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Evaluation of Quality of Tuberculosis Care in Limmu Genet District Hospital, Oromia Region, Ethiopia

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Abstract
Background: Despite many efforts to put TB under control, even now the disease remains to be a major public health problem. However, little is known about the quality of tuberculosis **(**TB**)** service delivery and patient's perspective with the service in Hospitals in Ethiopia in general and the study area in particular**. Objective:** To assess the quality of diagnosis and treatment of tuberculosis (TB) provided at the Limmu Genet District Hospital, Southwest Ethiopia.**Evaluation questions:** The evaluation was aimed to answer the following questions: Were all the necessary resources available for the TB care in Limmu Genet Hospital? How was the compliance of TB care practice in Limmu Genet Hospital with the national guidelines? Were TB patients at Limmu Genet Hospital accommodated with the service they received?**Methods:** A descriptive case study was conducted at Limmu Genet District Hospital. The data collection methods included record review, patient exit interview, observation, and in-depth interview of DOTS providers. In order to assure accuracy standard, data collectors were trained and pre test was done. Descriptive statistics was used to measure both objective indicators and sub objective indicators of quality. The qualitative data were transcribed and organized on the basis of emerging themes and sub-themes. **Result:** Majority of the resources recommended by the TBLCP national guideline including AFB reagents and materials and anti-TB drug, were available for the TB care in Limmu Genet Hospital. The overall compliance score to the TBLCP national guideline was good. However 16.1% of patients were inappropriately categorized for Tuberculosis type and 13.4 % of patients were prescribed in appropriate dosage. **Conclusions and Recommendation:** Separate and confidential waiting room, confidential counseling room and separate room for AFB examination were not available. The evaluation finding for availability dimension was found to be "Good" (in the range of 70-84%)**.:** DOTS providers have to strictly follow the national guideline when opening new AFB reagent and prescribing the correct dose of drugs according to their weight in Limmu Genet Hospital.

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We would like to express our thanks to Limmu Genet Hospital staff and all TB patients on intensive phase.
Introduction

Global situation of TB
Tuberculosis is an infectious disease caused in most cases by microorganisms called mycobacterium tuberculosis. It is a single most frequent cause of death from a single agent individual's age 14 to 49 years. In some countries especially in sub-Saharan Africa, HIV is the driving force in overlapping epidemic with tuberculosis [1]. In 2008, there were an estimated 9.4 (range, 8.9–9.9) million incident cases (equivalent to 139 cases per 100 000 population) of TB. Most of the estimated number of cases in 2008 occurred in Asia (55%) and Africa (30%), with small proportions of cases in the Eastern Mediterranean Region (7%), the European Region (5%) and the Region of the Americas (3%). There were an estimated 11.1 million prevalent cases of TB in 2008 equivalent to 164 cases per 100 000 population [2]. The estimated proportion of MDR-TB for all countries was then applied to estimated incident TB cases. Based on this approach, it is estimated that 489,139 cases emerged in 2006, and that the global proportion of resistance among all cases is 4.8%. China, India and the Russian Federation are estimated to carry the highest number of MDR-TB cases [3].

In Ethiopia, tuberculosis (TB) and Leprosy have been recognized as major public health problems since 1950s. However, despite various efforts, even now these diseases remain major problem [4]. Tuberculosis is a major cause of morbidity and mortality in Ethiopia, and the country ranks 12th among the world's 22 high-burden tuberculosis (TB) countries [5]. According to the World Health Organization's (WHO's) Global TB Report 2009, the country had an estimated 314,267 TB cases in 2007, with an estimated incidence rate of 378 cases per 100,000 population. The DOTS detection rate remains low, at 34% percent for smear positive, compared with WHO target of 70 % detection. The limited diagnostic capacity for TB in the country remains a challenge to improving case detection rates. The number of TB cases is likely to increase as Ethiopia's HIV/AIDS epidemic expands; while 16 percent of notified TB patients tested for HIV, 40 percent are HIV positive [6]. According to the report of 2009 there was case notification rate (all forms) of TB 51%, case detection rate (PTB+) 36% and the treatment success rate 68.8% which is below the WHO targets [7]. According

to the 2009 zonal report the case detection rate(PTB+) was 26.8%,treatment success rate for all cases 91%,74% for PTB+ and defaulter rate was 11% [8]. Tuberculosis is presenting new challenges as a global public health problem, especially at a time of increasing threats due to HIV infection, multi-drug-resistant and extensively drug-resistant strains of Mycobacterium tuberculosis [9]. Besides these, there have been poor performances achieved in TB control activities in Ethiopia in general and in Oromia Regional State in particular. Additionally, no such quality Evaluation research activities on TB control activities have been conducted in the region and at the Hospitals too. The ultimate goal of quality assessment in health care program is to assess whether a program possesses the right things (input), (processes) and it leads to the right things (outcome) to happen. Hence, evaluating the quality TB care can have significant importance TB control activities and in identifying area of improvements for better and effective TB control strategies. Therefore, the aim of this study was to evaluate quality of TB care in Limmu Genet Hospital. Donabedian's model was used to assess quality of TB care in Hospital, particularly to quality-assured sputum microscopy, standardized short-course chemotherapy treatment and record system seen in the Limmu Genet Hospital [10].

Objectives of the program

1. Increase percentage of patients identified with TB who is placed on DOT within 1 month of diagnosis from 85% to 90% by end of 2010.
2. Increase the number of referrals to the local health department made by community health centers by end of the year 2010.
3. Decrease percentage of defaulter rate from 11 % to 4 % by the end of the year.

Evaluation objectives

To assess Tuberculosis care quality at Limmu Genet Hospital, Southwest Ethiopia.

Evaluation Questions

Were all the necessary resources for the TB care available at Limmu Genet Hospital? If not, why?
How was the compliance of TB care practice in Limmu Genet Hospital with the national guidelines?
Were TB patients of Limmu Genet Hospital accommodated with the service they received? If not, why?

Evaluation Methods and Materials

Study area and period

The study was conducted from November 2014 to December 2015 at Limmu Genet district Hospital. Study area was selected based on the availability of cases. It is located at 430 km from Addis Ababa and 75 km from Jimma town in Limmu Kossa district Jimma Zone, Oromia Regional state.

Evaluation focus and approach

The focus of this evaluation was on lab diagnosis, treatment and follow up of the TB care components. The evaluation approach is formative. It is conducted for the purpose of improving the program and provides feedback about program processes and effects on program participants [11].

Evaluation Dimensions and Design

Three dimensions were used to measure quality of tuberculosis clinical care. The evaluation design is a descriptive case study of Limmu Genet Hospital and it was selected in describing and exploring 'the phenomena' that is the Tuberculosis (TB) care process in the hospital. The source population of this study included all TB patients, health care professionals, and patient registration books at Limmu Genet Hospital. The Study population were all TB patients those who were on the intensive phase of Direct observation treatment (DOTS) during the study period for exit interview, record of TB Patients who registered for DOT treatment during last one year, total 805 record of AFB smear microscopy during last one year and the DOTS providers at Limmu Genet Hospital. Limmu Genet Hospital TB care Clinic was taken as study units. Sampling frame for the reviewing registration book of Acid Fast Bacilli smear microscopy was list of patient records during last one year.

Sample Size and sampling technique

Observation

Sample size was calculated using single population proportion formula and prevalence of 50% is taken with 95% confident interval and 5% marginal error.

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

d=allowable error of 5%, CI=confidence interval at 95%

Hence, $N_1 = \frac{(1.96)^2 * 0.5(1-0.5)}{(0.05)^2}$

N_1 =384

The total number of AFB done during the last one year was 805; therefore

n= $N_1 / (1 + N_1/N) = 384/ (1+384/805) =$ **260**

Exit Interview

Twenty two TB patients in the intensive phase, were interviewed for accommodation dimension. Patients ≥ 18 years age old were included while Patients <18 years age old, who can't give consent and critically ill patients were excluded from the study. Three persons were selected purposively for in-depth interview (tuberculosis, leprosy control program focal person of the Hospital, representative of laboratory and pharmacy department). Systematic random sampling was used to select patient records of AFB microscopy.

Data Collection methods and procedure

For Patient's care provider in-depth interview was conducted for availability and compliance dimension in accessing resources and care giving to the clients respectively. Semi-structured questioners were administered to the patients exiting TB clinic to assess patients' perception of the Hospital and their satisfaction level about the provider. Observation was conducted to assess the organization's structure and staff behaviors. Patient records were reviewed for the assessment of level compliance to the national guideline.

Data Quality control

To ensure accuracy of the evaluation questionnaires pre- test was done on 5% of the patients in Limmu Kossa health center. One supervisor and four data collectors were trained on how to handle sensitive and emotional issues. Collected data were checked for its completeness and clarity and follow-up and supervision was made by supervisors.

Data Analysis and Interpretation

After data were coded, checked, cleaned and entered to SPSS version 20.0, descriptive statistics was used to measure both objective indicators and sub objective indicators developed under dimensions of quality. Chi-square test and logistic regression was used to find out the association between independent variables and dependent variables, and the significant level was set at α =0 .05. The qualitative data were transcribed and organized on the basis of emerging themes and sub-themes.

Matrix of analysis, Judgment and Ethical clearance

The overall point value given for quality was 640. Out of this 330 for availability, 150 for compliance and 130 for accommodation was assigned. A panel of experts: two physicians and one senior nursing and literature review were used to assign the scores and weights for each quality dimensions. Points were then allocated to these characteristics, which in turn allowed calculation of an overall score for each of the dimension. Ethical clearance was taken from Ethical Clearance Committee of the Oromia health bureau. A written permission was also obtained from the Hospital and informed-verbal consent was also taken from the study subjects.

Result

Three DOTS providers were interviewed. For exit interview a total of 22 patients were interviewed for accommodation dimension. A total of 260 AFB smear microscopy registration and 177 TB clinic records of patients were reviewed.

Availability of infrastructure and trained human power

The finding of this evaluation indicates that drug dispending room and confidential examination room was available while availability of separate and confidential waiting room, counseling room and separate room for Acid Fast Bacilli examination were not available at the Hospital during the study period. Two Nurses, one pharmacist, two Lab technicians, and one physician were involved in the service delivery. Pharmacy personnel were not trained on TB drugs while only one laboratory technician was trained on Acid Fast Bacilli sputum microscopy before two years. Both Physician and nurses were trained on TB national guideline.

Availability of Anti-Tb drug, materials and reagents

All anti-TB drugs were available in the last four months without stock out. Latest version materials of Tuberculosis and Leprosy Control Program (TLCP) manual, laboratory manual, TB unit registry, TB referral and transfer form, TB sputum examination request form, weighting scale, TB flip chart, flow chart for Diagnosi and tratment of PTB, and quarterly case finding, treatment outcome and TB activity report form were available at the

Hospital. However posters in different languages, *Water,* red pen and Bunsen burner/spiral lamp burner were not available at TB clinic.

The finding indicated that Immersion oil with a dropper, disinfectant (5% phenol, 10% sodium hypochlorite), staining reagents (1% carbol fuchsin, 3% acid alcohol for *M.tuberculosis* and 0.5% for *M.leprae* and 0.1% methylene blue were available. However, during observation, staining reagent had not labeled concentration amount, expiration date and naming. TB clinic was supervised by Oromia Health Bureau and Colombia University- International center of AIDS care program (CU-ICAP) regularly. But there was no written feed backs from them. However as Laboratory head responded, there was no supervision considering AFB at all. According to the guideline, the supervisors must prepare comprehensive report on their observations and findings including recommendations and disseminate the reports to the institution. According to this study the overall availability rating score was 230/330 (71.8%) which was considered as good.

Table 1: Overall result on availability dimension of quality of TB care, at Limmu Genet District Hospital, November, 2015

Indicators	Achievement	Weight	Score	Percentage
Infrastructure				
Availability of adequate and confidential examination room	A	20	**20**	**100**
Availability of separate adequate and confidential waiting room	N/A	20	**0**	**0**
Availability of confidential counseling room	N/A	20	**0**	**0**
Availability of separate room for AFB examination	A	20	**20**	**100**
Availability of drug dispensing room				
Trained human resource				
Availability of at least two Nurses trained on TB control activities	A	20	**20**	**100**
	A	10	**10**	**100**
Availability of at least one physicians trained on TB control activities	A	20	**10**	**50**
	N/A	10	**0**	**0**
Availability of at least two Lab technicians or technologist trained on AFB microscopy				
Availability of at least one trained pharmacist.				
Materials and reagents				
Availability of AFB reagents as per guideline	A	20	**20**	**100**
Availability of latest version of TLCP Manual	A	20	**20**	**100**
Availability of functional weighting scale	A	20	**20**	**100**
Anti-Tb drugs				
Availability of RHZ with no stock out in the last four months	A	20	**20**	**100**
Availability of RH with no stock out in the last four months	A	20	**20**	**100**
Availability of EH with no stock out in the last four months	A	20	**20**	**100**
Availability of STM with no stock out in the last four months	A	20	**20**	**100**
Availability of Ethambutol with no stock out in the last four months	A	20	**20**	**100**
Overall availability indicator score		**320**	**230**	
Availability Scoring Guide				
Rating :- percentage was used as parameter				
Percentage :- 230/320*100%			**Rating**	
>=85%			Excellent	
70-84%			Good	
50-69%			Fair	
<=49%			Poor	

Where "**A**" and "**NA**" denotes available or not available respectively

Compliance

Compliance with national guidelines [4, 12] of quality of patient care delivered by a TB focal person and laboratory personnel were assessed by reviewing a total of 177 patient charts and 260 lab registers based on 8 selected process indicators. Among a total of 177 patients registered for DOTS strategy; all of them had a registered unit TB registration number. Majority 93(52.5%) of them were male, 83(46.9%) female and 1(0.6%) unknown registration. Ages of patients were recorded for all of them and the mean age was 32.85 with SD $\pm$ 18.97. Similarly, weight at initial enrolment for DOT was recorded for majority 174(98.3%) of the patients. The initial diagnostic result of AFB for 21(11.3%), 124(70%), 32(18.1%) were positive, negative and not done/unrecorded respectively. Even though, there were initial diagnostic AFB result, classifications of

tuberculosis by type were smears positive PTB 20(11.3%); smear negative PTB 102(57.6%) and EPTB 55(31.1%). Thus, the majority (68.9%) were pulmonary TB and 55(31.1%) extra pulmonary TB. The correct classification rate was 83.9% according to the guideline (85% Pulmonary TB and 15% extra-pulmonary TB). Out of all pulmonary TB, the majority (83.6%) were smear negative pulmonary TB and 20(16.4%) smear positive pulmonary TB.

Table 2: Distribution of Initial AFB result by tuberculosis type at Limmu Genet Hospital Limmu Genet District Hospital, November, 2015

Initial AFB result	Tuberculosis type registered		
	PTB+, n (%)	PTB-, n (%)	EPTB, n (%)
Positive	19(95)	1(5)	0(0)
Negative	1(.8)	93(74.4)	31(24.8)
Not done/ unrecorded	0(0%)	8(25)	24(75)
Total	20	102	55

Treatment given during intensive phase was registered for 176 (99.4%) and the choice of fixed dose combination drug was assessed against the national guideline for all patients; accordingly all of the patients were correctly categorized. The reason given was availability of all anti-TB drugs, fully assigned trained man power at TB clinic, and guideline. The correctness dose of TB drugs was checked for each patient against their weight of intensive phase. For 174 (98.3%) patients weight at the beginning of treatment was seen. Thus, correct dosages of drugs were prescribed for 151 (86.8%) patients. From this 148 were new while the rest 3 were defaulters.

Table 3: Proportion of patients for who correct dose was prescribed by weight category at Limmu Genet District Hospital, November, 2015.

Category of patient	**Weight category**	**Total in each Weight category**	**Proportion of each category for whom correct dose was prescribed**
New	*7-9*	1	1(100%)
	10-12	8	0(0%)
	13-19	5	1(20.0%)
	20-29	9	7(77.8%)
	30-39	21	18(85.7%)
	40-54	107	104(97.2%)1
	55-70	20	17(85.0%)
Defaulter	*40-54*	2	2(100.0%)
	55-70	1	1(100.0%)
	Total	174	151(86.8%)

Laboratory diagnostic service and Follow up

Acid Fast Bacilli microscopy registration book was reviewed for the indicator proportion of suspects having three sputum examinations was done for 95% of patients. Laboratory head was interviewed and responded that laboratory personnel did not do quality control sample because of lack of supervision from regional laboratory and training on quality control sample. The finding of patient exit interview indicated that only 14/22 (63.6%) patients on intensive phase came to the clinic for DOTS daily except on Sunday. Follow up for sputum examination at second month showed that, among 20 registered PTB+ test, follow-up sputum examination were done for 11/22(55%) patients. The guide line says, all sputum-positive patients on Short Course Chemotherapy must have one sputum specimen examined at the end of the 2nd month, and this is extremely important as a tool to monitor the effectiveness of treatment. Chi square test was done and significant association was found between smear positive pulmonary TB and smear negative patients follow up for sputum examination at second month ($P<0.001$). Quality of treatment process (sputum conversion rate at 2 months were 11 (100%), for new smear-positive cases whom follow up sputum examination was done.

Table 4: Association of tuberculosis type and AFB follow up at second month at Limmu Genet District Hospital, November, 2015.

Tuberculosis Type	AFB follow up at 2nd month		Crude OR	95.0% C.I.		P value
	Done	Not done/unrecorded		Lower	Upper	
Smear negative	22(21.6%)	80(78.4%)	4.444	1.636	12.073	
Smear positive	11(55.0%)	9(45.0%) 5%)				.000

Record keeping

The mean average for the indicator proportion of patients for TB number, sex, age and weight at intensive phase registered completely filled was 99.3. For the indicator proportion of patients for date, name, lab serial number, contact address and reason for AFB examination completely filled were 78.98 %. Another measured indictor for

record keeping was whether slides were labeled with identification number or patient's name and keeps it smears for at least 3 months and stores them appropriately in slide box. The finding indicates that, slides were labeled with patient's lab serial number by using pencil but it was not stored even for two days, as soon as they reported the result, they discard it.

Table 5: Results of client record completeness assessment of, Limmu Genet District Hospital, November, 2015

Sr #	*Check point*	*Frequency*	*% completely filled*
TB clinic Registration			
1	Sex (n=177):	176	99.4
2	TB unit no (n=177)	177	100
3	Age(n= 177	176	99.4
4	Weight (N=177)	174	98.3
Average			99.3
AFB registration			
5	Date of sputum collection:(n=260)	251	96.5
6	Patient name:(n=260)	260	100
7	Patient's Lab serial number:(n=260)	258	99.2
8	Contact address:(n=260)	0	0
	reason for AFB examination	258	99.2
Average			78.9

Provider- Patient interaction and Treatment outcome

From a total fifteen observations of sputum collection at the laboratory only 7(46.7%) of the patient were greeted, 5(33.3%) explained the procedure of sample collection, 15(100%) not observed by the provider and 13(86.7%) of them were informed by the provider how much sputum sample was required when they come to the laboratory. Similarly, from a total of twenty cession observations, 15(75%) patients were greeted, 17(85%) participated in part of decision making, 15(75%) providers explained how to take drugs and 9(45%) able to attended in privacy of the consultation.

Treatment outcome were analyzed for a total of 177 tuberculosis patients who were registered at the hospital during the last one year. Of these, 1(0.6%) had cured, 1(0.6%) died, 3 (1.7%) defaulted, 33(18.6%) treatment completed, 68(38.4%) transferred out and 71(40.1%) unknown/unregistered. The provider said most cases were transferred to their near health posts or health centers for treatment. For defaulters were retrieved using their contact address. They defaulted from treatment by considering themselves as cured. But the guideline recommends at least 85% cure rate.

When all TB patients with no information of treatment outcome are defined as missing values treatment success rate for PTB+, PTB- and EPTB was 25%, 27.1% and 50% respectively. In all cases treatment success rate was influenced by high referral rate during treatment.

Table 6: Aspects of Outcome by tuberculosis type, Limmu Genet district Hospital, November, 2015.

Tuberculosis type	**Treatment success N (%)**	**Transferred out N (%)**	**Died N (%)**	**Defaulter N (%)**
PTB+ (n=12)	3(25)	9(75)	0(0)	0(0)
PTB- (n=70)	19(27.1)	47(67.2)	1(1.4)	3(4.3)
EPTB(n=24	12(50)	12(50)	0(0)	0(0)

Table 7: Overall result on Compliance dimension of quality of TB care, at Limmu Genet District Hospital, November, 2015.

Indicators	***Weight***	**Score**
Record keeping		
Slides labeled permanently with identification number or patient's name(if frosted, may use pencil) and keeps smears for at least 3 months (one quarter) and stores them appropriately (*5 point each for each element)*	10	5
Proportion of patients for who unit TB no, sex, age and weight at intense phase registered	20	19.86
Proportion of patients for who date, name, lab serial number, contact address and reason for AFB examination completely filled. *(4 point each for each element*)	20	15.8
Diagnostic service		
Proportion of suspects having at least two sputum examinations for diagnosis	20	19
Uses both Positive and negative control smear at least every weak and after new reagent	20	0
Follow-up sputum		
Proportion of PTB+ cases with follow-up sputum examination among all registered cases at second month of RX.	20	11
Treatment		
Choice of drug combination: HRZE or HRZS	20	20
Proportion of PTB patients on correct dosage of drugs taken	20	17.5
Overall compliance indicators	**150**	**108.16**
Compliance Scoring Guide		
Rating :- percentage was used		
Percentage:- 108.16/150*100%	**Rating**	
>=85%	Excellent	
70-84%	**Good**	
50-69%	Fair	
<=49%	Poor	

Accommodation

Twenty two patients were interviewed for all accommodation dimension questions making a response rate of 100 %. Regarding clients attitude toward organizational issues, three indicators such as proportion of patients who at least agree with adequacy of the schedule of the TB clinic for treatment1(4.5%) neutral, 5(22.7%) agreed and 16(72.8%) were strongly agreed, who at least agree with the time spent for waiting to receive treatment is short1(4.5%) disagreed, 3(13.6%) agreed and 18(81.8%) were strongly and the time the health worker spent with the patient during their visit was enough1(4.5%) disagreed, 4(18.2%) agreed and 17(77.3%) were strongly agreed.

Even though there were no separate waiting area, majority 18(81.8), 12(54.5%) and 17(77.3%) were strongly agreed with the cleanness of the waiting area, overall comfort of waiting area and with cleanliness of the examination room respectively. 50% of respondents strongly agreed with respect offered by the provider during their visit. The average level for accommodation dimension from patient exit interview was 4.52 out of 5 points (90.5%). On the other hand, the accommodation score was relatively lower for an interpersonal quality of service provider which was 3.9 out of 5 points.

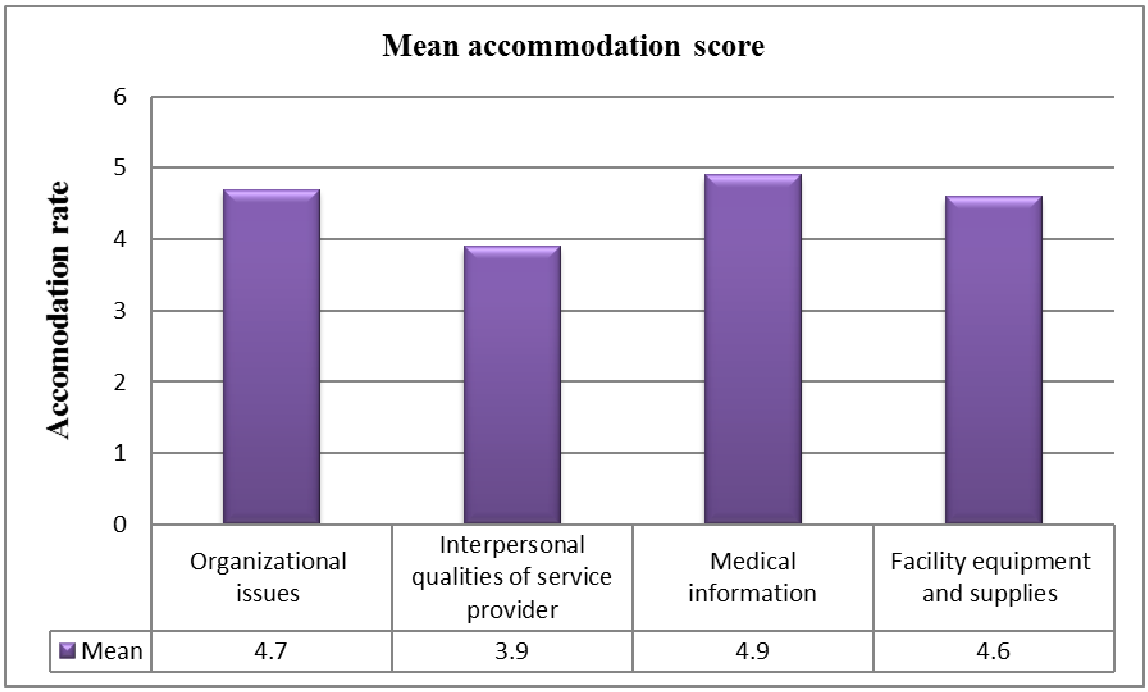

Fig 1: Summary of accommodation levels by sub dimensions of accommodation, Limmu Genet District Hospital, November, 2015.

Discussions

This study revealed that the required availability indicators have been available during the study period. However, presence of health worker trained in TB care like laboratory technicians, pharmacy personnel and infrastructures were not available. In contrast to other study conducted in eight Ethiopian districts, which revealed that the required structural factors have not been implemented optimally during the study period. The poor implementation of these structural factors affects the accessibility and effectiveness of TB care [13].

Finding from in- depth interview of laboratory head revealed that purulent sputum was encouraged rather than saliva for all suspected cases except some HIV patients who cannot expectorate purulent sample. According to the guideline sputum for thick, mucoid quality, pieces of purulent material, blood, and volume should be examined [2]. The finding from fifteen observation showed that, only 5(33.3%) were explained the procedure of sputum collection. The guide line recommended that use a positive control smear containing Acid Fast Bacilli and a negative control smear containing no Acid Fast Bacilli stained at least once a week, daily recommended. However, each new stain solution must be tested with a positive control and negative control smear before staining of patients' smears. Overall compliance to this diagnosis standard was failed 0% in the Hospital. Control was done once in quarter which is not related to whether the reagent is new or the exits one. The reason for this problem was lack of training for lab technicians, supportive supervision from zonal health department, responsible person to do quality control and commitment of medical laboratory technicians.

This study also identified proportion of suspects having at least two sputum examinations for diagnosis of Acid Fast Bacilli thus it was found that 229 (95%) of new cases had greater than two per patient sputum tests. However, a study conducted in Nigeria both in public and private health facilities showed a very higher level of adherence to the national guidelines of examining at least 3 sputum specimens for the diagnosis of TB. Three sputum samples were taken from 99.5% of patients managed; the rate among patients managed by both public and private providers was higher at 99.6% and 99.5% respectively [14]. For majority of the patients chart reviewed, 68.9% were pulmonary TB and 83.9% of them were correctly classified according to the guideline.

From the total Pulmonary TB patient, weight at the beginning of treatment was seen for only 98.3% of the patients. But according to the guide line it should be for all because it is important to prescribe the correct drug dose. The reason given was unavailability of weighting scale in the past eight months at TB clinic. The finding of this evaluation also reveals that the choice of drug combination was correct for all registered patients. From record review, correct dosage of drugs was prescribed for 87.4% patients. When this correctness dose was assessed against the national guideline for each category, it was 87.1 % (148) for new and 100% (3) for defaulter. In-depth interview of the Tuberculosis and Leprosy Control Program focal person indicated that appropriate dose of drug is provided for all patients coming to the clinic. But there are some times other providers who gave service for the patient without taking the training when we went for the training or day off due to night duty. Not all patients were came to TB clinic on the intensive phase, there were patients who came every day, every other

day, once in a week and twice a week based on the classification of patients, economic status and distance from the facility. Among registered PTB+ cases with follow-up sputum examination only 55% of them had one sputum examination but the guide line says, as routine, **all** sputum-positive patients on Short Course Chemotherapy must have one sputum specimen examined at the end of the 2nd month, and this is extremely important as a tool to monitor the effectiveness of treatment. This defect may be due to unrecorded registration or commitment from the providers or some times did not wait AFB test at laboratory department because of work load.

The finding from in-depth interview of laboratory head revealed that, after staining the slide using approved staining procedure which is posted at staining place, the number of high power fields seen to report the result as negative was only 50-60 fields within 2-3 minutes for each slide. The reason given for this was presence of work load other than AFB test. But according to the latest recommendation by the national AFB microscopy laboratory manual [12], 100 fields should be examined to report the result of sputum smear as negative.

In this study, even though the sputum slide boxes were available, the sputum slides were not stored for at least one quarter which does not meet the guideline. The reasons given were adequate lab technicians were not trained and the higher department did not take slide for external quality assurance. However, National TB program recommends that, good laboratory practices to reduce risk of confusing slides of different patients are labeling and keeping slides and records for at least 3 months [12]. The mean average of patients for who date, name, lab serial number, contact address and reason for AFB examination completely filled was 78.98% for those elements .

The study showed that accommodation dimension of quality was generally excellent. Average rate of accommodation was relatively higher for variables associated with professional competence and skill of the Health workers and medical information for which the average score was 4.8 for both out of 5 points, and because they had a better availability of drugs and trained man power at TB clinic. However, even though infrastructures such as waiting area, water, counseling room and separate AFB room were not available the client's mean satisfaction score to the facilities equipment and supplies was 4.6 out of 5. On the other hand, the accommodation score was relatively lower for Interpersonal qualities of service provider which was 3.9 out of 5 points

Conclusion and Recommendation

In general, the evaluation finding quality of availability indicated that the judgment was found to be "Good" (in the range of 70-84%). However, the availability of resources with regard to separate adequate and confidential waiting room, confidential counseling room and separate room for AFB examination was not available. Similarly, trained human resource like pharmacy personnel was not available and laboratory technicians were not adequate. Even though trained human power, drugs and guideline were available huge proportion (13.2%) of patients missed correct dose of prescription according to the guideline. The overall evaluation findings indicated that the judgment for compliance was found to be "Good" (in the range of 70-84%). The average level for accommodation dimension from patient exit interview was 4.56 out of 5 points (91.2%). Hence, the overall score for accommodation dimension was excellent. Tuberculosis care was good as whole.

Recommendations

Limmu Genet Hospital

1. Has to arrange separate and confidential waiting room, confidential counseling room and separate room for AFB examination which could maintain clients comfort and confidentiality. Has to construct water source at TB clinic.
2. Has to completely fill all the information provided by TB patient on the format provided for the program
3. Lab department should have to store all slides in slide boxes in the order they were recorded in the laboratory register.
4. Lab department should have to do positive and negative control smear at least every weak and after new reagent
5. TBLCP focal person has to strictly follow the guideline when prescribing the correct dose drugs according to their weight.

Oromia Region Health Bureau

1. Regular training of health care providers on National Tuberculosis Program guidelines is also recommended in order to ensure compliance to the guidelines and the provision of quality services to tuberculosis patients.
2. Has to give comprehensive report on their observations and findings including recommendations and disseminate it to the hospital.

3. Has to collect slides for external quality assurance and supervise laboratory department for AFB.
4. Maintain the quality of the laboratory network depends on regular training, supervision and support of laboratory staff.

Competing interests
We declare that we have no competing interests

Authors' contributions
Lammessa Tadesse and Habtamu Oljira Desta were the Principal Investigators, participated in Conceptualized the study, designed the study instrument and conducted the data analysis and wrote the first draft and final draft of the manuscript and involve in a critical review of the manuscript.

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