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**ADDIS ABABA UNIVERSITY
FACULTY OF MEDICINE
DEPARTMENT OF COMMUNITY HEALTH**

**Quality Assessment of Directly Observed Treatment
Short-Course of Tuberculosis in Afar National Regional
State**

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List of Acronyms

AOR:	Adjusted Odds Ratio
COR:	Crude Odds Ratio
Dx:	Diagnosis
DOTS	Directly Observed Treatment Short Course
EC:	Ethiopian Calendar
EFY:	Ethiopian Fiscal Year
EPHA:	Ethiopian Public Health Association
EPTB:	Extra Pulmonary Tuberculosis
FDRE:	Federal Democratic Republic Of Ethiopia
FMOH:	Federal Ministry of Health
GLRA:	German Leprosy & Tuberculosis Control and Relief Association
HC:	Health Center
HW:	Health Worker
PTB:	Pulmonary Tuberculosis
RHB:	Regional Health Bureau
RTLCL:	Regional Tuberculosis and Leprosy Control
Rx:	Treatment
SAS:	Signs and Symptoms
SPSS:	Statistical Package for Social Science
TB/Tb:	Tuberculosis
TLCP:	Tuberculosis and Leprosy Control Program
WCDC:	Woreda Communicable Disease Control
WHO:	World Health Organization

ABSTRACT

Introduction: despite availability of reliable diagnostic approaches and effective drugs for over decades, Tb remained a major public health problem, where there have been limited impacts in reducing its global burden despite the growing adherence to the recommendations of WHO on the use of DOTS and other interventions in many countries.

Objective: to assess the quality of Tuberculosis treatment in Afar National Regional State.

Methodology: cross sectional health institution based survey was conducted between 5th February and 10th March in six health institutions, where records were reviewed for 270 Patients', exit interview were made among 209 patients, six providers were interviewed and observations were made for 49 patients. Data were entered and analyzed using SPSS 11.0 for windows statistical software and findings at 95% confidence interval and p value of 0.05 were reported as statistically significant.

Result: the results of the study showed that staffing qualities were poor and patterns of supervision were weak but delivery supplies for Tb control activities were good. A relatively higher proportion of patients were dissatisfied with the appropriateness and adequacy of working hours and waiting time. Statistically significant correlation was observed between process quality and output quality (clients' satisfaction).

Conclusion And Recommendations: it was concluded that the quality of Tb treatment in Afar National Regional State was poor where; both the quantity and the quality of staffing were not satisfactory, the issue of refreshment training seems to be absent, the pattern of supervision was weak and was also unplanned, inconsistent and lack feedback whenever it had been effected, which is totally against the national guideline where it is strongly recommended as part of program communication. Hence, mechanisms to improve the different aspects of the program and sticking to the national TLCP manual were strongly recommended.

1. BACKGROUND

1.1. Introduction:

Tuberculosis is a chronic infectious disease caused by mycobacterium tuberculosis, an acid-fast bacillus. Though it affects peoples of all ages and sexes, poverty, malnutrition, overcrowding and more recently HIV/AIDS have been known for decades to make some groups more vulnerable to develop the disease¹. It is among the three major killer infectious diseases worldwide; HIV/AIDS, Tuberculosis and malaria². The World Health Organization (WHO) declared Tb as a global emergency due to its medical, social and economic consequences. Despite the growing adherence to the WHO recommendations on the use of DOTS and other interventions in many countries there have been limited impacts in reducing the global burden of Tb². Tb is a major public health problem in that about 8.4 million people develop active Tb and 2.3 million of them die from the disease each year globally, accounting for 2.5% of the global burden of disease and comprising 25% of all avoidable infectious cause of death among young women¹. It continued to be the leading cause of death globally despite the availability of reliable diagnostic approaches and effective drugs for over decades³.

Of the six WHO regions, five have Tb incidence that is falling or stable, but Africa has an incidence that keeps increasing at almost 10% per year, offsetting the gains in the rest of the world⁴.

Ethiopia has made efforts since 1950s, where Tb has been recognized as a major public health problem, and adopted DOTS program in 1992¹. However, the disease is still a major public health problem in that it is the 3rd leading cause of out patients' visit (4.46%), the 4th leading cause of admission (3.38%) and the 3rd cause of death (10.34%) according to the 1997 Health and Health related indicators of the Federal Ministry of Health⁵. Ethiopia stands 7th in the list of high burden countries (HBC) for Tb⁶; and the 2005 estimate indicated that the incidence of Tb of all forms and smear positive Tb is 356 and 155 per 100000 population respectively¹.

In order to help a person with tuberculosis successfully complete treatment, the WHO and the International Union against Tuberculosis and Lung Disease instituted a new strategy called directly observed treatment short course, which has five main components. The strategy uses a

nurse (health worker) to deliver and observe patients taking all the doses of their drugs, rather than relying on patients to take them on their own¹. It is highly effective at promoting successful treatment and comparison of self treatment versus various forms of DOTS has shown that completion of treatment is significantly higher when the treatment is supervised⁴. So assessing quality of tuberculosis treatment services in order to assess whether the treatment services are provided as per the DOTS strategy could be one method of fighting Tuberculosis and improving the health status of a population.

1.2. Rationale of the Study

Tuberculosis is presenting new challenges as a global public health problem, especially at a time of increasing threats due to HIV infection, multi-drug-resistant and extensively drug-resistant strains of *Mycobacterium tuberculosis*⁷. Besides, there has been poor performances achieved in Tb control activities in Ethiopia in general and in Afar National Regional State in particular, (case detection and Treatment success rate below the WHO standard). Additionally, no such research activities on Tb control activities have been conducted in the region and other pastoral areas of the country too.

Quality assessment has been considered as one element of quality assurance, which looks for sources of problems in a system and process; not bad performers. The first model to evaluate health care quality was developed by Avedis Donabedian and includes the element of structure, process and outcome⁸. As per the Donabedian's definition of quality, the ultimate goal of quality assessment in health care program is to assess whether a program possesses the right things (input), is doing the right things (processes) and it leads to the right things (outcome) to happen. Hence, assessing the quality of Directly Observe Short-Course Treatment of Tuberculosis can have significant importance in evaluating Tb control activities and in identifying area of improvements for better and effective Tb control strategies.

Therefore, this study was conducted to assess the quality of Directly Observed Treatment Short-Course of Tuberculosis in Afar National Regional State to identify any gap in providing tuberculosis treatment services and provide baseline information to decision makers and program managers.

2. LITERATURE REVIEW

2.1. Tuberculosis Control Program

Since 1976, the WHO has recommended a strategy called DOTS through which national governments can meet their responsibility to treat patients and to prevent the spread of Tuberculosis⁹. Ethiopia has adopted this strategy since 1992, which currently has main objectives of: interrupting transmission of the Tb infection, reducing mortality morbidity and disability, preventing spread of drug resistance, reducing burden of Tb among PLWHA and general population as well as reducing HIV incidence among Tb patients. The basic strategy, which is cost effective to the individual patient, to their families and to the general population in achieving these objectives is adoption of DOTS of Tb, which is the WHO recommended control strategy and adopted by most countries. This strategy comprises of five essential elements namely: **i)** Government commitment to ensure sustained and comprehensive Tb control activities, **ii)** Case detection by sputum smear microscopy among patients self reporting to health facilities, **iii)** Standardized short course chemotherapy using regimens of six to eight months for all diagnosed cases of Tb, **iv)** a regular uninterrupted supply of all essential anti-tuberculosis drugs and laboratory supplies and **v)** a standardized recording and reporting system that allows assessment of case finding and treatment results for each patient and of the Tb control program's performance overall¹.

WHO and the "Stop Tb" partnership recommended case detection rate of new smear-positive pulmonary Tb to be at least 70% of the estimated incidence, where the case detection rate is primarily passive and should primarily be based on sputum microscopy, which is the most reliable and important one. During sputum microscopy, three sputum specimens must be collected and examined in two consecutive days (spot-early morning-spot): a first spot specimen – when the patient presents him/herself; an early morning specimen- consisting of all the sputum raised in the first 1-2 hours and a second spot specimen when the patient returns with the early morning specimen. Similarly they recommended treatment success rate of at least 85% for newly detected smear-positive pulmonary, smear-negative and EPTB. And adequate chemotherapy requires an appropriate combination of drugs, which are prescribed in the correct dosage and taken regularly by the patient for sufficient period of time. Treatment of Tb has two main phases: intensive phase and continuation phase. The intensive phase is the phase where three or more

drugs are taken for eight weeks for new cases and 12 weeks for re-treatment cases with the assumption of making the patient non-infectious and minimize danger of drug resistance development. Where, as the continuation phase is the phase that follows the intensive phase with at least two drugs for 4-6 weeks with the assumption of making the patient permanently cured and prevents relapse¹.

2.2. Quality Assessment

The most comprehensive, yet the simplest definition of quality is that used by advocates of total quality management (W. Edwards Deming, 1982):“Doing the right thing, right, right way”. It has different dimensions like technical performance, effectiveness of care, efficiency of service delivery, safety, access to services, interpersonal relations, continuity of services, physical infrastructure and comfort and choices¹⁰. However, the institute of medicine defined quality as the degree to which health services for individuals and populations increases the likelihood of desired health outcomes and is consistent with professional knowledge¹¹. According to this definition good quality means providing patients with appropriate services in a technically competent manner, with good communication, shared decision making and with cultural sensitivity. However, quality assessment is systematic identifications what level of quality the system is 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 methods¹⁰.

The first model to evaluate health care quality, which was developed by Donabedian, includes the element of: structure, process and output parameters from which inferences can be drawn about the quality of care⁸. He defined structures 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 Service Organizations/Health Systems and between 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 diagnosis, 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 (the changes in individual's health status that is attributed to health care).

2.2.1. Structural quality assessment

Structural measures characterize the resources in the health system, describing the setting in which care occurs and the capacity of that setting to produce quality. It includes professional characteristics, health service characteristics, infrastructures, equipments and the surrounding environment¹². The underlying concept in structural assessment is 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 assessment¹³.

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 every quarter. A study conducted in China indicated a 30% decline in the prevalence of Tb following the implementation of DOTS. It is clear that DOTS will only be as effective as has been in China only if it is properly implemented and funded. Because it relies on a regular supply of essential anti-tuberculosis drugs besides sustained political commitment to fighting Tb, a diagnostic method known as “smear microscopy”, standardized treatment practices and a standardized recording and reporting system¹⁴. This argument can be supported by the fact that the success of infectious disease control program is often determined by the organization of the health system, availability and distribution of health resources as well as efficient utilization of them¹⁵.

The WHO also considers strong health system to be a prerequisite for delivering and sustaining vertical programs for controlling Tb, malaria and HIV/AIDS. That is to say implementation strategies that focuses on service deliver must be reoriented to embrace systematic approach to Tb control activities that takes into account organizational structure, financing and resource allocation¹⁶. A qualitative study conducted in Romagna region, 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 one¹⁷. The WHO ad hoc committee (1998) on Tb epidemic had also identified the following constraints in the control of Tb;

financial shortages, human resource problems, organizational factors, drug supply problems and lack of public awareness¹⁵.

Evaluation report of the five year, 1996-2001, program development plan of the TLCP of FMOH indicted that high turn over of staffs at the service delivery level; inadequate supervision by all levels involved in the TLCP; lack of mechanisms or commitment for defaulter tracing; frequent interruptions in the supply of drugs, laboratory utensils and formats and absence of adequate training and IEC materials at the regional levels as the main problems in Tb control activities¹⁸.

2.2.2. Process quality 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, availability and use of protocols or guidelines in the provision of care, delay in getting services adequacy of information and the technical competency of the provider. 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 treatment¹². Studies of the process of care can lie on direct observations or review of medical records¹³.

The national TLCP 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 has to be recorded daily and reported quarterly¹. However, study conducted in Tigray region indicated that about 6.8% of Tb patients were put on treatment without any documented evidences⁶. Similarly, a study conducted in the SNNPRS, indicated that Tuberculosis registries were incomplete in many cases where; 26.8% of the 239 Tb patients studied were not registered in the Tuberculosis control program, and all progress records were missing in 5.4 % of patients due to immediate defaulting¹⁹.

Strong inter-personal relation, which shows trust, respect, confidentiality, courtesy, responsiveness, empathy, effective listening, and communication between providers and patients is one dimension of quality through which a client centered services can be rendered¹⁰. However, a recent anthropological work in West Africa indicated that poor relations between health-care providers and patients resulted in rejection of public health-care systems²⁰. Similarly, a

study conducted among the Roma communities living in Western and Eastern Europe found cultural (inadequate communication between the patient and provider) barrier besides, economic (user fees, cost of transport, lost income/time), knowledge (poor knowledge on part of the providers) and geographic barriers to be the major one in the control of Tb among the study groups²¹.

Additionally, lack of linkages between DOTS and other providers (non-DOTS and HIV care), missed diagnosis and/or lack of referrals by non-DOTS providers, providers' poor knowledge of correct procedures and poor interpersonal communication, poor quality of services (hours, wait-time), health providers fail to give adequate information besides cost, distance to DOTS facility and lack of resources including human resources had been the main system barriers in Tuberculosis control²².

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 in addition to poor public awareness about Tb and lack of proper knowledge by community health workers⁶. Similarly, a study conducted in Gambia, indicted that higher defaulting rate was observed among those Tb patients who said they were uncertain that their treatment would not work and among those who incurred significant time or money costs traveling to receive treatment²³.

Although, pastoral populations represent about 10% of the Ethiopian population; DOTS program for them has been virtually absent and the main problem with Tb control in these pastoral populations is the very high defaulter rate of around 70%¹⁸. Afar peoples have survived as pastoralists, migrating with their livestock in search of pasture and water. Every three or so months, they dismantle and move their family and herds "in the path of the rain." The area is drought prone and erratic rainfall patterns force the Afar to frequently move. Their nomadic life has not helped them escape the scourge of TB. The disease is endemic in the Afar region, but access to treatment is almost virtually nonexistent for majority of the population. Health facilities are only found in towns along the roads and they are few and far between. These health facilities are not only remote, but also offer limited medical care provided by health workers who do not speak the Afar language well.

2.2.3. Output quality parameters

These measure health care performances and include relevant outcomes as survival rate, status of physiologic, physical and emotional health and patient satisfaction. They are end results of the process of patient care and of the timely availability of the necessary inputs¹². Patients' satisfaction has gained a considerable attention since 1980's being conducted either as a small ad-hoc or as a highly financed type of research. Although, it is recognized as one components of quality assurance, equating high level of satisfaction with high level of quality of care will be misleading as patients with lower expectations tend to be more satisfied and also as expectations vary according to knowledge and prior experiences, and are therefore likely to change with accumulating experiences. There have been several components of satisfaction being proposed at different times. However, Ware's taxonomy which has eight components is the most widely used one, though it has been criticized for being based up on criteria set by management agenda and professionals rather than emphasizing lay perceptions of care. These eight components are: interpersonal manner, technical qualities of care, accessibility/convenience, finance, efficacy/outcome of care, continuity of care, physical environment and availability¹³.

However, patients appear very sensitive to aspects of interpersonal relations they have with providers and the technical quality of care provided. Hence, five categories of taxonomy of perceived quality were developed. These are: technical competence of the health care personnel, interpersonal relations between the patient and health care provider, availability of adequate resources and services, accessibility and effectiveness of care¹³.

Therefore, as there have been multiple barriers that stand in the way of effective control of Tuberculosis, an interdisciplinary approach; integrating the quantitative assessment of the effectiveness of control strategies and the qualitative assessment of their effect on the ability of patients to access and complete treatment, is needed to develop effective, flexible context-oriented and patient-centered approaches. A key part of which is to assess the structures of care and support available for patients and to identify the shortfalls, over and above those mentioned in international policy documents, in the management of control at national and local level. An interdisciplinary approach will ensure simultaneous consideration of the social, economic, and environmental dimensions of disease, since questions about access to health care, recourse to

treatment, and delivery of care, including the determination of their respective costs and other factors are fundamental to effective Tb control¹³.

Measuring the quality of health care has paramount importance in continually improving the quality of care/services rendered and it considers the following assumptions:

- Quality is measured as a scale or degree rather than as a binary phenomenon,
- It encompasses all aspects of care by referring to health services,
- It can be observed from an individual as well as population perspective
- It has to be measured in terms of structure, process and outcome, which must be assessed in relation to the type and the specialty of the services.
- It is measured using practice parameters²⁴.

Practice parameters are means of describing what should be done unlike indicators, which are means for measurements. They are a generic term for acceptable approach to the prevention, diagnosis, treatment or management of conditions. Hence, Donabedian's quality parameters in health care were used in this study to assess the quality of Directly Observed Short-Course Treatment of Tuberculosis in Afar National Regional State, where availability of staffs, supplies and equipments for Tb control activity as well as patterns of service delivery and supervision were included for structural assessment, while technical performances, use of equipments and supplies for Tb control activities and interpersonal relations were included for processes of care assessment. Similarly, patients' satisfaction level was taken for output quality assessment.

3. OBJECTIVES

3.1 *General Objective*

To assess the quality of Directly Observed Treatment Short Course (DOTS) of Tuberculosis in Afar National Regional State.

3.2 *Specific Objectives*

1. To assess the structural qualities of DOTS in Afar with regard to staffing, materials, drugs and supplies as well as patterns of service delivery and supervision;
2. To assess the process qualities of DOTS in Afar focusing on provider-patient interactions, use of equipments and supplies for Tb control activities, recording and reporting and the process of care given to Tuberculosis patients;
3. To assess patients' satisfaction level in the given services; and
4. To assess any correlation among the three quality parameters of DOTS of tuberculosis in Afar National regional State.

4. METHODOLOGY

4.1. Study Area

The study area was Afar National Regional State, which is located in the Northeast part of the country and the region has common borders with Tigray in the North, Amhara in the West, Oromia and Somali National Regional states in the South and Southeast respectively. Internationally, it borders with the Republic of Eritrea in the North and Djibouti in the East^{25, 26}. It has 29 woredas and population of about 1,389,000. There were two Hospitals and, 14 Health centers, 45 Health stations, 59 health posts, and 3 lower private clinics, making the potential health service coverage of the region to be 72.5% during the study period⁵ while the actual health service coverage of the region was 40%. This indicated that there had been a huge gap in utilizing the existing health services. Sixty percent of the health facilities were providing DOTS⁵.

4.2. Study Design

The study was a cross-sectional institution based survey that employed both semi-structured and structured questionnaires.

4.3. Source Population

The study population is all Tb patients in the region.

4.4. Study Population

The study populations were all Tb patients on the intensive phase of DOTS and Tb Patients who completed their treatment in the previous one year.

4.5. Sampling Frame

The sampling frame used for the study is the health facility Tb registration form.

4.6. Study Unit:

The study units were randomly selected Tb patients who had completed their treatment in the previous year and those who were on the intensive phase of DOTS during the study period.

4.7. Sample Size Determination

4.7.1. Observation and interview of providers

Tb control activities in the six health institutions' Tb clinic (five Health Centers and one Hospital) were observed and heads as well as TLCP focal persons in the respective health facilities were interviewed. These were Dubti Hospital, Assaita, Chifra, Gewane, Awash and Melka-werer Health centers.

4.7.2. Record Review

Single proportional survey formula was used i.e.

$$N = \frac{Z\alpha^2 P (1-P)}{d^2} \quad 27$$

Where, P=proportion of desired behavior.

Here P of 6.8% was taken, as a study conducted in Tigray (5) indicated that 6.8% of Tb patients' documents were not properly recorded during their treatment.

D=allowable error of 3%

CI=confidence interval at 95%

$$\text{Hence, } N_1 = \frac{(1.96)^2 * .068 * .932}{(0.03)^2}$$

$$N_1 = 270$$

4.7.3. Exit Interview

Although a sample size of 422 was needed for exit interview the number of Tb patients on DOTS at the time of data collection was smaller i.e. there were only 209 patients. Hence, exit interview data were collected from all patients on the intensive phase of treatment in the six health facilities.

4.8. Sampling Procedures

The six health institutions providing DOTS was selected randomly. The six health institutions was decided to be taken based on the 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 a 30-50% sample (23). Hence, a

30% sample from a sampling frame of 14 health centers and two hospitals (five health centers and one hospital) were taken.

For reviewing patients' record, the 270 patient's records were proportionally allocated to the six health institutions based on the number of Tb patients' record in the selected health institutions. Then the required patients' record from each health institutions were selected by systematic random sampling where the first patient's record was selected randomly using lottery method. (Annex 10.3)

4.9. Inclusion and Exclusion Criteria:

4.9.1. Inclusion

The inclusion criteria used are to include all health institutions in Afar Regional State providing DOTS and laboratory services.

4.9.2. Exclusion

The exclusion criteria used are health institutions, which do not provide either DOTS or laboratory services

4.10. Data Collection Procedures

Donabedian's quality assessment model (annex 10.2) in Health care and FMOH's-TLCP manual were used for the development of questionnaires for structural and process quality assessment. In addition, standard questionnaires were used to collect data on client's satisfaction level¹³. Data collectors were trained on how to collect data using the questionnaires for two days (one day for training and one day for pre-testing). Then after certain unclear and redundant questions and variables were corrected data were collected with a daily close supervision.

4.10.1. Structural assessment

Structural data i.e. availability of different materials, drugs, equipments and supplies for Tb control activities were collected by the principal investigator using national TLCP performance monitoring checklist. While, data on staff assignment, training on tuberculosis control activities

like AFB microscopy procedures and patterns of service delivery and supervision were collected by making interview to heads of the health facilities.

4.10.2. Process quality assessment

Trained health professionals (nurses) who were on their gowns and had been assigned to work in other departments like maternal and child health department were assigned to observe the process of care and review record i.e. observations using guiding questions were made on some Tb control activities like whether health education on Tb was given in the health facility, time at which Tb clinics opened (functioning), adequacy of information given to Tb patients, patient's participation in decision-making process, uses of equipments in Tb clinics and on the level of provider-patient interaction. Observation and record review were done simultaneously by the same individual. Records review was made to assess the accuracy of care/services given to the patients, where data were collected mainly on the Diagnosis made, Treatments given, on the initial and follow-up laboratory results and on Treatment outcome of Tb control activities as well as on the documentation system. Flow charting of Tb patients' (clients flow analysis) from their entrance till exit in the selected health institution was made by the principal investigator using guiding checklist to assess the processes of care given to them. Additionally, health workers in charge of Tb clinic and laboratory technicians were also interviewed by the principal investigator on any procedures/norms followed in the health facility in the case detection, AFB microscopy procedures, treatment, monitoring and follow-up of Tb patients and use of guidelines, manuals etc...

4.10.3. Patients' satisfaction level assessment

Trained data collectors who speak the local language were employed to conduct the exit interviews using standard questionnaire¹³ (which was modified to the purpose of the study) among Tb patients' on the intensive phase of treatment. Client's socio-demographic and socio-economic characteristics, organization of treatment services, provider-client interaction, provider's competence, and adequacy of information were included in the interview. Each study participant was asked to tell his/her degree of satisfaction on three-scale responses (satisfied, neutral, dissatisfied).

4.11. Data Analysis

Descriptive statistics (frequency tables, median, range...) were used to describe the structural, process and outcome quality assessment results. Statistical tests like odds ratio was used for comparison of results. Logistic regression was employed to identify the determinant factors for patients' overall satisfaction level.

As quality is measured as a degree or as a scale, coding and scoring of the responses based on the kinds of responses obtained were done. Hence, for material assessment, score 1 was given for each materials and supplies available and score 0 was given for each materials and supplies unavailable in the selected Tb clinics. For staffing assessment score 2 was given for each of MD, HO or B.Sc nurses available and the scoring will increase by one to a maximum of score 4 as the number of these staffs increases by one, and score 0 was given for unavailability of each of them. Score 1 was given for availability of each of Laboratory technician and diploma nurses and score 0 was given for unavailability of them. For structural assessment, material and staffing scores were computed together. For process of care assessment, score 1 was given (for each of) if drugs and their dosages were recorded, follow-up sputum AFB microscopy on the 2nd, 5th/7th months of Rx was done, and documentation was complete and also if each available material for Tb control activity was being used, while score 0 was given if not. Similarly score 1 was given for each "yes" responses of the guiding questions' in the observation checklist and score 0 for each "no" responses. For patients' satisfaction level assessment, score 1 was given for those satisfied, score 0 for neutral, and score -1 for dissatisfied responses. Median score was taken as a cut-off point for results reporting and discussion.

Correlation analysis using Spearman's rho correlation test (a non-parametric test) was employed to see if any correlation exists among the three quality parameters (input, process and output).

SPSS 11.0 for windows statistical software applications were used for data entry and analysis. Findings at P value of 5% and confidence interval of 95% were accepted as statistically significant.

4.12. Data Quality Assurance

To assure data quality, data collectors were trained for two days and 5% of the sample were pre-tested in non-selected study participants in each health facility before data collection was started. Completeness, accuracy and consistency of the collected data was checked on daily bases during data collection by supervisors and the principal investigator, where those questionnaires found incomplete, inaccurate and inconsistent were returned back for data collectors to be filled again. Data were cleaned, edited and coded before data entry and then recoded after analysis.

4.13. Ethical Clearance

Letter of support was written to Afar Regional Health Bureau from DCH, Permission was obtained from the RHB and the respective Health institutions. Oral consent was obtained from each study participants before making exit interview and confidentiality was kept.

Anonymity was maintained for all those records reviewed. For those patients of age less than 18 years, oral consent was obtained from their parents and their parents were interviewed too; i.e. only adult respondents were interviewed. Questionnaire for exit interview was translated in to Amharic language for clarity and the data collectors were trained well on how to make interview and were closely supervised on daily bases.

4.14. Variables

The variables used in the study include;

- socio- demographic (age, sex, marital status, religion) and socio-economic (income, occupation) variables,
- availability and use of materials, drugs, supplies and other resources for Tb control activity,
- availability and use of protocols/guidelines in the process of care,
- Patients' satisfaction level: on availability and accessibility of services, adequacy of information, provider's competence in providing different services...

4.15. Operational Definitions

1. **Accuracy of care:** tendency to which the services given coincide with the predetermined standards.
2. **Appropriateness of services:** the condition whether the services given is according to the stated parameters/standards.
3. **Case detection rate-** the percentage of Tb cases detected among the total number of Tb cases estimated to occur in a region/country in a year.
4. **Continuation phase-** the phase that immediately follows the intensive phase consisting of at least two drugs for 4-6 weeks.
5. **DOTS-** Directly Observed short-course treatment; a strategy devised to help patients adhere to treatment which means health workers should watch the Tb patient swallow each dose of the prescribed drugs.
6. **Intensive phase-** the phase consisting of three or more drugs for the first eight weeks for new cases and 12 weeks for re-treatment cases.
7. **New cases-** patients who have never had treatment for Tb or have been on anti-Tb treatment for less than two weeks.
8. **Output Quality:** having the right outputs to happen like satisfaction with the care provided.
9. **Process Quality:** performing the right procedures like having the proper technical competence and providing the right services.
10. **Quality:** doing the right thing in the right way at the right time for the right patients.
11. **Quality assessment:** the systematic collection and analysis of information to determine quality of services/care.
12. **Relapse-** patients who has been declared cured or treatment completed from any form of Tb in the past but found to be AFB smear-positive or culture positive.
13. **Satisfaction-** the degree to which patients perceive or accept the services as appropriate to them.
14. **Structural Quality:** having the right inputs like system and provider characteristics.
15. **Technical aspects of a program:** these are those variables, which indicate the day-to-day activities of the program according to the stated standard. These include the diagnostic procedure, treatment protocol, patient monitoring and defaulter tracing mechanisms.

16. **Transfer in-** patients who started treatment in one district and transferred to another district to continue treatment.
17. **Treatment compliance/adherence-** tendency that the patient adheres to the prescribed treatment regimens.
18. **Treatment failure** – patient who while on treatment remained smear positive or became again smear positive at the end of five months or later after commencing treatment.
19. **Treatment success rate-** the percentage of Tb cases registered in a specified period that completed treatment, whether with bacteriological evidence of success (“cured”) or without (“treatment completed”).

5. RESULTS

General: among the six health institutions included in the study one was regional hospital and the remaining five were health centers. All heads the health facilities were willing to participate in the study and oral consent was obtained from each of them before starting data collection.

5.1. Structural Assessment

Staffing: There were a total of 125 technical staffs (health professionals) where four (3.2%) were medical doctors, two (1.6%) were health officers, four (3.2%) were B.Sc nurses, 12 (9.6%) were laboratory technicians, 15 (12%) were pharmacy technicians, 56 (44.8%) were diploma nurses, three (2.4%) were sanitarians and the remaining health workers namely health assistants and FLHW were 29 (23.2%) of the total health workers.

All the six health facilities had full time staffs assigned for Tb control activities. Five health facilities had at least one staff that had been trained on Tb control activities of which only two had received refreshment trainings in the last 12 months. Only three health facilities had at least one laboratory technician who had received on job trainings on AFB microscopy where two of them had received refreshment trainings in the last 12 months.

Materials, drugs and Supplies: All of the health facilities had the recent version of; TLCP manual, Tb unit registration form, Tb referral and transfer form, Tb sputum examination request form, Tb control activity report form, Tb flip chart and flow chart for diagnosis of PTB⁺. Four of the health facilities had the recent version of TLCP laboratory manual and only one health facility had Tb posters in different languages. Besides, all of the health facilities had the recommended anti-Tb drugs namely rifampine, isoniazide pyrazinamide and ethambutol and streptomycin. As to the laboratory materials for Tb diagnosis and control activities all of the health facilities had electrical/solar microscope, sputum cups, staining rack, staining reagents and boxes for keeping examined slides as well as other necessary supplies.

Service delivery and supervision: Tb treatment providers' interview were conducted among heads, TLCP focal persons and laboratory technicians in charge of the respective health facilities and the result showed that Afar RHB was the main source of drugs and laboratory supplies for

Tb control activities for the health facilities. The methods of delivery of these drugs and supplies were picking them up from the source by almost all health facilities and the RHB also delivers these supplies during supervisory visit for three health facilities. Only one health facility reported that it had a delay problem in the delivery of drugs/supplies, where inadequate transportation, insufficient staffs, administrative difficulties and financial problems were the main proposed reasons for the delay. All of the health facilities reported that they had problems in their day to day Tb control activities, in that five responded that they had problem of getting the patient themselves in that patients do not come to health facility regularly to collect their drugs as per the DOTS guideline, four had poor transportation system, three had lack of on job trainings, staff turn over and lack of supportive supervision from higher officials. Only one health facility had lack of drugs and laboratory supplies as a main problem in providing Tb control activities. Meanwhile, despite the existence of the above problems in only two of the health facilities did the health worker in charge had discussed the problems with his/her supervisor.

As to the methods of diagnosing suspected Tb cases in five of the health facilities sputum was collected for AFB microscopy and suspected Tb cases were referred to higher health facilities for X-ray and clinical diagnosis in case where sputum examination didn't help. Besides in one health facility suspected Tb cases were treated with broad spectrum antibiotics if AFB again had not been helpful and in another one health facility any suspected Tb cases were always referred to higher health facilities for assessment with out prior examinations and attempts. Regarding sputum collection procedures for AFB microscopy among the five health facilities providing AFB microscopy tests three health facilities were following the spot-morning-spot procedure while two health facilities were following the three spot-morning spot procedures.

Final diagnoses to the suspected Tb cases were reached primarily based on AFB results in five the health facilities. Similarly referral suggestive X-ray findings in four and clinical assessment in one the health facility was also used as criteria in reaching final diagnosis for any suspected Tb cases.

Health workers had been monitoring for patients' treatment compliance by daily filling patients' unit Tb registration form in four health facilities during the intensive phase and checking for

absentees on monthly bases during the continuation phase in five health facilities. However, one health facility had no mechanism of monitoring patients for their treatment compliance during continuation phase. Similarly, absentees were retrieved by contacting their contact person in four health facilities and by sending information through other patients to the absentees in three health facilities. But nothing had been done in two health facilities to retrieve absentees whenever it had happened.

As to the roles of TLCP focal person's role in Tb control activities, five focal persons responded timely reporting Tb control activities, four responded retrieving absentees and keeping patient's records, three responded diagnosing and managing Tb cases and two focal persons responded giving health education and assessing and referring suspected cases for diagnosis.

Modes of drug treatment in the intensive phase were fully DOTS in two health facilities and partially DOTS in four health facilities.

Although all health facilities had laboratory services, only five of them were providing AFB services despite the availability of basic laboratory materials and reagents. The proportion of AFB tests among all laboratory tests was 4.5% and Proportion of positive AFB tests was 12.3% out of all AFB tests.

Supervision: No TLCP focal person had regular supervisor and supervisory schedule for Tb control activities. Only one focal person had been supervised in the last 6 months while four focal persons were supervised in the last 12 months. It was responded that during the last supervisory visit supervisor(s) observed Tb registry for all of the TLCP focal persons supervised. For two focal persons they delivered supplies, reviewed reports and discussed problems with them, and for one focal person they provide current information related to Tb control. Two focal persons received supervisory feedback in the last 12 months where all of them had received it orally and none of them received either in written form or on supervision registry form.

5.2. Process of Care Assessment:

Use of equipments and supplies: Only five health facilities were using sputum examination request form, Tb control activity report form, Tb flip chart and flow chart for diagnosis of PTB. Four health facilities were using the recent version of TLCP laboratory manual and only one health facility were using (posted in visible places) Tb posters in different languages. Besides, all the health facilities were using the recommended anti-Tb drugs. Concerning usage of laboratory materials for Tb control activity only five health facilities were using them.

Recording and Reporting: a total of 270 records of Tb patients who completed their treatment in the previous year were reviewed. All of them were found to have a registered unit Tb registration number, 145 (53.7%) of the patients were males, 123 (45.6%) were females and the remaining two (0.7%) were unknown as their sex was not recorded. The majority 196(72.6%) were in the age group of 15-54years. Initial diagnostic AFB test were done for 182 (67.4%) patients, where 51(28%) were positive and 131(72%) were negative for AFB (Table 1).

Table 1: Descriptions of patients' unit Tb registry record in the selected health facilities during intensive phase of Tb treatment in Afar National Regional State. April, 2007.

S. No	Variable Category	Number	Percent	
1	Sex (n=270):	Male	145	53.7
		Female	123	45.6
		Unrecorded	2	0.7
2	Age group in years (n=270) :	0-4	3	1.1
		5-14	21	7.8
		15-54	196	72.6
		55+	48	17.6
		Unrecorded	2	0.7
3	Initial diagnostic AFB tests done (n=270):	Yes	182	67.4
		No	88	32.6
4	Initial diagnostic AFB result (182) :	Positive	51	28
		Negative	131	72
5	Weight of the patient recorded on intensive phase (270) :	Yes	247	91.5
		No	23	8.5
6	Classification of the patient (n=270) :	PTB ⁺	59	21.9
		PTB ⁻	116	43.0
		EPTB	94	34.8
		Unrecorded	1	0.4
7	Category of the patient (270) :	New	235	87.0
		Relapse	23	8.5
		Defaulter	4	1.5
		Transfer in	2	0.7
		Rx Failure	1	0.4
		Unrecorded	5	1.9
8	Drug & its dose given during intensive phase recorded (n=270) :	Yes	267	98.9
		No	3	1.1
9	Follow up AFB microscopy done on 2 nd month of Rx (n=51) :	Yes	36	70
		No	15	30
10	Result of 2 nd month follow up AFB microscopy (n=36) :	Positive	1	2.7
		Negative	34	94.6
		Unrecorded	1	2.7

During the continuation phase, weight was recorded only for 92 (34.1%) patients while drugs and their dosages given were recorded for 207 (76.6%) patients. Besides, follow up AFB microscopy on the 5th/7th months of treatment were done only for 20 (39.2%) of the 51 PTB⁺ patients, where one (5%) was found to be positive, 18 (90%) were negative and it was unrecorded for one (5%) patient (Table 2).

Table 2: Descriptions of patients' unit Tb registry record during continuation phase of Tb treatment in Afar National Regional State. April, 2007.

S. No	Variable Category	No	Percent	
1	Weight of the Pt on the continuation phase recorded (n=270) :	Yes	92	34.1
		No	178	65.9
2	Drug & its dose during continuation phase recorded (n=270) :	Yes	207	76.6
		No	63	23.3
3	Follow up AFB microscopy done on 5/7 th month of Rx (n=51) :	Yes	20	39.2
		No	31	60.8
4	Result of AFB microscopy done on 5/7 th month of Rx (n=20) :	Positive	1	5
		Negative	18	90
		Unrecorded	1	5
5	Treatment outcome of the patients (n=270) :	Cured	13	4.8
		Treatment Completed	112	41.6
		Died	9	3.3
		Treatment Failure	2	0.7
		Defaulter	9	3.3
		Transfer out	25	9.3
6	Completeness of information on Tb registry (n=270) :	Complete	31	11.5
		Incomplete	239	88.5

Provider-Patient interactions and information provision: it was observed that only two of the health facilities were providing health education that also addresses Tuberculosis to their clients as part of their routine daily activities. Almost all health facilities had and were using chair and table for the TLCP focal person in charge and five were able to attend their patients in privacy. Only three health facilities had supply of water to the Tb clinic.

Concerning the provider-patient interactions and information provision system, 49 patients were observed while they were receiving their drugs by trained nurses, and the result showed that only 36 (73.5%) patients were greeted politely, 26 (53.1%) participated in part of decision making processes in the process of service delivery and 28 (57.1%) were advised on the need to comply with treatment (Table 3).

Table 3: *Description of provider-patient interaction & pattern of services provision in the selected Health Facilities in Afar. April 2007.*

Variable Category		Number	Percent
Patients politely greeted (n=49) :	Yes	36	73.5
	No	13	26.5
Patients participated in part of decision making (n=49) :	Yes	26	53.1
	No	23	46.9
Patients speak the same language with the HW(n=49) :	Yes	35	71.4
	No	14	29.6
Health worker properly explained patients about how to take drugs (n=49) :	Yes	30	61.2
	No	19	38.8
Health workers advised patients when to return for follow up(n=49) :	Yes	27	55.1
	No	22	44.9
Health worker advised patients on the need to comply with Rx(n=49)	Yes	28	57.1
	No	21	42.9
Health worker explained patients when follow up AFB done (n=49) :	Yes	15	30.6
	No	34	69.4
Health worker advised patients to bring person with SAS of Tb(n=49) :	Yes	18	36.7
	No	31	63.3
Patients are asked by HW for any concern regarding treatment (n=4):	Yes	20	40.8
	No	29	59.2
Patients who asked HW for any concerns(n=49) :	Yes	26	53.1
	No	23	46.9
Patients get response for the concerns they have(n=26) :	Yes	24	92.3
	No	2	7.7

Client flow Charting: Client flow chart analysis was also made for 30 patients and it showed that the mean waiting time were 0.82hr/49.2minuts (SD \pm 0.58). It also was observed that in all health facilities patients arrived to the Tb clinic with their own bottle of water. After they had arrived at the health facility, they waited for the health worker at the respective Tb clinics' waiting area with their treatment card (those that had previously started treatment), referral form from other health facility or sputum result if sputum for AFB had been prescribed previously. In only two health facilities it was observed that patients were waiting for TLCP focal person listening health education through tape.

In two health facilities, TLCP focal person was not present on time in that some were observed that they were not maintaining punctuality and in another one health facility health worker prefer

to stay in tea-rooms rather than in Tb clinics while their patents were waiting for them in the waiting area.

For those patients who had already started treatment it was observed that drugs were given to them after their treatment card was crosschecked against their unit Tb registration number and they were advised/reassured/convicted to comply with treatment. Drug provision was under supervision on daily basis in only two health facilities while it was for one week to one month to be taken at home by the patient with out supervision, considering accessibility of the patients to the health facility. In one health facility it was observed that patients were sent to injection room with injectable drugs (Streptomycin) for injection.

There was an interruption of laboratory services either due to laboratory technicians' absences or interruptions of some laboratory supplies from the laboratory room. In five health facilities patients were sent for follow up AFB microscopy if only laboratory services were available (as there were frequent interruption).

In one health facility PTB^r and EPTB cases were referred from Tb clinic to OPD for general medical examination or to other next higher health facility. In one health facility any Tb patients who started treatment were referred to the nearest higher health facility for follow up assessment if patients were willing. Otherwise they continued their treatment with out laboratory or clinical follow up assessment.

However, for those new Tb cases unit Tb registration form were filled, treatment cards were given and drug treatments were started after advising and convincing the patients to comply with their treatment.

5.3. Patients' Satisfaction Level Assessment

Exit interview to assess patients' satisfaction level was made among a total of 209 patients who were on the intensive phase of Tb treatment. Among the study participants, the majority 154 (73.7%) were in the age group of 15-54 years; 113 (54.1%) were male; 119 (56.9%) were married; 94 (45%) were illiterates; 158 (75.6%) were Muslims and 44 (21.1%) were pastoral in occupation and 111(53.1%) of them earn monthly income of less than 250.00Birr (Table 4).

Table 4: *Socio-demographic and socio-economic characteristics of patients in the selected Tb clinics of Afar National Regional State, April 2007.*

No	Variables		Number	Percent
1	Age group (N=209):	5-14	5	2.4
		15-54	154	73.7
		55+	50	23.9
2	Sex (N=209):	Male	113	54.1
		Female	96	45.9
3	Marital Status (N=209)	Single	57	27.3
		Married	119	56.9
		Divorced	23	11
		Widowed	10	4.8
4	Educational Status (N=209):	Illiterate	94	45
		Read and Write only	24	11.5
		1-6 grade	44	21.1
		7-12 grade	32	15.3
		12+ grade	15	7.2
5	Religion (N=209):	Muslims	158	75.6
		Orthodox Christians	41	19.6
		Protestants	8	3.8
		Others	2	1
6	Occupation (N=209):	Pastoral	44	21.1
		Agro-pastoral	30	14.4
		Government employee	26	12.4
		Private Business	23	11.0
		Merchants	32	15.3
		Others**	54	25.8
7	Income(N=209):	< 250 Birr	98	46.9
		>= 250 Birr	111	53.1

NB: others**: includes students, housewives, daily laborers and military personnel.

One hundred fifteen (55%) of the patients were incurring cost while they received treatment in the health facilities, where 89(77.4%) of them incurred for transportation; 14 (12.2%) incurred for food and reception and the remaining 12 (10.4%) of the patients incurred for provider and laboratory services.

Ninety-eight (46.9%) of the study participants responded that some services to treat their health problems were unavailable during the study period; where 66 (67.3%), 50 (51%), 13 (13.2%) and 9(9.2%) responded X-ray, inconsistent laboratory services, unavailability of health personnel during working hours and interruptions and lack of drugs and other supplies respectively were the main one (Table 5).

Table 5: Description of respondents attributes in Tb control activities in the selected Tb clinics of Afar National Regional State, April 2007.

S. No	Variables	Number	Percent	
1	Cost incur (n=209)	Yes	115	55
		No	94	45
2	Cost incurred for (n=115)	Transportation	99	86.1
		Food & Reception	14	12.2
		Provider & Lab services	12	10.4
3	Patient ever visited HF before (n=209)	Yes	50	23.9
		No	159	76.1
4	Duration since Rx started (n=209)	<28 days	60	28.7
		>=28 days	149	71.3
5	Having problem with the Rx (n=209)	Yes	43	20.6
		No	166	79.4
6	Having easy access to HF (n=209)	Yes	137	65.6
		No	72	34.4
7	Time taken to the HF in walking (n=209)	< 1hr	72	34.4
		>= 1hr	137	65.6
8	Main Means of transportation (n=209)	Walking	104	49.8
		Car & animal transportation	105	50.2
9	Ever experienced drug shortage (n=209)	Yes	37	17.7
		No	172	82.3
10	Duration of drug shortage (n=37)	< 1 week	25	65.8
		1-2 weeks	11	28.9
		>= 2 weeks	1	5.3
11	Measures taken for shortage of drugs (n=37)	Referred to other HF	6	16.2
		Purchased from private clinic	6	16.2
		Interrupted treatment	14	37.8
		Borrowed from other patents	11	29.8
12	Availability of services to treat Patients problem (n=209):	Yes	111	53.1
		No	98	46.9
13	Services unavailability (n=98)	X-ray	66	67.3
		Health Personnel absenteeism	13	13.2
		Interruption of Lab services	50	51.0
		Interruption of drugs & supplies	9	9.2
14	Recommending services to some one else (n=209)	Yes	148	70.8
		No	61	29.2

The median time-taken to the health facilities was 35minuts walking, and the median waiting-time was 27 minutes while the proposed median waiting time was 7 minutes. The minimum and maximum waiting time was 3 and 135 minutes respectively.

Regarding the satisfaction of clients with the different aspects of services it was found that 147 (70.3%) and 133(63.6%), study participants were dissatisfied in the longest time to receive their treatment and in the adequacy and appropriateness of working hours of the Tb clinics

respectively. Meanwhile a relatively higher study participants were satisfied with the time spent with the health worker; 151 (72.2%) and cleanliness of the waiting area as well as with of the examination or treatment room; 140 (67.0%) as seen Table 6.

Table 6: *Client's satisfaction level with different components of services given in the Selected Tb clinics in Afar regional State (n=209), April 2007.*

S. No	Aspects of the variable	Satisfied (n=209)	Neutral (n=209)	Dissatisfied(n=209)
1	Adequacy & appropriateness of working hours	74 (35.4%)	2 (1.0%)	133 (63.6%)
2	Waiting time	61 (29.2%)	1 (0.5%)	147 (70.3%)
3	Time spent with HW	151 (72.2%)	2 (1.0%)	56 (26.8%)
4	Cleanliness of waiting area	140 (67.0%)	6 (2.9%)	63 (30.1%)
5	Comfort of waiting area	124 (59.3%)	6 (2.9%)	79 (37.8%)
6	Cleanliness of examination/treatment room	140 (67.0%)	17 (8.1%)	52 (24.9%)
7	Cleanliness of treatment/diagnosis equipments	95 (45.5%)	85 (40.7%)	29 (13.9%)
8	Respect offered by Health provider	186 (89.0%)	1 (0.5%)	22 (10.5%)
9	Measures taken to assure privacy	139 (66.5%)	37 (17.7%)	33 (15.8%)
10	Provider's competence/skill	131(62.7%)	45 (21.5%)	33 (15.8%)
11	Cost incurred	123 (58.9%)	2 (1.0%)	84 (40.2%)
12	Completeness of information given	75 (35.9%)	44 (21.1%)	90 (43.1%)
13	Effectiveness of services	174 (83.3%)	16 (7.7%)	19 (9.1%)
14	Overall services received	147 (70.3%)	2 (1.0%)	60 (28.7%)

Cross tabulation of patients' overall satisfaction in the received services versus certain explanatory variables showed that males, Christians, ever married and non-pastorals were more satisfied than females, Muslims, single and pastorals respectively. However, the differences for all cases were not statistically significant except for religion and occupation, though they showed no statistically significance difference during multiple logistic regressions (Table 7).

Table 7: *Patients' overall satisfaction level with the provided services versus certain explanatory variables in the selected health facilities of Afar National Regional State. April, 2007.*

Variable Category	Satisfaction level		COR(95% CI)	AOR(95% CI)
	satisfied	dissatisfied		
Sex: Female	66 (68.7%)	30 (31.3%)	0.87 (0.48-1.58)	0.69 (0.35-1.39)
Male	81 (71.7%)	32 (28.3%)	1.00	1.00
Age group: <20yr	75 (70.8%)	31 (29.2%)	3.29 (0.78-13.85)	2.62 (0.72-9.48)
20-40yr	19 (86.4%)	3 (13.6%)	1.00	1.00
>=40yr	53 (65.4%)	28 (34.6%)	0.94 (0.46-1.93)	0.78 (0.42-1.46)
Religion: Muslim	105 (66.5%)	53 (33.5%)	1.00	1.00
Christians	42 (82.4%)	9 (17.6%)	2.35(1.07-5.20)	1.87(0.78-4.48)
Educational status:				
>= grade 7	35 (74.5%)	12 (25.5%)	0.73 (0.33-1.61)	0.58 (0.21-1.60)
Grade 1-6	31 (70.5%)	13 (29.5%)	0.90 (0.41-1.95)	0.49 (0.18-1.30)
Read & Write	17 (70.8%)	7 (29.2%)	0.88 (0.33-2.34)	0.84 (0.30-2.50)
Illiterate	64 (68.1%)	30 (31.9%)	1.00	1.00
Marital Status:				
Single	45 (78.9%)	12 (21.1%)	0.83(0.27-1.12)	0.54 (0.35-1.96)
Ever married	102 (67.1%)	50 (32.9%)	1.00	1.00
Occupation:				
Pastoral	45 (60.8%)	29 (39.2%)	1.00	1.00
Non-pastoral	102 (75.6%)	33 (24.4%)	1.99 (1.08-3.67)	2.02 (0.88-4.62)
Income: >= 250 Br	76 (68.5%)	35 (31.5%)	1.00	1.00
< 250 Br	71(72.4%)	27 (27.6%)	0.90 (0.46-1.79)	0.83 (0.45-1.50)

Binary regression analysis for certain structural and process attributes versus patients overall satisfaction showed that patients attending health facilities with full-time staff assigned for Tb control activities, the full-time staff and laboratory technician received on job training and refreshment trainings on Tb control activities and supervised in the last six months were more satisfied than those without these structural attributes. Similarly, patients who were greeted politely, participated in parts of decision making processes, speak the same language with the providers were more satisfied than those who were not. However, the differences were not statistically significant except for speaking the same language with the provider, though it was not during multiple logistics regression (Table 8).

Table 8: *Patients overall satisfaction versus certain structural and process attributes in selected health facilities in Afar National Regional state. April, 2007.*

Structural and process attributes		COR(95% CI)
Full-time staff assigned for TCA:	No	1.00
	Yes	1.19 (0.21-6.62)
Full-time staff received refreshment training on TCA:	No	1.00
	Yes	2.38 (0.33-17.31)
Lab tech trained on AFB procedures:	No	1.00
	Yes	4.77 (0.42-5.57)
Lab tech received refreshments training on AFB:	No	1.00
	Yes	1.59 (0.26-9.75)
HW supervised in the last 6 months:	No	1.00
	Yes	1.26 (0.13-12.35)
Availability of sputum cups for AFB microscopy:	No	1.00
	Yes	1.19 (0.21-6.68)
Availability of microscopy services:	No	1.00
	Yes	1.19 (0.21-6.68)
Availability of reagents for AFB microscopy:	No	1.00
	Yes	7.69 (VHN)
Availability of slides for AFB microscopy:	No	1.00
	Yes	1.19 (0.21-6.68)
Patients greeted politely:	No	1.00
	Yes	1.07 (0.30-3.83)
Patients participated in parts of decision making process:	No	1.00
	Yes	1.25 (0.40-3.87)
Patients & provider speak the same language:	No	1.00
	Yes	4.79 (1.24-18.54)
Providers explain about drug intake:	No	1.00
	Yes	2.38 (0.73-7.69)
Providers explain about when to return back:	No	1.00
	Yes	1.60 (0.51-5.05)
Providers explain the need to comply with drugs:	No	1.00
	Yes	1.70 (0.54-5.34)
Providers explain when follow up AFB will be done:	No	1.00
	Yes	1.33 (0.39-4.58)
Patients asks providers for any pieces of information:	No	1.00
	Yes	1.25 (0.40-3.87)
Providers responds for patients' concern:	No	1.00
	Yes	1.24 (0.39-3.94)

5.4. Quality parameter Scoring: Scoring of the structural, process and output parameters indicated that only about half of the study participants scored the median score and above. The maximum score for staffing was 12 and the minimum was six while the median score was eight. Three (50%) health facilities scored greater than the median score and only one (16.7%) health facility scored the maximum score while three health facilities scored below the median score for

staffing. For materials and supplies scoring, the maximum score was 59 and the minimum was 41 where the median score was 54. Four (66.7%) health facilities scored the median and above the median score, while the remaining two (33.3%) health facilities scored below the median score.

Staffing and materials for Tb control activity were computed together to get structural score and it was found that the maximum structural score was 68, the minimum was 48 and the median score was 62.5. Three (50%) health facilities scored the median score and above. Similarly process scoring indicated that the maximum process score was 107, the minimum was 3 and the median score was 10; and 27 (55.1%) patients scored the median score and above. Out put (patients' satisfaction) scoring also indicated that the maximum score was 597 and the minimum was zero and the median score was 109, where only 90 (43.5%) patients scored the median score and above (Table 9).

Table 10: *Structural, Process and Output Parameters scoring in the selected health facilities in Afar Regional State, April 2007.*

Parameters		Structure	Process	Output
Scoring Description		Parameters	parameters	Parameters
N		6	49	209
Mean		61.00	10.71	134.42
Median		62.50	10.00	109.00
Minimum		48.00	3.00	0.00
Maximum		68.00	107.00	597.00
Number of study units scored the median score and above.		3 (50%)	27(55.1%)	90 (43.5%)
Percentiles	25 th	57.75	9.00	13.00
	50 th	62.50	10.00	109.00
	75 th	65.00	11.00	206.00

5.5. Quality parameter Correlation analysis: Correlations among the three quality parameters for Directly Observed Treatment Short-Course of Tuberculosis; namely structural, process and output (patients' satisfaction) quality parameters indicated that there was a statistically significant correlation at the level of 0.01 between process quality and output quality (patients' satisfaction) parameters. Similarly, there was a statistically significant correlation observed at the level of 0.01 between structural and process quality as seen in table 10. However, there was no significant correlation observed between structural and output (patient's satisfaction) quality parameters.

Table 10: Spearman's Correlation analysis the three quality parameters in the selected Tb clinics in Afar National Regional State (n=6), April 2007.

Quality parameter	Description	Output	Process	Structure
Output	Spearman rank Correlation test	1.00	0.27**	0.02
	P-value	.	0.00	0.777
Process	Spearman rank Correlation test	0.27**	1.00	0.30
	P-value	0.00	.	0.00
Structure	Spearman rank Correlation test	0.02	0.30	1.00
	P-value	0.777	0.000	.

** Correlation is significant at the .01 level.

6. DISCUSSION

This study attempted to assess the quality of DOTS of Tuberculosis in Afar National Regional State. Both the quantity and the qualities of staffing were not satisfactory in that half of the health facilities lacked laboratory technician who received on job training on Tb control activities. The issue of refreshment training seems to be an ignored agenda.

There were weak supervision patterns as there was very small proportion of TLCP focal persons got chance of being supervised in the last six months and the supervision pattern was also unplanned, inconsistent and lack feed back whenever it had been effected, which totally opposes the WHO and national recommendations where they recommend strong supportive supervision as part of program communication. The five year (1996-2000) evaluation report of the TLCP of FMOH had found similar findings¹⁸ and also the 1998 WHO ad hoc committee identified human resource problems and organizational factors as major constraints in the control of Tb¹⁵.

Majority of health facilities seem to be well equipped with the materials required for Tb control activity as per the national standard. However, utilization of these materials was minimal in that there were health facilities which were not using them.

The quality of patients' record seems very poor in that the majority, 239 (88.5%) patient records' were found incomplete; i.e. treatment for some patients were initiated and continued with out recording the full pieces of information needed to start treatment and commence patient monitoring. This finding was found to be higher than studies conducted in other parts of the country (Tigray and SNNPR), where 6.8% and 26.8% of patients' record were found incomplete. The difference might be explained in terms of geographical and health infrastructure and staffing difference between these areas^{6,19}.

Diagnoses of Tb cases primarily on AFB microscopy and their follow up on the 2nd months of treatment seem minimal in that only 36 (70%) initially diagnosed PTB⁺ cases received follow up AFB microscopy which is against the national guideline; where it recommends that all PTB⁺ patients should get follow up AFB microscopy services¹. Similarly, follow up AFB microscopy

at the 5th/7th months of treatment were done only for 20 (39.2%) of diagnosed PTB⁺ patients, opposing the WHO and FMOH's recommendations.

Small proportion of patients was classified as PTB⁺ making the majority of classification PTB⁻ and EPTB; which is opposite the usual expectations in Ethiopia, where it is expected that from all new cases of Tb, 80% are pulmonary and the remaining 20% are extra-pulmonary, and also from those cases with pulmonary Tb 80% are PTB⁺ and 20% are PTB⁻. This might be due to the current HIV/AIDS pandemic and the nature of pastoral area, where relatively higher proportion PTB⁻ and EPTB cases are frequently reported.

IEC activities for Tb control activities were absent as only small proportion of health facilities were giving health education that address Tb and had Tb posters in different languages being posted in visible public places, despite its being cost effective. The five year (1996-2000) evaluation report also reported similar findings¹⁸. This again opposes the national guide line where every treatment facilities are expected to deliver health education to patients and the public¹ as this is found to be the most effective and efficient strategy in any primary health care programs implementation and interventions.

Although sputum collection for AFB microscopy was primarily used for assessing suspected cases, it was reported, both by patients and providers that there were frequent interruptions of laboratory service contradicting the principles of DOTS. Hence, there were unnecessary and repeated referrals of suspected cases and confirmed cases solely for AFB microscopy services.

The patterns of patient-provider interactions were also weak in that a relatively smaller proportion of patients {36 (73.5%), 26 (53.19%), 28 (57.1%) and 35 (71.4%)} respectively were greeted politely, participated in parts of decision making, advised to comply with treatment and speak the same language with the providers. This seems that the processes of care were not patient centered services which are again opposite to the principles of quality health care and continuous quality improvement approaches²⁴. Studies conducted in western and eastern Europe as well as in West Africa^{10, 13} also found inadequate communications between providers and

patients, which in fact can lead to rejection of public health facilities and acting as a barrier for Tb control activities.

Getting patients regularly to collect their drugs daily during intensive phase as per the national TLCP manual and defaulting were the main problem/obstacle in Tb control activities forwarded by the majority of focal persons. This was mainly because of discrepancy between the living styles of the population, pastoralist, versus the static nature of the health care delivery system that can create some sort of geographical barrier. Similar findings have reported from West Africa and west and East Europe. For example a study conducted in Gambia found high defaulter rate among those patients that incurred significant time traveling to receive treatment²³ and study among Roma communities (Eastern Europe) reported transport and geographical barriers as among the main obstacles in Tb control activities²¹.

Despite the strong recommendations of WHO and FMOH for implementing effective treatment compliance, the findings of this study showed that monitoring for treatment compliance were not everywhere guaranteed in any of the health facilities, which could be due to the relatively poor qualities of staffing and lack of supportive supervision from the respective bodies namely Woreda Health Offices and RHB. Similar findings were also reported in the five year (1996-2000) evaluation report of FMOH¹⁸.

Roles of TLCP focal persons were not fully recognized in that no focal person completely responded the proposed duties and responsibilities recommended on the national TLCP guideline. This seems that health workers were not stick themselves as per the national guideline for TLCP manuals as duties namely; giving health education to patients and the community (Tb), assessing /referring suspected cases for investigation, diagnosing and treating Tb cases, retrieving absentees and keeping patients' records were not mentioned. This can be also explained in terms of the poor quality of staffing, program communication and supervision, warranting the need to organizing intensive training to health workers in charge of Tb clinics with strong supportive supervision for effective Tb control activity.

It was observed and responded that in only two (33.3%) health facilities Tb treatment during the intensive phase were given following DOTS principle, where the main proposed reason by providers were failure to get patients to collect their drugs daily as there is high mobility of the population following water points and grazing land. The mean waiting time observed and responded were 49.2 minutes and 34.65 minutes respectively. The mean waiting time responded were relatively higher than that observed, might be due to information bias in that respondents can respond in a positive way fearing of being recognized.

Even though, majority of respondents 148 (37%) responded that they would recommend the services to some one else, the out put quality were not as such satisfactory as it was difficult to judge the technical aspects of the program like cure rate and treatment completion rate since the majority, 100(37%) of patients' record showed their treatment out come were unrecorded.

Services to treat patients' problem were not available all the time as responded by the patients; where inconsistent laboratory services, unavailability of health workers during working hours and interruptions of materials, drugs and supplies were the major services unavailable. This was also confirmed during providers' interview and clients' flow analysis. Hence there should be a need to reconsider the issue of organizing Tb control programs in the region as it has been recommended that organization of health system, availability of health resources and their efficient utilization determines the success or failure of infectious diseases control program. These can include regular supply of essential anti-Tb drugs and supplies and also proper recording and reporting system as has been found to be effective in China¹⁴.

Dissatisfaction in waiting time was the major area of dissatisfaction which was also confirmed during clients flow analysis when the maximum waiting time of 135minutes was observed. Meanwhile, this study also identified higher proportion of patients dissatisfied in the adequacy and appropriateness of working hours, 133 (63.6%), which can lead to service rejections by the patients and defaulting which can be associated with incomplete treatment, treatment failure and drug resistances. However, the majority of respondents 147 (70.3%) were satisfied in the overall services they received.

Even though weak (Spearman rho correlation coefficient 0.27), statistically significant correlation was found between process quality and output quality (clients satisfaction) indicating that process qualities parameters are the predictors for out put quality parameters. Therefore measures to improve the process of care should be considered like provision of strong and sustainable supportive supervision, regular and adequate delivery of drugs and supplies for Tb control activities and so on.

Besides, smaller proportion of clients 90 (43.5%) scored the median score and above in output quality, which can be explained by the relatively smaller proportion of health facilities scoring the median input and process scores.

7. CONCLUSION AND RECOMMENDATIONS

7.1. Strengths of the Study

- Data were collected from all the three components of the program i.e. input, process and out put (triangulation methods were employed to collect data);
- Standard questionnaires and pre-tested program oriented data collection tools were used for data collection; and
- Data quality assurance mechanisms like data collectors training, supervision, and pre-testing were employed.

7.2. Limitations of the Study

- As it was health institution based study information bias can be introduced in that patients can respond in a relatively positive way fearing of being recognized;
- Similarly only satisfied patients usually visit health facility;
- Possibility of observation bias can be there during observation for process of care;
- Pre-existing poor data recording system;
- 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.

7.3. Conclusion and Recommendations

From this study we concluded that the qualities of staffing with regard to on job and refreshment trainings were poor, the patterns of supervision was weak and the process of care were not satisfactory as there was weak provider-patient interactions, frequent interruptions in treatment services due to inconsistent laboratory services, frequent health workers absenteeism and interruptions in delivery of drugs and supplies. Mechanisms of monitoring treatment compliance and follow up of patients' prognosis were weak. Additionally there was a very long waiting time observed which can lead to patients' dissatisfaction and failure to adhere to treatment which in turn can lead to service rejection, drug resistance and program failure.

Therefore, we recommend the followings for concerned stakeholders;

- **Staffing:** as health human resources both in quantity and quality are needed in the attainment of health related Millennium Development Goals, mechanisms to improve the qualities of staffing regarding on job and refreshments trainings should be sought.
- **Supervision:** As supportive supervisions can enable weak aspects of a program be strong and the non-functional one be functional, concerned bodies namely Woreda Health Offices and Regional Health Bureau should understand the importance of supportive supervision for program effectiveness and then design and implement strong supportive supervision mechanisms.
- **Materials, Drugs and supplies:** though delivery of materials, drugs and supplies for Tb control activities were satisfactory, there warrant the need for the proper utilizations of them as there were health facilities that didn't utilize equipment and provide some Tb control services despite the availability of these items.
- **Processes of care:** as processes are the main predictors of output quality of a program, mechanisms that can improve some aspects of the process like waiting time, services availability, provider-patient interactions, patient monitoring system and adequacy of information given should be sought as much as possible.
- **Patients' satisfaction:** as patients' satisfaction was not as such satisfactory, attentions should be paid in those areas where greater dissatisfaction was observed like waiting time, adequacy and appropriateness of working hours as well as to the completeness of information given to patients.
- **Recording and Reporting:** as a standardized recording and reporting system that allow the assessment of case findings and treatment results for each patient and program is one of the elements of DOTS strategy, we also recommend to the concerned bodies (Health Facilities, Woreda Health offices and RHB) to have mechanisms targeted to improve the recording and reporting system in place.
- Health workers should also stick to the national TLCP guideline in implementing Tuberculosis prevention and control activities, as much as possible.
- Finally, further community based studies are recommend for further assessment of Tb program quality and determinant factors for the program's effectiveness.

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10. ANNEXES

10.1. Questionnaires

Form I Questionnaire prepared to assess the structure of Tb clinics in

Afar National Regional State.

Health facility Name: _____

S. No	Questions	Answers	code
Staffing			
100	Number of Health workers in the health institution	1. MD _____ 2. HO _____ 3. Nurses _____ 4. Lab. tech. _____ 5. Pharmacy tech. _____ 6. Other (specify) _____	
101	Number of health workers trained on TB control activities	1. One 3. Three & above 2. Two 4. Not at all.	/---/
102	Is there a full time staff assigned in the TB clinic?	1. Yes 2. No---skip to 105	/---/
103	If yes, did he/she ever train on Tb control activities?	1. Yes 2. No	/---/
104	Have she/he received refreshment trainings on Tb control activities soon?	1. Yes-----when 2. No	/---/
105	Do you have laboratory technician in your health facility?	1. Yes 2. No	/---/
106	If yes, did he/she ever train on AFB techniques?	1. Yes 2. No	/---/
107	Is she/he received refreshment trainings soon?	1. Yes-----when 2. No	/---/
Materials		Availability	In use
		Yes No	Yes No
108	Latest version of TLCP manual		
119	Latest version of TLCP lab. Manual		
110	Latest version of Tb unit registry		
111	Latest Tb referral & transfer form		
112	Latest version of Tb sputum examination request form		
113	Latest version of quarterly case finding, treatment outcome and other Tb control activity report form		
114	Tb flip chart		
115	Flow chart for Dx and Rx of PTB		
116	Tb posters in different language		
117	Weighting scale.		
Anti-Tb Drugs		Availability	In use
		Yes No	Yes No
			No... Why?

118	Anti-Tb drugs:	RHZ					
		RH					
		EH					
		STM					
		Ethambutol					
119	Have you ever experienced shortage of drugs?	1. Yes 2. No					/---/
120	If yes, for how long?	1. less than a week 2. about a week 3. about two weeks 4. more than two weeks					/---/
121	Do you practice FEFO/FIFO?	1. Yes 2. No					/---/
122	How do you determine your drug requirements?	1. Quantification 2. Guessing 3. Higher officials determine for us 4. Other(specify)					/---/
Laboratory supplies		availability		In use			
		Yes	No	Yes	No		
123	Microscope -Binocular -Electrical/Daylight					/---/	
124	Xylene (toluene)					/---/	
125	Immersion oil with a dropper					/---/	
126	Sputum cups					/---/	
127	Glove					/---/	
128	Cotton wool swab					/---/	
129	Cotton/gauze					/---/	
130	Pen-blue/red					/---/	
131	Slides					/---/	
132	Slide holder					/---/	
133	Wire loop/Wooden applicator					/---/	
134	Bunsen burner/Spiral Lamp Burner					/---/	
135	Forceps for holding slide and fixing					/---/	
136	Staining reagent					/---/	
137	Filter paper and glass flasks					/---/	
138	Slide rack for staining					/---/	
139	Basin if their is no Sink					/---/	
140	Water filter can with a tap if no running water					/---/	
141	Alarm clock					/---/	
142	Waste receptacle (metal with lid)					/---/	
143	Box for keeping examined slides					/---/	
144	Bucket for water					/---/	
145	Disinfectant-5% phenol or 10% sodium hypo chloride.					/---/	

146. Are laboratory services available in the health facility? 1. Yes____, 2. No ____
147. If yes, is AFB done? 1. Yes____ 2. No_____
148. Total number of patients using laboratory services in the last year._____
149. Total number of AFB tests done in the last year._____
150. Total number of AFB tests with positive test result._____

Form II. Observation checklist for Service Delivery

Provider- patient interaction:

200. Does the provider greet the patient in a friendly/polite manner?

1. Yes, 2. No.

201. Does the patient participate in part of decision making process?

1. Yes, 2. No.

202. Do the provider and patient speak the same language?

1. Yes, 2. No.

Information provision:

203. Does the provider explain how to take the drugs? 1. Yes, 2. No.

204. Does the provider explain when to return for the next treatment?

1. Yes, 2. No.

205. Does the provider explain the need to comply with the drug treatment?

1. Yes, 2. No.

206. Does the provider explain when follow-up sputum microscopy is done?

1. Yes, 2. No.

207. Does the provider advises the patient to bring any family member/neighborhood having sign and symptoms of Tb to the Health facility?

1. Yes, 2. No.

208. Does the provider ask the patient for any concerns regarding the treatment?

1. Yes, 2. No.

209. Does the patient ask the provider for any pieces of information regarding the treatment?

1. Yes, 2. No.

210. If yes, did the provider respond to the client's question?

1. Yes, 2. No.

Facilities:

211. Does the provider have a chair and table?

1. Yes, 2. No.

212. Does the patient be able to be attended in privacy?

1. Yes, 2. No.

213. Are all patients able to sit while waiting for treatment?

1. Yes, 2. No.

214. Is adequate volume of water available in the Tb clinics?

1. Yes, 2. No.

Form III. **Health worker interview**

300. Where does the health facility usually get medications and supplies?
1. RHB. 3. NGO. 2. FMOH
301. How drugs and supplies are usually received?
1. Delivered to facility 2. Picked up from the supplier
302. What is the most common cause of a delay in delivery of supplies? (Check all that apply.)
1. Inadequate transport 3. Administrative difficulties
2. Insufficient staff 4. Financial problems
303. Do you have a regular supervisor?
1. Yes,
2. No (If NO, go to question 308.)
304. Do you have a schedule for supervisory visits?
1. Yes,
2. No
305. How many times have you had a visit from a supervisor?
- In the last 6 months _____ (number of times)
- In the last 12 months _____ (number of times)
306. What did your supervisor do the last time he/she supervised you? (Check all that apply.)
1. Delivered supplies (drugs, lab supplies, etc.)
2. Observed Tb registry form,
3. Observed treatment of Tb patients,
4. Reviewed reports prepared by health worker
5. Updated health worker on current information
6. Discussed problems with Health Workers.
307. A. Did you receive feedback from that supervisory session?
1. Yes,
2. No
B. If YES, in what form?
1. Supervisory register 3. Oral report
2. Written report
308. What are the most difficult problems that you face in doing your job? (Check all that apply.)
1. Lack of training 6. Staff shortages (turn over)
2. Poor communication system, 7. Poor working environment
3. Patients don't come to health facility, 8. Lack of supervision (feedback on performance)
4. Inadequate (poor) transportation system, 9. Lack of supplies and/or stock (health facility, housing)
5. Improper working time
309. Have you discussed these problems with your supervisor?
1. Yes
2. No
310. Have you received trainings on Tb control activities in the last 12 months?
1. Yes
2. No

311. How do you assess suspected cases for Tb?
1. Collect and examine sputum for AFB microscopy,
 2. Challenge with broad-spectrum antibiotics,
 3. Refer for Diagnosis to higher level health facility,
312. What procedures do you follow for sputum collection and examination for suspected cases?
1. Collect sputum immediately and appoint him for the next day,
 2. Appoint the patient to bring his/her sputum the following three mornings,
313. How do you decide final diagnosis?
1. If Sputum microscopy is suggestive of Tb,
 2. If suspected cases don't to respond to broad-spectrum antibiotics,
 3. X-ray findings suggesting Tb,
 4. If referred in from other health facility.
314. How do you monitor patient for treatment compliance?
1. Daily filling the registration forms,
 2. Checking for absentees on monthly basis (for those on continuation phase),
 3. No means of monitoring.
315. How do you retrieve for absentees? (Check all that apply)
1. Contact his/her contact person,
 2. Immediately report to my supervisor,
 3. Tell to Administrator/opinion leaders of the patient's district,
 4. Send information through other patients,
 5. Do nothing
316. What do you think is your role Tb control activities? (Check all that apply.)
1. Giving health education to patients and the community (Tb),
 2. Referring/assessing suspected cases for investigation,
 3. Diagnose and treat cases,
 4. Retrieve absentees,
 5. Keep patient records,
 6. Report activity reports timely,
317. How do you provide anti-Tb drugs for your pt during intensive phase?
1. Under Supervision.
 2. Give them drugs to take at home & come back after finishing.
318. When do you report Tb control activity report?
1. Monthly,
 2. Quarterly,
 3. Bi-annually,
 4. Annually,
 5. When asked by supervisor.

Form IV. Questionnaire prepared to assess the appropriateness of DOTS services given in

Afar National Regional State.

Health facility name _____

Ser. No	Questions	Response category	code
400	Patient's unit Tb Number	1. _____ 2. Not recorded	/---/
401	Sex of the patient	1. Male 2. Female 3. Not recorded	/---/
402	Age of the patient	1. _____ 2. Not recorded	/---/
403	Initial diagnostic AFB result	1. Positive. 2. Negative. 3. Not done/unrecorded	/---/
404	Weigh of the patient	1. _____ 2. Not recorded	/---/
405	Classification of the patient	1. Smear positive PTB 3. EPTB 2. Smear negative PTB 4. Not recorded	/---/
406	Category of the patient	1. New 5. Transfer in 2. Relapse 6. Others 3. Failure 7. Not recorded 4. Defaulter	/---/
407	Treatment given during the intensive phase	1. _____ 2. Not recorded	/---/
408	Dose of the drugs during the intensive phase	1. _____ 2. Not recorded	/---/
409	Sputum smear result on the 2 nd month of treatment	1. Positive. 2. Negative. 3. Not done/unrecorded	/---/
410	Weight of the of the patient on the second month of treatment	1. _____ 2. Not recorded	/---/
411	Drugs given during the continuation phase	1. _____ 2. Not recorded	/---/
412	Dose of the drugs during the continuation phase	1. _____ 2. Not recorded	/---/
413	Is AFB done on the 5 th and 7/11 th of treatment?	1. Yes 2. No---skip to 416	416
414	If yes, the result is	1. Positive. 2. Negative.	/---/
415	Treatment out come of the patient	1. Cured 5. Defaulter 2. Treatment completed 6. Transfer out 3. Died 7. unknown 4. Treatment Failure	/---/
416	Completeness of the registration form	1. Complete 2. Incomplete	/---/

Form V. Questionnaire prepared to assess Tb client's satisfaction level
in the service in Afar National Regional State.

CONSENT:

Hello, my name is _____. I am working as data collector in a study conducted by the Addis Ababa University, Medical faculty, Department of community health to assess the quality of DOTS in Afar national Regional state.

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 don't have to answer any question that you don't 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 Region. The interview will take only about 20-25 minutes. So are you willing to participate in the study?

Yes _____. Go to the next page.

No _____. Acknowledge and go to the next patient.

Health institution's name and type_____

Interviewer _____

Date of interview _____

Supervisor: Name _____, signature _____

S. no	Questions	Response Categories	code
General information			
500	Sex of the patient	1 Male____. 2 Female_____	/---/
501	Age of the patient	_____ (in years& in months for children)	/---/
502	Marital Status	1. Single 3.Divorced 2. Married 4. Widowed	/---/
503	Educational status	1. Illiterate 4) 6-12 grade 2. Read & Write 5) Above 12 grade 3. 1-6 grade	/---/
504	Religion	1. Muslim 3. Protestant 2. Orthodox Christians 4. Other (specify)	/---/
505	Occupation	1. Pastoral 4. Private Business 2. Agro-pastoral 5. Merchant 3. Gov't employee 6. Other (specify)	/---/
506	What is you approximate monthly income in Birr?		/---/
507	Do you incur cost for your visit?	1. Yes 2. No----skip to 510	/---/
508	If yes, for what purpose?	1.Transport 4.laboratory services 2. Food & Reception 5. Other (specify) 3. Provider' fee	
509	Have you ever visited this clinic for Tb services before?	1. Yes 2. No	/---/
510	How long have you been since you start Rx?		/---/
511	Do you have problem with the treatment?	1. Yes 2. No	/---/
512	Do you able to get the Tb clinic easily?	1.Yes 2. No	/---/
513a	How long (minutes/ hours) does it normally take you to the Tb clinic?	_____ Minuets /hours	/---/
513b	By what means you normally get to the Tb clinic?	1. Walking 3. Car 2. Camel 4. Other (specify)	/---/
Organizational issues:			
514	How satisfied are you with the adequacy of the schedule (working hours) of the Tb clinic for your treatment?	1. Satisfied 2. Dissatisfied 3. Neutral/ I don't know.	
515	After arriving at the Tb clinic, how satisfied are you with the time spent waiting to receive your	1. Satisfied 2. Dissatisfied 3. Neutral/ I don't know.	

	treatment?		
515a	About how long (min/hours) did you have to wait?	_____ (minutes/hours)	
515b	How long have you waited today?	_____ (minutes/hours)	
516	How satisfied are you with the time the health worker spent with you during your visit?	1. Satisfied 2. Dissatisfied 3. Neutral/ I don't know.	
Facility equipment and supplies:			
How satisfied are you with:			
517	The over all cleanliness of the waiting area?	1. Satisfied 2. Dissatisfied 3. Neutral/ I don't know.	
518	The over all comfort of the waiting area?	1. Satisfied 2. Dissatisfied 3. Neutral/ I don't know.	
519	The over cleanliness of the examination room/place where you received service?	1. Satisfied 2. Dissatisfied 3. Neutral/ I don't know.	
520	The cleanliness of any instrument or equipment used by the health workers to treat or examine you?	1. Satisfied 2. Dissatisfied 3. Neutral/ I don't know.	
521	Have you ever experienced shortage of drugs during your treatment period?	1. Yes 2. No	If no, 524
522	If yes, for how long?	_____ (in days/months)	
523	What measures did you take?	1. Referred to other Health facility 2. Purchased from private clinic 3. Interrupted treatment 4. Other (specify)	
Availability of Service:			
524	Were all the services you need to treat your problem available at the Tb clinic during your visits?	1. Yes 2. No	
525	If not, please list any services, which are not available at the clinic but are important to meet your need?	1. lack of Health Worker in Tb clinic, 2. lack of X-ray services 3. Interruption of laboratory services 4. Interruption of anti-Tb drugs.	
Interpersonal qualities of service provider:			
526	How are satisfied with:		
526.1	The respect offered by the provider during your visit?	1. Satisfied 2. Dissatisfied 3. Neutral/ I don't know.	
526.2	The measures taken to assure privacy during your examination and treatment?	1. Satisfied 2. Dissatisfied 3. Neutral/ I don't know.	
Professional competence and skill of the Health workers:			
527	How are satisfied with:		
527.1	The provider's skill and ability in treating your problem?	1. Satisfied 2. Dissatisfied 3. Neutral/ I don't know.	

527.2	The completeness of the information given to you about your problem?	1. Satisfied 2. Dissatisfied 3. Neutral/ I don't know.
Cost:		
528	How satisfied are you with the cost you incur during your treatment period?	1. Satisfied 2. Dissatisfied 3. Neutral/ I don't know.
Efficacy of treatment:		
529	How satisfied are you with:	
529.1	The effectiveness of the service you received at the Tb clinic in solving your problem?	1. Satisfied 2. Dissatisfied 3. Neutral/ I don't know.
529.2	The overall services you received from the health worker?	1. Satisfied 2. Dissatisfied 3. Neutral/ I don't know.
530	Would you recommend the services at this health facility to some one else?	1. Yes 2. No

Thank you for your cooperation!!

Form VI: *Flow charting guideline for process of care for Tb patients in Afar National Regional State*

General information:

1. Time the Tb clinic is scheduled to open: _____
2. Time did the Tb clinic actually open: _____
3. Time (at or after the clinic opened) did the first patient arrive: _____
4. Time the first patient seen: _____
5. Time the clinic actually closed: _____
6. Is health education given in the health facility? 1. Yes 2. No.
7. Is the health education session including Tb? 1. Yes 2. No.

10.2. Flow Chart for Clients Flow Analysis

Process of care

Key activities and time taken at each level:

a

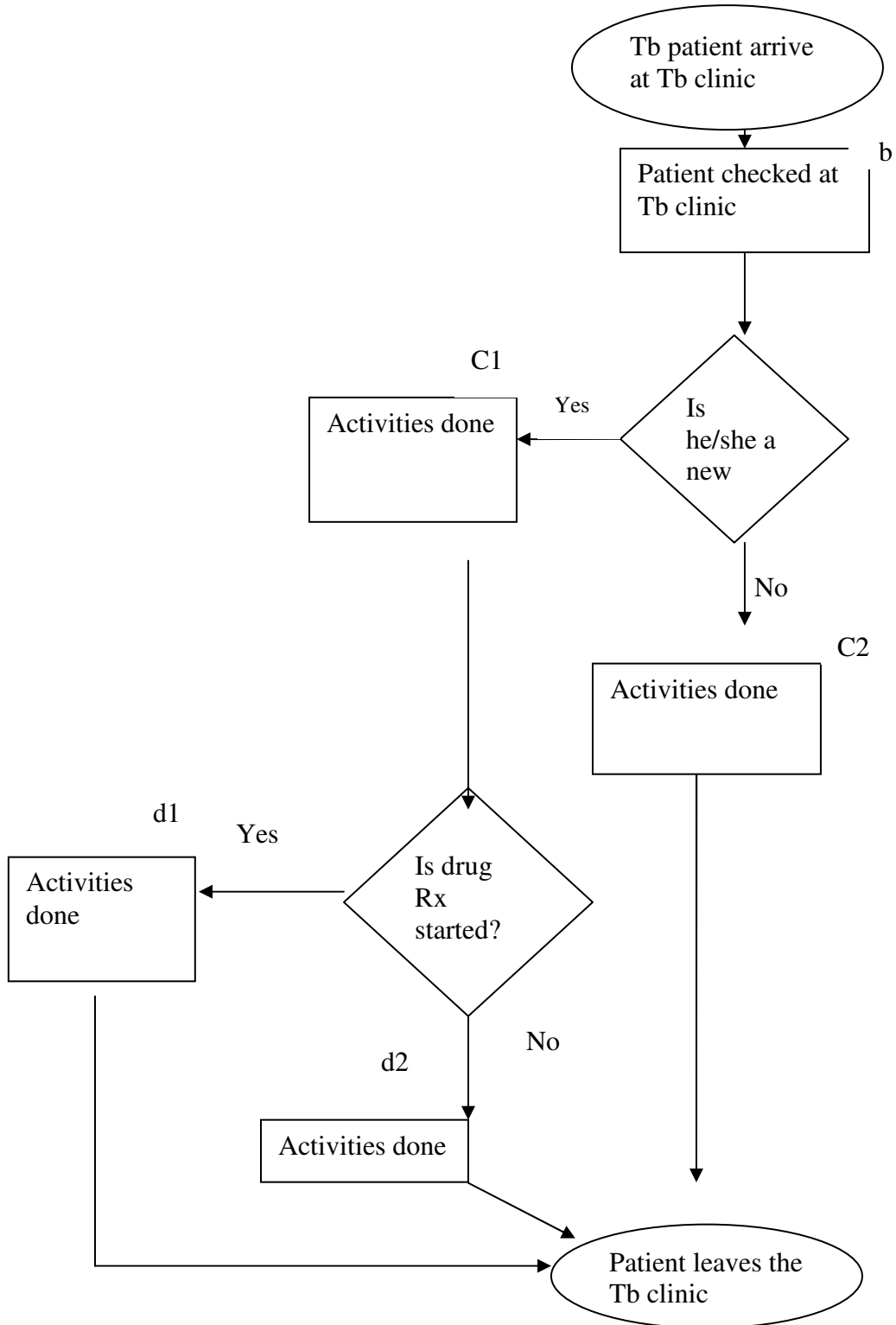
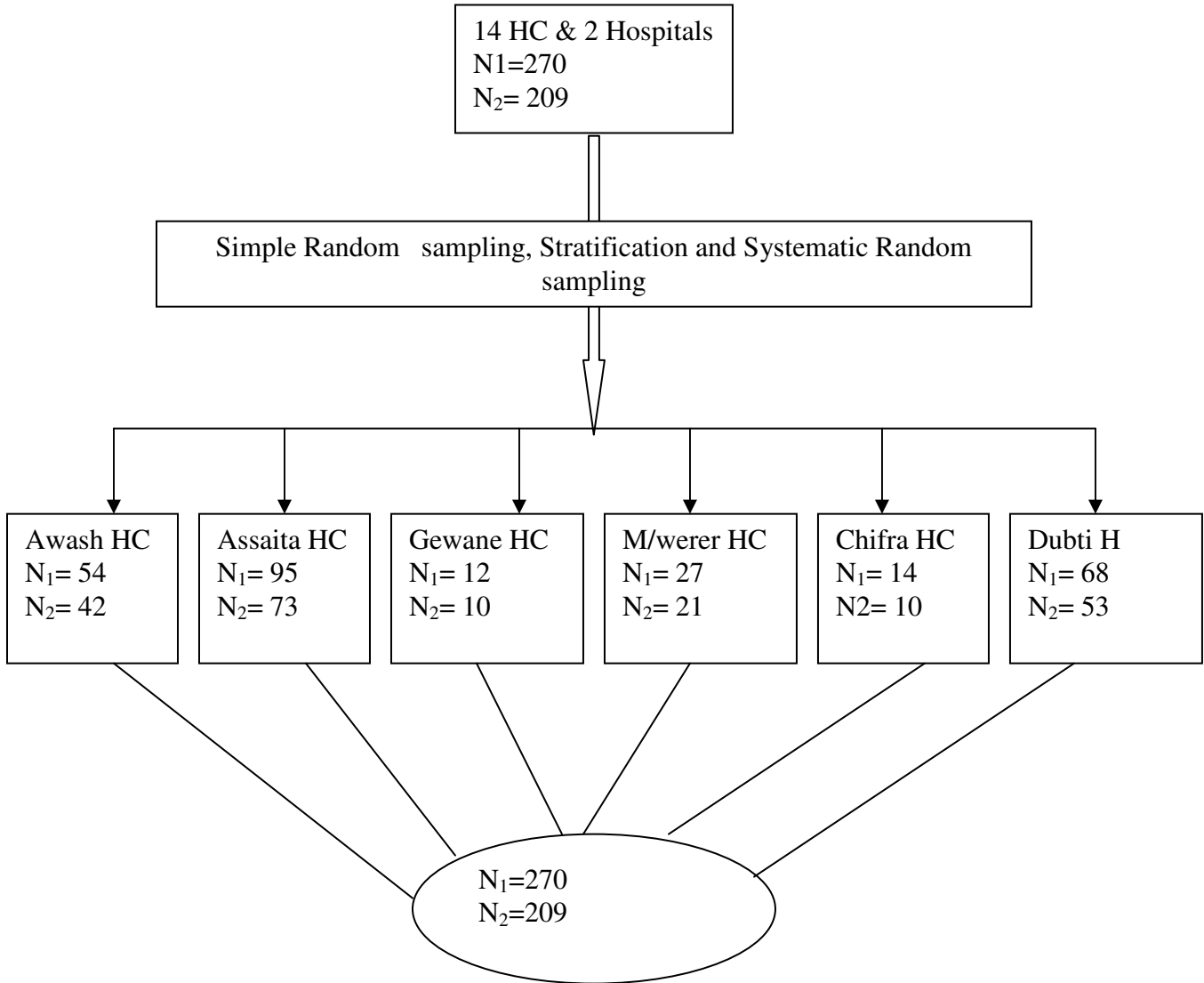


Table 1: Donabedian’s Quality assessment model in Health care

Structure	Process	Outcome
System characteristics: <ul style="list-style-type: none"> • Organization, • Budgeting, • Materials 	Technical style: <ul style="list-style-type: none"> • Prevention, • Diagnosis, • Treatment, • Follow Up 	Clinical end points: <ul style="list-style-type: none"> • Death, • Disability, • Sufferings
Provider characteristics: <ul style="list-style-type: none"> • Personnel, • Trainings 	Interpersonal style: <ul style="list-style-type: none"> • Client-provider interaction • Information completeness 	Satisfaction with care: Satisfied or dissatisfied
Patient Characteristics		Functional status
		General well being

10.3. Schematic Sampling Procedures

Fig. 1 Schematic sampling procedures



10.4. List of Tb laboratory Materials

1. Microscope- Binocular
 -Electrical/Daylight
2. Xylene (toluene)
3. Immersion oil with a dropper
4. Sputum cups
5. Glove
6. Cotton wool swab
7. Cotton/gauze
8. Pen-blue/red
9. Slides
10. Slide holder
11. Wire loop/Wooden applicator
12. Bunsen burner/Spiral Lamp Burner
13. Forceps for holding slide and fixing
14. Staining reagent
15. Filter paper and glass flasks
16. Slide rack for staining
17. Basin if their is no Sink
18. Water filter can with a tap if no running water
19. Alarm clock
20. Waste receptacle (metal with lid)
21. Box for keeping examined slides
22. Bucket for water
23. Disinfectant-5% phenol or 10% sodium hypo chloride.

