Implementation Evaluation of Tuberculosis Directly Observed Treatment Short-Course Strategy in Jimma Town Public Health Facilities

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Abstract

Background: *The national TB control program has currently achieved 100 percent geographical coverage and 92% of public hospitals and health centers offer tuberculosis directly observed short-course treatment. Despite this Ethiopia is ranked 10th from the world's 22 high-burden countries for TB, and 4th from sub-Saharan Africa. The burden of multi-drug resistance tuberculosis is also remaining high in Ethiopian settings, especially in previously treated TB cases. Previous TB treatment was the most powerful predictor for multi-drug resistance mycobacterium tuberculosis infection with inadequate TB treatment. Thus this study aimed to generate relevant information on the implementation of TB DOTS strategy to improve quality of service.*

Objective: *To explore the implementation level of tuberculosis directly observed treatment short-course strategy in Jimma town public health facilities in 2019 G.C.*

Method:*The study was conducted in Jimma town public health facilities, which is located 355KM to Addis Abeba in the southwest direction. A case study design using a qualitative and quantitative method was employed. Two years of records of 384 TB patients were selected using simple random sampling and proportionally allocated for six health facilities. Moreover, provider-patient interaction was observed and exit interview was conducted. Quantitative data was analyzed using SPSS 23.0 software and the finding was presented using descriptive statistics. The key informant interview result was summarized and analyzed in major thematic areas and supplement the quantitative finding. The overall implementation status of TB DOTS strategy was determined based on judgment criteria.*

Result: *The evaluation finding shows that the availability of resource was 70.8%. There were only two facilities have full time trained DOTS provider. Standardized regimen for existing adult TB patients and pediatric dose drugs were not fulfilled in three health facilities. Information education communication materials and TB posters were not available in all studied facilities. Compliance of TB DOTS providers toward national guideline score was 77.3%. From 384/353 (91.7%) of the patients on intensive phase were treated to the DOTS recommended drug regimen and during the continuation phase269/340 (79.1 %) of patients were treated according to DOTS drug regimen. From total 156 on intensive and 150 on continuation phase smear-positive PTB patients, 73.7%, 50%, and 52.7% have smear follow up test at the end of the 2nd, 5th and 6thmonths of treatment, respectively. The overall patient satisfaction was 80.1 %(satisfied) according to judgment criteria. About 105(75%) patients were satisfied with the convenience of TB clinic working hours, 60.7% of patients satisfied with daily visit and 85.7% TB patients satisfied with waiting time. In addition to this, 25.7% and 19.3% were not satisfied with the competency & knowledge of providers and adequacy of explanation about the treatment respectively.*

Conclusion and recommendation: *The overall status of TB DOTS implementation was partially implemented in Jimma town public health facilities based on judgment criteria. Attention should be given how to assign responsible and trained full-time HWs who could provide TB DOTS service as standard and availability of necessary drugs and IEC/BCC materials should be ensured.*

Keywords*: TB treatment, DOTS, Jimma town*

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Abbreviations and Acronyms

AFB	Acid-Fast Bacilli
CDR	Case Detection Rate
DOTS	Directly Observed Treatment Strategy
EA	Evaluability Assessment
EPTB	Extra pulmonary Tuberculosis
EQA	External Quality Assurance
FMOH	Federal Minister of Health
HC	Health Center
HBCs	High Burden Countries
HIV	Human Immunodeficiency Virus
HCPs	Health Care Providers
HCWs	Health Care Workers
IEC	Information Education Communication
JUMC	Jimma University Medical Center
MTB	Mycobacterium Tuberculosis
NTP	National Tuberculosis Control Program
PTB	Positive Pulmonary Tuberculosis
TB	Tuberculosis
WHO	World Health Organization

Operational Definitions

Compliance: is the occurrence of treatment activities of TB DOTS based on national guideline recommendations.

Availability: is the presence of required resources for treatment of TB DOTS as per national guideline.

Adequate EQA performance: EQA that showed concordance of 95% on EQA blind rechecking results.

Accommodation: Is the relationships between the manners in which the supply resources are organized to accept TB patients and TB patients ability to accommodate to these factors and perception of their appropriateness

Acceptability: Is the relationship of TB patients attitudes about personal and practice of providers to the actual characteristics of existing providers.

Adequate counseling: Information communication b/n care provider and patient the transfer of information regarding TB and its treatment. Includes explanations how TB transmitted, how to take drug and its possible side effect, advantage of DOT, advices the patient to bring any family member or neighborhood having signed and symptoms of TB to the health facility.

Full-time trained DOTS provider: is a responsible trained staff permanently assigned (at least basic 5 days DOTS training) available at work time in TB unit.

Good ventilation: TB unit with doors and windows on opposite position or can control the direction of infectious air (natural or mechanical).

Standard TB unit: separate TB unit/room with good ventilation which have isolated waiting area for TB DOTS patients.

Adequate amount of drugs: Standardized treatment regimen which is packed as TB patient kits for treatment of existing patients based on their weight for both intensive and continuation phase**.**

Implemented: Current achievement on infection prevention is in line with pre setted objectives and need to be continued. This is if the total score is >85%.

Partially implemented: Major areas in the implementation needs to be revised and modified. And this is said if the total score fall between 75%-84%.

Poorly implemented: Major and minor areas of the program implementation needs urgent revision and improvement. This is if the total score fall between 55%-74%.

Not implemented: The program plan, strategies and implementation needs very urgent revision and improvement and this is if the total score is <55%.

Chapter One: Introduction

1.1. Background

Tuberculosis (TB) is a chronic infectious disease caused by Mycobacterium tuberculosis (MTB). Typically it affects the lungs (pulmonary TB) but can also affect other parts of the body as well (extra pulmonary TB). The disease is spread through droplet infection when people with pulmonary TB expel the bacilli while coughing, sneezing, talking, etc. and mortality rates are high in the absence of the treatment. TB is one of the top 10 causes of death and the leading cause from a single infectious agent (above HIV/AIDS) (1).

Treatment using combinations of anti-TB drugs, developed in the 1940s and 1950s, can dramatically reduce mortality rates. Through the implementation of the DOTS strategy (1994-2005) especially those with a high burden of TB established the basics required for providing high-quality TB diagnosis and treatment. These efforts contributed greatly to meeting the TB-related target of the Millennium Development Goals (MDGs) of halting and beginning to reverse the TB epidemic. Between 2000 and 2014, improvements in quality-assured diagnosis and treatment of TB contributed to saving 43 million lives worldwide(2). Despite of this TB remains a major global public health problem. In 2017, 10.0 million people (range, 9.0–11.1 million) developed TB disease and 1.3 million deaths occur(3).

The National Tuberculosis Program efforts to control TB in Ethiopia began in the early 1960s through the adoption and implementation of different internationally recommended TB control strategies. Ethiopia adopted the Directly Observed Therapy Short-course (DOTS) strategy since 1997 after successful pilot program with the development of the first combined Tuberculosis and Leprosy Prevention and Control Program manual. Following this in Ethiopia the annual TB incidence decline 42% annually from 369 cases per 100,000 population in 1990 to 177 per 100,000 population in 2016(1). But still Ethiopia remains to be among the 30 countries reported with high burden of TB, TB/HIV and DR-TB for 2015 to 2020(4).

Since the year 2004 WHO recommended all countries and settings to change their TB treatment from 8-month to 6-month with the shift of the continuation phase of the anti-TB regimen from

Ethambutol and Isoniazid(EH) based regimen to Rifampicin and Isoniazid (RH)based regimen. Hence, the full course of treatment is expected to be directly observed by health professionals(5).

Among 22 High Burden Countries (HBCs) Ethiopia and Nigeria delayed the change from the 8 month to the 6 month regimen. The main reasons reported were primarily due to a perceived lack of strong DOT, fear of poor adherence and thus concern about increasing Rifampicin resistance(6).But since September 2010, Ethiopia FMOH, decided to implement the regimen change across the country in a phased manner. The regimen change was piloted in selected facilities found in three urban regions of the country which was followed by full scale-up into all the public health facilities. There was strong consideration for implementation of directly observed therapy(DOT) for the whole six month duration of patients treatment (7-8).

The treatment of tuberculosis as recommended in the DOTS strategy is characterized by a standardized approach to drug combinations, intermittency, and time frames, largely relying on short course regimens for six months (9-10).

The DOTS strategy recommends a short course regimen of six month for newly diagnosed TB patients. Start with an intensive phase of four drugs (isoniazid, rifampicin, pyrazinamide, and ethambutol) for two months, followed by a continuation phase of rifampicin and isoniazid for four months, all given under direct observation of treatment. For previously treated TB cases the regimen consists of two month treatment with Streptomycin, Rifampicin, Isoniazid, Pyrazinamide and Ethambutol followed by one month treatment with Rifampicin, Isoniazid, Pyrazinamide and Ethambutol during the intensive phase, followed by five months with Rifampicin, Isoniazid and Ethambutol: 2SRHZE/1RHZE/5(RH)E(8).

Watching the patients while swallowing every scheduled dose is one of components of DOTS. Taking drugs in the right doses and at the right intervals, is the most effective method to promote treatment adherence and gives individual TB patients the best chance of cure and also avoids the emergence of drug resistance(11).

Tuberculosis (TB) remains to be the major infectious disease causing high morbidity and mortality around the world. There were cases in all countries and age groups. Among global TB cases 90% adults (aged ≥15 years), 9% were people living with HIV (72% in Africa) and two

thirds were in eight countries. WHOs' list 30 high TB burden countries accounted for 87% of the world's cases.

Ethiopia is among those 30 high TB, HIV and DR-TB burden countries, with annual estimated TB incidence of 177/100,000 populations and death rate of 25 per 100,000 populations in 2016(3). The latest treatment outcome data for new cases show a global treatment success rate of 82% in 2016(3). This is a reduction from 83% in 2015 and 86% in 2013; in countries where notifications have increased, reporting of treatment outcomes has not kept pace(4).

1.2. Statement of the Problem

Tuberculosis still remains to be the single infectious agent that takes more lives each year especially it remains a major public health problem in many developing countries(12). Strong association of TB with HIV and the emergence of drug resistance to essential TB medicines put TB among the serious threats that the world is facing(13).

Currently global TB treatment success rate was 84%. Out of total TB cases 3.5% of new TB cases and 18% of previously treated TB patients were estimated to have had MDR-TB(4). Sub-Saharan Africa represents 14% of the global burden of new MDR-TB cases. Ethiopia also ranked 8^{th} out of 30 high MDR-TB burden countries in the world with a prevalence of 2.7%(1.5–4.0) in newly and 14.0% (3.6–25.0) in previously treated TB patients in 2017(4). Even if 92% of public hospitals and health centers offer DOTS the burden of MDR-TB remains high in Ethiopian settings, especially in previously treated TB cases(8).

In 2016, Ethiopia notified 125,836 new TB cases, 15100 (12%) cases were reported among children aged less than 15 year while the 8% of the TB cases were also HIV co-infected(1).TB has a long term corrosive impact on the health of Ethiopia's population. The economic consequences of TB include those due to lost income and productivity during diagnosis and treatment. And also direct household expenditures for TB care and the unmeasured disabilities due to permanent lung damage in up to 50 percent of survivors. Since the majority of TB cases occur among young adults and children, TB cumulatively have a high economic cost(2).

Many interventions are being implemented to address TB problem. However, all these efforts have been implemented, till now there is high prevalence of TB in Ethiopia as general and in this

area. Inadequate TB treatment due to shortage of drug and care providers non-compliance to guideline have been identified as cause for drug resistance (2). Previous TB treatment was the most powerful predictor for MDR-MTB infection(14).

To improve quality of service and increase cure rate implementation of TB DOTS strategy demands effective management by focusing on its key components. Ensuring adequate resources and administrative support for TB control is among these components to avoid shortage of necessary resource. strengthen standardized short-course chemotherapy using regimens of six to eight months, for all diagnosed cases of tuberculosis under proper case-management conditions, including direct observation of treatment(12,15).

Focusing on TB DOTS components will minimize man made error and shortage of TB drugs which enable the program to achieve intended objective. Poor treatment due to shortage of drug and care providers noncompliance to guideline while providing treatment will causes for drug resistance. Drug resistance is barrier to control TB (13,17).

Number of drug resistance case is increasing in the study area from time to time(17). Therefore the aim of this study is to generate updated information on the availability of necessary resources, compliance of TB DOTS provider with national guideline and satisfaction of TB patients toward service provided for them. In addition to this it aims to explore the implementation status of TB DOTS strategy in Jimma town public health facilities to contribute for the improvement of service quality.

1.3. Significance of the Evaluation

The finding of this evaluation will help programme coordinators, service providers, and head of facilities, Jimma town health office, Jimma zone health department and regional health bureau. It provides information on current status of TB DOTS implementation in relation to availability of resources, compliance of care providers toward national guideline and Satisfaction of TB patients toward access of service provided for them. Create a better basis for care providing, health care planning and management to improve the program. The study also helps to generate relevant information on current status of implementation of TB DOTS strategy for further study and strengthen the program improvement at each level.

Chapter Two: Program Description

2.1. Program stakeholders

Stakeholders are people or organizations invested in the program, interested in the results of the evaluation, and/or with a stake in what will be done with the results of the evaluation. Representing their needs and interests throughout the process is fundamental to good program evaluation. Much more likely to support the evaluation and act on the results and recommendations if they are involved in the evaluation. Conversely, without stakeholders support, findings and evaluation may be ignored, criticized, resisted, or even sabotaged(19-20)

The major stakeholders that identified during Evaluability Assessment (EA) are those involved directly and indirectly in program operation and implementation, served or affected by the program, primary users of the program and those who have interest on the program. These are; Oromia health bureau, Jimma zone health department, Jimma town health office, and health care providers at health facilities, TB patients, Jimma town administration office and NGOs.

The listed stakeholders were identified according to their role in the program and in the evaluation. Their ways of communication and level of importance based on the information they provided were also identified. They provide information on program services during EA and they identify and prioritize the area of program that should be addressed by the evaluation. They also participated in defining the problem and formulating research questions, selecting indicators of evaluation and assigning weights for indicators and setting judgment parameters.

Table 1: Stakeholder identification and analysis matrix of TB DOTS in Jimma town, 2019

Stakeholders	Role in the program	Interest on the evaluation	Role in the evaluation	Communication strategy	Level of importance
Jimma Zone health department	Budget allocation Technical (training) & material support Monitoring & evaluation (plan, report, supervision, review meeting)	Utilization of findings and recommendation of the evaluation for program improvement	Provides data, reviewing Indicator, set criteria for Judgment	Face to face	High
Jimma town Health office	Budget allocation Technical(training) & material support Monitoring & evaluation (plan, report, supervision, review meeting	Utilization of findings and recommendation of the evaluation for program improvement	Provides data, reviewing Indicator, set criteria for judgment	Face to face	High
DOT provider at health facilities	Providing service according to guideline, record and report TB cases	Knowing their service provision status Improve quality of service provision	Provide information , help in facilitation of data collection	Face to face	High
Regional health Bureau	Budget allocation Technical(training) Monitoring & evaluation (plan, report, supervision, review meeting)	Utilization of findings and recommendation of the evaluation for program improvement	Provide information	E-mail/phone	High
TB patients	Service utilization	Improvement of service quality	Provide information	Face to face	High
NGOs population service international (PSI) & challenge TB	Technical and material support and supervision	Utilization of findings and recommendation of the evaluation for program improvement	Provide information on the program resources and activities	Face to face/ E-mail/phone	Medium

2.2. Expected program effects (long & short term)

Mission

To reduce morbidity, mortality and disability, and improve the health status of Jimma town people through providing a comprehensive package of preventive, promotive, rehabilitative and basic curative health services via a decentralized and democratized health system.

Vision: A world free of tuberculosis which is zero deaths, disease and suffering due to tuberculosis.

Goal

- To reduced mortality due to TB and TB related factors in Jimma town

General Objective

- To detect 80 % of all forms of TB among Jimma town population through DOTS program
- To reduced incidence and prevalence rate of TB in Jimma town
- To improve TB DOT service quality in Jimma town TB DOTS providing facility

Specific objective

- To increase TB treatment drug and material supply from 85% to 90% in 2019
- To increase Cure rate for bacteriologically confirmed new PTB cases (CR) from 85% to 90 in 2019
- To increase treatment Success Rate (TSR) among bacteriologically confirmed PTB cases from 95% to 100% in 2019
- To increase detection rate of MDR TB from 98% to 100% in 2019
- To reduce interruption of supply from 40% to 30% in 2019
- To increase satisfaction of clients from 85% to 90% in 2019

2.3. Major strategies

Major strategies in reaching the objectives include early case detection, adequate chemotherapy, and provision of comprehensive and standard patient care, enhanced case management, community participation, accurate monitoring and evaluation of program performance. This strategy is an effective case management system that helps ensure that patients take quality anti-tuberculosis drugs, at the right dosage, for the appropriate length of time. It also minimizes the development of resistance by preventing treatment failure(1,20).

The DOTS strategy ensures that infectious TB patients are identified and cured using standardized drug combination. The five key components of DOTS strategy are:

- Government commitment to ensure sustained and comprehensive TB control activities, increase human and financial resources and make TB control a nationwide priority;
- Case detection by sputum smear microscopy among symptomatic patients self-reporting to health facilities;
- Standardized short-course chemotherapy using regimens of six to eight months, for all diagnosed cases of tuberculosis under proper case-management conditions, including direct observation of treatment;
- Regular, uninterrupted supply of all essential anti-tuberculosis drugs and laboratory supplies;
- Standardized recording and reporting system that allows assessment of case finding and treatment result for each patient and of the tuberculosis control programme performance overall.(1)

2.4. Program resources and activities

Input

Government is the main source of fund. However, there are nongovernmental organizations called population services international (PSI) and challenge TB that work with the government on TB control program. The main contributions of NGOs are providing of in-service training to HCPs and supervision of the service at health facility and community level.

- Trained human resource
- Standard TB unit
- Adequate and uninterrupted supply of TB drugs, AFB reagents and other laboratory consumables (slides, sputum cup, immersion oil),
- Equipment (microscopy and weighing scales)
- Manuals and guidelines supply of registers and formats
- M&E Tools reporting and recording formats: (SOP, AFB request paper, performance report form, referral forms and standard supervision checklist, standardized registration books at TB clinic & laboratory).

- Budget (annual allocation of budget from the government, internal revenue and funding from donors).
- IEC/BCC materials
- Technical support(training)

Activities

Activities that are undertaken by HEWs are TB Suspect identification &referral for diagnosis, defaulter tracing and community mobilization.

At health facility Patient management activities were mainly carried out by general HCPs at all health facilities except JUMC slides, others are collected by town health office and checked at Shanen Gibe hospital for External Quality Assurance (EQA).

- Offering drug to patients daily and observe during intake of drug,
- Health education,
- Screening (symptomatic & lab dx.), contact screening, campaign on sputum collection,
- Treatment including re-treatment of relapse,
- Drug toxicity follow up, treatment follow up,
- Defaulter tracing and recording and reporting

Activities at Jimma town health department level:

- Resource allocation,
- Supportive supervision,
- Drug and reagent provision,
- Performance monitoring, following HR gap,
- Training, distribution of IEC/BCC materials and slide collection for quality control

Outputs

- Number of TB suspect identified,
- Number of suspects referred for Dx,
- Number n of suspects screened for TB,
- Number of community mobilization sessions,

- Number of people took health education,
- Number of sample referred (MDR suspect),
- Number of patients taking treatment,
- Number of patients who developed drug toxicity,
- Number of patients defaulted,
- Number of resource allocated,
- Number of supportive supervision conducted,
- Number of trained human power on the program,
- Number of concordant and discordant slides
- Number of EQA feedback for health facilities

Outcome

Intermediate outcome

- Increased number of suspect identified for screening,
- Increased number of suspects screened for TB,
- Improved community awareness about TB,
- Reduced number of defaulter,
- Improved EQA performance,

Long term outcome

- Increased case detection rate,
- Increased treatment success rate
- Improved quality of TB information system
- Improved TB DOT service quality

Impact

- Reduced incidence and prevalence rate of TB in Jimma town
- Reduced mortality due to TB and TB related factors in Jimma Town
- Improved quality of life

2.5. Logic model for TB DOTS program

A logic model describes the sequence of events for bringing about change by synthesizing the main program elements into a picture of how the program is supposed to work. Often, this model is displayed in a flow chart, map, or table to portray the sequence of steps leading to program results. One of the virtues of a logic model is its ability to summarize the program's overall mechanism of change by linking processes to eventual effects(21). The logic model can also display the infrastructure needed to support program operations. Elements that are connected within a logic model might vary but generally include inputs, activities, outputs, and results (which range from immediate, intermediate to long term effects). Creating a logic model allows stakeholders to clarify the program's strategies; therefore, the logic model improves and focuses program direction. It also reveals assumptions concerning conditions for program effectiveness(23)

Statement of the problem: Strong association of TB with HIV and the emergence of drug resistance to essential TB medicines put TB among the serious threats worldwide. Number of MDR-TB case is increasing in the study area. Previous TB treatment was the most powerful predictor for MDR-MTB infection.

Goal: To reduced mortality due to TB and TB related factors in Jimma town

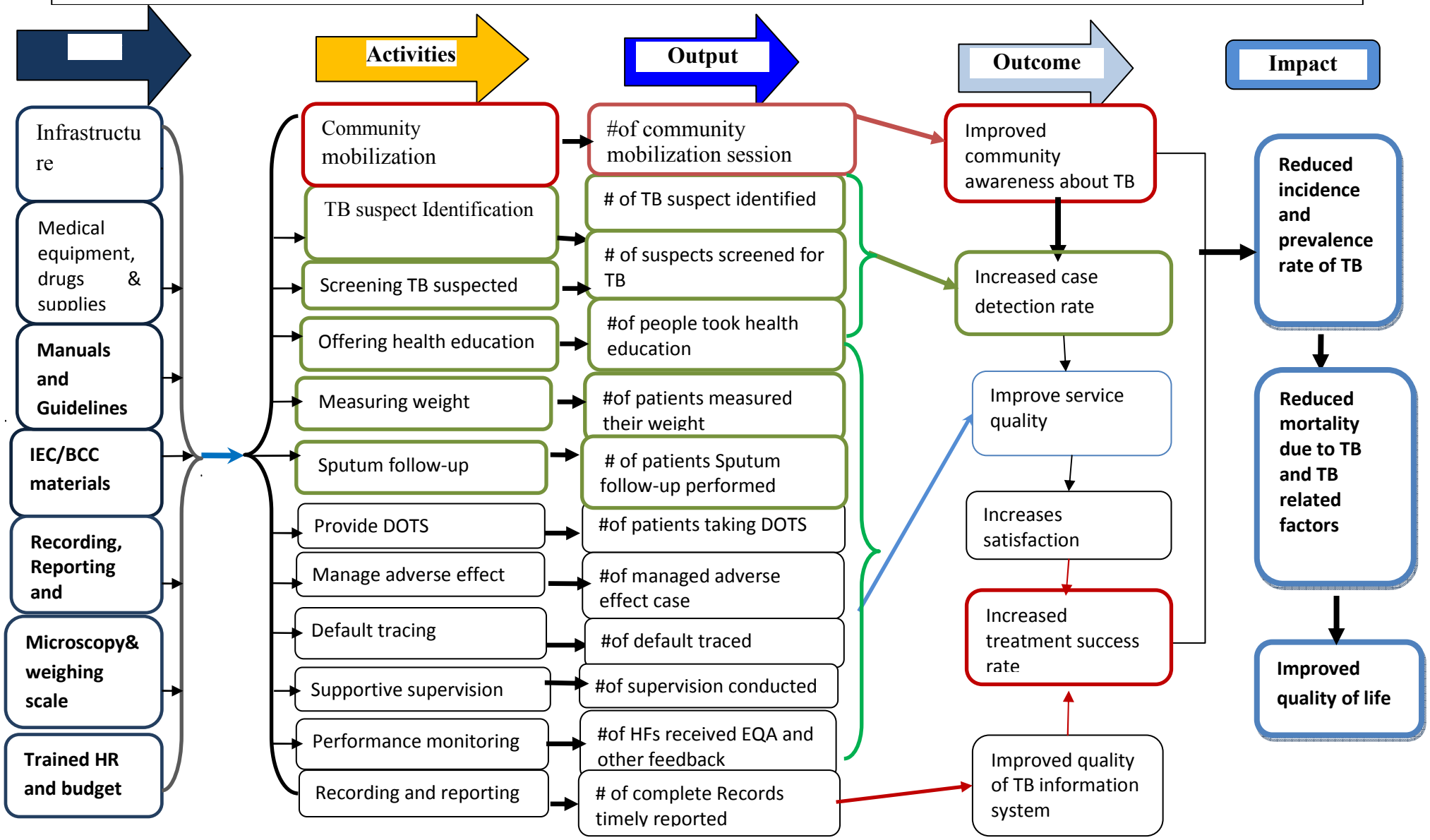

Figure 1: logic model for TB DOTS program of Jimma town, 2019

2.6. Stage of program development (level of Maturity, including historical aspects)

TB DOTS piloted first in Ethiopia in 1994. central office of national TB program combined the tuberculosis and leprosy program and tuberculosis team established, In 1995 Planning and programming department for 1996-2000 designed, in 1996 FMHO, WHO, KNCV signed to implement DOTS strategy all over the country. In 1997 planning and programming department implemented, in the same year TB and Leprosy program is integrated in to the general health services. In 2001 TBL control program fully integrated and in 2004 TB/HIV collaborative activities were initially rolled out(8). In the study area, Jimma town, TB Control program DOTS implemented since 1997 in health centers and hospital.

Long time has passed since the program is started and the program is mature enough to be evaluated. This evaluation will investigate how the program is delivered, assess reasons for successful or unsuccessful performances and provides strong evidence for improvement. And also determine whether the program is a delivered to the target population according to TB, DR-TB& Leprosy guideline or not. Through this evaluation structure and process of the program (availability of resource to perform activities and the level of providers' compliance to national guideline during service provision and satisfaction level of TB patients by access of service were assessed.

Chapter Three: Literature Review

Worldwide, TB is one of the top ten causes of death and the leading cause from a single infectious agent (above HIV/AIDS)(4). It affects all ages and both sexes(1).According to WHO 2018 global report best estimate is that 10.0 million people (range, 9.0–11.1 million) developed TB disease in 2017(4).

TB is falling globally, in all WHO regions, and in most countries, but not fast enough to reach the first (2020) milestones of the End TB Strategy(3). Majority of TB case and death occur in poorest countries which are economically and culturally disadvantaged segment of a population where access to health services is limited(1). There were cases in all countries and age groups, 90% adults (aged ≥15 years), 9% were people living with HIV (72% in Africa) and two thirds were in eight countries: India (27%), China (9%), Indonesia (8%), the Philippines (6%), Pakistan (5%), Nigeria (4%), Bangladesh (4%) and South Africa (3%). These and 22 other countries in WHO's list of 30 high TB burden countries accounted for 87% of the world's cases(4).

Ethiopia is among the 30 High TB, HIV and DR-TB burden countries, with annual estimated TB incidence of 177/100,000 populations and death rate of 25 per 100,000 populations for 2016(3). Among the notified TB cases in 2016, 2.7% of new TB cases and 14% of the retreated TB cases were estimated to develop drug resistant TB(1).The country's has expressed its commitment to accelerate the fight to end TB epidemic by 2035 by endorsing the new post-2015 Global "END TB strategy" and has already aligned the National TB Strategic Plan within the framework of National Health Sector Transformation Plan(23). For successful implementation of TB DOTS availability of necessary resource and compliance of care providers toward national guideline is essential. Let's see them in detail as follow:-

3.1. Availability of Resource Needed to Implement the Program

Strengthening human resource is one of the integral components of the Stop TB Strategy, because expanding access to TB care depends on the availability of well-trained health workers(24). But different study findings showed that there is a gap on availability of resources and materials to deliver the program as intended.

Qualitative study conducted in Nigeria stated that sometimes patients defaulted on treatment due to shortage of TB drugs in the clinic setting(25). But WHO recommends that "Standardized treatment regimen which is packed as TB patient kits for treatment of existing patients based on their weight"(1). Poor quality, Unavailability of certain drugs (stock-outs or delivery disruptions) and Poor training are causes of inadequate anti tuberculosis treatment. Additionally WHO and FMOH are commended that adequate supply of drugs and equipments are part of programmatic activities at each level of TB control programme(1,9).

Study conducted in Nigeria showed that Lack of information was attributed to insufficient policy information dissemination associated with lack of in-service training and reporting mechanisms after workshops(25).

Similarly study conducted in Ethiopia health facilities revealed that of those facilities offering any TB services only 60% have trained staff(26), To maintain quality of implementation of DOTS service, care providers must be updated to current evidence based information. Training is also necessary to encourage adherence to national protocols and guidelines introducing some degree of standardization in both treatment and diagnosis.

National TB guideline of Ethiopia and WHO recommended that every health unit involved in the prevention, diagnosis and treatment of TB should have separate standard TB unit, an adequate and uninterrupted supply of drugs, laboratory reagents& equipment and recording standards in order to achieve sustainable program implementation(1,27).

study conducted in southern nation and nationalities region of Ethiopia showed that 9 of 13 diagnostic centers have reagents for Acid-fast stain, (28), this indicates as there was scarcity of reagents for AFB staining.

Study conducted in Tigray region revealed that daily outpatient TB services were available in 31 (71%) of 44 health facilities, while in the remains there were only available on specific days of the week (29). This also contradict with national guideline recommendation, "daily administration of all doses of six month of the treatment should be implemented under DOT in Ethiopia considering the high HIV and MDR-TB prevalence"(1).

Similarly study conducted in Tigray revealed that, in most of health facilities, teaching materials were scarce and patients were taught in groups(29).These finding is inconsistent with the national recommendation of "all parties involving in TB control program should use IEC materials(1)."

3.2. Compliance of Health Care Providers toward National Guideline

The quality of care is the product of applying science and technology in actual practice and this becomes true when the application is based on preset recommended standards of guideline of the program (Donabadian 2005)(30). Health care providers inadequate treatment is the factor to contribute for poor treatment outcome due to Non-compliance with guidelines(13).

Standardized short-course chemotherapy using regimens of six to eight months, for all diagnosed cases of tuberculosis under proper case-management conditions, including direct observation of treatment(15, 28) However, studies in different settings showed that due to different reasons, providers do not use standards of operation, and this has a negative impact on service quality and treatment success.

According to the study carried out in Egypt (87.5% and 74.7%) of the cases were treated with correct DOTS drug regimen during initial and second phase (31). But national guideline recommended in order to achieve the designed aid of treatment, an anti-TB treatment regimen should administered based on standard: in appropriate combination of drugs, in the correct dosage, regularly taken by the patient, and for a sufficient period of time (1).

Study conducted in Jimma zone showed, from total 48 smear positive PTB patients, 87.5%, 56.2% and 37.5% have got smear follow up test at the end of the 2^{nd}, 5^{th} and 6^{th}months of treatment, respectively(32). The reasons for low sputum follow-up performance were an interruption of AFB reagents and inability of sputum producing at the end of 5^{th} and 6^{th} month. This contrasts the national TB control program, which recommends that all sputum-positive patients on TB treatment must have one sputum specimen follow up test at the end of 2^{nd}, 5^{th} and 6^{th}months (1,17).

Study conducted in Tigray (6.8%) patients and Sidama zone (26.8%) were initiated and continued without recording full information needed to start treatment and monitoring the

progress(28-29).This contradict with FMOH and WHO DOTS recommendation "recording and reporting on a continuous basis are crucial to ensure and improve quality of anti-tuberculosis care"(1,17).

Adverse effects are often the other reason why patients interrupt their treatment and must be quickly detected and adequately managed but study carried out in Tigray region showed that only 39% TB focal persons were able to manage adverse effects. And also only 8 (18%) of 44 TB focal persons were supervised on a monthly basis, while 10 (23%) of 44 were never supervised during the study period. Among supervised only 5 (11%) of 44% TB focal persons received written feedback from their district TB coordinator. Twenty-five (57%) TB focal persons had never been involved in district TB programme evaluation in the preceding year(29).

According to WHOs' report the emergence of MDR-TB is because of human error, largely due to poorly prescribed chemotherapy. If" too few pills are prescribed, the treatment will not cure the patient's TB and patient might continue to suffer from TB, develop resistance to TB treatment and infect others with MDR TB"(33). Wrong dose and wrong combination are causes of inadequate anti tuberculosis treatment.

3.3. Satisfaction of TB patients by access of TB DOTS service provision

Measuring patient satisfaction level has been increasingly becoming a measure to evaluate health care services directly provided to the patient. Moreover, patient satisfaction is often viewed as a variable that is influenced by access of care(34). Satisfaction measurement is a core component to design and evaluate modern health care services and delivery system. It is also one of the measurements that evaluate quality health care service that plays a positive role in evaluation of health care service especially patients perceptions concerning care they received.

A study conducted in Uttar Pradesh, India, reports that only 15% of the TB patients were dissatisfied with TB care they received. Among reported reasons for dissatisfactions non suitable opening time of DOTS centers, unavailability of HCPs, long waiting time and interruption and lack of drugs and other supplies were the main ones. Apart from these, the causes for satisfaction were easy availability of the medicines nearby their homes or working place, good patient provider interaction, motivation and health education about the disease(35). Common causes of

patient dissatisfaction were unavailability of health personnel during working hour, interruption and lack of drugs and other supplies.

Similarly, According to study conducted in Sidama zone 90% of the respondents were satisfied with TB treatment service(36).Patients' perceptions on the health care provider interaction were reason for their satisfaction. In addition to this Perceived professional care, accessibility, technical competency, convenience and perceived consultation, relational empathy and Waiting time were identified as reason of patient satisfaction on TB treatment service.

As knowledge and competence of care providers increase patient satisfaction will increase. Patients' adherence to treatment and willing to daily visit health facility will be also increase; during this providers also motivated and provide service as guideline standard and implementation of the program will be also ensured. If implementation of the program at root level ensured service quality will be improved and at the same time treatment success rate will be increased. As treatment success increased the occurrence of DR-TB will be minimized and intended objective and goals will be achieved(33,35,36).

Chapter Four: Evaluation Questions and Objectives

4.1. Evaluation Question

1. Are necessary resources available to deliver TB DOTS treatment? If yes, how? If no, why?
2. Are TB DOTS treatment service providers complying with TB, DR-TB& Leprosy guideline? If yes, how? If no, why?
3. Are TB patients satisfied by TB DOTS treatment services provided for them? If yes, how? If no, why?

4.2. Objectives of the Evaluation

General objective

To explore implementation status of TB DOTS program in Jimma town public health facilities in 2019 G.C.

Specific objective

1. To assess the availability of necessary resources for the treatment of TB DOTS program in Jimma town public health facilities in 2019 G.C.

2. To assess the compliance of HCPs toward the national TB guideline while they provide TB DOTS in Jimma town public health facilities in 2019 G.C.

3. To assess the satisfaction level of TB patients with TB DOTS service received in 2019 G.C.

Chapter Five: Evaluation Methods

5.1. Study Area

The study was conducted in Jimma town public health facilities. Jimma town is a zonal town which is located in Oromia region around 355 kilometers far to Southwest of Addis Ababa, Ethiopia. According to Jimma town health office document, Jimma town has 17 kebele a total population of 198576, of whom 99844were men and 98732women.

There are 1 specialized hospital and one general hospital, 4 health centers, three NGOs, 32 private clinics,17 health posts, in the town from which health services are provided to targeted population. In the town six governmental health facilities have been providing TB DOTS service. Jimma University Medical center, Shenan-Gibe primary hospital, Jimma health center, Higher two health center, Mendarakochi health center and Bochobore health center are facilities which has been providing TB DOTS service.

5.2. Evaluation period

Evaluability assessment was conducted from Nov, 1/2018 and the evaluation was conducted from March 1 to April 1/2019 G.C.

5.3. Evaluation approach

Formative approach was used to evaluate activities undertaken to furnish information that will guide program improvement(37). Therefore, the evaluation was formative approach to assess implementation level of DOTS strategy in Jimma town public health facilities for purpose of program improvement. Findings from the evaluation were indicated that how things are going by highlighting problems related to implementation of program and also indicated whether necessary resource are available and activities being conducted in a proper manner or not.

5.4. Evaluation design

A case study design was employed in order to answer why and how question and get in-depth information in real life context, deep understanding, and validation, extensive and explorative reports of what has happened over time with in the program(38).

5.5. Focus of evaluation and dimensions

Focus of evaluation: Focus of evaluation is implementation evaluation of TB DOTS in Jimma town public health facilities. It provides depth and detail about the programs strengths and weakness. How it is working? / Why not working so well?(39)

Evaluation dimensions: Dimensions are measureable aspects of the program feature under evaluation. The evaluation dimensions have been selected with stakeholders based on evaluation question(18). These dimensions help to evaluate implementation level of TB DOTS program in Jimma town. Dimensions which were assessed in this evaluation are availability of infrastructure and other resources for treatment, compliance of HCPs to NTP guideline and satisfaction.

Satisfaction was assessed with its three sub components of Access. These components were perception of patients on availability of necessary resources, the manners in which the supply resources are organized and patients attitudes about personal and practice of providers to the actual characteristics of existing providers.

5.6. Indicators

Jimma zone health department and Jimma town health office TB focal persons were participated in selecting indicators. Majority of indicators were adopted from HMIS and national TB guideline. Some of them were developed based on the local situation and reviewing different literatures. However, due to limited resource for collection and analysis of data; multi-voting technique was used to prioritize the selected priority indicators. A total of 33 indicators were selected 12 for availability, 11 for compliance and 10 for access (three for accommodation, four for acceptability and three for availability).

Availability: availability of infrastructure, trained human resource, essential drugs, laboratory equipment and standard formats was assessed.

1. Number of HFs where trained full time DOTS providers are available
2. Number of HFs where standard TB unit are available
3. Number of HFs where adequate amount of adult dose of TB drugs are available
4. Number of HFs where adequate amount of pediatric dose of TB drugs are available
5. Number of HFs where adequate amount of AFB reagents are available

6. Number of HFs where functional weighing scales for DOTS service for adult is available
7. Number of HFs where functional weighing scales for DOTS service for pediatric is available
8. Number of TB units where functional microscopy is available
9. Number of laboratory units where laboratory AFB registration book are available
10. Number of TB unit /TB treatment providing unit/ where standard TB unit register are available
11. Number of HFs where NTG is available
12. Number of TB treatment providing unit where IEC/BCC materials are available

Compliance: compliance of care provider to national TB guideline throughout providing TB DOTS treatment was assessed with 11 indicators.

1. Proportion of patients whose weight is measured
2. Proportion of TB patients who enrolled in correct dose of treatment on intensive phase
3. Proportion of TB patients who enrolled in correct dose of treatment on continuation phase
4. Proportion of Smear positive for whom sputum follow up performed at the end of 2nd month of treatment
5. Proportion of Smear positive for whom sputum follow up performed at the end of 5th month of treatment
6. Proportion of Smear positive PTB for whom sputum follow up performed at the end of 6th month of treatment
7. Number of HFs submit complete reports timely to Jimma town health office
8. Number of HFs supervised by Jimma town TB program expert in the last six months.
9. Number HFs with adequate EQA performance
10. Proportion of TB patients adequately counseled during TB DOT service
11. Proportion of TB patients observed while swallow the drugs

Satisfaction: perception of patients on availability, accommodation and acceptability.

1. Proportion of TB patients satisfied with the availability of laboratory service
2. Proportion of TB patients satisfied with availability of necessary drugs
3. Proportion of TB patients satisfied with presence of TB DOTS treatment service
4. Proportion of TB patients satisfied with the daily visiting of health center for TB treatment
5. Proportion of TB patients satisfied with convenience of TB unit working hours

6. Proportion of TB patients satisfied with time spent in waiting room
7. Proportion of TB patients satisfied with the friendliness/courtesy of the providers
8. Proportion of TB patients satisfied with the attention and respect of providers to their privacy
9. Proportion of TB patients satisfied with the competence/knowledge of the providers
10. Proportion of TB patients satisfied with the adequacy of counseling (explanation about treatment)

5.7. Populations and Sampling

All TB patients and all HCPs involved in DOTS service at Jimma town were source population for this study. For TB unit register, all TB patient records who have been following TB DOTS service from April 1/2017 to March 1/2019 and all HCPs who involved in DOTS service were source population.

5.6. Sample size and Sampling technique

For health facilities: To maximize the source of information all functional public health facilities found in Jimma town were included.

TB register review: At TB unit level

The sample size for TB register review was determined using single population proportion formula. The assumptions: Level of confidence 95%, 5% margin of error, and P is the proportion of compliance of HCPs to national TB guideline to TB treatment, but since there is no study done on compliance of HCPs to national TB guideline on study area, p =50% was used to have maximum sample size. Based on these assumptions the actual sample size for the study was computed using the formula for single population proportion

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

Where, n= sample size

$Z\ \alpha/2$= Critical value=1.96,

P= compliance of HCPs to national guideline,

d= precision (marginal error) =0.05,

$$\text{Then} \quad n = \frac{(1.96)^2(0.5*0.5)}{(0.05)^2} = 384$$

Sampling technique for TB register: Two year records of TB patients registered from April 1/2017 to March 1/2019 were reviewed from TB unit register using simple random sampling.

The sample size (N=384) of TB register review were proportionally allocated to six HFs, which provide TB DOTS. Proportional allocation was based on the number of TB patients enrolled on TB DOTS strategy from April 1/2017 to March 1/2019 in each HFs.

Table 2: proportional allocation of TB register review from April 1/2017 to March 1/2019

Health facilities	number of TB patients enrolled on TB DOTS strategy	sample size
JUMC	310	112
Shenen gibe hospital	244	89
Jimma health center	197	71
Mendera kochi health center	89	32
Higher 2 health center	138	50
Bochobore health center	82	30

Sample size for observation: The sample size for observation of patient-providers interaction was determined based on the standardized USAID observation guideline recommendation 3-5 observation sessions per health care providers(40). According to this guideline five observation sessions per one health care provider was observed from each health facility. The observation was also considering compliance of care providers to guideline on working days and weekends and service provision by untrained TB DOTS treatment providers. The first two observation sessions was dropped to minimize Hawthorne effects.

Key informant interview: purposive method was employed for in-depth interview. TB service providers (TB focal persons) who were providing TB DOTS and heads of health centers were interviewed. In addition to this Jimma town program expert was interviewed to have more detail information on the program. A total of 13 in-depth interviews were conducted 13 key informants who have reach information on the program were participated.

Exit interview: Consecutive patients who full fill the inclusion criterion (age 15 years or older) were included in patient exit interview.

Table 3: Summary of data source and sampling technique

Study unit	**Sample size**	**Sampling technique**
HFs	6	Purposive
TB unit register	384	Simple random sampling
Expert interview	13	Purposive
TB patients	140	Census
Provider – patient interaction observation	45	Purposive

Study unit and unit of analysis

Study Unit: All TB DOTS providing public health facilities, all TB patients under DOTS treatment, selected register of TB patients, selected TB focal person and head of health facilities which fulfils the inclusion criteria.

Unit of Analysis

Primary unit of analysis: TB DOTS treatment providers

Secondary unit of analysis: health facilities

Tertiary unit of analysis: Jimma town

5.7. Inclusion and exclusion criteria

Inclusion criteria: Health facilities which provide TB DOTS service were included. The records of all TB patients registered from April 1/2017 to March 1/2019 in each HFs were eligible for TB unit register review.

TB unit focal person (TB care providers), heads of HFs and TB program expert of Jimma town health office were participants of this study. In addition to this, all TB patients under treatment which received treatment service for greater than a week and 15 or more years of old. All study subjects who did not met the above criteria and also TB patients who were critically ill to respond were not eligible.

5.8. Data Collection

Quantitative and qualitative data collection method was used to answer the evaluation questions. Structured questionnaire for patient exit interview, structured checklist for observation, for document review, for resource inventory and in-depth interview guide for key informant interviewee were used.

5.8.1. Development of data collection tools

Resource Inventory checklist: This tool was help to assess the availability of program resources for the delivery of TB DOTS treatment. Moreover, the checklist includes questions that assess

medical equipment's, human resource, guideline, recording and reporting tools. The tool was adopted from national guideline and WHO guideline(1,16).

Document review: this tool was used to assess compliance of TB DOTS providers to national guideline. The tool were adopted from national guideline (1).

Observation checklist: a tool was helps to assess the compliance of TB DOTS providers with the national guideline standard while providing the treatment and provider patient interaction. A tool was adopted from different literature(33,41).

Key informant interview guide: the tool was help to supplement quantitative finding. It includes general questions about how TB DOTS treatment have been going on, questions related with availability of resources, compliance of TB DOTS providers and questions related to opinion about barrier to treatment service and possible solutions. The guide was prepared in to three parts based on the key informant's position.

5.8.2. Data Collection procedure

Total of four data collectors and one supervisor were recruited from study area Jimma town, out of the studied facilities. The selection criteria for data collectors were degree holder (3 nurses and 1 health officer were involved) who had experience in data collection. Supervisor was health professional degree holder (statistics) with one year experience in supervision. Document review and exit interview were conducted by data collectors, while in-depth interview resource inventory and Observation conducted by principal evaluator.

Document review was conducted form TB unit register. Resource inventory was conducted by both observation of resources and interview with responsible bodies. Availability of necessary TB drugs, availability and functionality of medical equipment's, presence of guidelines and standard TB unit and trained TB DOTS provider were conducted by the principal evaluator. Direct observation was conducted while health care providers provide TB DOTS treatment service. The time of observation was on working days and on weekends for those who provide on weekend. Untrained providers are also included in observation.

Key informants were interviewed after conducting resource inventory, observation and document review. Field note and tape record was used. Interviewee guide with probes was used to clarify and dig out participants' response.

5.8.3. Data quality management

Data collectors and supervisor were received training on the content of the data to be collected, data collection tool, ethical issues to be addressed during gathering the data and how to communicate with respondents for 2 days. The data collection tools were pretested before data collection in Yebu health center (5% of the sample size). Additionally supervisor was also received training on how to manage data collection process and the way to monitor the quality of data. Completeness of questionnaires were checked every day after data collection and any problems encountered was discussed among supervisor and data collectors and solved immediately in daily bases.

5.9. Data analysis

Quantitative data was checked for completeness, edited, coded, entered and analyzed using SPSS version 23.0 and descriptive summery was done. Qualitative data was analyzed manually, thematic analysis technique was used. First, the recorded data was transcribed and translated. The translated data was coded in to different codes. Each code were categorized in to different categories and then thematized in to three themes. The themes were reasons for unavailability of program resources, response for poor compliance of DOTS providers and reason for low satisfaction of patients. The results were triangulated with the respective dimensions to supplement quantitative data.

Judgment parameter and matrix analysis

Judgment Criteria was agreed up with the interest of stakeholders. Weight was given for each dimension in terms of their relative importance in the program by stakeholders. Dimensions of implementation of TB DOTS service were judged based on these pre-set judgment matrixes to determine implementation status.

Judgment Criteria:the criteria were agreed up with the interest of stakeholders. Judgment criteria for implementation of TB DOTS program was ≥85% Implemented, 75-84% partially implemented, 55-74% poorly, <55% not implemented

Judgment criteria for satisfaction dimension was ≥85%, V. satisfied, 75-84% satisfied, 60-74% dissatisfied, <60% V. dissatisfied

For compliance and availabilityJudgment parameter: ≥85%=Very Good, 75% - 84% = Good,

55% - 74% = Fair, <55% = critical

Weighting of dimensions and Indicators: weight was given for each dimension in terms of their relative importance in the evaluation. It was decided as 40% for Availability, 40% for compliance, 20% for patient satisfaction by stakeholder agreement

5.10. Ethical consideration

Ethical clearance was obtained from Institutional Review Board (IRB) of Jimma University, Faculty of Public Health. Formal letter was written from Jimma town health bureau to health facilities and permission was obtained from managers of the facilities. Informed Consent was obtained from participants. Respondents were informed that participation is voluntary and that they have full autonomy to withdraw the participation at any time they feel so. Names and other personal information which can affect the confidentiality of the respondents was not taken or recorded rather codes were used. Any information will be kept confidential and only used for evaluation purpose.

5.11. Dissemination plan

The findings will be presented for Jimma university scientific community and will be submitted to Jimma University Institute of health science, department of health economics, management and policy. The final document (both hard copy and soft copies) will be disseminated to stakeholders for ensuring use of findings. Efforts will be made to publish the findings on the reputable peer-reviewed journal.

Chapter Six: Results

This evaluation was conducted in six public health facilities providing DOTS treatment service. Three hundred eighty-four (384) TB patient records were reviewed. Resource inventory was conducted in all studied facilities. One hundred forty exit interviews were conducted with TB patients who were following DOTS in these facilities. A total of 45 observation sessions were conducted to see provider-patient interaction and compliance of healthcare providers to the standard. Key informant interview was conducted with six TB focal persons, six head of each facility (head of the nurse for hospitals) of each facility and one at the town health office, which makes a total of 13 interviews.

6.1 Availability of resources

Among all facilities, only half of them have full-time DOTS provider. There were two providers in one of HF and the rest five each has one provider who has received training about TB care. However, in three of HCs DOTS treatment has been provided by none trained providers too(table 4).

Table 4 Availability of necessary resources to provide TB DOTS in Jimma town public health facilities, 2019

Variables	Health centers, n=4		Hospitals n=2	
	Yes	No	Yes	No
HFs with Full time trained TB DOT provider	1	3	2	0
HFs with trained TB DOT providers received refreshment training within one year	4	0	2	0
Standard TB unit	1	3	2	0
functional adult weighing scales for DOTS service	4	0	2	0
functional pediatric weighing scales for DOTS service	0	4	0	2
laboratory units has functional microscopy	4	0	2	0
HF has essential laboratory equipment*	4	0	2	0
HF has adequate amount of AFB reagents	4	0	2	0
standard TB unit register	4	0	2	0
AFB registration book?	4	0	2	0
updated TB DOTS guideline	4	0	2	0
health education (IEC/BCC) materials	0	4	0	2
adequate EQA performance	4	0	2	0
HF has adequate amount of adult dose of essential TB drugs	2	2	1	1
Adequate amount of pediatric dose of essential TB drugs	2	2	1	1

Majority of key informants (heads of facilities) agree on a shortage of trained TB DOTS providers.

> *"…. there is a shortage of human resource in general and also specifically in the TB unit who had received training on TB DOTS. This is the major challenges to provide TB DOTS service based on the standard. TB focal persons assigned to other responsibility to fill the gap of human power, and also untrained care providers assigned to provide TB DOTS service."*[A 38 years male respondent]

A 32-year male key informant also mention the issue,

"… Like other health care provider TB DOTS providers (TB focal person) equally assigned for night shift and they want financially benefit from duty, because of this untrained health workers assigned on TB DOTS treatment to avoid treatment interruption."

All studied facilities had separate TB room but not separate building. Four of those health facilities had good ventilation. Three of the health facilities had no waiting area for the patient. One respondent described the issue as follow:

"…this TB unit is below the standard. The roof height is short, the door and the windows should be in the opposite position as you can see this is not fulfilled. And also there is no space to construct as standard. "[A 32-year male key informant]

Standardized regimen for existing adult TB patients were not fulfilled in three health facilities. There is no contingency of essential TB drugs for new TB patients almost in all health facilities. Care providers used drugs for new TB patients from existing TB patients' kits. The methods of delivery of these drugs and supplies were picking them up from the source by all health facilities TB focal person. All health facilities had reported drugs supplies were problems in providing TB DOTS service.

One participant explains the issue as follow:

"…PFSA is the main source of drugs and laboratory supplies for TB control activities for all facilities. Most of the time drug interruption for existing patients occurred because of TB focal

persons didn't request for drugs timely. Because of this drugs distributed to other districts facilities which asked first." [45-years female respondent]

Another participant also mentioned the issue as:

"…Most of the time shortage of TB drugs occurred in this facility. The reason is the consumption rate of this facility was not calculated correctly and there are a high number of patient flows than expected. [27-years male respondent]

In all health facilities, there were no IEC/BCC materials. TB flip chart and TB posters in local language were not available and not used by all studied facilities. One participant explains the issue:

"…this TB unit is new and we are arranging the room. Previous TB posters and IEC materials disappeared during this movement and we are requesting to fulfill these materials." [A 35-years female respondent]

Judgment Matrix of availability dimension

The level of implementation TB DOTS program with respect to program resource availability was fair 70.8 based on the judgment parameter.

Table 5: Judgment matrix for availability of necessary resource and equipments for TB DOTS service in Jimma town public health facilities, 2019

Evaluation Question	Availability Indicator	Expected (a)	Observed (b)	Weight given(c)	Score (b/a)*c	Observed value in %	Score
Are resources infrastructure and medical equipments available to deliver DOTS? If yes, how? If no, why?	Number of HFs where trained full time DOTS providers are available	6	3	10	5	50	**70.8% Fair**
	Number of HFs where standard TB unit is available	6	3	5	2.5	50	
	Number of HFs where adequate amount of adult dose of TB drugs are available	6	4	20	13.33	66.7	
	Number of HFs where adequate amount of pediatric dose of TB drugs are available	6	3	10	5	50	
	Number of HFs where adequate amount of AFB reagents are available	6	6	10	10	100	
	Number of HFs where functional weighing scales for DOTS service for adult is available	6	6	5	5	100	
	Number of HFs where functional weighing scales for DOTS service for pediatric is available	6	0	5	0		
	Number of laboratory units where functional microscopy is available	6	6	10	10	100	
	Number of laboratory units where laboratory AFB registration book is available	6	6	5	5	100	
	Number of TB unit /TB treatment providing unit/ where standard TB unit register are available	6	6	5	5	100	
	Number of TB treatment providing unit where health IEC&BCC materials are available	6	0	5	0	0	
	Number of TB unit /TB treatment providing unit/ where NTG is available	6	6	10	10	100	
Overall result based on judgment criteria					70.8		

Judgment parameters: ≥85%=Very Good, 75% - 84% = Good, 55% - 74% = Fair, <55% = critical

6.2. Compliance of DOTS providers

From all health facilities forty-five sessions of provider-patient interaction were observed. Of these, fifteen (33.3%) observation sessions were treated by untrained TB DOTS providers.

Only two health facilities provide TB DOTS service on weekend.

More than half of patients (51.1%) were greeted by their healthcare provider. Only 6(13.3%) of patients were asked if they missed any days of therapy.Among those observed DOTS providers only 3(6.7%) patients reminded the schedule of the next sputum examination and also, they stress problem of defaulting while providing service for 10(22.2%) of patients and ask about possible side effects(table 6).

Table 6: Description of provider-patient interaction & communication on services provision of TB DOTS in Jimma town public health facilities, 2019

Variable category	**Yes**	**NO**	**NA**
Patients greeted by care providers politely	23(51.1%)	22(48.9%)	
patients asked (or caregivers, if patients are children) if they missed any days of therapy	6(13.3%)	39(86.7%)	
Patients asked If they (patients/ caregivers) missed days, what was done (e.g., took the next day) and counsel for better adherence (If no problems, ask HCW how they would counsel patient)	13(28.9%)	32(71.1%)	
care provider stress very well about the problem of defaulting& explain the method they can be easily traced	10(22.2%)	35(77.8%)	
care provider ask patients about any new symptoms (possible side effects to treatment)	10(22.2%)	35(77.8%)	
While discussing with the patient, providers used clear language that patient understand simply...if possible local language	45(100%)	0	
Before the treatment, providers measured patient weight	6(13.3%)	3(6.7%)	36(80%)
Health worker provide correct drug based on the weight of patient	6(13.3%)	3(6.7%)	36(80%)
provider observe the patient while swallowing the drugs	40(88.9%)	5(11.1%)	
provider remind the patient of the schedule of the next sputum examination	3(6.7%)	42(93.3%)	
Provider let the patient ask any questions the patient may have	0	45(100%)	
provider respond to patient's questions	13(28.9%)	32(71.1%)	
health worker record on the unit register immediately after Consultation of every patient	35(77.8%)	10(22.2%)	

There was a difference when service provided by trained TB DOTS providers and other HCWs. One respondent described the issue as follow:

"…in this health facility all health workers provide TB DOTS to avoid service interruption which makes difficult to follow guideline. TB DOTS guideline standard is not followed when service provided by other health workers which are not trained on TB DOTS, and also it is difficult to follow progress of Tb patients."[35-year female respondent]

Five (11.1%) TB patients who had followed treatment in one of studied health facilities were not observed while swallowing the drug; they came to the health facility only to collect their drugs to take at home. However, other TB patients follow DOTS in five of health facilities 40(88.9%) were observed while swallow their drugs.

A 27 years male respondent react on issue as,

"…Usually patients are seen when they exhaust to visit the health facility on a daily basis, because of this to minimize treatment interruption with strict counseling I gave them drugs every 15 days for intensive and monthly for continuation phase to receive at their home."

At the beginning of intensive phase all (6) observed TB patients measured their weight and assigned to right dose. But from three of observed patients whom transferred to continuation phase none of them were measured their weight, they assigned by considering their previous weight. The result also showed that none of patients were informed schedule of the next sputum examination. And also none of patients were asked if they had question. From 13 patients who asked question 10 patients question was responded by care providers. All care providers were used clear and local language during all observed session. Treatment monitoring chart of 10 (22.2%) patients was not filled in TB register during treatment.

Participant explains the issue as follow:

"... In this health facility national guideline standard is not followed during DOTS treatment because all health workers provide the treatment to minimize burden of work as I have additional responsibility. Care providers may forget to remind TB patients' sputum schedule and other treatment standard because they focus on only providing drug. It was good if at least two trained TB DOTS providers are in this facility we may help each other and there will be no communication gap. [A 32-year male respondent]

Among 384 record reviews, 159 (50.8%) patients were males. Thirty-one of patients aged below 10 years, and the majority of patients, 233(60.7%) were in the age category of 15-49 years. Of these, 176(45.8%),65 (16.9%) and 143 (37.0%) were diagnosed for smear-positive PTB, smear-negative PTB and EPTB respectively. Two hundred forty-seven (64.3%) patients smear test result was written. Out of 176 smear-positive patients, 81(64.6%) were reported as cured. One hundred eighty-one of all forms of cases were completed the treatment. Eight patients died, five defaults the treatment, 2 patients treatment failure 5 patients transferred out and 7 patients outcome was not recorded. Therefore, in general, the treatment success rate including cured and treatment completed was 69.5%.

According to participant response,

*"… the reasons for such low success rate were: treatment service has given by different HCPs rather than trained TB DOTS provider and they may forget to record. [*A 29-years female respondent]

The weight of the patients was used to determine the dose of the drug. The weight of 365(95%) patients under intensive phase of treatment was recorded at the beginning of treatment. Three hundred thirty five (91.7%) patients received the right dose of drug under intensive phase; while 23(6.3%) patients received wrong dose and 6 patients' dose were not recorded. The weight of 283(83.2%) patients was measured at the beginning of continuation phase (end of intensive phase) from total of 340 patients on continuation phase, and the rest 54(11.2%) patients were not.

From those 283 patient, 269(95%) received the right dose, 9 (3.2%) received wrong dose and five (1.8%) patients dose were not recorded (table 7).

Table 7: TB patients' weight, drug and dose from document which were followed under DOTS in Jimma town public health faculties from April 1/2017 to March 1/2019

	Intensive phase (n=384)			Continuation phase(n=340)			
	Yes	No	Not recorded	Yes	No	NA	Not recorded
Weight measured	365(95%)	19(5%)	-	283(83.2%)	54(15.9%)	3(0.9%)	-
Right drug	377(98.2%)	6(1.6%)	1(0.2%)	313(92%)	0	3(0.9%)	24(%)
Right dose	353(91.9%)	20(5.2%)	11(2.86%)	269(79.1%)	60(17.6%)	3(0.9%)	8(2.4%)

All patients received the right drug under continuation phases of treatment. Participants explain the issue as follow:

"… There is no responsible person in this unit because there is no additional budget assigned for this service. I heard that there was a budget for providers on TB treatment earlier. If there is assigned money care provider might be motivated to come and provide the treatment every morning in addition to his/her other responsibilities in HFs. Because of this all health care workers participated on TB DOTS provision and this is difficult to provide service as standard and for monitoring." [A 30-years female respondent]

"…There is shortage of pediatric dose of TB drug in this facility, most of the time TB patients are adults and we didn't request for pediatric dose. So if children came we prescribe adult dose based on their weight and for adults we use standardized regimen." [A 32-years male respondent]

"…untrained care providers might forget to measure weight of TB patients especially on continuation phase, even if they measure they might forget to record."[A 29 female respondent]

From one hundred seventy-six smear-positive PTB patients 156 patients finished intensive phase and 150 finished continuation phases. About 73.7%, 50%, and 52.7% have got smear follow up test at the end of the 2^{nd}, $5^{th}$and 6^{th}months of treatment, respectively. Their sputum follow up test presented below(table 7).

Table 7: Sputum follow up performed in Jimma public health facilities from April 1/2017 to March 1/2019

	sputum follow-up pulmonary positive TB	
	Yes	No
at end of 2nd month	115(73.7%)	41(26.3%)
at end of 5th month	75(50%)	75(50%)
at end of 6th month	79(52.7%)	66(47.3%)

According to participants response,

"…the reason for low sputum follow up at 5th and 6th month was, there were an interruption of AFB reagents previously and some patients could not produce appropriate sputum for follow up AFB test, therefore follow up 5th/6th month sputum were not performed"[A 30-years male respondent]

"…treatment provided by different health care workers in this facility. Untrained TB DOTS providers may forget to remind TB patients' sputum follow-up schedule" [A 32-year male respondent]

"…most of the time laboratory service was not available at working time and there is a shortage of laboratory technician but by now this problem is solved in this facility." [A 29-year female respondent]

Regarding the submission performance report, all HFs submitted complete and timely (quarterly) report to Jimma town health office from April 1/2017 to March 1/2019.

One respondent explain the issue as:

"…I distribute separate reporting format and I follow focal persons to fill and sometimes I remind them by phone call" [A 45-year female respondent]

Regarding HCs supervision, all HCs were supervised by Jimma town health office TB program expert and hospitals were also supervised by FMOH but did not provided the written feedback.

Judgment Matrix of compliance dimension

Based on judgment matrix analysis the level of compliance of TB DOTS providers with national guideline were good (77.3%)

Table 8: Judgment matrix for compliance of TB DOTS providers toward national TB guideline in Jimma town public health facilities, 2019

Evaluation question	Indicator	Expected (a)	Observed (b)	Wight given (c)	Score (a/b)*c	Observed value %	Score
Are TB DOTS service providers complying with TB, DR-TB& Leprosy guideline? If yes, how? If no, why?	Proportion of patient whose weight is measured before beginning of intensive phase	384	365	12	11.4	95	**77.3%, Good**
	Proportion of patient whose weight is measured before beginning of continuation phase	340	283	10	8.3	83.2	
	Proportion of TB patients who enrolled in correct dose of treatment on intensive phase	384	353	12	11	91.9	
	Proportion of TB patients who enrolled in correct dose of treatment on continuation phase	340	269	12	9.5	79.1	
	Proportion of smear positive PTB for who sputum follow up performed at the end of 2nd month of Rx	156	115	12	8.8	73.7	
	Proportion of smear positive PTB for who sputum follow up performed at the end of 5th month of Rx	156	78	6	3	50	
	Proportion of smear positive PTB for who sputum follow up performed at the end of 6th month of Rx	150	81	6	3.24	54	
	Proportion of complete reports submitted to health office	6	6	6	6	100	
	Number of HFs supervised by TB program expert in the last six months	6	6	6	6	100	
	Proportion of TB patients who adequately counseled during TB DOT	45	13	10	2.9	28.9	
	Proportion of TB patients observed while swallow the drug	45	40	8	7.1	88.9	
Overall result based on judgment criteria					77.3		

Judgment parameter: ≥85%=Very Good, 75% - 84% = Good, 55% - 74% = Fair, <55% = critical

6.3. Satisfaction of TB patients by access of TB DOTS service provision

Client satisfaction was assessed using 10 likert scale items of access sub dimensions (availability, accommodation and acceptability). A total of 140 TB patients were interviewed. The responses of client were dichotomized in to satisfied and dissatisfied; those who were very satisfied and satisfied were categorized as "satisfied" and neutral, dissatisfied and very dissatisfied were categorized as "not satisfied".

Socio demographic and general characteristics of TB patient on DOTS service

Variables		**Number**	**Percent**
Sex	Male	78	55.7
	Female	62	44.3
Age	15-24	42	30
	25-49	78	55.7
	>49	20	14.3
Marital status	Married	81	57.9
	Single (Never married)	42	30
	Separated	9	6.4
	Divorced	4	2.9
	Widowed	4	2.9
Residence	Urban	106	75.7
	Rural	34	24.3
Education level	No formal education	29	20.7
	Primary school	35	25
	Secondary school	39	27.9
	Preparatory	8	5.7
	Diploma and above	29	20.7
Occupation	Permanent employee	15	10.7
	Self employee	45	32.1
	Temporary employee	12	8.6
	Unemployed	68	48.6
Religion	Orthodox	52	37.1
	Protestant	20	14.3
	Muslim	68	48.6
Type of TB	Pulmonary positive TB	58	41.4
	Pulmonary Negative TB	31	22.1
	Extra Pulmonary TB	51	36.4
Phase of treatment	Intensive phase	42	30
	Continuation phase	98	70
Planned treatment duration	Six month	135	96.4
	Eight month	4	2.9
	Other	1	.7

How TB drugs collected	Daily	102	72.9
	Within each 15 days	19	13.6
	Monthly	19	13.6
Good communication with HCPs	Yes	135	96.4
	No	5	3.6

Majority of patients were satisfied with availability of treatment service, necessary drugs and friendliness/courtesy of the providers. While low satisfaction observed with availability of laboratory service, daily visiting of health center for TB treatment, convenience of TB unit working hours and competence/knowledge of the provider(table 9).

Table 9: Satisfaction of TB patients by access of TB DOTS service provision in public health facilities of Jimma town, 2019

Variables	**Satisfied**	**Not satisfied**
Availability of laboratory service when needed	91(65%)	49(35%)
Availability of necessary drugs	124(88.6%)	16(11.4%)
Availability TB DOTS treatment service	135(96.4%)	5(3.6%)
The daily visiting of health center for TB treatment	85(60.7%)	55(39.3%)
Convenience of TB unit working hours	105(75%)	35(25%)
Time spent in waiting room	120(85.7%)	20(14.3%)
Friendliness/courtesy of the providers	129(92.1%)	11(7.9%)
Attention and respect of providers to their privacy	119(85%)	21(15%)
Competence/knowledge of the provider	104(74.3%)	36(25.7%)
Adequacy of counseling (explanation about treatment)	113(80.7%)	27(19.3%)

According to KI response,

"... There are TB patients comes from rural kebeles of this HF catchment area. They complain about the distance and daily transport cost. These patients asked me to give them those drugs at least weekly, but I always convince them by telling the severity of the problem if they missed their drug and the importance of DOTS." [A 32- year female respondent]

''...there is shortage of drugs in this facility I don't know what will be happen in the future, but for now nobody interrupts the treatment because of this problem I have been asking other health facilities who have contingency when shortage occurs''. [A 27-years male respondent]

Most of TB patients 129(92.1%) were satisfied with friendliness/courtesy of the providers, 119(85%) patients satisfied with attention and respect of providers, 104(74.3%) knowledge and competency of care provider. In addition to this, 19.3% was not satisfied with the adequacy of explanation about the treatment.

One respondent describe the issue as follow:

"... In this health facility all health workers who have duty (night shift) provide TB DOTS before he/she leave the facility. This time health workers focus on DOT and the other counseling following progress of patients and other elements of DOTS will be forgotten." [29 years female respondent]

Judgment Matrix of compliance dimension

Based on judgment parameter the level of implementation of TB DOTS program in terms of patient satisfaction was 80.1% which is satisfied (table 11

Table 10: Judgment Matrix for Satisfaction of TB patients by access of TB DOTS service provision in public health facilities of Jimma town, 2019

Evaluation Question	Dimension	Indicator	Expected (a)	Observed (b)	Wight given (c)	Score (a/b)*c	Observed Value %	Score
Are TB patients satisfied by service provided for them? If yes how? If no why?	Availability	Proportion of TB patients satisfied with the availability of laboratory service when needed	140	91	10	6.5	65	**80.1, Satisfied**
		Proportion of TB patients satisfied with availability of necessary drugs	140	135	10	9.6	96.4	
		Proportion of TB patients satisfied with TB DOTS treatment service	140	124	15	13.3	88.6	
	Accommodation	Proportion of TB patients satisfied with the daily visiting of health center for TB treatment	140	85	15	9.1	60.7	
		Proportion of TB patients satisfied with convenience of TB unit working hours	140	105	10	7.5	75	
		Proportion of TB patients satisfied with time spent in waiting room	140	120	10	8.6	85.7	
	Acceptability	Proportion of TB patients satisfied with the friendliness/courtesy of the providers	140	129	10	9.2	92.1	
		Proportion of TB patients satisfied with the attention and respect of providers to their privacy	140	119	10	8.5	85	
		Proportion of TB patients satisfied with the competence/knowledge of the provider	140	104	5	3.7	74.3	
		Proportion of TB patients satisfied with the adequacy of counseling (explanation about treatment)	140	113	5	4	80.7	
Overall result based on judgment criteria						80.1		

Judgment criteria ≥85%, V. satisfied, 75-84% satisfied, 60-74% dissatisfied, <60% V. dissatisfied

Summary of judgment matrix

The overall status of implementation of TB DOTS program in Jimma town public health facilities based on the judgment criteria was partially implemented (75.2%) based on weight given for each dimensions (table12).

Table 11: Overall judgment matrixes and analysis of dimension of TB DOTS program implementation in Jimma town public health facilities, 2019

Dimension	**Value given (a)**	**% achieved (b)**	**Value achieved(a*b)/100**	**Overall score**
Availability	40	70.8	28.32	❖ **75.2, Partially implemented**
Compliance	40	77.3	30.9	
Satisfaction	20	80.1	16	
Total	100		**75.2**	

Judgment criteria ≥85% Implemented, 75-84% partially implemented, 55-74% poorly, <55% not implemented

Chapter seven: Discussion

The evaluation finding shows that the overall status of TB DOTS implementation was partially implemented (75.2%) in Jimma town public health facilities based on judgment criteria. The availability of resource was good (70.8%). Compliance of TB DOTS providers toward national guideline scored good (77.3%) and patient satisfaction was 80.1% (satisfied) based on judgment criteria.

7.1. Availability of Resource

This evaluation finding showed that one of the constraints in the implementation of TB DOTS is the lack of necessary resources to provide service. All facilities provide DOTS service, but there were only half of the facilities 50% fully provide DOTS by trained full-time DOTS providers. The rest provides DOTS by untrained providers in the absence of those trained DOTS providers. Similarly, Study in Ethiopia revealed that of those facilities offering any TB services only 60% have trained staff(26). These might be due to a shortage of responsible (permanent) trained humanpower on TB DOTS in general and workload on those permanently assigned trained care providers.

All TB focal persons had received training within the previous year. Moreover, this result is supported by WHO recommendation, "all health workers should be familiar with recent information at least once in a year" To maintain quality in the implementation of DOTS, care providers must be updated to current evidence-based information. Training is also necessary to encourage adherence to national protocols and guidelines introducing some degree of standardization in providing DOTS treatment. Strengthening human resource is also one of the integral components of the Stop TB Strategy because expanding access to TB care depends on the availability of well-trained health workers(24). This means there is in-service training for TB focal person on a continuous base.

All facilities have a separate room for TB treatment. However, only half of the studied facilities had standard TB unit with waiting room and good ventilation. The WHO and Ethiopian Food, Medicine & Healthcare Administration and Control Authority (FMHACA) specifically recommend health facilities to have a separate room with at least 7.5 to 9 square meters floor and

4 square meters window area to be a minimum prerequisite in establishing or providing DOTS of TB treatment service (12,42). This means TB treatment providing rooms are under standard at least their ventilation system and waiting areas were not fulfilled this is due to TB treatment units are not constructed as a standard from the beginning especially in some of the health centers there is no space to construct as well.

Concerning to availability of essential TB drug Standardized regimen for existing TB patients (adult) was fulfilled only in half of the health facilities. This finding was inconsistent with WHO recommendation to use standardized treatment regimen for existing TB patients on DOTS for simpler implementation, simpler drug supply management, easy to train HCWs, reduces the chance of error in regimen construction and minimizes the need for sophisticated culture and DST laboratories(1). This is comparable with the findings of studies conducted in Jimma Zone the minimum buffer stock level is not ensured for existing TB patients; because of this frequent stock out of anti TB, drugs were common in the area(32). However, WHO and FMOH recommended that an adequate supply of drugs and equipment are part of programmatic activities at each level of TB control program (1,28).

In the current study, the reason for the observed gap might be due to the absence of one responsible person in treatment service providing to follow up and request drugs timely. In addition to this in some of the health facilities high flow of TB patients than expected, shortage of drugs from the source and absence of a safe and adequate place to put standardized regimen were the reason.

All of the studied facilities had recording formats, but there were poor information communication materials (IEC materials and TB posters were not available in all facilities). Similarly study in Tigray revealed that, in most of health facilities, teaching materials were scarce and patients were taught in groups(29).This finding is inconsistent with the national recommendation of "all parties involving in TB control program should use IEC/BCC materials(1)." This means attention was not given for dissemination of health education and behavioral change communication. This might be due to the participation of untrained care providers in service provision; mainly they focus on only providing the drugs and observation while patients swallowing the drugs.

DOTS provided on weekends only in one-third of study sites. However, TB patients received their drugs at home. This result is lower than Study conducted in Tigray region daily outpatient TB services were available in 31 (71%) of 44 health facilities, while in the remains there were only available on specific days of the week (29).

This finding is contradicted with national guideline recommendation, "daily administration of all doses of six months of the treatment should be implemented under DOT in Ethiopia considering the high HIV and MDR-TB prevalence"(1). This might be due to poor provider-patient interaction and information communication gap. This gap may lead patients to exhaust to visit health facilities daily and their motivation will be decreased. Convincing and observing patients during their intake of medication on a continuous base are essential in order to enhance treatment adherence and prevent the development of DR-TB.

7.2. Compliance Dimension

According to national guideline recommendation in order to achieve the designed aid of treatment, an anti-TB treatment regimen should be administered based on the standard: in appropriate combination of drugs, in the correct dosage, regularly taken by the patient, and for a sufficient period of time (1). However, the current study showed that, during the initial phase of therapy, 91.7% of the patients were treated to the DOTS recommended drug regimen and during continuation phase, 79.1 % of patients were treated according to DOTS drug regimen. However, 20 (5.2%) patients and 60(17.6%) patients 'prescribed drugs were not the recommended dose on intensive and continuation phase of treatment respectively. whereas, 11(2.86%) patients on intensive phase and 8(2.4%) on continuation phase patients prescribed dose was not recorded.

Similarly, from three of observed patients who transferred to continuation phase none of them were measured their weight, they assigned by considering their previous weight. This result is better than the findings of the study carried out in Egypt (87.5% and 74.7%) of the cases were treated with correct DOTS drug regimen during the initial and second phase(31). This difference might be because of the difference in the study period and study design.

From observed 45 sessions 5(11.1%) TB patients who came to collect TB drugs from one of the studied facility were not observed while swallowing the drug. However, other TB patients follow DOTS in five of health facilities 40(88.9%) were observed while swallowing their drugs. And

also none of the patients were asked if they had a question. From 13 patients who asked question 10 patients question was responded by care providers. Treatment service has given by different HCPs rather than trained TB DOTS provider and they may forget to record. Twelve out of 45 (33.3%) observed patients were treated by untrained TB DOTS providers. This contradicts with the national guideline" National TB program recommends supervision of treatment to be made by a trained health worker, Health extension worker or a trained TB treatment supporter."(1)

Treatment monitoring chart of 10 (22.2%) patients were not filled in TB register immediately after treatment. Similarly, Study conducted Sidama zone (26.8%) and Unlike this study conducted in Tigray only (6.8%) patients were initiated and continued without recording full information needed to start treatment and monitoring the progress(28)(29). The reason for this might be treatment service has given by different HCPs rather than trained TB DOTS provider and they forget to record. This contradicts with FMOH and WHO DOTS recommendation "recording and reporting on a continuous basis are crucial to ensure and improve the quality of anti-tuberculosis care"(1,17).

This study also showed that from total 156 finished intensive and 150 on continuation phase smear-positive PTB patients, 73.7%, 50%, and 52,7% have got smear follow up test at the end of the 2^{nd}, 5^{th} and 6^{th}months of treatment, respectively. This result is lower than that of Study in Jimma zone from total 48 smear positive PTB patients, 87.5% and 56.2% have got smear follow up test at the end of the 2^{nd} and 5^{th} month of treatment. And better than that of 6^{th} months of treatment (37.5%) (32). From observed patients, none of them were informed schedule of the next sputum examination. But this result contradicts with the national TB control program, which recommends that all sputum-positive patients on TB treatment must have one sputum specimen follow up test at the end of 2^{nd}, 5^{th} and 6^{th}months (1). This might be due to a shortage of permanently assigned trained the responsible person on service and untrained care providers forget to remind the patients and monitoring their progress.

Concerning service provision management of TB cares, all studied health facilities supervised quarterly. This finding is also supported by national and international recommendations "supervision should be conducted and organized at various levels of organization in quarterly base(1)". This finding is much better than studies conducted in Tigray regional state where eight

focal persons from forty-four facilities were supervised by district TB officers (27,30). This might be a current study conducted in town and due to its convenience for supervision.

7.3. Satisfaction of TB patients (Access Dimension)

Measuring patient satisfaction level has been increasingly becoming a measure to evaluate health care services directly provided to the patient. Moreover, patient satisfaction is often viewed as a variable that is influenced by access to care(34).

Majority of patients were satisfied with the availability of treatment service, necessary drugs and laboratory service 135(96.4%), 124(88.6%) and 91(65%) respectively. The reason for relatively low satisfaction observed on laboratory service was due to laboratories was not opened at work time in some of the health facilities.

Regarding accommodation about 105(75%) patients were satisfied with the convenience of TB clinic working hours,85(60.7%) patients satisfied with the daily visit and 120(85.7%) TB patients satisfied with waiting time. The reason for high dissatisfaction observed on daily visit might be lack of information communication.

Most of TB patients 129(92.1%) were satisfied with friendliness/courtesy of the providers, 119(85%) patients satisfied with attention and respect of providers, 104(74.3%) knowledge and competency of the care provider. In addition to this, 19.3% were dissatisfied with adequacy of explanation about the treatment. This might be because of the gap in provider-patient interaction. Effective interpersonal communication between health care providers and patients are one of the most important elements for improving patient satisfaction, and facilitate for providers to comply with guideline recommendation.

Service provision is provided by trained and untrained care providers and most providers focus only on the daily provision of drugs DOT. Moreover, in most of the health facilities for trained one, it is difficult to follow the national guideline standard because they were overburden and they are not fully assigned on service provision.

The overall patient satisfaction with TB DOTS service among TB patients who were interviewed were 80.4% this result is lower than the study conducted in Uttar Pradesh, India 85% patients are satisfied by the service provided for them. The causes for satisfaction were easy availability of

the medicines nearby their homes or working place, good patient-provider interaction, motivation and health education about the disease(35).

Similarly, The current study result is also much lower than the study conducted in Sidama zone 90% of the respondents were satisfied with TB treatment service(36). Patients' perceptions on the health care provider interaction; Perceived professional care, accessibility, technical competency, convenience, consultation and Waiting time were identified as the reason for patient satisfaction on TB treatment service. As knowledge and competence of care providers increase patient satisfaction will increase. Patients' adherence to treatment and willing to daily visit health facility will be also increased; during this providers also comply with the guideline.

Limitation

- ✓ During observation of provide-patient interaction care provider might act as guideline by recognizing they are observed.
- ✓ Since the study is conducted at health facilities there might be information bias, patients might be respond in a relatively positive way fearing of being recognized.

Chapter Eight: Conclusion and Recommendation

8.1. Conclusion

TB DOTS was implemented partially in Jimma town public health facilities. The major constraints observed regarding the availability of necessary resources to deliver TB DOTS service was the absence of pediatric dose of TB drugs, shortage of adult dose of TB drugs, and shortage of full time trained TB DOTS provider in three of HFs and workload on those full time trained DOTS providers.

Likewise, major problems observed on compliance dimension were absence of measuring weight of patients at the end of intensive phase and prescribing incorrect dose of drug, absence of DOT in one of the health facilities, low compliance of care providers not requesting all TB patients sputum examination at the end of 2^{nd}, and $5^{th}/6^{th}$ month and poor provider-patient interaction were some of the constraints.

Even though all patients were satisfied with the majority of access items, relatively high proportion of TB patients dissatisfied with daily visiting of HFs and with knowledge and competency of care provider and adequacy of explanation about the treatment.

8.2. Recommendation

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

To health care providers

- ✓ TB DOTS providers should be strictly complying with all elements of DOTS strategy as Implementation of TB DOTS service highly depends on these elements.
- ✓ Attention should be given to a timely request for both adult and a pediatric dose of essential TB drugs.
- ✓ As patients' satisfaction was not as such satisfactory great emphasis should be given for interaction and information communication with TB patients.

To Health Facilities

- ✓ Attention should be given how to assign responsible and trained-full time HWs who could provide TB DOTS service as standard.

To Jimma Town Health Office

- ✓ Supervision should include written feedback
- ✓ Efforts should be made to increase the standards of TB units.

To Jimma Zone Health Department

- ✓ Ongoing refreshment training and training on information communication skills should be given for health workers assigned on DOTS.
- ✓ Distribution of drugs, supplies, medical equipment, IEC materials, and posters should be ensured.

To Regional Health Bureau:-

- ✓ The regional health bureau should be mobilize government and nongovernmental organizations to improve health facilities' infrastructure waiting areas, IEC materials and equipment.

Chapter Nine: Meta evaluation

This Meta evaluation will focus on summative Meta evaluation on implementation evaluation of TB DOTS, in Jimma town by considering program evaluation standard (Utility, feasibility, propriety and accuracy).The tool was adapted from Daniel L. Stufflebeam. The tool contains 30 sub standards 85 items (checkpoints) in four standards. The Judgment parameter was decided to be Excellent, if >85% V. Good, if 75-85%, Good, if 60-74% Fair, if 45-60% Poor, <45%. The overall status of the evaluation was measured 85% percent which was excellent according to the standards criteria (43).

9.1. Utility standard

To enhance use of the finding this evaluation was fully participatory from the beginning to end. Key stakeholders are identified at the beginning and they were participating throughout the evaluation process to consider information need. This will ensure utilization and enhance use of the finding of major intended users. The judgment criteria of this evaluation were set with stakeholders and the indicator are also commented by them and commented by advisors. Report was prepared based on evaluation question and conclusion and recommendation was set for program improvement. This standard was measured by 21 cheek pointes among this 16 of them were scored yes/met, which was scored 85% based on judgment parameter.

9.2. Propriety standard

There should no procedure that affects the privacy, dignity, confidentiality, and rights of participants. Ethical Issues of the evaluation protocol was respected. This is for ensuring that the evaluation fulfills the propriety standards. These standards deal with respecting the rights of human subjects, compliance with agreements about the confidentiality of information gathered, the appropriate release of results and others. This standard was measured by 24 cheek pointes among this 21 of them were scored yes/met, which was scored 87.5 % based on judgment parameter.

9.3. Feasibility standard

TB prevention and control program by using the DOTS and other strategy is a well-established program with national guideline that makes certain the availability of adequate data for the evaluation. The cost was considered the presence of limited resources and the resources which were used are justifiable for benefits of program improvement. This standard was measured by 10 cheek pointes among this 7 of them were scored yes/met, which was scored 70% based on judgment parameter.

9.4. Accuracy standard

Scientific methods were followed during data collection, analysis, and presentation techniques. Quality control strategies were well formulated. Data were collected from multiple sources by using multiple methods and triangulation to reach a valid conclusion by program document review, in-depth interview for care providers and observation during service provision. This standard was measured by 30 cheek pointes among this 27 of them were scored yes/met, which was scored 90% based on judgment parameter.

Reference

1. Federal Ministry of Health Ethiopia: National Guidelines For TB, DR-TB and Leprosy in Ethiopia Sixth Edition November 2017 Addis Ababa. 2017;(November).

2. Reves R , Angelo, S . As Ethiopia Moves toward Tuberculosis Elimination,Success Requires Higher Investment. Ethiopia: Center for Strategic and International Studies; 2016.

3. World Health Organization. Global tuberculosis [Internet]. Geneva; 2017. Available from: http://apps.who.int/irs.

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

5. World Health Organization. Treatment of tuberculosis Guidelines. Fourth Edi. WHO, editor. Geneva, Switzerland; 2009.

6. Wells WA, et al. Tuberculosis regimen change in high-burden countries. Int J Tuberc Lung Dis. 2010.

7. Fiseha D, Demissie M. Assessment of Directly Observed Therapy (DOT) following tuberculosis regimen change in Addis Ababa , Ethiopia : a qualitative study. BMC Infect. Dis. BMC Infectious Diseases; 2015;(November).

8. Federal Minister of Ethiopia. Guidelines for clinical and programmatic management of TB, Leprosy and TB/HIV in Ethiopia. fifth. Addis Ababa; 2012.

9. Medicins Sans Frontieres and Partners in Health. Tuberculosis practical guide for clinicians, nurses, laboratory technicians and medical auxiliaries. 2014th ed. 2014.

10. Cox HS, Morrow M, Deutschmann PW. Long term efficacy of DOTS regimens for tuberculosis :systematic review. BMJ. 2008;(July 2009).

11. World Health Organization. The Stop TB Strategy: Building on and enhancing DOTS to meet the TB-related Millennium Development Goals. 2006.

12. World Vision. Technical Guideline for Tuberculosis (TB) and TB-HIV Program Implementation. 2017.

13. World Health Organization. Companion handbook to the WHO guideline for the programmatic management of drug-resistant tuberculosis. Geneva, Switzerland; 2014.

14. Eshetie S, Gizachew M, Dagnew M, Kumera G, Woldie H, Ambaw F, et al. Multidrug resistant tuberculosis in Ethiopian settings and its association with previous history of anti-tuberculosis treatment : a systematic review and. BMC Infectious Diseases; 2017;(April).

15. World Health Organization. An Expanded DOTS Framework for Effective Tuberculosis Control. Geneva; 2002.

16. Iinternational council for Nurses. TB Guidelines for Nurses in the Care and Multi-drug Resistant Tuberculosis. 3rd ed. Geneva, Switzerland: Iinternational council for Nurses; 2015.

17. Jimma Town Health Office. Annual plan of prevent and control of TB, Leprosy and TB-HIV. Jimma;

18. U.S. Departement of Health and Human Services Centers for Disease Control and prevention. Introduction to Program Evaluation for Public Health Programs : A Self-Study Guide. 2011.

19. Linda G. Morra-Imas RCR. The Road to Result Designing and Conducting Effective Development Evaluation. Washington DC: The World Bank; 2009.

20. Pinet G. Good Practice in Legislation and Regulations for TB Control : An Indicator of Political Will. Geneva, Switzerland: WHO; 2001.

21. CDC. Source : Framework for Program Evaluation in Public Health. 1999;48.

22. Centre for International Development and Training. A Guide for Developing a Logical Framework. University of Wolverhampton; 1902. p. 1–27.

23. FMOH.Revised Strategic Plan Tuberculosis, TB / HIV, MDR-TB , and Leprosy Prevention and Control 2006-2013 EC. 2020;(October 2013):1–166.

24. world Health Organization. The Global Plan To Stop TB 2011-2015.

25. Luhaiima TR, Graduate MAC, Phil D. An evaluation of the implementation of tuberculosis policies at a regional hospital in the Limpopo Province. 2008;(December):31–8.

26. Bekele A, Defar A, Tadesse M, Teklie H. Tuberculosis service provision in Ethiopia : Health Facility Assessment Tuberculosis Service Provision in Ethiopia : Health Facility Assessment. 2015;(January).

27. World Health Organization. Treatment of Tuberculosis: Guidelines for National Programs. Second Edi. Geneva, Switzerland; 1997.

28. Shargie EB, Lindtjorn B. DOTS improve treatment outcomes and service coverage for tuberculosis in South Ethiopia: A retrospective trend analysis. 2005;(July).

29. Mesfin MM, Newell JN, Walley JD, Gessessew A, Tesfaye T. Quality of tuberculosis care and its association with patient adherence to treatment in eight Ethiopian districts. 2009;44(August).

30. Donabedian A. An Introduction to Quality Assurance in Health Care. Rashid B, editor. OXFORD University Press; 2003.

31. Abdel-aziz BF. Assessment of the implementation of DOTS strategy in two chest facilities in Alexandria , Egypt. 2015;(November).

32. Dangiso DD, Logita DH. Process Evaluation of Quality in the Diagnosis and Treatment of Tuberculosis in Public Health Facilies of Southwes Ethiopia : Cross Sectional Study. 2016;6(October 2015).

33. WHO treatment guidelines for drug- resistant tuberculosis 2016. 2016;(October).

34. Jacobs B, Ir P, Bigdeli M, Annear PL, Damme W Van. Addressing access barriers to health services : an analytical framework for selecting appropriate interventions in low-income Asian countries. 2011;

35. Gupta S. Evaluation of Patient Satisfaction Level Undergoing DOTS Theraphy in Meerut District of Uttar Pradesh. 2015;3(2).

36. Sahile Z, Ejigu T. Patient satisfaction on tuberculosis treatment service and adherence to treatment in public health facilities of Sidama zone , South Ethiopia. 2013;(March).

37. Petter H. Rossi HE, Freeman MWL. Evaluation: A systematic Approach. Sixth Edit. Laughton CD, editor. Sage Publications; 1999.

38. Zainal Z. Case study as a research method. 2007;

39. Muriel J. Evaluating Public and Community Health Programs.

40. Bowels KE, Kang dufour M-S Evaluation Toolkit: patient and provider perspective about Routine HIV Screening in Health Care Settings. Centers Dis Control Prev (Internet) 2012;21-7. Available from: http://www.cdc.gov/hiv/topics/testing/healthcare/index.htm

41. WHO. A Patient-Centred Approach To TB Care.Recommended TB patient care and support interventions to enhance treatment effectiveness 2018.

42. Federal Minister of Ethiopia. Development of the National Minimum Standards for Healthcare Facilities in Ethiopia: A Milestone for Country Ownership and Sustainability of Best Practices. 2014;(June).

43. Stufflebeam LD. Evaluation models, new directions for Evaluation American Evaluation Associations, San Francisco, Jossy-bass, November 2001

Annexes

Annex 1: Information matrixes

Table 12: Information matrix for availability of necessary resource in Jimma town public health facilities, 2019

Evaluation Question	Availability Indicator	Source of data	Data collection Method	Data collection tools
Are resources available to deliver TB DOTS? If yes, how? If no, why?	Number of HFs where trained full time DOTS providers are available	Head of facility	Questioner	Checklist
	Number of HFs where standard TB unit is available	Focal person	Questioner/ Observation	Checklist
	Number of HFs where adequate amount of adult dose of TB drugs are available	TB unit/ focal person	Questioner/Observation	Checklist
	Number of HFs where adequate amount of pediatric dose of TB drugs are available	TB unit/focal person	Questioner/Observation	Checklist
	Number of HFs where adequate amount of AFB reagents are available	Lab. unit	Questioner/Observation	Checklist
	Number of HFs where functional adult weighing scales for DOTS service is available	TB unit/focal person	Questioner/Observation	Checklist
	Number of HFs where functional pediatric weighing scales for DOTS service is available	TB unit/ focal person	Questioner/Observation	Checklist
	Number of laboratory units where functional microscopy is available	Lab. Unit/ laboratory technician	Questioner/Observation	Checklist
	Number of laboratory units where laboratory AFB registration book is available	Lab. Unit/ laboratory technician	Quantitative/Observation	Checklist

	Number of TB unit where standard TB unit register is available	TB unit/focal person	Quantitative/Observation	Checklist
	Number of TB treatment providing unit where IEC/BCC materials are available	TB unit	Quantitative/Observation	Checklist
	Number of TB unit /TB treatment providing unit/ where program guideline is available	TB unit	Questioner /Observation	Checklist
	Number of trained TB DOT providers in the last one year	Head of facility/Focal person	Questioner	Checklist

Table 13: Information matrix for compliance TB DOTS service providers to national TB guideline in Jimma town, 2019

Evaluation question	Indicator	Numerator and denominator for compliance indicators	Data source	Data collection method	Data collection tool
Is HCPs compliance to NT&L guideline? If yes, how? If no, why?	Proportion of patient whose weight is measured	Number of patients enrolled in DOTS service from April 1/2017 to March 1/2019 whose weight were measured Total number of TB patients enrolled in DOTS service from April 1/2017 to March 1/2019	Document/ CPs and patient interaction	Document review /observation	Checklist
	Proportion of TB patients who enrolled in correct dose of treatment on intensive phase	Number of TB patients who enrolled in correct dose of treatment on intensive phase from April 1/2017 to March 30/2019 Total number of TB patients start TB DOTS Rx. from April 1/2017 to March 1/2019	Document/ CPs and patient interaction	Document review /observation	Checklist
	Prop. of TB patient who enrolled in correct dose of treatment on continuation phase	Number of TB patient who enrolled in correct dose of treatment from April 1/2017 to March 1/2019 Total number of TB patient under TB DOTS transferred to continuation phase from April 1/2017 to March 30/2019	Document CPs and patient interaction	Document review /observation	Checklist
	Proportion of smear positive PTB whose sputum follow up performed at the end of 2nd month of Rx	Number of smear positive PTB patients whose sputum follow up performed at the end of 2nd month of Rx from April 1/2017 to March 1/2019 Total number of smear positive PTB patients who follow DOT from April 1/2017 to March 1/2019	Document	Document review	Checklist
	Proportion of smear positive PTB for who sputum follow up performed at the end of 5th month of Rx	Number of smear positive PTB patients whose sputum follow up performed at the end of 5nd month of treatment from April 1/2017 to March 1/2019 Total number of smear positive PTB patients who follow DOT for ≥ 5 month	Document	Document review	Checklist

	Proportion of smear positive PTB for who sputum follow up performed at the end of 6th month of Rx	Number of smear positive PTB patients whose sputum follow up performed at the end of 6th month of treatment from April 1/2017 to March 1/2019 Total number of smear positive PTB patients who follow DOT for ≥ 6 months from April 1/2017 to March 1/2019	Document	Document review	Checklist
	Proportion of complete reports submitted to health office	Number of complete reports submitted to Jimma town health office from April 1/2017 to March 1/2019 Total number of reports submitted to Jimma town health office from April 1/2017 to March 1/2019	Document	Document review	Checklist
	proportion of HFs supervised by TB program expert in the last six months	Number of TB DOTS providing HFs supervised by TB program expert in the last six months Total number of TB DOTS providing HFs in Jimma town	Focal person	Interview	Checklist
	Proportion of TB DOTS providing HFs with adequate EQA performance	Number of TB DOTS providing HFs with adequate EQA performance Total number of TB DOTS providing HFs	Document	Interview	Checklist
	Proportion of TB patients adequately counseled during TB DOT service	Number of TB patients adequately counseled during TB DOT service at a time of data collection Total number of TB patients enrolled in TB DOT service at a time of observation	CPs and patient interaction	Observation	Checklist
	Proportion of TB patients observed while swallow the drugs	Number of TB patient observed while swallow the drugs at a time of data collection Total number TB patient enrolled in DOT service at a time of data collection	CPs and patient interaction	observation	Checklist

Table 14: Information matrix for satisfaction of TB patients under DOTS service in Jimma town, 2019

Evaluation Question	Dimension	Indicator	Numerator and denominator for indicators	Source of data	Data collection Method	Data collection tools
Are TB patients satisfied by service provided for them? If yes how? If no why?	Availability	Proportion of TB patients satisfied with the availability of laboratory service when needed	# of TB patients satisfied with the availability of laboratory service when needed / Total number of TB patients visit health center at a time of study period	TB patients	Interview	Questioner
		Proportion of TB patients satisfied with availability of necessary drugs	# of TB patients satisfied with availability of necessary drugs when needed / Total number of TB patients visit health center at a time of study	TB patients	Interview	Questioner
		Proportion of TB patients satisfied with presence of TB DOTS treatment service	# of TB patients satisfied with presence of TB DOTS treatment service / Total number of TB patients visit health center at a time of study	TB patients	Interview	Questioner
	Accommodation	Proportion of TB patients satisfied with the daily visiting of health center for TB treatment	# of TB patients satisfied with the daily visiting of health center for TB treatment / Total number of TB patients visit health center at a time of study	TB patients	Interview	Questioner
		Proportion of TB patients satisfied with convenience of TB unit working hours	# of TB patients satisfied with convenience of TB unit working hours / Total number of TB patients visit health center at a time of study	TB patients	Interview	Questioner
		Proportion of TB patients satisfied with time spent in waiting room	# of TB patients satisfied with time spent in waiting room / Total number of TB patients visit health center at a time of study	TB patients	Interview	Questioner

	Acceptability	Proportion of TB patients satisfied with the friendliness/courtesy of the providers	# of TB patients satisfied with the friendliness/courtesy of the providers Total number of TB patients visit health center at a time of study	TB patients	Interview	Questioner
		Proportion of TB patients satisfied with the attention and respect of providers to their privacy	# of TB patients satisfied with the attention and respect of providers to their privacy Total number of TB patients visit health center at a time of study	TB patients	Interview	Questioner
		Proportion of TB patients satisfied with the competence/knowledge of the providers	# of TB patients satisfied with the competence/knowledge of the providers Total number of TB patients visit health center at a time of study	TB patients	Interview	Questioner
		Proportion of TB patients satisfied with the adequacy of counseling	# of TB patients satisfied with the adequacy of counseling Total number of TB patients visit health center at a time of study	TB patients	Interview	Questioner

Annex 2: Relevance matrix of indicators

Table 15: Relevance matrix of indicators used for evaluation of implementation of TB DOTS service in Jimma town public health facilities, 2019

Indicator	Availability	Compliance	Satisfaction
Availability indicators			
Number of HFs where full time DOTS providers are available	RR	RR	RR
Number of HFs where standard TB unit is available	RR	RR	R
Number of HFs where adequate amount of adult dose of TB drugs are available	RRR	RRR	RRR
Number of HFs where adequate amount of pediatric dose of TB drugs are available	RR	RR	R
Number of HFs where adequate amount of AFB reagents are available	RR	RR	R
Number of HFs where functional weighing scales of adults for DOTS service is available	RR	RR	R
Number of laboratory units where functional microscopy is available	RR	RR	R
Number of laboratory units where laboratory AFB registration book available	RR	RR	R
Number of TB unit where standard TB unit register is available	RR	RR	R
Number of TB treatment providing unit where health education materials are available	RR	RR	R
Number of TB unit /TB treatment providing unit/ where program guideline is available	RRR	RRR	R
Number of TB DOT providers received training	RR	RRR	R
Compliance indicators			
Proportion of patient whose weight is measured	RR	RRR	R
Proportion of TB patients who enrolled in correct dose of treatment on intensive phase	RRR	RRR	R
Proportion of TB patients who enrolled in correct dose of treatment on continuation phase	RRR	RRR	R
Proportion of smear positive PTB for who sputum follow up performed at the end of 2nd month of Rx	R	RRR	R
Proportion of smear positive PTB for who sputum follow up performed at the end of 5th month of Rx	R	RR	R
Proportion of smear positive PTB for who sputum follow up performed at the end of 6th month of Rx	R	RR	R

Proportion of complete reports submitted to health office	R	RR	R
Number of HFs supervised by TB program expert in the last six months	RR	RR	R
Proportion of TB DOTS providing HFs with adequate EQA performance	RR	RRR	R
Proportion of TB patients who receive adequate counseling during TB DOTS	RR	RRR	R
Proportion of patients observed while swallow the drugs	R	RRR	RR
Proportion of TB patients satisfied with the availability of laboratory service when needed	R	R	RRR
Proportion of TB patients satisfied with availability of necessary drugs	R	R	RRR
Proportion of TB patients satisfied with availability of TB DOTS treatment service	RR	R	RR
Proportion of TB patients satisfied with the daily visiting of health center for TB treatment	R	RR	RRR
Proportion of TB patients satisfied with convenience of TB unit working hours	RR	RR	RRR
Proportion of TB patients satisfied with time spent in waiting room	RR	R	RR
Proportion of TB patients satisfied with the friendliness/courtesy of the providers	R	RR	RRR
Proportion of TB patients satisfied with the attention and respect of providers to their privacy	R	RR	RRR
Proportion of TB patients satisfied with the competence/knowledge of the providers	R	R	R
Proportion of TB patients satisfied with the adequacy of counseling	R	R	R

Annex 3: Data collection tools

Data extraction check list for TB patient charts/document review

Name of HC_____

Name of data collector_____ sig. _____

Name of supervisor _____ sig. _____

Instruction*: Mark (√) if the following evidences were recorded in TB patient chart, and mark (X) if not and write what is written on the document for which write is in the bracket.*

s/n	Unit TB no.	Patient name(mark)	Patient address(mark)	Sex	Contact name(mark)	Contact address(mark)	Age (write)	Smear result(write)	Lab no.	Weight (write)	Category(mark)	P/Pos.	P/neg.	EPTB	Intensive phase(write)		DATE RX started(write)	Month RX started(write)	No. days RX interrupted(write)	HIV test offered(write)	HIV result(write)	Sputum follow-up In month(mark)					Continuation (write)phase(write)		No. days RX interrupted	Treatment outcome(mark)						
															Drug	Dose						2nd	3rd	5th	6th	weight (write)	Drug	Dose		Cured	Completed	Died	Failure	Default	Transferred out	Others

Exit Interview for TB patients

Consent forms for TB patients at _____ HC

Dear sir/ madam My name is _____ I am a member of an evaluation team of implementation evaluation of TB DOTS strategy in Jimma town public health facility. It is believed that strongly implemented TB DOTS service increases clients' satisfaction, which contributes to increase good treatment outcome. The purpose of this study is to evaluate the implementation status of TB DOTS service provided in public health facilities and level of satisfaction of Tuberculosis patients, and finally to give important comment that will help to strengthen and improve quality of service. To do this, your information is very important. I would like to ask you a few questions about your visit to the health facility to find out your experience today. I would be very grateful if you could spend a few minutes to answer questions related to the service. your name will not be recorded and all information you give will be kept strictly confidential. Your participation is voluntary and you are not forced to answer any questions you don't want. But your honest participation will contribute to generate information that can be used to improve the quality of implementation of TB DOTS service.

Do I have your permission to continue? Yes _____ No_____

Name of HC_____
Name of data collector_____ sig. ____
Name of supervisor _____sig._____
Date _____

S.N	Questions	Response
Socio-Demographic and General Characteristics of Patient		
1	Gender of respondent	1. Male 2. Female
2	Age	_____
3	Marital status	1. Married 4. Divorced 2. Single (Never married) 5. Widowed 3. Separated
4	Family size	_____
5	Residence	1. Urban 2. Rural
6	Highest education level	1. Diploma and above 4. Primary school 2. Preparatory 5. No formal education 3. Secondary school
7	Occupation	1. Permanent employee 4. Unemployed 2. Self employee 5. Pensioner 3. Temporary employee
8	Religion	1. Orthodox 2. Protestant 3. Catholic 4. Muslim 5. No religion 6. Other
9	Type of TB	1. Pulmonary positive TB 2. Pulmonary Negative TB 3. Extra Pulmonary TB
10	Treatment category from card	1. New 4. Return after Defaulted 2. Relapse 5. Transfer in 3. Treatment after Failure 6. Other(specify_____
11	When did you start TB treatment	(DD/MM/YYYY)_____
12	Do you have TB symptoms now	1. Yes 2. No
13	Total planned treatment duration	1. Six months 2. Eight months 3. Other (specify)_____
14	Currently how you are collecting your TB drugs	1. Daily 2. Weekly 3. Monthly 4. Other
15	Did you expect to come and collect the drugs every ------for this much time?	1. Yes 2. No
16	Do you think that you and HCPs have good communication?	1. Yes 2. No

Satisfaction with the services provided

The following are statements about different characteristics that client satisfies with. Please answer according to your agreement in the statement.

Number from 1-5 represents your satisfaction level with each statement, and rate as follow based on your agreement:5 =Very satisfied 4 =satisfied 3= Neutral 2 =Dissatisfied 1 =Very dissatisfied

Table: Patient Satisfaction Questions

S.N	Client satisfaction item	v. satisfied	Satisfied	Neutral	Dissatisfied	v. dissatisfied
Availability dimension						
1	How satisfied are you with the availability of necessary drugs when needed?					
2	How satisfied are you with availability of labratory service when needed?					
3	How satisfied are you with presence of TB treatment service providers at work time?					
Accommodation dimension						
1	How satisfied are you with the daily visiting of health center for TB treatment?					
2	How satisfied are you with convenience of TB unit work hours?					
3	How satisfied are you with time spent in waiting room?					
Acceptability dimension						
1	How satisfied are you with the friendliness/courtesy of the providers?					
2	How satisfied are you with the attention and respect of providers to your privacy?					
3	How satisfied are you with the competence/knowledge of the providers?					
4	How satisfied are you with the adequacy of explanation about treatment?					

Inventory checklists to assess availability of resource for providing TB DOTS

Name of HC_____ Name of data collector_____ sig._____

Name of supervisor _____ sig. _____ date_____

NOTE: check for expire date of reagents and drugs, describe appropriately

A. Check list to assess availability of resource for providing TB DOTS

Item No.		Yes	No	Remark	
1	Is health facility has full time trained TB DOT provider?				
2	Is the standard TB unit available?				
3	Is HF has functional adult weighing scales for DOTS service?				
4	Is HF has functional pediatric weighing scales for DOTS service?				
5	Is laboratory units has functional microscopy?				
6	Is HF has essential laboratory equipment?*				
7	Is HF has adequate amount of AFB reagents?				
8	Is HF TB unit has standard TB unit register?				
9	Is HF laboratory units has laboratory AFB registration book?				
10	Is TB DOT providers received training within one year?				
11	Is HFs has updated TB DOTS guideline?				
12	Is HF has health education (EIC) materials?				
13	Is this HF with adequate EQA performance?				
14	Essential drugs for adverse effect management				
		Yes	No	If yes quantity in Number	Remark
15	Is HF has adequate amount of adult dose of essential TB drugs?				
15.1	RHZE tabs				
15.2	RH tabs				

16	Is HF has adequate amount of pediatric dose of essential TB drugs?				
16.1	RHZ tabs				
16.2	E tabs				
16..3	RH tabs				
17	STM vials				

**6 Functional Binocular light Microscopes, Slide, Frosted slide, Slide box, Sputum containers approved, Wire loops or sticks, Funnel, Filter paper, Staining rack, Sprit lamp/Bunsen burner , Lens tissue, Red pen Recording for positive result , Carbol fuchsine, Methyl blue 52 3% acid alcohol, Oil immersion, Forceps for holding slide and fixing , Alarm clock 56 5% phenol or 10% Sodium hypo chloride*

Provider-patient interaction observation checklist

Name of HC_____

Name of data collector_____sig._____

Name of supervisor _____ sig. _____

Checklist to assess compliance of TB DOTS care provider to national guideline

NOTE:This assessment should be completed by observing care provider while providing TB DOTS

Q.N		Yes	NO
1	Did care provider greet a patient politely?		
2	Did care provider ask patients (or caregivers, if patients are children) if they missed any days of therapy?		
3	If they (patients/ caregivers) missed days, did care provider ask what was done (e.g., took the next day) and counsel for better adherence (If no problems, ask HCW how they would counsel patient)		
4	Did the provider stress very well about the problem of defaulting& explain the method they can be easily traced ?		
5	Did care provider ask patients about any new symptoms (possible side effects to treatment)?		
6	While discussing with the patient, did the provider use clear language that patient understand simply...if possible local language		
7	Before the treatment, did the provider measure patient weight?		
8	Did the health worker provide correct drug based on the weight of patient?		
9	Did care provider observe the patient while swallowing the drugs?		
10	Did care provider remind the patient of the schedule of the next sputum examination?		
11	Did the provider let the patient ask any questions the patient may have?		
12	Did the provider respond to patient's questions?		
13	Did the health worker record on the unit register immediately after Consultation of every patient?		

Interview Guide for Qualitative Method

Interview guide to Jimma town TB DOTS program expert

Consent forms

Dear sir/ madam,My name is _____ I came from Jimma University. I am a conducting implementation evaluation of TB DOTS service. The purpose of the study isto find ways of improving the quality of implementation of TB DOTS service. I am interested to know your experiences so far in TB DOTS services. May I ask you some questions about this? Please be assured that this discussion is strictly confidential and your name will not be recorded. Also, you are not forced to answer any question you don't want to, and you may withdraw from the interview at any time.

Do I have your permission to continue? Yes ___No___

Name and signature of the data collector: _____start time _____end time_____

Date of data collection __ /__/ __Name and signature of the supervisor: _____

Age of respondent_____ sex_____

Profession _____ experience in national TB program in this town_____

1. Is there any problem related to TB DOTS program? If yes, what are the problems related to TB DOTS program? What are the likelihood solutions? _____

2. In your opinion, how could compliance of TB DOT providers to national guideline improved? What else? _____

3. Describe the availability of trained health workers involved in TB DOTStreatment in this town? _____

4. Describe the adequacy of drugs and reagents? Is there an occasion of interruption and why? Which items? What measures were taken for interruption or shortage and your suggestion to improve? _____

Thank you

Interview guide to heads of health facilities

Consent forms for all TBDOTS service providers at _____ HF

Dear sir/ madam, My name is _____ I came from Jimma University. I am a conducting implementation evaluation of TB DOTS service. The purpose of the study is to find ways of improving the quality of implementation of TB DOTS service. I am interested to know your experiences so far in providing TB DOTS services. May I ask you some questions about this? Please be assured that this discussion is strictly confidential and your name will not be recorded. Also, you are not forced to answer any question you don't want to, and you may withdraw from the interview at any time.

Do I have your permission to continue? Yes _____No_____

Name and signature of the data collector: _____start time _____end time_____

Date of data collection __ /__/ __Name and signature of the supervisor: _____

Age of respondent_____ sex_____

Profession _____ experience in national TB program in this HF_____

1. How do you assign TB DOTS provider in TB unit? What else?

_____

2. Have care providers receive training on TB DOTS within the last one year? If no why?

_____

3. In your opinion, how could compliance of TB DOTS care providers to national guideline improved?

_____

4. In your opinion how could availability of resource improved?

5. What are the general problems related to TB DOTS program? What are the likelihood solutions?

6. Describe the adequacy of drugs and reagents? Is there an occasion of interruption and why? Which items?

7. Is this HFs supervised by TB program expert of Jimma town in the last six months? If yes is that supportive?

8. Is EQA performed with in the last three month? If yes, is an adequate performance is observed? if no what is possible reason?

Thank you

Interview guide to TB DOTS providers (TB focal person)

Consent forms

Consent forms for all TBDOTS service providers at _____ HF

Dear sir/ madam, My name is _____ I came from Jimma University. I am a conducting implementation evaluation of TB DOTS service. The purpose of the study is to find ways of improving the quality of implementation of TB DOTS service. I am interested to know your experiences so far in providing TB DOTS services. May I ask you some questions about this? Please be assured that this discussion is strictly confidential and your name will not be recorded. Also, you are not forced to answer any question you don't want to, and you may withdraw from the interview at any time.

Do I have your permission to continue? Yes _____No_____

Name and signature of the data collector: _____start time _____end time_____

Date of data collection __ /__/ __Name and signature of the supervisor: _____

Age of respondent_____ sex_____

Profession _____ experience in national TB program in this HF_____

1. How do you assigned in TB unit? What else?

_____

2. Have you receive training on TB DOT within the last one month? Is the training helpful? If no why?_____

4. In your opinion, how could compliance of TB DOTS care providers to national guideline improved?

_____

5. In your opinion how could availability of resource improved?

6.What are the general problems related to TB DOTS program? What are the likelihood solutions?

7. Describe the adequacy of drugs and reagents? Is there an occasion of interruption and why? Which items?

Thank you

Annex 4: Meta-Evaluation Judgment checklist

Checklist for Judging Evaluation Designs and Reports

Title of Evaluation document: Implementation Evaluation of Tuberculosis Directly Observed Treatment Short-Course Strategy in Jimma Town Public Health Facilities

This judgment checklist contains the four Meta evaluation standards (Utility, feasibility, propriety and accuracy) with their total 30 sub-standards. Each sub-standard also has checkpoints and total points of 90 cheek points.

A. The Requirements for Utility Standard

Sub-Standards and checkpoints	Met criteria			Elaboration
	Yes (1)	No (0)	NA	
U1: Stakeholder Identification				
Does clearly identified the evaluation client				
Does consult potential stakeholders to identify their information needs				
Do arrange to involve stakeholders throughout the evaluation				
Are address stakeholders' evaluation needs				
Does the information to be provided allow necessary decisions about the program to be made?				
U2: Evaluator credibility				
Does the evaluator can address stakeholders' concerns?				
Does the evaluation plan respond to key stakeholders' concerns?				
Do the given stakeholders information technical quality and practicality?				
Do appropriately attend stakeholders' criticisms and suggestions?				
U3: Information scope and selection				
Are the client's evaluation requirements understood?				
Assign priority to the most important stakeholders?				
Does the stakeholders' questions being addressed?				
U4: Values identification				
Do alternative sources of values consider for interpreting findings				
Are a clear, defensible basis for value judgments provide				
Do identify pertinent customer needs				
Do the stakeholders' values take into account?				
U5: Report clarity				
Do reports focus on contracted questions?				

Are conclusions and recommendations have support?				
U6: Report timeliness and Dissemination				
Are make timely interim reports to intended users?				
Does the presentations appropriately being briefed?				
U7: Evaluation Impact				
Do stakeholders' use of findings encourage and support?				
Does make sure that reports are open, frank, and concrete?				
Does supplement written reports with ongoing oral communication?				

B. The Requirements for Feasibility Standards

Sub-Standards and checkpoints	Met criteria			Elaboration
	Yes(1)	No(0)	NA	
F1: Practical Procedures				
Do data burden being minimized?				
Does competent staff appoint?				
Does TOR being developed?				
F2: Political Viability				
Do bias or misapply the findings counteract attempts?				
Do agree on editorial and dissemination authority				
Does any corrupted evaluation terminate				
F3: Cost Effectiveness				
Does program improvement foster?				
Does accountability information provide?				
Do new insights generate?				
Do effective practices spread?				

C. The Requirements for Propriety Standards

Sub-Standards and checkpoints	Met criteria			Elaboration
	Yes(1)	No(0)	NA	
P1: Service Orientation				
Was excellent service promoted?				
Was the evaluation's service orientation clear to stakeholders?				
Are program strengths to build on Identify?				
Were harmful practices exposed?				
P2: Formal Agreement				
Did the evaluation receive ethical approval letter?				
Do confidentiality/anonymity of data formal was assured?				
P3: Rights of Human				
Do stakeholders made clear that the evaluation will respect and protect the rights of human subjects?				
Do stakeholders being informed?				

were participant values understood?				
P4: Human Interactions				
Are relate to stakeholders in a professional manner?				
Did effective communication with stakeholders maintained?				
Did the institution's protocol being followed?				
Be sensitive to participants' diversity of values and cultural differences				
P5: Complete and Fair Assessment				
Do give account of the evaluation's process?				
Do have the draft report reviewed?				
Acknowledge the final report's limitations?				
P6: Disclosure of Findings				
Do define audiences right-to-know the finding?				
Are report all findings in writing?				
Do disclose the evaluation's limitations?				
Do assure that reports reach their audiences?				
P7: Conflict of Interest				
Are potential conflicts of interest identify				
Do engage independent parties to assess the evaluation				
Do engage uniquely qualified persons, even if they have a potential conflict of interest				
P8: Fiscal Responsibility				
Are specify the budget for items expense?				
Do assign responsibility for managing the evaluation finances?				
Does expenditure summary as part of evaluation report?				

D.The Requirements for Accuracy Standards

Sub-Standards and checkpoints	Met criteria			Elaboration
	Yes(1)	No(0)	NA	
A1:Program Documentation				
Do collect the intended program descriptions				
Does describe how the program was intended to function				
Are discrepancies between the various descriptions analyses				
A2:ContextAnalysis				
Do multiple sources of information use to describe the program's context?				
Do estimate context of program outcomes effects?				
A3:Described Purposes and Procedures				
Do identify points of agreement among stakeholders regarding the evaluation's purposes				
Does the actual evaluation procedures record				
A4:Defensible Information Sources				
Are variety sources of information obtained?				
Do employ a variety of data collection methods?				
Do define the population for each source?				
A5:Valid Information				
Do the evaluation focus on key questions				
Do the data collectors train and calibrate				
A6:Reliable Information				
Do the units of analysis specify?				
Do levels of reliability of measuring devices acceptable?				
Is the consistency of scoring, categorization, and coding check and report?				
A7:Systematic Information				
Do establish protocols for quality control of information?				
Are check the accuracy of scoring and coding?				
Do data tables generated from computer output proofread and verify?				
A8:Analysis of Quantitative Information				
Choose appropriate procedures for evaluation questions and nature of the data				
Do examine variability as well as central tendencies?				
Do identify and examine outliers and verify their correctness?				

Do identify and analyses statistical interactions				
A9:Analysis of Qualitative Information				
Do define the boundaries of information to be used				
Do choose appropriate analytic procedures and methods of summarization				
Do test the derived categories for reliability and validity				
A10:JustifiedConclusions				
Do conclusions focus directly on the evaluation questions?				
Do reflect the evaluation findings?				
A11:ImpartialReporting				
Do establish and follow appropriate plans for releasing findings to all audiences?				
Do report perspectives of all stakeholder groups?				
A12:Meta-evaluation				
Do define the standards to be used judging the evaluation?				
Do assign responsible body for documenting and assessing the evaluation process and products?				
Do evaluate the instrumentation, data collection, data handling, coding, and analysis against the relevant standards?				
Do maintain a record of all Meta evaluation steps, information, and analyses?				