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Assessment of Tuberculosis Retreatment Case Rate and Its Treatment Outcomes at Adama Hospital Medical College, East Showa, Ethiopia

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Abstract

Background: Even though the proportion of previously treated TB patients' (retreatment cases) is increasing at alarming rate, there is scarcity of data regarding their magnitude and treatment outcomes. Therefore, this study is meant to assess TB retreatment case rate and their treatment outcomes at Adama hospital medical college (AHMC) in Ethiopia.

Methods: The study employed a retrospective cross-sectional survey where a total of 732 registered TB patients' data were reviewed between Aprils to May 2014. Data analysis was done using SPSS version 20.0.

Results: In this study, 147 (20%) of 732 TB cases were registered as retreatment cases. Of these, 16 (11%) relapse, 13 (9%) return after defaulted (RAD), 23 (16%) failure and 95 (64%) were categorized as 'other' among which 61 (64.9%) had sputum smear-negative pulmonary TB (PTB) and 34 (35.1%) had extra PTB (EPTB). Retreatment case is more likely to occur in HIV positive 48 (59%) individuals. Regarding their treatment outcomes, treatment success rate (cure plus treatment completed) of 65 (63.7%) was obtained. Whereas 13 (12.8%) registered as died, 10 (9.8%) as failure, 9 (8.8%) as defaulters and 5 (4.9%) as transferred out cases to other health facility. HIV positive individuals are more likely (54%) to have poor treatment outcomes.

Conclusion: The prevalence of TB retreatment cases obtained in this study was higher as compared to similar studies. Similarly, their treatment success rate (TSR) was lower as compared to the national figure. Therefore, more attention should be given to the prevention and treatment of TB retreatment cases to avoid social and economic burden of tuberculosis in Ethiopia.

Keywords: Tuberculosis; TB re-treatment case; Treatment success rate (TSR); Adama Ethiopia

Introduction

Tuberculosis (TB) is one of the most wide spread infection known in the world. Approximately 1.7 billion people or one-third of the world's population is to be infected with mycobacterium tubercle bacilli. Every year, about nine million cases of active TB disease and 2 million deaths occur globally. Most of the cases of active TB (7 million) are in Asia and Africa [1-3]. Tuberculosis is the major cause of death in developing countries; it comprises 25% of avoidable adult deaths. TB affects mostly young adults in their productive age groups because of the HIV epidemic [4-7].The annual infection rate in developing countries reached 2% or more; whereas in developed countries this figure is 0.5% [8].

Although the new tuberculosis treatment strategy based on short course chemotherapy is introduced in 1991, Africa is falling short of the world health organization's targets for case detection and treatment rates [1]. In Ethiopia, the effort of controlling tuberculosis began in the early 1960s with the establishment of TB centers and sanatorium in three major urban areas of the country.

According to the 2011 health and health related indicators of federal ministry of health (FMOH), TB is the 3rd leading cause of death in Ethiopia. During the year of 2010/11 a total of 159,017 TB cases were notified in Ethiopia. Among these 151,866 (95.5%) were new case of TB, all forms and 4,612 (2.9%) were retreatment cases notified. Previously treated TB patients are classified into four categories: relapse, failure, and return after defaulted (RAD), and other. According to Ethiopian national TB guidelines, 'other' includes chronic re-treatment TB patients, recurrent smear-negative pulmonary tuberculosis (PTB) and extra-pulmonary tuberculosis (EPTB).

A global report on relapse, failure, RAD and other for Africa, south-East Asia, and western pacific regions in 2007 showed that out of 581,000 TB re-treatment cases registered 65% and 35% were registered as smear-positive and smear-negative (other) respectively [9,10]. These retreatment TB cases in turn play major role in the development of drug resistance including MDR-TB which is considered to be a global threat today. For example, according to the anti-TB drug resistance survey conducted in 2005, among 804 newly diagnosed TB cases 1.6% were found to be infected with MDR TB while from 76 previously treated TB cases, 11.8% develop MDR TB.

For the last decade (1999-2008), Ethiopia registered a total of 372,427 smear positive, 1,166,863 new all forms and 7,582 re-treatment TB cases. In its 2012, WHO reported that there was an estimated 1700 and 550 MDR TB case notified new and retreatment PTB cases in 2011 respectively in Ethiopia. Similarly, Ethiopian national drug resistance survey of 2005 estimated the prevalence of MDR-TB among new and retreatment cases was 1.6% and 12% respectively. Current evidence from the study hospital also indicated that most MDR-TB cases were emerged from retreatment cases especially among those who failed their retreatment regimens. However, there is no clear data in relation to the prevalence of TB retreatment cases, outcomes of their treatment as well as factors which affect the occurrence of retreatment and poor treatment outcomes of retreated TB cases in this hospital. Therefore, this study is designed to generate essential data on these regards and give appropriate recommendation based on the findings.

Method and Material

Study area and period

The study was conducted in AHMC, Adama town, Oromia regional state, Ethiopia. Adama town located 98km east of the capital city Addis Ababa. Currently it has a total population of 311, 483 (male 154, 184 and female 157, 299).

There are different private and public health institutions in the town including one medical hospital. The information from Adama health Bureau shows that currently there are 108 health institutions in town. Of these institutions, 89 are private, 7 governmental including one medical hospital, 1 non- governmental and 11 other governmental institutions. Currently there are about 320 health professionals working in the AHMC. Of these, 10 are pharmacist, 4 druggist, 26 general practitioners, 20 specialists, 112 nurses of all type, 21 medical laboratory technicians and 5 health officers. Additionally, there are 6 wards that contain a total of 220 beds. In AHMC the diagnosis of PTB is based on clinical examination, sputum smear microscopy, and chest radiography. In most cases, diagnosis of EPTB is made based on radiography, but it was also diagnosed bacteriologically or histopathologically. According to national guideline the retreatment patients should be treated with the standard WHO category-II regimen, consisting of two months of daily streptomycin (S), rifampicin (R), isoniazid (H), pyrazinamide (Z) and ethambutol (E), followed by one month of RHZE and five months of RHE (2SRHZE/1RHZE/5RHE). The study was conducted from April to May, 2014.

Study Design

This study was conducted based on the retrospective cross-sectional study of retreatment TB patients (age 15 and above) using routine program data from TB registers and patient treatment cards registered from January, 2010 to August, 2013 at AHMC.

Populations

Source population

All the TB patients who were registered in TB clinic at AHMC for last four years from 2010 to 2013.

Study Population

All the TB patients who were registered in TB clinic at AHMC for last four years from 2010 to 2013 that fulfill the inclusion criteria.

Inclusion and Exclusion Criteria

Inclusion criteria

All registered TB patients aged 15 and above who were treated at AHMC of TB clinics from 2010 -2013.

Exclusion criteria

Poor registration or recording that could affect the analysis.

Patients that were discontinued treatment due to miss diagnosis 12 (7%).

Data Collection Method

Data collected from registers for each patient included TB registration number, registration date, age, sex, TB classification, patient category, treatment regimens, initial sputum microscopy results and HIV status. This data was collected by TB clinic staff after permission were obtained from the concerned body. By using data collection format, then data was collected from documentary sources (secondary data).

Study Variables

Dependent variables

Prevalence TB retreatment cases

Treatment outcomes of TB retreatment cases

Independent Variables

Characteristics of patients (age, sex, pregnancy, lactation…)

Clinical characteristics of the patients such as HIV status, smear status etc….

Data Analysis and Interpretation

The collected data were entered and analyzed using Microsoft excel. Cross-tabulation was made to examine association of independent variables with outcome variables. The findings were summarized in terms of frequencies and percentages and presented using tables.

Data quality control measures

Data were cleared and checked every day for completeness and consistency.

Operational definitions of terms and concept

Smear positive pulmonary TB: A patient with two sputum specimens' positive for acid fast bacilli by microscopy.

Smear Negative pulmonary TB: A patient with three sputum specimens negative for acid fast bacilli by microscopy.

Multi drug-resistant TB: Mycobacterium tuberculosis resistant to isoniazid and rifampicin, with or without resistance to other drugs.

Extra pulmonary TB: Tuberculosis in organs other than the lungs.

Re-treatment: Treating TB patients again with failure, relapse, RAD and other.

Treatment complete: Finishing the course of treatment and/or cure.

TSR: cure plus treatment completed

Ethical Consideration

A formal letter was written from Ambo University, College of Medicine and Health Sciences, Department of pharmacy to Adama hospital medical college. Then ethical committee viewed and approved that the study used routine programmatic data that did not include any personal identifiers.

Limitations and Strength of the Study

Limitation of the study

The study was conducted only in one hospital which is may not holds true for others.

The research was not included miss diagnosed patient who discontinued treatments.

The study was not included transferred out patients to the surrounding health institutions.

The study did not include all age groups because of financial problem.

Strength of the study

The study was included all patients registered as retreatment at AHMC of TB clinics to reduce the bias formed during sampling method except age group less than 15 years because of rarely diagnosed with these age groups for retreatment TB and financial problem.

Results

Between January 2010 and August 2013, 732 adult TB cases were registered at AHMC. Of all TB registrations, 658 (90%) had smear microscopy; 221 (30%) had positive smear results. A total of 147 (20%) were registered as retreatment cases. Compared to a new TB cases retreatment cases were more likely to be male 90 (61%) versus 296 (51%), age 15-35 years 84 (57%) versus 290 (50%), and less likely to have known HIV status 65 (44%) versus 398 (68%). Among those with known HIV status retreatment cases were more likely to be HIV positive 48 (59%) versus 107 (57%) (Figure 1 and Table 1).

Characteristics	New cases New case		Retreatment cases Retreatment case		p-value
	N	%	N	%	
Sex					
Male	296	51%	90	61%	0.1543
Female	289	49%	57	39%	
Age					
15-35	290	50%	84	57%	0.039371
>35	260	44%	63	43%	
Unknown	35	6%	0	0%	
HIV status					
Positive	212	36%	76	52%	0.010889
Negative	342	59%	71	48%	
Unknown	31	5%	0	0%	
Smear status					
Positive	169	29%	52	36%	0.001536
Negative	342	59%	95	64%	
Unknown	74	12%	0	0%	

Table 1: Distribution of patient characteristics by treatment category (n=732).
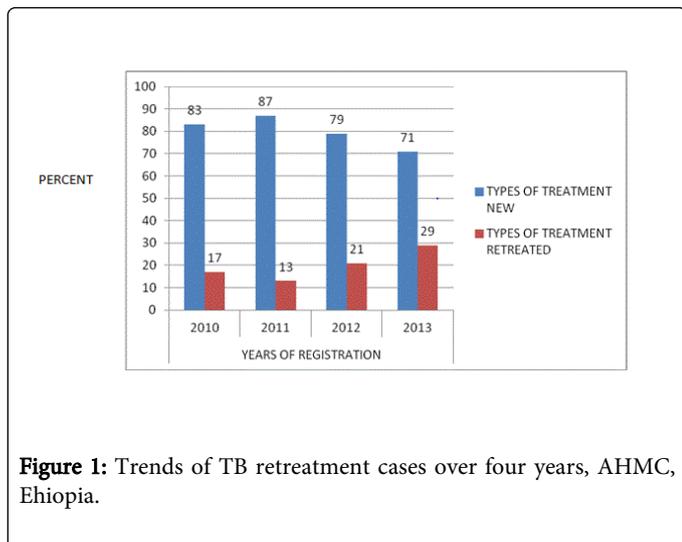
Figure 1: Trends of TB retreatment cases over four years, AHMC, Ehiopia.

Treatment Outcomes of Retreatment Cases

Treatment outcomes were recorded for 102 (69%) of 147 retreatment cases. Of the 102 recorded outcomes 81 (79%) had PTB and 21 (31%) had EPTB. Treatment cards were missing for 45 (31%), these patients were not included in further analysis. Of all outcomes 17 (16%) cure rate, 48 (47%) treatment complete, 9 (8.82%) loss to follow up (defaulters), 13 (12.75%) death, 10 (9.80%) failure rate and 5 (4.90%) transferred out (Figure 2 and Table 2).
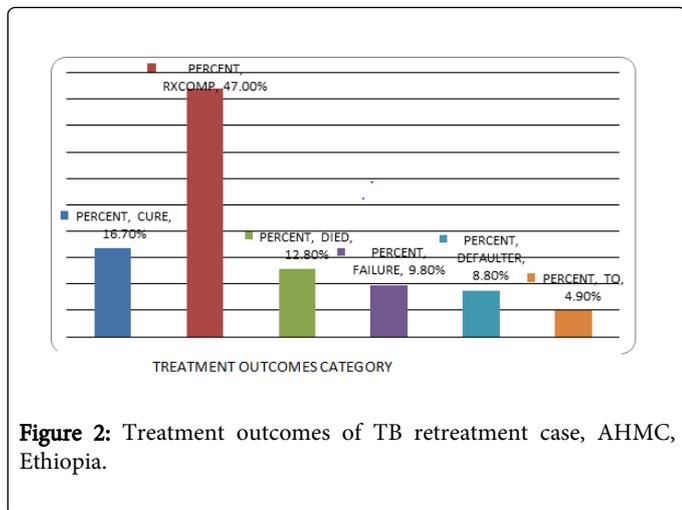

Figure 2: Treatment outcomes of TB retreatment case, AHMC, Ethiopia.

Factors Associated with Treatment Outcomes of TB Retreatment

The total TSR of the study was 65 (64%) which is poor outcome compared to other studies. Results from this study indicates that females were more likely to have better treatment outcomes than males 35 (54%) versus 30 (46%). Treatment success was also significantly higher in smear negative 'other' than smear positive relapse, RAD and failure 47 (72%) versus 18 (28%) (Table 2).

Characteristics	Total	Successful	Not successful p-value

		N	%	N	%
Sex					
Male	45	30	46%	15	41%
Female	57	35	54%	22	59%
Age					
15-35	54	40	62%	14	38% 0.000689
>35	48	25	38%	23	62%
HIV Status					
Positive	64	44	68%	20	54% 0.042395
Negative	38	21	32%	17	46%
Retreatment category					
Relapse	16	9	14%	7	19% <0.001
RAD	10	7	11%	3	8%
Failure	13	2	3%	11	30%
Other(EPTB,PTB)	63	47	72%	16	43%
Treatment regimen					
Category I	48	27	56%	21	44% <0.001
Category II	49	36	73%	13	27%
Others	5	2	40%	3	60%
Years of Registration					
2010	29	23	79%	6	21% <0.001
2011	18	12	71%	6	29%
2012	25	16	64%	9	36%
2013	30	14	47%	16	53%

Table 2: Association between different factors with treatment outcomes among retreatment TB patients (n=102).

Discussions

This study was done from a routine TB program setting in Adama Hospital Medical College (AHMC) to explore characteristics and treatment outcomes in previously treated adult TB patients registered as relapse, RAD, treatment failure, and 'other'(EPTB,PTB). In this study16 (11%) relapse, 13 (9%) RAD, 23 (16%) treatment failure and 95 (64%) 'Other' was classified as retreatment TB. Among 'other'61 (64.9%) had smear negative PTB, 48 (51%) were HIV positive and most were men older than 35 years.

According to Ethiopian national TB guidelines a retreatment regimen (2SRHZE/1RHZE/5RHE) should have been used for all retreatment cases. But more than half of patients classified as 'other' and treatment failure were inappropriately treated with category I regimen (2RHZE/4RH) and others category regimen like (2SHE/

10HE). However, Overall TSR was low among retreatment TB patients receiving category II regimen suggesting that; this regimen may also not be the most appropriate. Because as WHO standardization, TSR for high burden TB countries like Ethiopia should be 85%. Therefore, this study indicates 65 (64%) TSR which was poor results compared to WHO standardization.

There are several possible explanation for larger number of 'other' smear negative TB and were HIV positive, raising question about whether these were truly recurrent smear negative PTB and/or EPTB as result of re-infection or reactivation or whether they had HIV related disease that was miss diagnosed as TB. It is also possible that other pulmonary or cardiac disease that was miss diagnosed as TB. As a result, miss diagnosis is a great problem in AHMC next to patient non-adherence to anti-TB drugs. Adoption of new accurate diagnostic tool such as GeneXpert MTB/RIF, culture test and drug sensitivity test (DST) might help to reduce miss diagnosis in this group of patients which is currently functioning only at regional laboratory.

According to drug administration and control authority of Ethiopian standard treatment guideline WHO 2010 recommendation previously treated TB patients should be undergone DOT system both at initiation and continuation phases. But at AHMC TB clinic retreatment TB patients were served similar to new TB patients DOT system for only 2 months.

Comparing to other studies like in Israel, Addis Ababa and Gambella regional hospital TB retreatment cases were larger 147 (20%) in AHMC; I also observed different TSR among retreatment cases. In my study the TSR result is better than similar study done in Israel and Addis Ababa. But according to the study conducted in Gambella regional hospital my TSR result was low. The most important reason for low TSRs were loss to follow up 9 (8.82%), treatment failure 10 (9.80%) and death 13 (12.75%). This proportion indicates a need closer follow up of these groups during TB treatment, particularly as loss to follow up may include hidden deaths. As this study indicates the number of previously treated patients were increasing from the year of registration data recorded evidence based documents. This also, shows there is a poor care for retreatment patients from health care TB staffs at Adama hospital medical college.

Also, despite the overall low treatment outcome rates cure rate for smear positive relapse significantly higher than cure rate in smear negative other 7vs3 (41% versus 18%). There are various possible explanations: relapse patients have microbiologically proven TB in contrast to 'other' cases, which as discussed above may be mixed of true TB, HIV related disease and other pulmonary or cardiac disease. Given high HIV infection rates in 'other' cases and the inclusion of condition that may not respond to TB treatment, only moderate proportion might improve clinically.

Generally, the retreatment group had high retreatment failure rates 10 (9.80%) outcome s which may indicates a high prevalence of MDR-TB, so this does requires more in depth study. The reason of increasing failure rate to result MDR-TB may be non-adherence of patients, in availability of drugs, less care from TB staff HW, false laboratory result, drug resistance, and etc. My result showed that males had lower TSR and were more likely to default or die while on TB treatment, and this may reflect low compliance with TB treatment therapy.

In my study the following limitations viewed. First, 45 (31%) of treatment cards for retreatment patients were lost. This introduces bias if patients without treatment cards had different outcomes than those with treatment cards. A considerable proportion of adverse effects were recorded on treatment card, but not on TB register. Second, 12 (7%) miss diagnosed patients that discontinued TB treatment regimen also disturb the quality of this study.

Despite these limitations, the study findings are useful inform policy and programs in Ethiopia and other comparable setting to improve care TB patients.

Conclusion and Recommendation

Conclusion

This study shows that the treatment failure and 'other' TB category constitutes a sizeable population of retreatment patients and is poorly managed. In AHMC giving up dated regular information to health provider particularly physicians and laboratory technicians may reduce poor management and misdiagnosis of retreatment TB. The high proportion of missing treatment cards suggest that less priority is given to retreatment patients. The treatment success may be improved by adoption of more accurate diagnostic tools such as GeneXpert MTB/RIF and sufficient training and regular supervision of TB staff.

Generally, in management of previously treated TB patients following a routine programmatic that was settled by Ethiopian, FMOH to control TB, TB/HIV and leprosy plan of the 2013 is a good practice to bring high TSR.

Recommendation

Strengthening laboratory of referral hospitals to the capacity of performing GeneXpert MTB/RIF, culture and DST.

Separating TB treatment card room solely from whole patient card room.

Implementation of DOTs plus strategy regardless of age group both at initiation and continuation phases.

Encouraging operational research towards evidence based diagnosis of TB patients.

Giving sufficient training and regular supervision to TB staffs.

Competing Interests

The authors declare that they have no competing interests.

Authors Contributions

JLL and BBT had involved in the design, implementation of the study, performed statistical analysis, and drafted the manuscript. MAW, DEN and GBW conceived and designed the study, involved in the implementation of the study, performed statistical analysis and critically revised the manuscript. All the authors read and approved the final manuscript.

Acknowledgement

college administrate for their help during data gathering process for this thesis.

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