to-face interview by trained data collectors, who speak the local language. The exit interviews were conducted using questionnaires among TB patients on the intensive phase of treatment.

5.6. Study Variables

5.6.1. Variables used in this study

✓ **Structural quality variables**

- Availability of supplies and material
- Staffing
- Service management
- Infrastructure and service accessibility

✓ **Process quality related variables**

- Provider-patient interaction and communication
- Providers adherence to national treatment guide line
- Mechanisms of recording & reporting

✓ **Outcome related variables**

- Patients' satisfaction
- TB treatment outcomes

5.6.2. Independent variables

- *Socio-demographic variables* (age, sex, marital status, religion educational level, ethnicity place of residence)
- Socio-economic variables (occupation ,income)

5.7. Operational Definition

1. **Structural quality of DOTS of TB treatment:** an average score for structural variables (Staffing, availability of drugs and diagnostic supplies, infrastructure and accessibility) was computed by assigning a score of 1 for the presence of that aspect or positive responses; a score of 0 for the absence of that aspect or negative responses of each aspect, percentage score for each health facility was calculated and structural quality was classified as; Very good (90-100), Good (80-89), marginal (70-79), Poor (60-69) and Very poor (0- 59) based on published literatures (17,33).
2. **Proper staffing:** is at least one trained staff assigned (basic 5 days DOT training) in TB clinic and laboratory department (1).
3. **Availabilities of drugs and supplies:** The amount of essential TB drug and laboratory reagents sufficient for at least a month of stock day. It was measured in number of stock on hand sufficient for minimum of a month otherwise, if the stock level is not enough for not more than a month for actually existing patient it is called insufficient according to national recommendation (1).
4. **Infrastructure:** Are the facilities adequate for TB treatment. It is adequate if TB clinic having separate examination room its floor area greater than 7.5 square meters and window size 4 square meter, for ensuring infection prevention practice. The room should have also gender specific latrine; 24 hours tap water, and electricity supply (3, 44).
5. **Accessibility of service:** provision of daily diagnosis and treatment services including in weekend with sufficient essential drugs with reasonable minimum distance of five-kilo meter (33).
6. **Information communication b/n care provider and patient** was the transfer of information regarding TB and its treatment between provider and patients. It was measured when the care provider explains how TB was transmitted, how to take drug and its possible side effect, advantage of DOT, advises the patient to bring any family member or neighborhood having signs and symptoms of TB to the health facility. Percentage score for each was calculated and information communication was classified as: very poor (0%–49%), poor (50%–59%), fair (60%–69%), good (70%–79%), very good (80%–89%) and excellent (90%–100%) based on published literatures (17,33)

7. **Provider-patient interaction** - is any transactions of words, gestures, questions or responses occurring during service delivery. The provider listen, understand, and cares for the patient in “respectful” way and in a private environment. It was measured by assigning a score of 1 for positive response and 0 for negative response for these variables (did patient politely greeted ,participated in part of decision making and did the health worker speaks the same language with the patent, properly explained patients about how to take drugs, advised patients when to return for follow up, advise patients on the need to comply with Rx, explained patients when follow up AFB done, advise patients to bring person with symptom of TB, and asks the patient for any concern regarding treatment). Percentage score for each was calculated and interpersonal relation was classified as: very poor (0%–49%), poor (50%–59%), fair (60%–69%), good (70%–79%), very good (80%–89%) and excellent (90%–100%) based on published literatures (17,33)
8. **Satisfied patients:** - the degree to which patients perceive or accept the services as appropriate to them. The overall satisfaction, which is a composite measure for the thirteen indicators of satisfaction, was calculated. This calculation was done with assigning values for responses given by the patients. Accordingly, response of very satisfied was given a value of five. A value of four was assigned for response of satisfied, three for neutral response. Values of two and one were given for responses of dissatisfied and very dissatisfied responses respectively.
9. **Quality of records:** - was assessed by assigning a score of one for recorded items and zero for unrecorded for each 17 items. Percentage score for each record was calculated and quality of medical recording was classified as: very poor (0%–49%), poor (50%–59%), fair (60%–69%), good (70%–79%), very good (80%–89%) and excellent (90%–100%) from published literatures (17,33).
10. **Waiting time:** was considered as the time from when the patient arrived at the health facility till contact to clinician. It was measured by patient flow chart analysis for 30 patients and then the mean waiting time was computed.
11. **Health care provider adherence to TB treatment guideline:** Healthcare providers’ compliance with the NTG recommendations during treatment of TB patients. It was measured by proportion of TB patients who were prescribed the correct regimen,

appropriate types of drugs, correct dosage of drugs and sputum smear adherence for pulmonary positive patients. The data was generated from the unit TB register record review (1, 3). Smear microscopy compliance for pulmonary smear positive cases has two elements, number and timeliness of smear performance. The required number of three smears at 2nd, 5th and 7th month of treatment were fulfilled a score of 1, however, if one smear was missing, the appropriate fraction 1/3 was subtracted from the score, and within the same fashion if the required smears were accomplished on time, a score of one was assigned otherwise zero. Quality of smear performance microscopy was classified as: very poor (0–0.5), poor (0.5–0.6), marginal (0.6–0.7), good (0.7–0.8), very good (0.8–0.9) and excellent (0.9–1.0). Conformity to drug regimen according to DOTS strategy, cases were classified as adhering or non-adhering to the recommended drug regimen (type and dose of drugs).

12. Quality of DOTS of TB treatment services: The overall quality index used in this study was a composite index devised to evaluate the quality of anti tuberculosis care. This index was computed by multiplying 5 parameters:

- Quality of record registration
- Sputum smear microscopy adherence index
- Drug regimen conformity index during the initial phase
- Drug regimen conformity index during the continuation phase,
- Treatment success rate

Overall quality was graded as: poor (<50%), good (50–90), and excellent (90–100) from published literatures (17,33).

5.8. Data entry and analysis

The responses to the questionnaires were coded again to the original English version and entered to SPSS 16.0 version software. Data editing and cleaning were done to remove missing/conflicting ideas. Recoding and re-categorizing were done for relevant variables. Descriptive statistics (frequency tables, median, range...) were used to describe the structural, process and outcome results. Bivariate and multivariate logistic regression analysis with 95% confidence interval at P value of 5% was computed to know the degree of association.

5.9 Data quality management

5.9.1. Before data collection

Data collection tools were properly prepared. Then the English version questionnaires were translated in to Amharic, which is the local language of the study area. Two days training were given to data collectors and supervisors. All data collection tools were pre- tested on 5% of the sample size in non-selected health facility.

5.9.2. During data collection

Questionnaires were checked for completeness on a daily basis by supervisors. Incorrectly, filled or missed records were sent back to the respective data collector for correction .After checking all questionnaires for consistency and completeness, the supervisors submit the filled questionnaire to the principal investigator. The principal investigator also rechecked completed questionnaires.

5.9.3. After data collection

Data were checked for its completeness, coded, edited, cleaned, organized and analyzed.

5.10. Ethical Consideration

Ethical approval and clearance were obtained from the Ethical Clearance Review Committee of Jimma University College of Public Health and Medical Science. Official letter was obtained from Ethical Clearance committee and Department of Health Services Management of Jimma University and delivered to Dessie City Administrative Zone health department to get permission. Prior to the interview consent was obtained from each study participant. Participants' identifiers were not collected to ensure their confidentiality. Anonymity and confidentiality were maintained for all those records reviewed

5.11 Dissemination of the Results

After accomplishing the study, the result will be presented to the Department of Health Services Management, College of Public Health and Medical Science, Jimma University. After approval by the department, copies of the whole research will be submitted to the Amhara Regional State Health Bureau, Dessie City Administrative Zone Health office. Subsequently, attempts will be made to present it in conferences, and if possible, it will be sent to peer review.

Chapter Six: Result

6.1. Structural Quality of TB Treatment

All the eight public health facilities (two hospitals and six health centers) heads 8 (100%) and TB care providers 16 (100%) were participated in the study making response rate of 100%.

6.1.1 Staffing and Management of Service Provision

There were a total of 87 technical staffs trained on TB & HIV care , among these were medical doctors 3 (3.5%)health officers,12(14.0%) ,nurses, 47(54.0%) laboratory technicians, 22 (25.0%) and the remaining health workers namely health assistants 3(3.5%). All of the studied facilities had one health and laboratory professional assigned as full time worker who had basic training on TB treatment and diagnosis activities. Even if all studied facilities TB focal person need to have training particularly on MDRTB, only four care providers and six laboratory professionals had received refreshment trainings in the last 12 months.

TB clinic care providers were nurses in two third of studied health facilities. The mean service year of professionals was 3.4 years (range 7 months to 10 years) and all the respondents had a one-week basic training on TB treatment. The time of training ranged from 5 years back to 6 months. Daily outpatient TB services were available in all studied facilities and even if all had regular quarterly reporting and supportive supervision schedule, except three facilities' TB care providers the rests were never supervised in the last six months.

Concerning management of service provision, it was observed that care providers had been monitoring their patients' treatment compliance by daily filling of patients' unit TB registration form immediately after the patients took their pills in all of the studied facilities during the intensive phase of therapy. Similarly, absentees were retrieved by their contact person and health extension workers in three fourth of the facilities. All the eight health facilities were involved actively in AFB sputum microscopy tests through spot-morning-spot procedure with result return time of two days, but only half of the facilities were implement internal and external sputum smear microscopy quality control procedures.

6.1.2 Availability and Use of Anti TB Drugs, Diagnostic and IEC Materials

The two most important first line anti TB drugs (Isoniazid and Rifampicin), as well as most other first line adult anti-TB drugs were available in all studied health facilities. The available anti TB agents are sufficient for seven to eleven days for existing patients. PFSA was the main source of drugs and laboratory supplies for TB control activities for all facilities. The methods of delivery of these drugs and supplies were picking them up from the source by almost all health facilities. Only one health facility had reported lack of drugs and laboratory supplies were main problems in providing TB control activities (Table 2).

About laboratory equipments and reagents, all of the health facilities had Binocular microscope, sputum cups, staining rack, staining reagents and boxes for keeping examined slides. The available laboratory reagents and slides are enough for a minimum of two months.

In most health facilities, teaching materials were scarce. For instance, copies of recent tuberculosis and leprosy laboratory manual, TB flip chart, flow chart for diagnosis and TB posters in local language were available in only one fourth of the studied health facilities. All have TB unit registration form, referral and transfer form sputum examination request form and TB control activity report form. Concerning use of these IEC materials TB unit registration form, referral form, transfer form sputum examination request form and TB control activity report form were used by all studied facilities. However, TB flip chart and flow chart tuberculosis treatment and diagnostic manual and TB posters were used by in only one fourth of the facilities (Table 3).

Table 2: Availability and use of anti tuberculosis antibiotic at public health facilities in Dessie city Administrative Zone, August 2013.

Name of product	Dose in mg	Number of stocks	Daily consumption	Number of patients (IP &CP)	Number of stock days
RHZE fixed dose of					
Rifampicin	150				
Isoniazid	75	3217 pills	292 pills	103	11
Pyrazinamide	400				
Ethambutol	275				
RHZ fixed dose of					
Rifampicin	150				
Isoniazid	75	460 pills	22 pills	5	21
Pyrazinamide	400				
RH fixed dose of					
Rifampicin	150	2152 pills	240 pills	90	9
Isoniazid	75				
EH fixed dose of					
Ethambutol	400	490 pills	0 pills	0	-
Isoniazid	75				
			0	0	-
Ethambutol	400	50 pills			
Streptomycin	1000	63 amp	9 gram	9	7

IP=Intensive phase, CP=continuation phase

Table 3: Availability and use of IEC materials at public health facilities in Dessie city Administrative Zone, August 2013.

Manuals ,Forms and Registers	Available		Use	
	Yes(N %)	No (N %)	Yes (N %)	No (N %)
Latest version of TB/HIV treatment manual (2013)	2(25%)	6(75%)	2(100%)	0
Latest version of lab. Manual (2012)	3(37.5%)	5(62.5%)	2(66.5%)	1(33.5)
TB flip chart	2(25%)	6(75%)	2(100%)	0
Flow chart for Dx and Rx of PTB	2(25%)	6(75%)	2(100%)	0
Unit TB register	8(100%)	0	8(100%)	0
AFB Lab register	8(100%)	0	8(100%)	0
TB Treatment follow-up card	8(100%)	0	8(100%)	0
Quarterly report form	8(100%)	0	8(100%)	0
TB posters in different language	2(25%)	6(75%)	2(100%)	0
TB transfer/referral forms	8(100%)	0	8(100%)	0
Report and Requisition Form	8(100%)	0	8(100%)	0
Lab request form	8(100%)	0	8(100%)	0

6.1.3 Infrastructures, Service Accessibilities and Medical Equipments

All studied facilities had separate TB treatment room. Power and tap water supplies were available for 24 hours in all studied facilities. The average floor area of the room is 6.3 square meter. Each examination room had good ventilation with average area of its window is 3.4 meter square. Three (37.5%) of the health facilities had gender specific toilet. Half of the health facilities had no waiting area for patients. None of the health facilities had separate area for sputum specimen collection and clear signs of indicators for each service area. With regards to availability of medical equipment and furniture for TB treatment each TB clinics should have at least examination bed, stretcher, examination light, wheel-chair, adult and pediatrics weight scale, examination screen, refrigerator, sphygmomanometer, stethoscope and thermometer according to WHO and FMHAC recommendation (3,44). Only 62% of the required equipments and furniture were available. There were no stretcher, wheelchair, pediatric weighting scale, screen and examination light at all in all studied facilities.

6.1.4. Overall Structural Quality

The index of overall structural quality mean score was 0.64, which was graded as poor. Three fourth of the health facilities, had poor score, only Dessie health center and Boru meda hospital graded as marginal with the score of 0.73 and 0.70 respectively (Table 4).

Table 4: Structural quality score of public health facilities pertaining to TB care, in Dessie city Administrative Zone, August 2013.

Health facility	Availability of drug, diagnostic and other material	Staffing	Service management	Infrastructure and access.	Average score
Dessie Referral hospital	0.62	0.70	0.70	0.53	0.66
Boru Meda hospital	0.60	0.70	0.72	0.60	0.70
Dessie health center	0.72	0.70	0.70	0.69	0.73
Buanbuwuha health center	0.60	0.70	0.70	0.53	0.66
Segnogebye health center	0.60	0.70	0.72	0.38	0.62
Tita health center	0.60	0.60	0.60	0.38	0.58
Gerado health center	0.60	0.60	0.70	0.38	0.60
Boruselase health center	0.60	0.75	0.60	0.38	0.60
Simple average score	0.62	0.68	0.68	0.46	0.64

*Very good (0.9-1), Good (0.8-0.89), marginal (0.7-0.79), Poor (0.6-0.69) Very poor (0.5- 0.59)

6.2. Quality of TB Treatment Process

Patient-provider interaction, communication between patient to care provider and health workers activities were assessed by observation and reviewing records.

6.2.1. Patient- provider interaction, information communication and use of supplies

6.2.1.1. Provider-patient interaction:

Thirty-two sessions of patient-provider interaction were observed while patients were on treatment. It was observed that nearly half of them were not greeted politely.

6.2.1.2. Information communication between care providers and patients

Concerning the provider-patient information provision system, 32 patients were observed while they were receiving their drugs. The result showed that 22 (66.67%) patients were informed how TB was transmitted, 23 (69.7%) of the patients were informed how to take drug, and its possible side effect. Seven (22%) of the patients were advised on advantage of DOTS, but on the time of observation no one was informed to bring any family member or neighborhood having sign and symptoms of TB to the health facility (Table 5).

Table 5: Description of provider-patient interaction & communication on services provision of tuberculosis in the selected health facilities in Dessie city administrative zone, August 2013. (N=32)

Variable category	Yes (%)	No (%)
Patient politely greeted.	16 (51.5 %)	15(48.5%)
Patient participated in decision-making.	10 (30.3%)	22 (69.7%)
Health worker explained about TB transmission	13 (39.4%)	19 (60.6%)
Health worker speaks the same language with the patient.	32 (100%)	0
Health worker advised patients to comply with DOTS	7(22%)	25 (78%)
Health worker explained patients when follow up AFB done?	13 (39.4%)	19 (60.6%)
Health worker advised pts to bring person with symptom of TB	0	32 (100%)
Health worker asked patient for any concern regarding treatment	0	32 (100%)
Patient asked health workers for any concerns.	7 (21.2%)	25 (78.8%)
Patient get response for the concerns he/she have.	5 (71.5%)	2 (28.5%)

6.2.2. Health Worker Performance

6.2.2.1. Quality of registrations

Records of patients who attended public health facilities in Dessie City Administrative Zone for TB treated from June 20 /2011 to June 20 /2012 were audited, irrespective of age, sex and initial diagnostic category. From 295 medical records, data were collected through a pre-coded checklist, covering items pertaining to patients' personal data and data related to process and outcome of care. Nineteen items were audited. Majority of the process items (90.6%) were clearly registered on the TB unit registration book. About 8.4% of patients were initiated and continued without recording information needed to monitor treatment. One percent of the recorded items were illegible. The overall registration quality was graded as excellent (Table 6).

Table 6: Compliance with registration of process of items pertaining to process of care delivered to TB patients in the selected health facilities in Dessie city administrative zone. August 2013.

Items	Frequency	Percentage
Patient's unit TB Number	295	100
Sex of the patient	288	97.6
Age of the patient	295	100
Name of contact person	295	100
Address of contact person	259	87.8
Initial diagnostic AFB result	209	98.1
Weigh of the patient during intensive phase	266	90.2
Classification of the patient	290	98.3
Category of the diagnosis	285	96.7
Types of drugs given during the intensive phase	286	96.9
Dose of the drugs during the intensive phase	275	93.2
The 2nd sputum smear result (N=82)	67	81.7
Weight of the of the patient on the continuation phase	254	88.1
Types of drugs given during the continuation phase	283	95.9
Dose of the drugs during the continuation phase	287	90.5
The 3rd sputum smear result(N=82)	61	74
The 4th sputum smear result(N=82)	53	64.6
Treatment outcome of the patient	291	98.6
HIV status of TB patient (N=295)	240	81.5
	Average percentage	90.6

6.2.2.2. Adherence to DOTS Drug Regimens and Smear Microscopy Schedule

6.2.2.2.1. Characteristics of TB patients

Two hundred five TB patients' records were audited. Among them, 137 (46.7%) were in the age group of 21-34 years. Males were little more than half 149 (50.6%) of the total patients. Sputum AFB test was done for 209 (98.1%) patients during the time of initial diagnosis. Positive results were recorded in 82 (39.2%) of the cases.

Regarding diagnostic category, the highest frequency was new cases which accounts, 280 (94.9%). With respect to treatment outcome, 44 (14.9%) were cured cases and 174 (59%) completed treatment, defaulters constituted 27(9.2%) & the treatment success rate (those cured + treatment completed) was 218(79.6%) (Table7).

Table 7: Descriptions of TB patients in the selected public health facilities during intensive phase of TB treatment in Dessie city Administration. August 2013.

Variable Category (N=295)		Number	Percent
Sex	Male	149	50.6
	Female	135	45.9
	Not mentioned	11	3.5
Age group in years	1-19	54	18.3
	20-34	135	45.7
	35+	102	34.6
	Not mentioned	4	1.4
Classification of the patient	PTB+	81	27.1
	PTB-	127	43.1
	EPTB	83	27.8
	Not mentioned	6	2.0
Category of the patient	New	280	94.9
	Relapse	8	2.7
	Defaulter	2	0.7
	Transfer in	5	1.7
Treatment outcome of the patients	Cured	44	14.9
	Completed	174	59
	Died	22	7.5
	Failure	3	1.0
	Defaulter	27	9.2
	Transfer out	21	7.1
	Not mentioned	4	1.4

6.2.2.2. Sputum smear microscopy adherence

From 82 pulmonary smearcases, all number of smears was performed in 36 (43.9%) of cases. One and two smears were omitted in 28 (34.1%) and 16(19.5%) of the cases respectively. All performed smears were carried out timely. The overall smear adherence score was 0.62 graded as marginal based on published literature (11, 23) (Table 8).

Table 8: Compliance with performing required number of smear microscopy according to DOTS strategy at Public health facilities in Dessie City Administrative Zone, August 2013.

Smear Microscope Adherences			
Number of Smear Done		Timeliness of smears	
No smear omitted	$1.0 \times 36 = 36$	On time	$1 \times 51.1 = 51.1$
One smear omitted	$0.66 \times 28 = 18.48$	One months late	$0.66 \times 0 = 0$
Two smear omitted	$0.33 \times 14 = 4.62$	Two months late	$0.33 \times 0 = 0$
Three smear omitted	$0.0 \times 2 = 0$	Three months late	$0 \times 0 = 0$
not applicable(death)	2	Not applicable((death)	2

Mean score = 0.63 Overall quality grade =Marginal

6.2.2.2. Adherences to DOTS drug regimen conformity during initial and continuation phase

From 295 patients' records the number of anti TB pills were recorded in 275 (93.2%) & 267(90.5%) cases during intensive and continuation phase of treatment respectively. Similarly the correct doses of drugs were given for 221 (80.4%) patients during the initial phase, and 197 (73.8%) of patients during the continuation phase respectively. Fifty (18.2%) and 67(25%) patients 'were treated by incorrect doses during first and second phase of treatment respectively and of these 38 (76%) and 58(87%) cases were treated by under doses (Table 9).

Table 9: Quality of anti-Tuberculosis drug therapy according to DOTS strategy at public health facilities in Dessie City Administrative Zone, August 2013.

Drug regimen	Initial phase of therapy .N (%)	Continuation phase of therapy. N (%)
	275(100%)	282 (100%)
Types of prescribed drugs conforming to DOTS	(N=275)	(N=282)
Dose of prescribed drugs conforming to DOTS	221(80.4%) (N=275)	197(73.8%) (N=267)
Both type and dose of prescribed drugs conforming to DOTS	221(80.4%) (N=275)	197 (73.8%) (N=267)

6.2.3. Overall performance of health workers during process of TB treatment

The score of overall performance of health workers during the process of tuberculosis treatment was 0.21, which was graded as poor .The performance of each health workers range from 0.07 to 0.44. (Table10).

Table 10: Quality of process of TB care in Public health facilities, in Dessie City Administrative Zone, August 2013.

Health facility	Quality of Registration	Drug regimen conforming to DOTS IP	Drug regimen conforming to DOTS CP	Sputum smear microscopy Adherence	Score of process of care
DRH	0.90	0.84	0.62	0.94	0.44
BMH	0.92	0.73	0.76	0.77	0.38
DHC	0.91	0.79	0.79	0.68	0.38
BHC	0.88	0.84	0.74	0.60	0.32
SHC	0.93	0.83	0.74	0.60	0.35
THC	0.94	0.81	0.67	0.39	0.19
GHC	0.87	0.70	0.79	0.27	0.16
BSHC	0.86	0.74	0.72	0.14	0.07
Total	0.90	0.80	0.74	0.62	0.34

Performance of health worker overall score = 0-< 0, 5(poor); 0.5- < 0.9 (good); 0.9- 1 (excellent) based on published literature (11, 23)

IP=Intensive phase

CP=Continuation phase

6.3 Outcome of quality TB treatment

TB treatment success rate and patient satisfaction level on the service provided were used as outcome quality parameters

6.3.1 Treatment Success Rate

From the total 295 cases 21 patients transferred to other facilities. 218 (79.6%) of TB patients completed the recommended eight months treatment. Among this 44 (14.9%) cured. The rest 21 (7.1%), 22 (7.5%) and 27 (9.2%) were transfer out, treatment defaulter and died respectively, however the treatment outcome of four cases were not recorded

6.3.2. Factors affecting TB treatment success rate

Treatment success rate was significantly associated with patients' age, record quality, sputum smear adherence and drug regimen conformity in both treatment phases during bivariate logistic regression analysis at $p\text{-value} \leq 0.05$. However on multivariate logistic regression analysis, among these variables, significant associations were found between treatment success rate with conformity to drug regimen during intensive (AOR=0.04, 95% CI: 0.01, 0.91) and continuation phase (AOR=0.05, 95% CI: 0.01, 0.5) of therapy and sputum smear microscopy adherence (AOR=10.42, 95% CI: 1.33-81.46). Quality of records and age of the patients were not predictors of TB treatment success rate. Those patients, whose prescribed drug were not adhered with DOTS regimen of tuberculosis treatment during both intensive and continues phase of therapy were 96% and 94% less likely to be successful in their treatment as compared to those who had got correct regimen respectively . The same was true for adherence to sputum smear microscopy schedule, (AOR=10.42,95% CI: 1.33-81.46), the odds of success rate is 10.42 times as compare to those whose follow up sputum smear tastes were not performed timely (Table11).

Table 11: Strength of association between treatment success rate of tuberculosis and explanatory variables in Dessie city administrative zone, North East Ethiopia, August 2013.

Independent variables	Treatment outcome(N)		COR /95%CI/P	AOR /95%CI/P
	Successful	Not Successful		
Sex of the patient (N=291)				
Male	107 (71.8%)	42 (28.2%)	1	
Female	105 (80%)	27 (20%)	1.57/0.90-2.73/0.109	-----
Not mentioned	3 (43%)	4 (57%)	0.29/0.06-1.37/0.98	
Types of health facilities (N=291)				
Hospital	63 (57%)	21(25%)	1.01/0.56-1.37/0.119	
Health center	155 (75%)	52 (25%)	1	-----
Diagnostic Category (N=291)				
New	210 (75%)	66 (24%)	1	
Previously treated	4 (50%)	4 (50%)	0.31/0.07-1.29/0.108	-----
Not mentioned	4 (57%)	3 (43%)	0.42/0.09-1.92/0.26	
Age (N=291)				
1-19	32 (59.3%)	22 (40.7%)	1	1
20-34	104 (77%)	31 (23.5%)	2.3/1.17-4.53/0.01*	10.67/0.07-6.46/0.74
≥35	82 (80%)	20 (20%)	2.82/1.35-5.85/0.01*	12.4/0.88-173/0.06
Drug conformity/adherence/ to DOTS regimen during initial treatment phase (N=291)				
Conforming	196 (88.3%)	25 (11.3%)	1	1
Non conforming	14 (28%)	36 (72%)	0.05/0.02-0.10/< 0.01*	0.04/0.01-0.91/0.04*
Not mentioned	8 (40%)	12 (60%)	0.10/0.03-0.23/< 0.01*	0.07/0.0-0.36/0.007*
Drug conformity/adherence/ to DOTS regimen during continuation treatment phase (N=291)				
Conforming	172 (87.8%)	25 (11.3%)	1	1
Non conforming	30 (44.8%)	37 (55.2%)	0.11/0.06-0.22/< 0.01*	0.05/0.01-0.50/0.01*
Not mentioned	16 (58%)	12 (42%)	0.18/0.08-0.44/< 0.01*	0.15/0.05-4.06/0.27
Sputum smear microscopy adherences (N=82)				
Adhered	33 (91.7%)	3 (83%)	7.74/2.06-28.96/0.002*	10.42/1.33-81.46/0.026*
Not adhered	27 (58.7%)	19 (41.3)	1	1
Quality of unit TB registration (N=291)				
Poor	12 (43%)	16 (57%)	0.1/0.04-0.24/<0.01*	0.01/0.0-1.83/0.08
Good	73 (64.6%)	40 (35.4%)	0.23/0.12 -0.44/<0.01*	0.01/0.01-2.01/0.09
Very good	133 (88.7%)	17 (11.3%)	1	1

COR=Crude Odd Ratio AOR = Adjusted Odds Ratio CI= Confidence Interval P= P-Value *= significant

6.3.2 TB Patients' Satisfaction Level

One hundred twelve TB patients in eight public health facilities of Dessie City Administrative Zone were interviewed. The overall response rate was 108 (96.5%); four (3.5%) patients were not participating in the exit interview for most mentioned reasons of lack of time.

6.3.2.1 Socio-demographic characteristics of patients

Out of the total respondents, more than half, 57 (52.8%) of the respondents were males and two third of them were below 45 years of age. The median age of the respondents was 33 year with standard deviation of 10.1. In addition, over one thirds of the respondents 45 (41.7%) were Muslim. Nearly half of them were married, 49 (45.5%). More than half, 58 (54%) respondents had attended secondary and above education. Occupationally half of them were merchants (Table 12).

Table 12: Socio-Demographic Characteristics of TB Patients on treatment at public health facilities in Dessie City Administrative Zone, North East Ethiopia July 2013.

Socio-demographic factors (N=108)		Frequency	Percentage
Residences			
	Urban	85	78.7
	Rural	23	21.3
Sex			
	Female	51	47.2
	Male	57	52.8
Age groups			
	15-29	43	39.8
	30-44	37	34.8
	45+	28	25.9
Religion			
	Muslim	45	41.7
	Orthodox	42	19.5
	Protestant	21	19.5
Marital status			
	Single	22	20.4
	Married	49	45.4
	Widowed	24	22.2
	Divorced	13	12
Educational status			
	No formal education	21	19
	Primary education	29	27
	Secondary education	30	28
	Above secondary	28	26
Occupational status			
	Government employee	40	37
	Merchant	54	50
	Daily laborer	14	13
Monthly income class			
	600-1000	33	30.5
	1001-1400	20	18.5
	1401-1800	14	13
	1801+	41	38

6.3.2.2 Service area related factors

The mean distance of health, facilities were 2.5km. Forty-nine (45.4%) of the respondents were traveled on foot to reach health facilities. Of 108 patients, 66 (61%) had visited the facility previously. One third of the respondents wait clinician in reception room for not more than half an hour. The respondents' median of waiting time was 20 minute. Eighty-three (77%) of the patients recommend others to use the health facilities' service (Table13).

Table 13: Description of respondents attributes in TB control activities in the selected TB clinics of Dessie City Administrative Zone, August 2013.

Variables (N=108)		Frequency	Percentage
Duration since treatment started	< one month	57	52.8
	≥ one month	51	45.2
Patient ever visited health facility before	Yes	66	61
	No	42	39
How far it is	< 2.5km	52	48
	≥ 2.5km	56	52
Means of transportation	Walking	30	28
	Taxi	78	72
Waiting time to see clinician	< 30 minutes	76	70.4
	≥ 30 minutes	32	29.6
Respect offered by health worker	Yes	83	77
	No	25	23
Did you get drugs and other service you needed	Yes	76	70
	No	32	30
Recommending services to somebody else	Yes	83	76.9
	No	25	23.1

6.3.3.3. TB patients' Satisfaction level with TB treatment service

Hence out of the indicators of satisfaction, the higher rate for client satisfaction were for the efficacy of TB treatment services with a mean rating of 3.40 (± 0.93), and appropriateness of working hours with a mean rating of 3.16 (± 1.12). The lower rate of satisfaction response were regarding with cleanness and comfort of waiting area with the mean rating of 2.21 (± 1.16), and 2.12 (± 1.1) respectively (Table 14).

Table 14: Level of Client Satisfaction with DOTS service in Dessie City Administrative Zone, of selected public health facilities, North East, Ethiopia, August 2013.

Variables	Very Dissatisfied N (%)	Dissatisfied N (%)	Neutral N (%)	Satisfied N (%)	Very Satisfied N (%)	Mean Rating
Appropriate working hours	7(6.5)	34(31.5)	15(13.9)	39(36.1)	13(12)	3.16 \pm 1.20
Waiting time	8(7.4)	32(29.6)	26(24.1)	37(34.3)	5(4.6)	2.99 \pm 1.06
Time spent with health-workers	22 (20.4)	28 (25.9)	46 (42.6)	8 (7.40)	4 (3.40)	2.48 \pm 1.02
Cleanliness of waiting area	38 (35.2)	30 (27.8)	23 (21.3)	13 (12)	4 (3.7)	2.21 \pm 1.16
Comfort of waiting area	33 (30.6)	43 (39.8)	18 (16.7)	14 (13)	-	2.12 \pm 1.10
Cleanness of exam. room	24 (22.2)	24 (22.2)	21 (19.4)	35 (32.4)	4 (3.7)	2.73 \pm 1.23
Cleanliness of equipments	30 (27.8)	-	31(27.8)	46 (42.6)	1 (0.90)	3.17 \pm 0.85
Health worker politeness	6 (5.6)	52 (48.1)	15 (13.9)	31(28.7)	4 (3.7)	2.77 \pm 1.05
Assuring of privacy	6 (5.6)	43 (39.8)	22 (20.4)	33 (30.6)	4 (3.70)	2.87 \pm 1.03
Perceived competence/skill of health worker	2 (1.9)	20 (18.5)	26 (24.1)	53 (49.1)	7 (6.5)	3.10 \pm 0.94
Completeness of information	24 (22.2)	44 (40.7)	24 (22.2)	15 (13.9)	1 (0.9)	2.31 \pm 1.0
Efficacy of treatment	2 (1.9)	19 (17.5)	26 (24.5)	53 (49.1)	7 (6.50)	3.40 \pm 0.93
Overall services received	36 (33.3)	31 (28.7)	35 (32.4)	6 (5.6)	-	3.20 \pm 0.80

6.3.3.3. Overall satisfaction of TB patient

The mean and mode scores for the overall satisfaction were found to be 2.80 and 2.54 respectively. Fifty (46.4%) of the patients scored below the mean level of satisfaction for the service give in the TB clinics of public health facilities and the rest 58 (53.7%) patients' scored mean and above mean level of satisfaction score. Eighty-four (77.8%) and fifty-six (51.8%) patients were satisfied by efficacy of treatment and health professional skill/competence/ respectively. But majority of patients were dissatisfied by the physical infrastructures of the health facilities 70 (64.8%) and interpersonal relationship with health workers 59 (54.6%) (Table 15).

Table 15: Item wise overall satisfaction TB patients at Dessie city administrative zone, selected health facilities, Amhara region, North East Ethiopia, August 2013

The Five Components of Satisfaction	Level of Satisfaction	
	Satisfied N (%)	Dissatisfied N (%)
Satisfaction with organizational service provision system	55 (51.0%)	53 (49.0%)
Facility, equipment and supplies	38 (35.2%)	70 (64.80%)
Interpersonal qualities of care providers	49 (45.4%)	59 (54.60%)
Professional competence and skill	56 (51.8%)	53 (48.2%)
Efficacy of treatment	84 (77.80%)	24 (22.20%)

6.3.3.5. Factors affecting the level of patients' satisfaction

On bivariate logistic regression the overall patient's satisfaction was associated with area of residence ($P=0.014$), sex ($p=0.01$), marital status ($P= 0.025$), previous visit of the health facilities ($P=0.007$), distance of the facilities ($P <0.001$) means of transportation ($p <0.001$), waiting time ($P=0.001$), availabilities of prescribed drugs and other related services ($P=0.001$) and respect offered by health workers during time of treatment ($P= 0.01$). However, during multivariate logistic regression analysis with 95% CI among these variables, significant associations were found with sex (AOR=0.13, 95% CI: 0.03, 0.49), distance from health facilities ,(AOR=0.20, 95% CI: 0.05-0.76), waiting time to get clinician (AOR=0.10, 95% CI:0.02-0.43), availability of prescribed drugs and other related services (AOR=0.20, 95% CI: 0.06-0.68) and being respected by health workers during treatment follow up (AOR=0.13, 95% CI: 0.02-0.84). Female respondents (AOR=0.13 95%CI: 0.03, 0.76) were 87% less likely to be satisfied as compared to male respondents. Similarly patients, who waited for more than half an hour to get the health worker (AOR=0.10 95%CI: 0.02, 0.43) and travel more than 2.5km to reach health facilities (AOR=0.20 95% CI: 0.05, 0.76) were 90% and 80 % less likely to be satisfied as compared to those who waited less than half an hour and his residence is within 2.5 kilometer radius from the health facilities respectively. In the same way patients who didn't get prescribed drugs and other services in the facility (AOR=0.20 95%CI: 0.06, 0.68) were 80% less likely to be satisfied as compared with those who had got all prescribed drug and other related services. Patients who were being treated without respect (AOR=0.13 95%CI: 0.02, 0.84) were 87% less likely to be satisfied as compared to respected patients during treatment (Table16).

Table 16 : Strength of Association between overall satisfaction of TB patients and socio-demographic variables in Dessie city administrative zone public health facilities, August 2013.

Independent variables	Level of Satisfaction		COR /95% CI/P	AOR/95% CI/P
	Satisfied (N)	Dissatisfied (N)		
Address				
Urban	41(48.2%)	44(51.8%)	1	
Rural	18(78.3%)	5(21.7%)	3.86/ 1.31-11.36/0.014*	2.02/0.46-0.93/0.35
Sex				
Female	21(41.2%)	30(58.8%)	0.34/0.16-0.76/0.009*	0.13/0.03-0.49/0.003*
Male	38(66.7%)	19(33.3%)	1	1
Age				
15-29	23(53.5%)	20(46.5%)	1	
30-44	19(51.4%)	18(48.1%)	0.92/0.38-2.21/0.85	-----
45+	17(60.7%)	11(39.3%)	1.34/0.51-3.58/0.55	
Religion				
Muslim	22(48.8%)	23(51.2%)	1	
Orthodox	25(59.5%)	17(40.5%)	1.54/0.65-3.64/0.32	-----
Protestant	12(57.1%)	9(42.9%)	1.39/0.49-3.99/0.53	
Marital status				
Married	30(61.2%)	19(38.8)	1	1
Single	7(31.8%)	15(68.2%)	0.3/0.10-0.86/0.025*	0.37/0.07-1.80/0.21
Widowed	13(54.2%)	11(45.8%)	0.75/0.28-2.01/0.56	0.14/0.02-1.04/0.054
Divorced	9(69.2%)	4(30.8%)	1.42/0.38-5.28/0.59	1.55/0.25-9.87/0.63
Educational status				
No formal education	14(48.3%)	15(51.7%)	1.41/0.44-4.55/0.56	
Primary education	15(51.7%)	14(48.3%)	0.66/0.23-1.86/0.43	-----
Secondary education	16(14.8%)	14(13%)	0.65/0.23-1.86/0.43	
Above secondary	17(58.6%)	12(41.4%)	1	
Occupation				
Government employee	21(52.6%)	19(47.5%)	1	
Merchant	30(55.6%)	24(44.4%)	1.13/0.50-2.51/0.77	-----
Daily laborer	8(57.1%)	6(42.9%)	1.20/0.35-4.11/0.76	
Monthly Income				
600-1000	20(60.6%)	13(39.4%)	1.62/0.64-4.10/0.31	
1001-1400	11(55%)	9(45%)	1.28/0.44-3.75/0.66	-----
1401-1800	8(57.1%)	6(42.9%)	1.40/0.41-4.76/0.59	
1801+	20(48.8%)	21(51.2%)	1	

COR = Crude odd ratio, AOR = Adjusted Odds Ratio CI= Confidence Interval P= P-value
*significant

Table 17: Strength of Association between Overall Satisfaction of TB patients and Explanatory service area Variables in Dessie city administrative zone, North East Ethiopia, August 2013

Independent variables	Level of Satisfaction		COR /95% CI/P	AOR/95% CI/P
	Satisfied (N)	Unsatisfied (N)		
Duration of treatment started				
Less than a month	32(56.1%)	25(43.9%)	1	
≥ a month	27(52.9%)	24(47.1%)	0.88/0.41-1.87/0.73	-----
Patient ever visit the health facilities before				
Yes	43(65.2%)	23(34.8%)	1	1
No	16(38.1%)	26(61.9%)	0.34/0.15-0.73/0.007*	0.90/0.25-3.20/0.86
How far the health facilities from patient home				
< 2.5km	39(75%)	13(25%)	1	1
≥ 2.5km	20(35.7%)	36(64.3%)	0.20/0.08-0.43/<0.001*	0.20/0.05-0.76/0.019*
Means of transportation				
Taxi	53(67.9%)	25(32.1%)	1	1
Walking	6(20%)	24(80%)	0.12/0.04-0.33/<0.001*	0.23/0.05-1.11/0.067
Waiting time to be seen by clinician				
<30 minutes	51(86.4%)	25(32.9%)	1	1
≥30 minutes	8(25%)	24(75%)	0.16/0.06-0.42/0.001*	0.10/0.02-0.43/0.002*
Availabilities of drugs and other services				
Yes	49(64.5%)	27(35.5%)	1	1
No	10(31.3%)	22(68.7%)	0.27/0.12-0.60/0.001*	0.20/0.06-0.68/0.01*
Respect offered by health workers				
Yes	56(67.5%)	27(32.5%)	1	1
No	3(12%)	22(88%)	0.10/0.02-0.24/<0.001*	0.13/0.02-0.84/0.032*

COR = Crude odd ratio, AOR = Adjusted Odds Ratio CI= Confidence Interval P= P-value

6.3.4 The overall quality of TB care

The overall quality index used in this study was a composite index computed to evaluate the quality of anti tuberculosis care. This index was computed by multiplying 5 parameters from the index score of quality of record registration, sputum smear microscopy adherence index, drug regimen conformity index during the initial phase, drug regimen conformity index during the continuation phase and treatment success rate (11, 23). Since the overall score of service quality is less than 0.50 in all facilities, it was graded as poor in all facilities. Two hundred twenty four 76% percent of the cases were received poor quality of services (Table 18).

Table 18: Overall quality of TB care in Public health facilities, in Dessie city administrative zone, North East Ethiopia, August 2013

Health facility	Quality of registration	Drug regimen conforming to DOTS IP	Drug regimen conforming to DOTS CP	Sputum smear microscopy Adherence	TB treatment success rate	Overall score of quality care
DRH	0.90	0.84	0.62	0.94	0.76	0.33
BMH	0.92	0.73	0.76	0.77	0.71	0.28
DHC	0.91	0.79	0.79	0.68	0.87	0.33
BHC	0.88	0.84	0.74	0.60	0.67	0.26
SHC	0.93	0.83	0.74	0.60	0.67	0.23
THC	0.94	0.81	0.67	0.39	0.76	0.17
GHC	0.87	0.70	0.79	0.27	0.78	0.11
BSHC	0.86	0.74	0.72	0.14	0.65	0.10
Total	0.90	0.80	0.74	0.62	0.74	0.24

* Quality score Grading: poor (0-<5) good (0.5-0.9) and excellent (0.9-1) based on published literature (11, 23).

Chapter Seven: Discussion

This study identified major constraints in all components (structural, process and outcome) of TB care using Donabedian's quality assessment model in health care against agreed quality criteria developed by team of public health experts based upon WHO standards.

7.1 Structural quality:

The main findings from service management and staffing of structural quality components of TB care are all studied health facilities were staffed by full time assigned trained focal person. Of them only four TB clinic care providers and six laboratory professionals had received refresher trainings with in the previous one year. These findings are by far better than the findings, of a study conducted in Afar regional state where no one had got refresher trainings (18). Moreover, it was also in contrary to WHO recommendation, "all health workers should be familiar with recent information at least once in a year" (2). To maintain quality in implementation of DOT treatment service, care providers and laboratory technicians must be updated to current evidence-based information (3). Training is also necessary to encourage adherence to national protocols and guidelines introducing some degree of standardization in both treatment and diagnosis (2, 3). Concerning service integrations, all TB clinics do HIV blood testing within the same room. It is better than the findings of a study conducted in south nation and nationalities in assessment of DOT effectiveness whereby only 33% of the facilities' did HIV testing in TB clinics (23). The current finding is in line with WHO recommendation of service integration of TB/HIV control programmes (1, 2).

From the drug and diagnostic component of structural quality of TB cares, all of the health facilities the available first line anti TB agents were sufficient for only nine days. It is below the national minimum recommendation, of "every facility should have at least one month buffer stock level for existing patients" (1). It is comparable with the findings of studies conducted in Jimma Zone and Afar where in both studies the minimum buffer stock level is not ensured; because of this frequent stock out of anti TB, drugs were common in the area (17, 18). The WHO and FMOH recommended that adequate supply of drugs and equipments are part of programmatic activities at each level of TB control programme (1, 3).

Majority of the studied facilities (75%) had recording formats and IEC materials. However there was problem in the utilization of some materials, especially posters were not displayed in their

waiting area. Only two health facilities use TB posters and flip chart. This finding is inconsistent with the national recommendation of "all parties involving in TB control program should use IEC materials" (1).

About service accessibility and infrastructure, all studied facilities had power supply and water supply as per the National guideline of Ethiopia (1). Patients can get the service at any time even in weekends. Three fourth of the patients are physical service accessibility since their residences are within the recommended 5 km radius (30). All the facilities have separate room for TB treatment. However, there are no service area indicators, patient waiting areas, gender specific latrine, and separate areas for sputum specimen collection. The WHO and Ethiopian Food, Medicine & Healthcare Administration and Control Authority (FMHACA) specifically recommend health facilities to have separate room with at least 7.5 to 9 square meters floor and 4 square meters window area to be a minimum prerequisites in establishing or providing DOTS of TB treatment service (2,43). In this study even if all the facilities had separate TB treatment rooms, only one- third of the sites had adequate treatment room with good ventilation. This finding is supported by studies conducted in Jimma zone (42%) and South Africa (37%) of the public health facilities were fulfilled the WHO recommended unit TB treatment facilities' standards (17,22).

From the service provision management component of structural quality of TB cares, two third of service providers never supervised in the last six month and in all studied facilities. This finding is supported by studies conducted in Afar regional state only one focal person from six facilities and in Tigray regional state where eight focal persons from forty-four facilities were supervised by district TB officers (18,26) .Such a finding is inconsistent and far below the national and international recommendations "supervision should be conducted and organized at various levels of organization in quarterly base"(1, 2).

It was also observed that only two third of the selected health facilities' implement quality control policy in AFB microscopy test. Such findings were also observed in the studies done to assess quality of tuberculosis treatment in Afar region state (54%) and Jimma zone (58%) ,in both studies the finding showed, almost nearly half of the studied facilities had never implemented sputum smear quality control policy (18, 17). However, FMOH recommendation, implementing laboratory quality control policy is important in ensuring, information generated by the laboratory is accurate, reliable and reproducible (33).

Concerning defaulter tracing mechanisms, absentees were not retrieved either by their contact person or health extension workers in one fourth of the studied facilities. This finding is inconsistent with the FMOH and WHO of great emphasis on defaulter tracing policy (1, 3). Such a poor defaulter retrieving mechanisms were also seen in Jimma zone and South Africa studies (17, 22).

The overall structural quality score of the current study is 0.64. Majority of the studied facilities (75%) were structurally poor. This finding is also supported by other studies conducted in Jimma zone and South Africa and with overall structural quality scores were 0.56 and 0.67 respectively (17,22). The absence of quality control, active defaulter tracing mechanism refreshing training, supportive supervision and review meeting were the major identified gaps in majority of the facilities.

7.2 Process of quality

Effective interpersonal communication between health care providers and patients are one of the most important elements for improving patient satisfaction, treatment adherence and outcomes (34). But the finding of this study shows interpersonal relationship and communication between care providers and patients were not “satisfactory”. For instance, care provider greeted the patients and introduced themselves in 51.5% of the sessions, and patients were never advised on advantage of DOT in more than three fourth of the sessions (78%). In all sessions, no care provider informed his/her patients to bring any family member or neighbor having symptoms of TB to the health facilities. Only 21% of the patients got the chance of asking their concerns. This seems that the processes of care were not patient centered. This finding is supported by a study in Addis Ababa where 45.7% of the cases were politely greeted, but lower than a study in Afar regional state patients in 73.5% of the sessions were politely greeted (37,18). The highest results of a study conducted in Afar regional state might be because of great concern of health workers to alleviate patients' problem arise because of the discrepancy between the living styles of pastoralist, versus the static nature of the health care delivery system (18).

Another finding from record audit shows most of the process items 91.6% was recorded. About 8.4% of patients were initiated and continued without recording full information needed to start treatment and monitoring the progress. This finding was found to be lower than studies conducted in Jimma zone (7.1%) and Tigray (6.8%), but better than Sidama zone (26.8%) and Egypt (15.9%) in assessment of TB treatment qualities (17,34,23,33). Generally the findings

does not go with the FMOH and WHO DOTS recommendation "recording and reporting on a continuous basis are crucial to ensure and improve quality of anti-tuberculosis care" (1,2). Majority of TB patients (85%) are in the economically productive age group (15–60 years), this finding is supported by previous studies conducted in Egypt (82.4%) and Jimma zone (90), of TB patients were in this age group (33, 17). With regards to classification of TB types from 295 TB cases, 81 (27.1%) patients were classified as smear positive pulmonary tuberculosis (PTB+), 127(43.1%) of classification smear negative pulmonary tuberculosis (PTB-) and 83(28%) of patients were extra pulmonary tuberculosis (EPTB), which is opposite of the usual expectations in Ethiopia, where it is expected that from all new cases of TB, 80% are pulmonary TB and the remaining 20% are extra-pulmonary TB, and also from those cases with pulmonary TB 80% are (PTB+) and 20% are (PTB-) (1).This might be due to the current HIV/AIDS pandemic, where relatively EPTB cases are frequently reported and the other reason might be because of over diagnosis of pulmonary negative cases (34). Diagnoses of TB cases primarily on AFB microscopy and their follow up at decreasing trend in that 81.7%, 74% and 64.4% initially diagnosed PTB+ cases received follow up sputum AFB microscopy on 2nd, 5th, and 7th months of treatment respectively. The proper number of smear was performed in only 44% of the cases. Two and more smear microscopy were omitted in 23% of the cases this shows that there were cases not properly monitored their course of treatment. This finding is better the study findings seen in Jimma and Egypt where the proper number of smears performed were 39% and 38.3% of the cases respectively (17,33). The overall score of smear microscopy performance in the current study is 0.62, which is graded as marginal. It is slightly lower than the finding of Jimma where the overall smear performance score was 0.67 (17). But the finding is below the national as well as international recommendations, where all PTB+ patients should get follow up sputum AFB microscopy service (1, 5).

About drug adherences, the current study showed that, during the initial phase of therapy, 80.4% of the patients were conforming to the DOTS recommended drug regimen. On the other hand, during the continuation phase, 73.8 % of patients' drugs were conformed to DOTS drug regimen. However, 50 (18.2%) and 67(25%) patients 'prescribed drugs were not the recommended dose in first and second phase of treatment respectively and of these 38 (76%) and 58(87%) cases were treated with under dose. It is almost similar with the findings of studies carried out in Egypt (87.5% and 74.7%) of the cases were treated with correct DOTS drug regimen during initial and

continuation phase of therapy respectively (33). But it is better than finding of a study conducted in Jimma Zone which was 64.7% and 46.9% of the cases had been treated by correct DOTS drug regimen during intensive and continues phase of therapy respectively (17). The number of patients who were treated with lower doses were high. This in turn leads to treatment failure and development drug resistance. According to WHO report the emergence of MDRTB is because of human error, largely due to poorly prescribed chemotherapy. If " too few pills are prescribed, the treatment will not cure the patient's TB and patient might continue to suffer from TB, develop resistance to TB treatment and infect others with MDR TB" (3). A study conducted in Tigray in assessment of TB treatment service quality and patients adherence to treatment also shows highest proportions of defaulters were observed in patients whose treatment were initiated by over dose of anti TB pills (26). The overall score of process of care is 0.34. One hundred ninety-five (66%) of cases received poor care process. The performance of health workers in process of care in the current study area was lower than the performance of health workers in Jimma zone it was 0.42 (17). The reason for lower achievement was study design. Basic knowledge of health workers in TB management was not included in the current study area.

7.3 Outcome quality

One of the outcome quality components is TB treatment success rate. In this study treatment success rate, cure rate and death rate are 73.9%, 53.6% and 7.5% respectively. The rests are 9.2% and 7.1% were defaulters and transfer out cases respectively. Both cure rates, treatment success rates are far below the National and International target of 85% and above. This might leads to development and subsequent spread of drug-resistant TB (1, 2). Such lower finding was also reported from a study in Jimma zones overall treatment success rate was 69.1% (23). Similar lower such findings were also seen for TB cure rate in South Africa (58%) and Egypt (48.6) respectively (8, 11). But WHO argued that " It is possible to achieve a cure rate up to 99% and success rate \geq 85% of detected cases as long as health workers adhered to DOTS components" (2).

Concerning defaulter rate in the current study more than 10% defaulter rate was observed in one third of the studied facilities. Because of weak defaulter tracing mechanism in the current study area, higher defaulter rate against national and international recommendation of less than ten percent defaulter rate (1, 4). According to WHO annual report incomplete treatment of TB cases

leads to reappearance of symptoms and continued transmission of disease to others (3). This can have also high impact on not only to the patients' and their families economy but also at national level.

During multivariable analysis, three variables were significantly associated with TB treatment success rate, i.e. adherences to the recommended drug regimen during intensive and continuous phase of therapy and sputum smear microscopy adherence.

TB treatment success rate decreases when the prescribed drugs were not confirmed with DOTS regimen during both intensive and continues phase of therapy (AOR=0.04 & 0.05) as compared to those who had been treated by correct regimen respectively. This finding is supported by the findings of research conducted in Jimma zone, where drug conformity during intensive and continuation phase of therapy are predictors to TB treatment success rate (17). A study conducted in Egypt also supports the current finding in that drug conformity during continuation phase of therapy is predictors to TB treatment success rate (33). The same was true for adhering to recommended schedule of sputum smear microscopy with treatment success (AOR=10.42, 95% CI: 01.33-81.46). This finding is also supported with studies conducted in Egypt (AOR=58.6) and Jimma Zone (AOR=33.46) in both cases sputum smear adherence had high association with treatment success rate (33, 17).

The second output indicator in service delivery is patient satisfaction, which indicates service acceptability by service users (31). The overall rate of satisfaction of TB patients was 53.7%.

It is lower than findings of various studies (South Africa and Sidama zone) on Tuberculosis patients towards treatment service, (97%) and (91%) respectively (22,28), but it is almost comparable with findings of a study done in Addis Ababa and Jimma hospital where 55.6% and 57.1% of patients were satisfied at outpatient departments respectively (38,40). Patients were not satisfied for most of satisfaction indicators such as cleanness and comfort of waiting area (66%), cleanness of examination room (60%) interaction and communication between care providers and patients (67%) and time spent with health worker (53%), which are supported by similar study in Afar regional state and Sidama zone respectively (18,28). The highest rate of satisfaction was observed in efficacy of the TB treatment of service (79.6%), perceived providers competence (66%), and service hour appropriateness (61%). Besides to the above one of the indirect satisfaction indicator was found be relatively high, i.e. 72.2% of the patients are ready to advice their friends to use the facility. However, this is higher than the overall service

satisfaction of patients (53.7%). Similar findings were also seen with a study done in Addis Abeba during assessment of quality of ART service, 72 % of the clients advised others to see and use the service, but the overall service satisfaction rate was 44.4% (38). Such a controversy was because of "social desirability biases by patients and patients may be reluctant to reveal their opinions for fear of alienating their attendants" (38). There is in contrast to study findings of Afar Regional State only 37% of respondents who recommended the service to their friends. This was mainly because of discrepancy between the living styles of the population, pastoralist, versus the static nature of the health care delivery system makes the patients to hate DOT strategy (18).

During multivariable analysis among the socio-demographic variables, sex of the patients was significantly associated with overall satisfaction. Female had lower odds of being satisfied (AOR=0.13, 95% CI: 0.03-0.49) with TB treatment services as compared to men. This finding is supported by a study conducted in AA in ART service quality (38). The most commonly proposed reason for difference is that women have high concern for their health and privacy than men, and as a result, they need more information and ensuring privacy. In addition, women are highly sensitive to become dissatisfied with cleanliness of health facility surroundings (40).

Long waiting time to get clinicians found to be one of predictors for TB patient's satisfaction in this study. This finding indicates that those patients who stayed in reception room to get clinician for more than half an hour became dissatisfied (AOR=0.10, 95% CI: 0.02-0.43) as compared to those who stayed less than 30 minutes. Even if the median waiting time was 20 minutes, 40% of the patients became dissatisfied by length of their stay. The reason might be differences in actual waiting time. The median waiting time observed during client flow analysis and responded by the patients during exit interview were 37 and 20 minutes respectively. The median of responded waiting time was lower than that of observed, it might be due to social desirability bias in that respondents can respond in a positive way fearing of being recognized. Studies conducted in Sidama, Jimma and South Gondar zone during the assessment of patients' satisfaction with TB treatment services; in all studies waiting time was a critical predictor of patients' satisfaction. In all studies, the risk of dissatisfaction increased when length of stay increased and failure to get the intended service on time (28, 41, 43).

Failure to obtain prescribed drugs and other related services (mainly x-ray and some laboratory services) are associated significantly with overall satisfaction (AOR=0.20, 95% CI: 0.02-0.84).

Patients who did not have all prescribed drugs and related service in the facility were 80% less likely to be satisfied. This finding agrees with those of another study conducted in Afar, Jimma and Gondar where users were dissatisfied with the inconsistent drug supply (18,41,43). According to DOTS strategy, one of the key interventions for managing cases and preventing drug resistance TB are ensuring an adequate and continuous drug supply (1, 3).

Other predictor for patient satisfaction in this study was distance from health facilities. This finding indicates that patients who travel long distance reach to health facilities were dissatisfied (AOR=0.20, 95% CI: 0.02-0.84) as compared to those who were within 2.5 kilometer radius. The current finding is also supported by many local studies where patients become dissatisfied by physical inaccessibility or longer distance to health facilities (18, 41, 43).

Moreover, the other predictor for patient's satisfaction in this study was also being treated with respect. This finding indicates that patients who were not treated respectfully by care providers during service delivery were dissatisfied (AOR=0.13) as compared to those who were respected. This finding agrees with the study done in Afar and Tigray regional state show that TB patients' satisfaction was significantly associated with patient to care provider politeness (18, 26).

7.4 Overall quality

The overall status of service quality is poor with score of 0.24. In all studied facilities, more than half of the cases received poor service qualities of care. Two hundred twenty four 76% of cases were received poor quality of TB treatment services. Such finding was also seen in other studies by similar methodologies in Jimma Zone 66% and Egypt Bacos 79.2% of TB patients received poor service (17, 33).

Strength and limitation of the study

Strength

- The questionnaires were adapted from a validated statistical survey tool and pretest was conducted in 5% of the study population.
- Results did not depend on the responses of patients and providers, observation were done on availabilities of equipments, furniture, and infrastructure and provider-client interaction during actual service delivery.

Limitation

- Since the study is a health institution based, there will be information bias, patients can respond in a relatively positive way fearing of being recognized
- Mostly satisfied patients usually visit health facility.
- Possibility of observation bias during observation for process of care
- As it is difficult to establish cause-effect relationship with a cross-sectional study design, it is difficult to generalize the exact causes for the poor qualities of the DOTS in the study area.

Chapter Eight: Conclusion and Recommendation

8.1 Conclusions

- ☞ The overall tuberculosis treatment service status in all dimensions is poor.
- ☞ Majority of the studied facilities is structurally poor. The absence of quality control, active defaulter tracing mechanism refreshing training, supportive supervision and review meeting were the major identified gaps in majority of the facilities. The care settings had poor infrastructure and do not have sufficient amount of supplies and other materials.
- ☞ The performance of health workers in process of TB patient care is poor in all studied facilities. They are loosely adhered to national TB treatment protocol poor in communication and interaction with their clients.
- ☞ The dimensions of outcome quality indicators are not also "satisfactory". Treatment outcomes were far below national and international recommendations. The overall level of patients' satisfaction with TB treatment service was found to be lower than many studies.
- ☞ This study demonstrated that adherence to a standardized drug regimen and smear microscopy were significant predictors of TB treatment success rate. Similarly, long waiting time, shortage of drugs, distance to clinics and inadequate patient respections were the determinant predictors of patient satisfaction.

8.2 Recommendations

Based on the findings of this study, the following recommendations were forwarded.

▶ To health care providers:-

- ☞ Success of anti tuberculosis therapy could be ensured through strict adherence to all the elements of DOTS strategy.
- ☞ Great emphasis should be given for interaction and communication with patients, defaulters tracing and smear quality control procedures.
- ☞ As patients' satisfaction was not as such satisfactory, attentions should be given for those areas where greater dissatisfaction was observed like waiting time, and patient respect ion and provision of complete of information.

▶ **To Dessie City Administrative Zone Health Department:-**

- ☞ Regular supervision and follow up should be strengthened.
- ☞ Efforts should be made to increase the standards of health facilities infrastructure.

▶ **To Regional Health bureau:-**

- ☞ Ongoing (refreshment) training and training on communication skills should be given for health workers.
- ☞ Procurement/distribution/ of drugs, supplies, medical equipments, furniture and IEC materials (flip charts and posters) and follow up of their utilization should be ensured.
- ☞ The regional health bureau should mobilizing government and nongovernmental organizations to improve health facilities' infrastructure.

▶ **To Federal Minister of Health:-**

- ☞ Capacity strengthening supports for TB treatment sites should be continued to improve services of infrastructure, waiting areas, IEC materials and equipments.

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Annexes

Annex 1: Data Collection Tools/Instruments and Consent Form

Part One: - Questionnaires and Verbal Consent Form for Facilities' Heads and Care Providers to Assess Tb Clinic Structure.

VERBAL CONSENT FORM

INTERVIEWER READ. Hello, my name is _____. I am working as data collector in a study conducted by Jimma University, College of public health and medical science, department of health service management to assess the quality of DOTS of TB treatment in Dessie city administrative zone. Your facility is selected in this study just by chance. You will find some questions asking you about DOTS services provision at your health institution. The information you provide us will be completely confidential and will not be shared with anyone else without your consent. Any identifying information (e.g. name of health facilities, address, etc) will be removed from the data and will not be included in the final report. Your participation in the survey is voluntary. Therefore, you will not be obliged to answer any questions that you do not want to, and you may end the survey any time. There are also no repercussions for not participating in the survey. The information you provide us is extremely important and valuable as it will help the government and even to your institution to improve service quality. We will share the results of this evaluation with you after the data are analyzed. The interview will take only about 15-20 minutes. So are you willing to participate in the study?

Yes, _____ after filling the blank space below give the questionnaires to respondent.

No _____. Acknowledge and go to the next

Unique code of health institution-----Unique code of questionnaire -----

Name of Interviewer-----Signature of interviewer -----

Checked by supervisor: -----Signature -----

1.1 Questionnaires for Facility Head

Please encircled to the appropriate answer in the box or fill in the blanks as required.

S. no	Questions	Answers
1	Type of facility.	1. Hospital 2. Health center
2	Number of Health workers in the health institution?	1. MD ----- 4. Lab. tech.----- 2. HO ----- 5. Phar. tech. ----- 3. Nurses -----6. Others.....
3	Do you coordinate TB control activities in your facilities?	1. Yes 2. No 3.
4	Number of health workers trained on TB control activities	1. One 3. Three & above 2. Two 4. Not at all
5	Is there a full time staff assigned in the TB clinic?	1. Yes 2. No---If go to Q 8
6	If yes, did he/she ever train on TB control activities?	1. Yes 2. No
7	Did she/he receive refreshment trainings on TB control activities?	1. Yes-----when------(DMY) 2. No
8	Do you have laboratory personals ever train on AFB techniques in your facility?	1. Yes 2. No

9	If yes, did he/ take refreshment trainings?	<ol style="list-style-type: none"> 1. Yes-----when------(DMY) 2. No
10	Is your facility providing TB treatment service for 24 hour per day?	<ol style="list-style-type: none"> 1. Yes 2. No-----If go to Q 12
11	For how many days in a week does the facility open for 24 hours)	<ol style="list-style-type: none"> 1. Every day 2. Every day except weekends 3. Other(specify)
12	From where did you get medications and supplies?	<ol style="list-style-type: none"> 1. Public sector (MOH/RHB 2. PFSA 3. NGO 4. Other (specify)
13	How drugs and supplies are usually received?	<ol style="list-style-type: none"> 1. Supplier delivered to facility 2. Facility picked from the supplier
14	Have you ever experience stock out of anti TB drugs and HIV test kit in your facility?	<ol style="list-style-type: none"> 1. Yes 2. No
15	If 'YES' what measure do you take?	<ol style="list-style-type: none"> 1. Borrow from another facilities 2. Wait for shipment 3. No actions taken 4. Other (specify)
16	What is the most common cause of a delay in delivery of supplies? (more than one answer is possible)	<p>Transport problems</p> <p>No one monitors stock levels</p> <p>Supplies not requested in advance</p> <p>Other (specify)</p>

-
- 17 Do you compiled quarterly TB reports? 1 Yes 2. No
- 18 Did you conduct review meeting in your facility? 1 Yes 2. No
- 19 If 'Yes' when was the last time? -----(DMY)
- 20 Did you carry out supportive supervision for TB? 1 .Yes 2. No
- 21 If yes, do you use supervision checklist? 1 Yes 2. No
- 22 If 'yes' how many supervisions have you conducted during the past 6 month? -----
-

Thank You Very Much!

1.2 Questionnaires for TB Clinic care Provider

Please encircled to the appropriate answer in the box or fill in the blanks as required.

S. no	Questions	Answers
1	What is your background?	1. Health officer 2. Nurse 3. Others (specify)
2	Which type of services are provided in TB clinic ?(more than one answer is possible)	1. DOTS 2. HIV test 3. Other services
3	How many TB patients do you have on treatment now?	1. Intensive phase----- 2. Continuous phase-----
4	Do you assigned here as a full time work?	1 Yes 2 No
5	For how many years/month/ have you worked in this clinic?	-----year or-----month
6	How do you assigned in TB clinic?	1. Appointed by the head 2. Self motivated 3. Others (specify)
7	Did you take the basic training on TB/HIV?	1. Yes 2. No if no, go to Q 35
8	Have you had refresher training in the past?	1. Yes 2. No

9	If yes, when did you have take?	<ol style="list-style-type: none"> 1. Within the last 12 months 2. Within the last 2 to 5 years 3. More than 5 years back 4. I don't remember
10	Do you think you need further training?	<ol style="list-style-type: none"> 1. Yes 2. No
11	If yes, on which specific area?	<ol style="list-style-type: none"> 1. TB/HIV basic training 2. Counseling for HIV testing 3. MDRTB
12	How often do you receive anti TB drugs?	-----
13	Have you ever experienced shortage of drugs?	<ol style="list-style-type: none"> 1. Yes 2. No
14	If yes, for how long?	<ol style="list-style-type: none"> 1. Less than a week 2. About a week 3. About two weeks 4. More than two weeks
15	If 'No', for how long your available stocks enough for existing patients	<ol style="list-style-type: none"> 1. Less than a week 2. About a week 3. About two weeks 4. more than two weeks
16	Do you plan your supply requirements in advance?	<ol style="list-style-type: none"> 1. Yes 2. No
17	How do you determine your drug requirements?	<ol style="list-style-type: none"> 1. Based on consumption 2. Guessing

		3. Woreda TB/HIV officer determine
		4. Other(specify)
18	Do you supervised regularly?	1. Yes, 2. No if no, go to Q 47
19	If 'Yes' how many times have you had a visit from a supervisor?	1.Number of visit in the last 6 months By facility head----- BY woreda TLCP officer----- 2 Number of visit in the last 12 months By facility head----- BY woreda TLCP officer-----
20	What did your supervisor do last time he/she supervised you? (more than one answer is possible)	1. Delivered supplies 2. Observed TB registry form, 3. Observed Rx adherence 4. Reviewed reports 5. Updated on current information 6. Discussed the problems 7. Other (specify)
21	Did you receive feedback from that supervisory session?	1. Yes 2. No
22	If Yes, in what type?	1 Oral 2 Written
23	What are the most difficult problems that you face in doing your job? (more than one answer is possible)	1. Lack of training 2. Poor communication system, 3. Patients don't come to the clinic 4. Lack of supervision 5. lack of supplies and/or stock

		6.	Improper working time
		7.	Staff shortages (turn over)
		8.	Poor working environment
24	Have you discussed these problems with your supervisor?	1.	Yes
		2.	No
25	How do you monitor patient for treatment compliance? (more than one answer is possible)	1.	Daily filling the registration forms,
		2.	Checking for absentees on monthly basis (for those on continuation phase)
		3.	No means of monitoring
26	How do you retrieve for absentees? (more than one answer is possible)	1.	Contact his/her contact person,
		2.	Report to my supervisor,
		3.	Tell to administrator/opinion leaders
		4.	Send information through health extension
		5.	Do nothing
27	What do you think is your roles in TB control activities? (more than one answer is possible)	1.	Giving health education
		2.	Assessing suspected cases for investigation
		3.	Diagnose and treat cases
		4.	Retrieve absentees
		5.	Keep patient records
		6.	Report activity reports timely
28	How do you provide anti-TB drugs for your patient during intensive phase?	1.	Under supervision.
		2.	Give them drugs to take at home & come
		3.	Back after finishing.

-
- 29 When do you report TB control activity report? (more than one answer is possible)
1. Monthly
 2. Quarterly
 3. Bi-annually
 4. Annually
 5. When asked by supervisor
- 30 Have you ever advised/encouraged a TB patient to be tested for HIV?
1. Yes
 2. No
- 31 If a patient agrees to be tested, what action do you take?
- Collect blood sample and test at this clinic
Collect blood sample and send to lab.
Other (specify)
- 32 How many TB patients tested for HIV in the past 6 months?
-

THANK YOU VERY MUCH!

1.3 . Questionnaires for Laboratory Head

Please encircled to the appropriate answer in the box or fill in the blanks as required.

S.no	Questions	Answers
1	How many laboratory personals trained in AFB techniques?	
2	How many of lab personnel got refresher training with last 12 month?	
3	Do you have reagents for internal quality control?	1. Yes 2. No
4	If yes for how many days enough with present consumption rate?	1. Yes 2. No
5	Did you implement internal quality control activities in the last 12 months?	1. Yes 2. No
6	How often do you receive supplies like stains and others?	
7	Do you plan your supply requirements in advance?	1. Yes 2. No
8	Which Sputum specimens routinely collected for diagnosis, follow-ups?	Spot-morning -spot Morning-spot -morning Morning-morning-morning
9	How often are your performance report?	1. Monthly 2. Quarterly 3. By 6 month 4. Annually
10	What is the maximum number of days that all the 3 results sent back?	One day Two days Three day

THANK YOU VERY MUCH!

Part Two: - Observational Check Lists

INTERVIEWER READ .This inventory should be completed by observing the facilities that are available on the day of visit. In all cases, you should verify that the items exist by actually observing them. Remember/tell/ the concerned body of the facility about the objective of observation. The objective is after identifying the actual equipment, supplies and infrastructure we will give recommendation to the government to improve services quality not to evaluate the performance of the staff or the facility.

You should do observation after you got permission.

Code No of health institution----- Questionnaires No-----

Date of Interview-----Signature of observer -----

Checked by supervisor: ----- Signature -----

2.1 Checklist to Assess Facility Structure /Input/

Please encircled to the appropriate answer in the box or fill in the blanks as required

S. no	Questions	Answers
1	Does this facility have clear signs indicators for different service areas? (Lab. TB clinic, wards)	1. Yes 2. No 3. Some have
2	The facility staffs are easily identifiable to patients.	Wear Both gown & name tag Have name tag Neither gown or name tag
3	Does the facility have separate room for TB clinics?	1. Yes 2. No
4	If 'Yes' for Q.3.what is the--	1. Number of rooms? ----- 2. Area of the exam. room m 2-----
5	If 'Yes' for Q. 3 does the examination room has window?	1. Yes .The area of window in m2---- 2. No
5	Does the TB clinic have waiting areas?	1. Yes. Its area in m2 ----- 2. No
6	If 'Yes' to Q.5, does it clean?	1. Yes 2. No
7	Is there adequate number of chairs for the number of patients present at waiting area?	1. Yes 2. No
8	Are there safe/tape/ drinking water in the clinic?	1. Yes 2. No
9	Does the clinic have toilet?	1. Yes 2. No
10	If 'yes' for Q. 9 the toilet	1. Gender specific 2. Not gender specific 3. Clean
11	Is there separate area for TB laboratory work?	1. Yes 2. No
12	Are there separate tables for specimen receipt / smear preparation / microscopy?	1. Yes 2. No
13	Is there a generator as a back up?	1. Yes 2. No

Equipments and furniture of TB clinic	Is it available?		It 'yes' is it functional.	
	Yes=1	No=2	Yes=3	No=4
14 Examination bed				
15 Stretcher				
16 Wheel chair				
17 Stethoscope				
18 Sphygmomanometer				
19 Thermometer				
20 Weight scale(adult)				
21 Weight scale(pediatric)				
22 Screen for patient examination				
23 Examination light				
24 Refrigerators				

Tools (Note latest version is 2013 manual or 2012 training manual)	Is it available?		It 'yes' is it used.	
	Yes=1	No=2	Yes=3	No=4
25 Latest version of TLCP manual				
26 Latest version of TB unit registry				
27 Latest TB referral & transfer form				
28 Latest TB sputum examination request form				
29 Latest version of reporting form				
30 TB flip chart				
31 Flow chart for Dx and Rx of PTB				
32 TB posters in different language				
33 Latest version of TLCP lab. Manual				
34 Standard laboratory register book				
35 EQA Protocol available				
36 Treatment flow up card				

Drugs	Is it available?		It 'yes' its quantity in number.	
	Yes=1	No=2		
37	Anti-TB	37.1	RHZE tabs	
	drugs	37.2	RHZ tabs	
		37.3	EH tabs	
		37.4	RH tabs	
		37.5	E tabs	
		37.6	STM vials	

Laboratory supplies

Comments/Remarks

- 38 Functional Binocular light Microscopes
 - 39 Slide
 - 40 Frosted slide
 - 41 Slide box
 - 42 Sputum containers approved
 - 43 Wire loops or sticks
 - 44 Funnel
 - 45 Filter paper
 - 46 Staining rack
 - 47 Sprit lamp/Bunsen burner
 - 48 Lens tissue
 - 49 Red pen Recording for positive result
 - 50 Carbol fuchsine
 - 51 Methyl blue
 - 52 3% acid alcohol
 - 53 Oil immersion
 - 54 Forceps for holding slide and fixing
 - 55 Alarm clock
 - 56 5% phenol or 10% Sodium hypo chloride
-

Part Three: - Checklist to Assess Service Delivery

Instruction for data collector

Greet provider and client; introduce yourself and then tell the purpose of the study. Obtain the agreement from both client and provider before proceeding to observe the interaction between them. No need of intervention to be involved. For each of the question listed below, tick on the column that represents what happened during observation. You are expected to make-to-make four-observation session for each facility.

Good morning/good afternoon

Dear provider and client. My name is -----I am a member of research team on quality TB treatment, which is conducted by Jimma University. For this study, you are chosen by chance. I do not put your name or registration number on this questionnaire. The observation will contribute to generate information, which can be used to improve the quality of DOTS of TB treatment service.

Do you agree to participate in this study?

Yes _____ Go to the next page.

No _____ Acknowledge and ask the reason then go to the next-----

I appreciate your co-operation very much

Code No of health institution----- Questionnaires No. -----

Date of Interview----- Signature of interviewer -----

Checked by supervisor: -----Signature -----

S. no	Questions	Answers	
		Yes=1	No=2
1	Does the patient politely greeted?		
2	Does the patient participate in part of decision-making?		
3	Does the health worker speaks the same language with the patient?		
4	Does the health worker explain how to take drugs?		
5	Does the health worker advised patients when to return?		
6	Does the health worker advised patients on the need to comply with treatment?		
7	Does the health worker explained patients when follow up AFB done?		
8	Does the health worker advised patients to bring person with symptom of TB to the clinic?		
9	Does the patient asked by HW for any concern regarding treatment?		
10	Does the patient asked HW for any concerns?		
11	Does the patient get response for the concerns he/she have?		

Part 4:-Check List for Client Flow Analysis to Know Treatment Process and the Exact Waiting Time.

Instruction for data collector: The time of arrival and time of service contact with clinician should be observed and register for three consecutive days.

S.no	Facility code	Times of patient arrived at TB clinic			Times of patient seen by clinician			Average waiting time
		Day1	Day 2	Day 3	Day 1	Day 2	Day 3	
		1						
2								
3								
4								
5								
6								
7								
8								
9								
10								

Part 5:-Checklist to Assess Service Appropriateness by Reviewing Unit Tb Register.

Instruction for data collector: - Please encircled to the appropriate answer in the box or fill in the blanks as required.

Code No of health institution-----Questionnaires No. -----

Date of Interview-----Signature of interviewer -----

Checked by supervisor: -----Signature -----

S.no	Questions	Response category
1	Patient’s unit TB Number	1. Recorded 2. Not recorded 3. Not readable
2	Sex of the patient	1. Male 2. Female 3. Not recorded 4. Not readable
3	Age of the patient	1. ____year 2. Not recorded 3. Not readable
4	Initial diagnostic AFB result	1. Positive. 2. Negative. 3. unrecorded 4. Not readable
5	Name of contact person	1. recorded 2. not recorded
6	Address of contact person	1. recorded 2. not recorded
7	Weigh of the patient	1. ____kg 2. Not recorded 3. Not readable

8	Classification of the patient	1. Smear positive PTB 2. Smear negative PTB 3. EPTB 4. Not recorded 5. Not readable
9	Category of the patient	1. New five. Transfer in 2. Relapse 6. Others 3. Failure 7. Not recorded 4. Defaulter 8. Not readable
10	Treatment given during the intensive phase	1. list drug and dose 2. Not recorded 3. Not readable
11	Dose of the drugs during the intensive phase	1. _____ 2. Not recorded 3. Not readable
12	Sputum smear result on the 2nd month of treatment	1. Positive. 2. Negative. 3. Not done/unrecorded 4. Not readable
13	Weight of the of the patient on the second month of treatment	1. _____ 2. Not recorded 3. Not readable
14	Drugs given during the continuation phase	1. _____ 2. Not recorded 3. Not readable
15	Dose of the drugs during the continuation phase	1. _____ 2. Not recorded 3. Not readable
16	Is AFB done on the 2 nd , 5 th and 7 th month of treatment?	1. Yes 2. No---skip to Q 17

17	If yes, the result is	1. Positive. 2. Negative.
18	Treatment outcome of the patient	1. Cured 2. Treatment completed 3. Transfer out 4. Defaulter 5. Died 6. Treatment Failure 7. Unknown
19	HIV status of TB patient ?	1 _____ 2 Not recorded/not tested 3 Not readable
20	Completeness of the registration form	1. Complete 2. Incomplete

Part Six: - Questionnaire Prepared to Assess TB Patients Satisfaction Level

CONSENT:

INTERVIEWER READ .Hello, my name is _____. I am working as data collector in a study conducted by Jimma University, Medical faculty, Department of community health to assess the quality of DOTS of TB treatment in Dessie city administrative zone. As you are randomly selected from patients taking treatment services in this health institution, I kindly request you to participate in this study. I will ask you some questions related to the services you are getting from this health institution. Your name will not be written in this form and you will never be used in connection with any information you tell me. You do not have to answer any question that you do not want to answer and you may end this interview at any time you want to. Your answers are completely confidential. Your honest answers to these questions will help us better understand about the quality of DOTS services in the Town. The interview will take only about 15-20 minutes. So are you willing to participate in the study?

Yes _____. Go to the next page.

No _____. Acknowledge and ask the reason then go to the next-----

Unique code of health institution-----Unique code of questionnaires -----

Date of Interview-----Signature of interviewer -----

Checked by supervisor: -----Signature -----

Please encircled to the appropriate answer in the box or fill in the blanks as required

Questions	Answers
General information	
1. Sex of the patient	1. Male 2. Female
2. Address of the patients	1. Urban 2. Rural
3. Age of the patient	_____(in years adult) _____(in months for children)
Marital Status	
	1. Single 2. Married 3. Widowed 4. Divorced
5. How many family member do you have	-----
6. Educational status	1. Illiterate 2. Read & Write 3. 1-8 grade 4. 9-12 grade 5. Above 12 grade
7. Religion	1. Muslim 2. Orthodox Christians 3. Protestant 4. Other (specify)
8. Occupation	1. Farmer 2. Student 3. Civil servant 4. Private Business 5. Merchant 6. Other (specify)

-
9. What is your approximate monthly income in Birr? -----
10. Have you ever visited this clinic for TB services before? 1. Yes
2. No
11. How long have you been since you start treatment? -----days
12. Do you have got respectations by care provider? 1. Yes
2. No
13. How far is your home from the clinics I km? -----km
14. How long (minutes/ hours) does it normally take you to the TB clinic? -----
15. By what means you normally get the TB clinic. 1. Walking
2. Taxi
3. Other (specify)

Organizational Issues

16. The schedule (working hours) of the TB clinic for your treatment? 1. Very dissatisfied
2. Dissatisfied
3. Neutral
4. Satisfied
5. Very Satisfied
17. After arriving at the Tb clinic, how satisfied are you with the time spent waiting to receive your treatment? 1. Very dissatisfied
2. Dissatisfied
3. Neutral
4. Satisfied
5. Very Satisfied
18. About how long (min/hours) did you have to wait? ____ (minutes/hours)
-

-
-
- | | | |
|----|---|--|
| 19 | How satisfied are you with the time the health worker spent with you during your visit? | 1. Very dissatisfied
2. Dissatisfied
3. Neutral
4. Satisfied
5. Very Satisfied |
|----|---|--|

How satisfied with the facility ,equipment and supplies:

- | | | |
|----|--|--|
| 20 | The overall cleanliness of the waiting area? | 1. Very dissatisfied
2. Dissatisfied
3. Neutral
4. Satisfied
5. Very Satisfied |
| 21 | The overall comfort of the waiting area? | 1. Very dissatisfied
2. Dissatisfied
3. Neutral
4. Satisfied
5. Very Satisfied |
| 22 | The over cleanliness of the examination room/ place where you received service? | 1. Very dissatisfied
2. Dissatisfied
3. Neutral
4. Satisfied
5. Very Satisfied |
| 23 | The cleanliness of any instrument or equipment used by the health workers to treat or examine you? | 1. Very dissatisfied
2. Dissatisfied
3. Neutral
4. Satisfied
5. Very Satisfied |
| 24 | Have you ever experienced shortage of drugs during your treatment period? | 1. Yes
2. No If go, Q 25 |
-
-

-
- 25 If yes, for how long? _____ days
- 26 What measures did you take?
 1. Referred to other health facility
 2. Interrupted treatment
 3. Other (specify)
- 27 Did all the services you need to treat your problem available at the TB clinic during your visits?
 1. Yes
 2. No
- 28 If not, please list any services, which are not available at the clinic but are important to meet your need?
 1. Absent of Health Worker in TB Clinic during working hour
 2. lack of X-ray services
 3. Interruption of laboratory
 4. Interruption of anti-Tb drugs.

Interpersonal quality of health workers

- 29 Politeness of providers during your visit?
 1. Very dissatisfied
 2. Dissatisfied
 3. Neutral
 4. Satisfied
 5. Very Satisfied
- 30 The measures taken to assure privacy during your examination and treatment?
 1. Very dissatisfied
 2. Dissatisfied
 3. Neutral
 4. Satisfied
 5. Very Satisfied

Professional competence/skill/of health workers

- 31 The provider's skill and ability in treating your problem?
 1. Very dissatisfied
 2. Dissatisfied
 3. Neutral
-

		4. Satisfied
		5. Very Satisfied
32	The completeness of the information given to you about your problem?	1. Very dissatisfied 2. Dissatisfied 3. Neutral 4. Satisfied 5. Very Satisfied
Efficacy of treatment		
33	The effectiveness of the service you received at the Tb clinic in solving your problem.	1. Very dissatisfied 2. Dissatisfied 3. Neutral 4. Satisfied 5. Very Satisfied
34	The overall services you received from the health worker.	1. Very dissatisfied 2. Dissatisfied 3. Neutral 4. Satisfied 5. Very Satisfied
35	Would you recommend the services at this health facility to someone else?	1. Yes 2. No

THANK YOU VERY MUCH FOR YOUR KIND COOPERATION!

Annex 2 Amharic version of questionnaires

ይህ ክፍል በደሴ ከተማ አስ/ዞን ስር ባሉ ጤና ተቋማት ውስጥ የሚሰጥ የቲቢ ህክምና አገልግሎት የተካሄደዎትን የህክምና ክርካታ ለመመዘን የተዘጋጀ መጠይቅ ነው

ትውውቅ

ከንደምን ሰነብቱ ስሜ -----ይባላል። በጅም የኒቨርስቲ በሚደረገው በዚህ ጥናት ውስጥ በመረጃ ሰብሳቢነት ተሳ ፊ ስሆን የጥናቱም አላማ በደሴ ከተማ አስ/ዞን ስር ባሉ የመንግስት ጤና ተቋማት የሚሰጠውን የቲቢ ህክምና አገልግሎት ጥራት ጥናት በማድረግ ያለውን ክፍትት ለማሳየት ነው። ለጥናቱ አላማ መሳካት ከአገልግሎቱ ጋር የተያያዙ ጥቂዎችን ስለማቀርብለዎት በጤና ተቋሙ ከተሰጠዎት አገልግሎት ላይ በመመስራት የተሟላ መረጃ በድህረ-ገጽ የርሰዎን ቀና ትብብት ንሻለን። የርሰዎ ስምም ሆና አድራሻ በመጠየቁ ውስጥ አይካተትም። ንደዚሁም የሰጡት ምላሽ የርሰዎ ስለመሆኑ በምንም ሁኔ ለሌላ አካል አይገለጽም።

በዚህ ጥናት ውስጥ ለመሳተፍ የርሰዎ ሙሉ ፈቃደኝነት የሚያስፈልግ ሲሆን ፈቃደኛ ካልሆኑ ከመጀመሪያውም ሆነ ቃለ መጠየቁን ከጀመሩ በኋላም በመሃል ላ ማቀረጥ ይቻላል።

ከ ሱ ሱ ሱ በጥናቱ በሚያደርጉልን ትብብር የቲቢ ህክምና አገልግሎት ጥራትን ለማስጠበቅ ድርሻው የጎላ ነው። ቃለ መጠየቁም የሚወስደው ጊዜ ከ15-20 ደቂቃ ብቻ ነው።

በጥናቱ ውስጥ ለማሳተፍ ፈቃደኛ ነዎት?

ተሳ ቃ ጅ ከሆኑ መጠየቁን ይጀምሩ።

ቃ ጅ ካልሆኑ ተሳ ፊ ወ.ን በማመስገንና ምክንያቱን በመጠየቅ የሚቀጥለውን ካሚ ቁ።

የጤና ተቋሙ ል ኮ ----- ቁ ል ኮ -----

ቃለ-መጠየቁ የተደረገበት ቀን-----ቃለ-መጠየቁን ያደረገው ሰው ስምና ፊርማ-----

ቃለ-መጠየቁን ክትትል ያደረገው ሱፐርቫይዘር ስምና ፊርማ-----

ከዚህ በታች ለቀረቡት ጥያቄዎች ከባላላው የሚሰጡትን ምላሾች ባደውን በባላላው መሠረት በባላላው ፊደሎችን ይክበቡ።

ተ.ቁ	ባላላ	መልስ	ኮ
ባላላው አጠቃላይ መረጃ			
1	ባላላ	1 ወንድ 2 ሴት	
2	አድራሻ	1 ከተማ 2 ገጠር	
3	ባላላ	1-----አመት	
4	የጋብቻ ሁኔታ	1 ያላገባ/ባች 2 ያገባ/ባች 3 ባላላ/ች 4 የሞተችበት/ባት	
5	የቤተሰብ አባላት ብዛት		
6	የትምህርት ሁኔታ	1 ማንበብና መጻፍ የማይችል 2 ማንበብና መጻፍ ብቻ የሚችል 3 1-8 ክፍል 4 9-12 ክፍል 5 ከ12 ክፍል በላይ	
7	ሀይማኖት	1 ሙስሊም 2 ኦርቶዶክስ 3 ፕሮቴስታንት 4 ሌላ	
8	የስራ ሁኔታ	1 ባለ 2 ተማሪ 3 የመንግስት ሰራተኛ 4 በግል ድርጅት ተቀባይ የሚሰራ 5 ነጋዴ 6 ሌላ	
9	አማካኝ ባርሃዊ ገቢዎ በብር ስንት ነው?		
10	ቀደም ሲል በቲቢ ክሊኒክ የቲቢ ህክምና አገልግሎት አግኝተዋልን?	1 አዎ 2 አይደለም	
11	የቲቢ ህክምና ከጀመሩ ስንት ጊዜ	-----ቀናት	

- ሆኖዎታል?
- 12 በቲቢ ህክምና አሰጣጥ ወቅት ያጋጠመዎት ችግር ነበር? 1 አዎ
2 ስም
- 13 ህክምና የሚሰጠው ባለሙጺ ካሚዎችን ያከብራል? 1 አዎ
2 ስም
- 14 ርሰዎ ካሉበት ጠቅ የቲቢ ክሊኒክ በኪሎ ሜትር ደረስ ምን ያህል ይርቃሉ? 1 አዎ
2 ስም
- 15 ርሰዎ ካሉበት ከክ ክሊኒክ ድረስ በሰዓት/በደቂቃ----- ለመድረስ የሚፈጅበዎት ጊዜ ስንት ነው? 1 አዎ
2 ስም
- 16 አርሰዎ ካሉበት ከክ ክሊኒክ ድረስ በምን መጡ? 1 በግር
2 በታግሊ
3 ሌላ

በጤና ተቀሙ በሚሰጠው አገልግሎት ምን ያክል እንደረኩ መልስ ይስጡ

- 17 የቲቢ ክሊኒክ በቂ የስራ ሰዓት ሰጥቶ የህክምና አገልግሎት ሊሰጠዎት በመቻሉ ምን ያህል ረክተዎል? 1 በጣም አልረካሁም
2 አልረካሁም
3 መልስ የለኝም
4 ረክቻለሁ
5 በጣም ረክቻለሁ
- 18 ክሊኒኩ ከደረሱ በኋላ የህክምና አገልግሎቱን ለማግኘት በቆዩበት ጊዜ ምን ያህል ረክተዎል? 1 በጣም አልረካሁም
2 አልረካሁም
3 መልስ የለኝም
4 ረክቻለሁ
5 በጣም ረክቻለሁ
- 19 አገልግሎቱን ለማግኘት ስንት ደቂቃ/ሰዓት ቆዩ? -----ሰዓት
-----ቂቃ
- 20 በክሊኒኩ አገልግሎት ለማግኘት ሲመጡ የጤና ባለሙያዎች ጊዜ ሰጥተው ሲያስተናግደዎት በመቻላቸው ምን ያህል ረኩ? 1 በጣም አልረካሁም
2 አልረካሁም
3 መልስ የለኝም
4 ረክቻለሁ
5 በጣም ረክቻለሁ

በጤና ተቀሙ በህክምና መሳሪያዎችና በሌሎች ግብአቶች ላይ ያለትን የአገልግሎት ርካታ

በሚመለከት

- 21 በመቆያ ክፍሉ ባለው ጽዳት ሁኔታ
- 1 በጣም አልረካሁም
 - 2 አልረካሁም
 - 3 መልስ የለኝም
 - 4 ረክቻለሁ
 - 5 በጣም ረክቻለሁ
- 22 በ ቅላላ በመቆ ቦ ባለ ምቹት
- 1 በጣም አልረካሁም
 - 2 አልረካሁም
 - 3 መልስ የለኝም
 - 4 ረክቻለሁ
 - 5 በጣም ረክቻለሁ
- 23 በምርመራ ክፍሉ/አገልግሎቱን ባገኘብት ክፍል ባለው የክፍል ጸዳት
- 1 በጣም አልረካሁም
 - 2 አልረካሁም
 - 3 መልስ የለኝም
 - 4 ረክቻለሁ
 - 5 በጣም ረክቻለሁ
- 24 ለህክምና አገልግሎት የጤና ሙያተኞች በሚጠቀሙባቸው የህክምና መሳሪያዎች ጽዳት
- 1 በጣም አልረካሁም
 - 2 አልረካሁም
 - 3 መልስ የለኝም
 - 4 ረክቻለሁ
 - 5 በ ም ረክቻለሁ
- 25 የህክምና አገልግሎት ለማግኘት ክሊኒክ በመጡበት ሰዓት የመድሃኒት እጥረት አጋጥሞዎት ያውቃል?
- 1 አዎ
 - 2 መልስዎ የለም ከሆነ ወደ ጥ.27 ሂ
- 26 መልስዎ አዎ ከሆነ ለስንት ጊዜ ?
- 27 ምንስ መፍትሄ ወሰዱ?
- 1 ወደ ሌላ ጤና ተቀም ተላኩ
 - 2 ህክምናውን አቀረጡ
 - 3 ሌላ

አጠቃላይ አገልግሎቱን በሚመለከት የተሰማዎት ርካታ በሚመለከት

- 28 ያለበዎትን የጤና ችግር ለማቃለል
- 1 አዎ
 - 2 አይደለም
- በክሊኒኩ ውስጥ የተሰጠዎት አገልግሎት ፍላጎተዎን የሚያሟላ ነበር ወይ ?

29	መልስዎ አይደለም ከሆን በክሊኒክ ያልተማሉና ለርስዎ ጤንነት አስፈላጊ ናቸው ያሉትን አገልግሎት ይግለጹ?	1 የጤና ባለሙያዎች በስዓቱ አለመገኘት 2 የራጅ አገልግሎት አለመማላት 3 የላቦራቶሪ አገልግሎት መቀረት 4 የመድሀኒት እጥራት
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የጤና ባለሙያዎችን ግንኙነትን በተመለከተ የተሰማዎት አርካታ

30	የጤና ባለሙያዎች ለርስዎ ባለው ትህትና	1 በጣም አልረካሁም 2 አልረካሁም 3 መልስ የለኝም 4 ረክቻለሁ 5 በጣም ረክቻለሁ
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31	በጤና ባለሙያዎች የምርመራና የህክምና አገልግሎት በተሰጠዎት ወቅት የርስዎን ደህንነትና ሚስጢር ለመጠበቅ በሚያደርጉት ጥረት	1 በጣም አልረካሁም 2 አልረካሁም 3 መልስ የለኝም 4 ረክቻለሁ 5 በጣም ረክቻለሁ
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በጤና ባለሙያዎች ችሎታና ክህሎት የተሰማቸው ርካታ

32	ያለበዎትን የጤና ችግር ለማከም የጤና ባለሙያዎች ባላቸው የሙያ ችሎታ ክህሎት	1 በጣም አልረካሁም 2 አልረካሁም 3 መልስ የለኝም 4 ረክቻለሁ 5 በ <input type="checkbox"/> ም ረክቻለሁ
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33	ያለበዎትን የጤና ችግር በሚመለከት ከጤና ባለሙያዎች በተሰጠዎት መረጃ	1 በጣም አልረካሁም 2 አልረካሁም 3 መልስ የለኝም 4 ረክቻለሁ 5 በጣም ረክቻለሁ
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በተሰጠዎት የህክምና አገልግሎት ውጤት ላይ የተሰማዎትን ርካት በሚመለከት

34	በክሊኒክ ውስጥ የተሰጠዎት የህክምና አገልግሎት የነበረበዎትን የጤና ችግር በማቃለል በኩል ያለዎት ርካታ	1 በጣም አልረካሁም 2 አልረካሁም 3 መልስ የለኝም 4 ረክቻለሁ 5 በጣም ረክቻለሁ
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35	ባጠቃላይ ከጤና ባለሙያዎች በተሰጠዎት የህክምና አገልግሎት ያላቸው የርካታ ሁኔታ	1 በጣም አልረካሁም 2 አልረካሁም 3 መልስ የለኝም 4 ረክቻለሁ 5 በጣም ረክቻለሁ
36	በጤና ተቀሙ ውስጥ የሚሰጠውን የህክምና አገልግሎት ሌሎችም <input type="checkbox"/> ነገር- <input type="checkbox"/> ነድጠቀሙ ምክር አዘል መልዕክት ያስተላልፋሉ?	1 አዎ 2 አላስተላልፍም

ለቀና ትብብረዎ ከልብ አመሰግናለን!!

Annex 3 Declaration

I undersigned, hereby declare that this thesis is my original work. The work has not been presented for degree in any university and source of materials used for the project has been acknowledged.

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Approval of the Examiner:

This thesis has been submitted our approval as university examiner.

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Date of submission _____