

Trends of tuberculosis treatment outcomes at Mizan-Aman general hospital, southwest Ethiopia: A retrospective study

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Abstract: *Background:* TB continues to be a major public health problem in Ethiopia, which ranks seventh by estimated number of cases among the 22 TB high-burden countries. TB Treatment will only be effective if the patient completes the regimen which includes a combination of drugs recommended by the physicians. Incomplete treatment may result in prolonged excretion of bacteria which may lead to increased morbidity and mortality and spread of the disease. *Objectives:* to assess the trends of tuberculosis treatment outcomes at Mizan Aman General Hospital, Bench Maji Zone, Southwest Ethiopia, from September 2010 to August 2013. *Methods:* A retrospective study design was conducted at the TB clinic of Mizan general Hospital by analyzing the data of registered tuberculosis patients. The original case records were carefully reviewed, analyzed and interpreted to determine descriptive statistic such as frequencies and proportion of variables. The results of the study were presented using tables and line diagram. The study was approved ethically by Jimma University, college of public health and medical science, department of Nursing. *Result:* about 2043 TB patient record was retrieved in this study period from 2010- 2013. Of these, 1207 (58.00%) were males and 874 (42.00%) were females. The magnitude of TB case during the study period were smoothly declined in the first four consecutive six months 382, 312, 212 and 116, respectively, whereas in the fifth six month the TB case dramatically increased to 547 however in the last phase reduces to 472. During the study period 362 (17.72 %) completed the treatment, 79 (3.87 %) cured, 4 (0.20%) defaulted, 1575 (76.99%) transferred out to other health facility, 25 (1.22%) were died but no one could failed the treatment regimen. *Conclusion:* The trends of overall TB diagnosed cases were reduced in the first two years but it increases in the third year. The treatment outcomes; high in transfer out and low in cure rate was observed. Thus, Behavioral change communication education emphasized on early detection and treatment of TB cases is important strategies to reduce TB burden.

Keywords: TB, Trend, Treatment Outcome

1. Introduction

1.1. Background

Tuberculosis (TB), an infectious disease caused by the bacillus *Mycobacterium Tuberculosis* (MTB), is one of the leading causes of morbidity and mortality world-wide, and ranks as the second leading cause of death from infectious diseases next to the human immunodeficiency virus (HIV) (1,2). Globally in 2012, an estimated 8.6 million people developed TB and there were 1.3 million deaths from the

disease (including an estimated 1.1 million cases and 320 000 deaths among HIV-positive people). About 58% and 27% of the 8.6 million people who developed TB in 2012 were in the Asian and African regions respectively (1,3).

TB continues to be a major public health problem in Ethiopia, ranks seventh by estimated number of cases among the 22 TB high-burden countries. In 2012 WHO estimated that there were 230,000 TB cases and 16 000 deaths from TB; with an estimated 23,000 cases and nearly 5,600 deaths occurred among HIV-positive people (1,4). The incidence of TB cases and mortality from TB are

unacceptably large given that most are preventable and curable if people can access health care for a diagnosis and the right treatment is provided.

Detection and treatment of new cases in the DOTs strategy, was developed by the WHO for the prevention and control of TB in the early 1990s, is believed to be the most valuable strategy for TB control; and is considered as a cost-effective health intervention for reducing the incidence and death of TB in developing countries. Current anti-tuberculosis therapy consists of a combination of drugs taken over a period of at least 6 months for new patients and 8 months for retreatment patients (1,5).

Although, the key targets of TB control in DOTs were to detect the disease and treat the cases, and to ensure complete their treatment and get cured; delayed presentation for treatment, incomplete treatment or poor compliance as well as treatment interruption or default; a phenomenon that contributes to prolonged infectiousness and increase the risk of drug resistance, relapse, and death, are the major challenge that TB programmes face in resource-constrained settings where the health care services are not well developed (6,7). (8–10).

Hence, assessing trends of TB and its treatment outcomes are important in order to design disease management program in an effort to stop the continued transmission of TB within the community and to reduce drug resistance, relapse or death among affected individuals (11–13). However, despite DOT short course TB treatment is being practiced in Bench Maji Zone, trends of the disease have not been assessed yet in the area. Therefore, the aim of this study was to assess trends and treatment outcomes of TB in Bench Maji Zone, with special emphasize on Mizan hospital, Southern Ethiopia.

2. Methods

A retrospective study design was conducted among TB patients registered at Mizan-Aman General Hospital located in Bench Maji Zone Southwest Ethiopia from February 17 to March 14/2014. The hospital serves for the population of Bench Maji and two adjacent zones. The health facilities within these zones register and treat all diagnosed TB patients under the DOTS. All diagnosed TB cases are registered at the unit registers, compiled at the district registers, and reported to the zonal and regional TB programme. Once diagnosed with TB, patients are provided with anti-TB medication and care free of charge. The hospital provides services for approximately 6679 inpatient and 50386 outpatient attendances a year coming to the hospital from the catchment population of about 1.5 million people. Out of the outpatient attendants the hospital has a total of 1165 registered new cases of TB who came to the TB clinic for follow up, and 404 of them are smear-positive pulmonary TB patients. The study was conducted from September 2010 up to August, 2013.

The Source Population of the study was all patient cards/charts of tuberculosis registered. While the Study

Population was all patient cards/charts of tuberculosis registered and put on DOTS in the hospital during the study period from September 2010 to August 2013 were reviewed. But, incomplete patient cards were excluded from the study.

Data was collected by trained nurse professional using structured checklist. The checklist contains patient's demographic characteristics, type of TB (smear-positive PTB, smear-negative PTB, and Extra PTB), immunodeficiency virus (HIV) status, treatment outcomes (cured, completed treatment, defaulted, treatment failure, died or transferred out). Treatment outcomes were evaluated in accordance with the National Tuberculosis and Leprosy Control Program (NTLCP) adopted from the WHO. The data collection process was checked on a daily base.

The collected data were entered into a computer using SPSS version 20.0 software. A summary descriptive analysis was made using graphical presentation, calculating summary statistics (frequency and percentages). Outputs were organized and presented in tables, graphs and narratives. Normality and the outliers were checked by box plot and/or scatter plot.

The study was approved by health research and post graduate coordinating office, college of Public health and medical science of Jimma University. Letter of co-operation was obtained from Bench Maji zone health department and the hospital after informing the purpose of the study.

3. Result

3.1. Patient Characteristics

Table 1. Patient characteristics of study subjects (n=2043), Mizan Aman General Hospital, Sep 2010 - Aug 2013.

Variables and response category	Frequency	Percent (%)
Sex		
Male	1169	57.22
Female	874	42.78
Age group (in years)		
≤ 14	220	10.77
15-24	498	24.38
25-34	657	32.16
35-44	343	16.79
45-54	204	9.99
55-64	92	4.50
≥ 65	29	1.42
TB type		
Smear positive pulmonary TB	510	24.96
Smear negative pulmonary TB	1043	51.05
TB lymphadenopathy	441	21.59
Others	9	0.44
TB category		
Pulmonary TB	1553	76.02
Extra pulmonary TB	450	22.03
HIV status (n = 2016)		
Positive	328	16.05
Negative	1650	80.76

A total of 2043 TB patients were registered at Mizan Aman General Hospital from 2010- 2013. Of these, 1169 (57.2%) were males and 874 (42.78%) were females. Among the study participants 657 (32.16%) were in the age group from 25 to 34. Out of the total 2043 cases, 1043 (51.05%) were smear negative pulmonary TB cases. In terms of patients category 1,553 (76.02%) were pulmonary TB and 450 (22.03%) were extra pulmonary TB. About 328 (16.05%) of the study participants were HIV positive (Table 1).

3.2. Treatment Outcomes

Of the 2043 TB patients who were registered at the hospital during the study period, 347 (16.98 %) were completed the treatment, 181 (8.86%) cured, 4 (0.20%) defaulted, 1486 (72.74%) were transferred out to other health facility, 25 (1.22%) died but no one could failed the treatment regimen. Regarding to smear positive treatment outcome 181 (79.39 %) was cure rate, 37(16.23 %) complete and 9 (3.95%) deaths. The treatment success rate (it was computed as: completed the treatment with negative TB bacteria result at the end of treatment (cured) plus completed the treatment but without bacteriology result at the end of treatment) was 218 (95.61%) (Table 2).

Table 2. TB treatment outcome (n=2043), Mizan Aman General Hospital, Sep 2010 - Aug 2013

Variables and response category	Frequency	Percent (%)
TB treatment outcome (all type)		
Treatment completed	347	16.98
Cured	181	8.86
Default	4	0.20
Failed	0	0.00
Transfer out	1486	72.74
Death	25	1.22
TB treatment outcome (smear +ve)		
Complete	37	16.23
Cured	181	79.39
Defaulter	1	0.44
Death	9	3.95
TB treatment success rate (smear +ve)		
Success	218	95.61
Not success	10	4.39

3.3. Trends of TB Treatment Outcome

The proportion of TB treatment outcome during our study period were smoothly improved the treatment complete and cure rates however defaulter and death rates were relatively reduced. In the case of transfer out there were dramatic reductions in the second year, but it increased by more than three folds in the last year of study period (Table 3 and Fig. 1).

Table 3. Trends of TB tretment outcomes (n=2043), Mizan Aman general hospital, Sep 2010 - Aug 2013

Time in years	Treatment outcome No(%)					
	Treatment completed	Cured	Default	Failed	Transfer out	Death
2011	95(4.65)	50(2.45)	4(0.20)	0.00	538(26.33)	7(0.34)
2012	101(4.94)	47(2.30)	0.00	0.00	173(8.47)	14(0.69)
2013	151(7.39)	84(4.11)	0.00	0.00	775(37.93)	4(0.20)

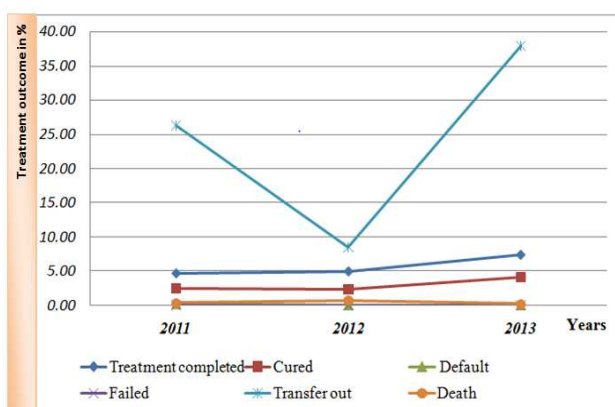


Figure 1. Trends of TB tretment outcomes (n=2043), Mizan Aman general hospital, Sep 2010 - Aug 2013

4. Discussion

In this facility based retrospective study, data on the treatment outcome; demographic characteristics, types of TB and trends across the study period were assessed in Bench Maji zone Mizan Aman general hospital. The high proportion of all forms of TB observed among males compared to females in this study was consistent with study

conducted in Gambella regional and Harer Felege Hiwot referral hospitals which reported 54.5% and 58.46% male TB cases, respectively [12, 20]. This might be attributed to either males are more likely to develop the disease or are more likely to utilize health service and diagnose their cases than females.

The overall trend of TB in this study was gradually increasing with age until 34 years (10.77% to 32.16%) and then showed a decline as age increased (32.16% to 1.42%). This was consistent with the findings reported in Gambella hospital study (25.10% to 28.14% and 28.14% to 0.69%, respectively) [12]; that might be as the result of study area location that is near to gold mining, in which youths and early adult age people are prone to come for job causing high proportion of TB cases in these age groups

Majority of patient who were registered during the study period were affected by smear negative pulmonary TB (51.05%) and this finding was supported by a Gambella hospital study that reported 50.35% [12], this might be due to the occurrence of HIV infection. This study also found that the occurrence of pulmonary TB was high as compared to extra pulmonary TB. As to TB HIV co-infection; this study reported 16.05% TB HIV co-infection which is in agreement with the current Ethiopian Federal Ministry of Health report by 2009/10, reporting 15.00 % TB HIV co-infection [19].

The trend of TB+ treatment outcome was found to be improved by cured rate and treatment completeness from first to third years of the study period. On the other hand, the trend of defaulter and death rates were decreased. The overall proportion of cured were 3.87 % which is quite low and this might be due to high transfer out rate (76.99%) observed in the hospital. Furthermore, the cure rate of TB smear positive was 62.70%, which was low as compared with the nationally expected level (85%) and this difference might be due to poor data registration after follow-up AFB examination at the TB clinic and/or inability to send patients for follow-up AFB examination during scheduled standard treatment period.

The defaulter rate (0.20%) revealed in this study was lower than in other studies conducted in the country; 36.4% and 6% at Gondar University Teaching Hospital and Southern Ethiopia, respectively [16, 17]. This lower defaulter rate might be due to proper supervision and health education in the study area. The overall proportion of death (1.22%) in this study was lower than death rate reported from Addis Ababa (4%) and the national figure (3%) [18]. The observable difference might be due to defaulter rates in those previous studies were high and/or lack of follow up and defaulter tracing mechanism. Furthermore, the death rates of TB smear positive in this study (7.14%) were higher than the study conducted in Addis Ababa [19]. This might be due to high prevalence of HIV in the area.

The treatment success rate of TB smear positive found by this study at TB clinic in Mizan Aman General Hospital was satisfactory (95.61%). This result is consistent with 2005 WHO report on global tuberculosis control, the treatment success rate among 22-high burden countries varied from 60% in Uganda to 93% in China, with an average of 83% in WHO report, 2005 [5].

5. Conclusion

The trend of overall TB cases was reduced in the first two years but it increases in the last year. Furthermore, the overall trends of TB treatment outcomes, particularly treatment complete and cure rate were smoothly increased within the last three years. However, the trend of death rate and defaulters were decreased. On the other hand, the overall trend of transfer out was found as high. Perhaps, the treatment success rate of TB smear positive was found at satisfactory improvements. Cognizant of this fact, we recommend that community mobilization, advocacy, and treatment outcome monitoring program should be design and/or strengthening to reduce the burden of tuberculosis.

Competing Interests

The authors declare that they have no competing interests.

Authors' Contributions

WS was involved in the conception, design, analysis, interpretation, report writing and manuscript writing. AA, TG and TF had been involved in the analysis, interpretation, report writing and manuscript writing. All authors read and approved the final manuscript version submitted for publication.

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