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Treatment outcome of Tuberculosis Patients at Gambella Hospital, Southwest Ethiopia: Three-year Retrospective Study

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Abstract

Background: The study conducted in Gambella Regional hospital that include three years TB treatment outcome.

Methods: This study analyzed the records of 1,156 TB patients registered in hospital from January 2011 to June 2013. Bivariate analyses with a logistic regression model used to analyze the association between treatment outcome and potential predictor variables.

Results: The study categorized 1,156 TB patients status as, 251 (21.71%) extra pulmonary TB (EPTB), 398 (34.43%) smear positive pulmonary TB (PTB) and 507 (43.86%) smear negative PTB cases. Among the study subjects, 280 (24.22%) were Human immunodeficiency virus (HIV) seropositive. The treatment outcome was classified successfully treated, 814(70.76%), defaulted, 97 (8.39%), transferred out, 198 (17.13%), died, 43 (3.72%) and treatment failed, 4 (0.35%) patients.

Conclusion: This study showed that TB patients' treatment success rate treated at the hospital DOTS clinic found below the national success rate. Treatment of HIV-TB co-infection cases needs a better attention in the study area with a continuous of strengthening and monitoring of treatment outcome for successful TB control program. As a recommendation farther research should be done to identify causes of a common reason for unsuccessful treatment outcome in TB patients and working on the increasing awareness of the community.

Keywords: TB; PTB; HIV-TB co-infection; Treatment

Introduction

Tuberculosis (TB) is one of the major global health problems, which ranked as the second leading cause 0f death from an infectious disease worldwide next to human immunodeficiency virus (HIV) that causes ill health among millions of people each year [1]. Based on the latest 2012 World Health Organization (WHO) estimates there were an estimated 8.6 million people developed TB and 1.3 million died from the disease (including 320 000 deaths among HIV-positive people). Increased numbers of TB deaths are occurring unacceptably while most cases are preventable [2].

Since WHO declared TB as a global public health emergency in 1993, starting in the mid-1990s, various efforts to improve TB care and control intensified at national and international levels. WHO developed the Directly Observation Treatment Short Course (DOTS), which is internationally recommended as most effective and cost-effective TB control strategy particularly in low-income country [1,3]. A successful DOTS approach has five-component packages comprising political commitment, diagnosis using sputum smear microscopy, a regular supply of first-line anti-TB drugs, short-course chemotherapy and a standard system for recording and reporting the number of cases detected by national TB control programs (NTPs) and the outcomes of treatment[1]. Treatment for TB takes long period, and high cost of drugs, which resulted wide compliance of patients, mainly in low-income countries. Failure and relapse rates among TB patients in some areas ranged from 10-60% resulting in the wide spread of multi-drug-resistance [4,5].

Beyond the increased difficulty in treating the disease, the patient remained infectious for long, which aggregate the risk to the public and to healthcare workers. Multi-drug resistant (MDR) TB also appears in association with HIV infection and AIDS which accelerate the progression of TB infection into active TB disease, further compromising the health and the immune system of these patients [6-8]. In the absence of treatment natural history of TB showed mortality could reach 70% within 10 years among smear positive and HIV-negative cases of pulmonary; 20% among culture positive(but smear- negative) within 10 years. However, since 1995, over 51 million people were successfully treated and an estimate of 20 million lives saved through DOTS strategy and the Stop TB Strategy [1].

Principally treatment of TB aims at curing patients, interrupting transmission and preventing emerging of drug resistant bacilli [9]; still, these did not bring achievement in several regions of the world. Probable causes are death of patients in the course of treatment, default or resistance of bacilli to the drugs prescribed [10]. Treatment outcome show the quality of TB treatment delivered by a health system. Treatment outcome evaluation using standardized categories has been issued by WHO in conjunction with the European Region of the International Union against TB and Lung Diseases (IUATLD) [11].

At present, the Gambella Regional Hospital gives diagnostic and treatment services for TB patients based on the direct observed treatment short course (DOTS) program. In the region, TB is one of the listed causes of mortality, morbidity based on the hospital data, and WHO reports [12]. HIV/AIDS sero-prevalence indicators showed a gradual decline from year 2004 to 2010 from a prevalence of 4.3% to 2.8% in adults, which is found to be high, compared to other parts of the country. This study designed to assess treatment outcome of TB cases in Gambella Regional Hospital, Southwestern Ethiopia.

Materials and Methods

Study area

The study conducted in Gambella Peoples National Regional State, Gambella town. The region is located in the Southwestern part of Ethiopia and borders of Oromia region to the North and east and the Southern Nations, Nationalities and Peoples' Regional State to the south and South Sudan to the west. Gambella is a name for both the region and the city, which is located about 753 kilometers West of Addis Ababa perched at an elevation of 526 meters above sea level (Figure 1). The town is founded on the banks of the River Baro, Ethiopia's widest and the only navigable river. The Gambella Regional state has one Government owned Hospital located at Gambella Town, where the present study conducted. According to the Gambella Health Bureau, the Hospital gives serves for 390, 593 populations, which is the population of the region [13], while on average the hospital is visited annually by 44, 269 health service seekers [14].
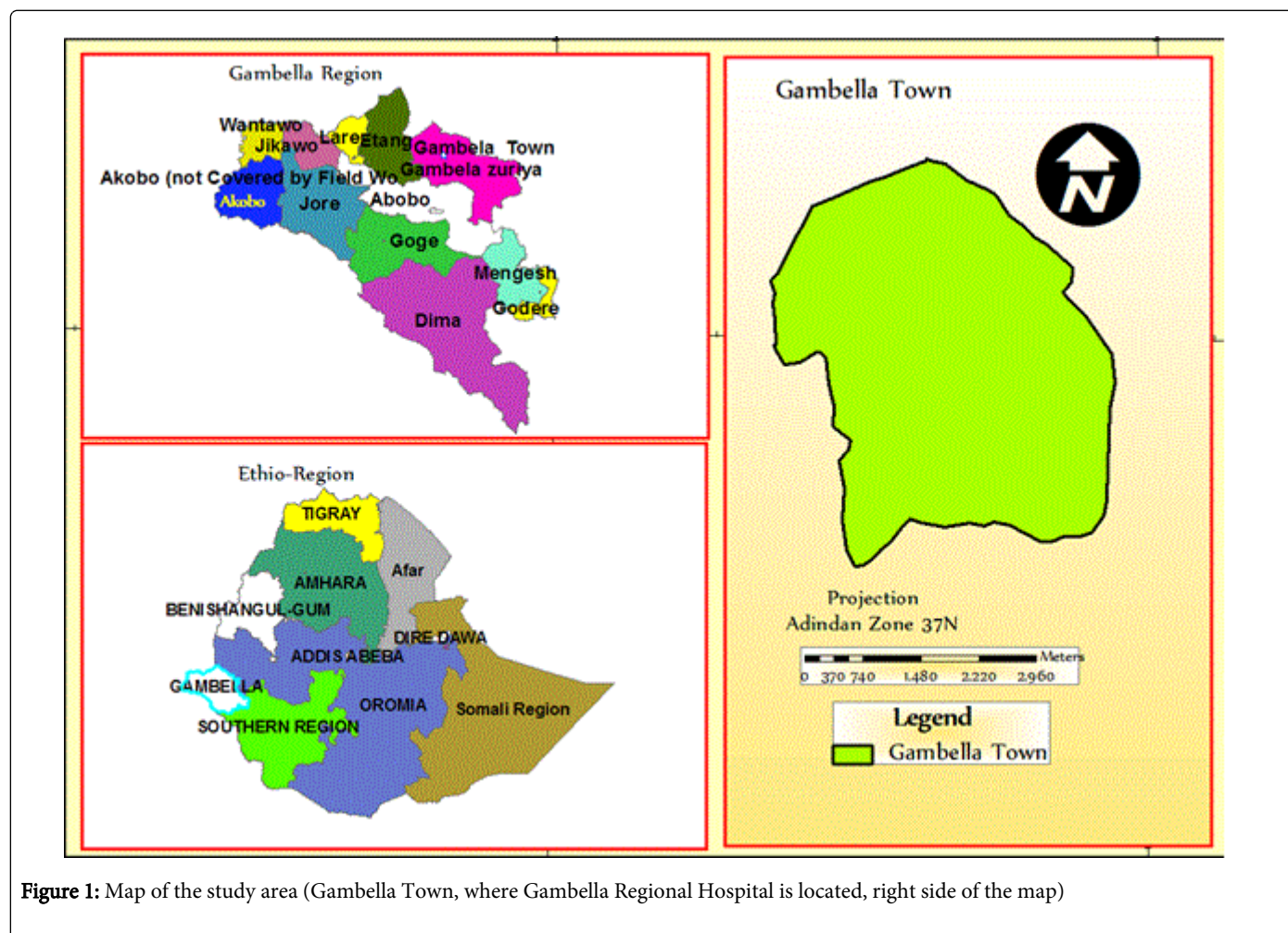

Figure 1: Map of the study area (Gambella Town, where Gambella Regional Hospital is located, right side of the map)

The hospital has a Directly Observed Therapy; Short-Course (DOTS) TB clinic, under which the diagnosis of PTB is followed by examination of three sputum smears by Zihel–Nielsen staining method for acid fast bacilli (AFB) besides, chest radiographs and pathological investigations are also used to support the diagnosis. Patients diagnosed with TB referred to the DOTS clinic where they are registered and treated according to the national TLCP guideline.

Study design and data collection

A three-year retrospective descriptive analysis to assess treatment outcomes and risk factors of 1,156 TB patients registered from January 2011 to June 2013 carried out in Gambella Regional Hospital DOTS clinic. Basic demographic data such as patient's age, sex, address, HIV sero-status, patient type, and TB type and treatment outcome were included in the pre-arranged collecting format. Treatment outcome evaluated in accordance with the National TB and Leprosy Control Program (NTLCP) adopted from the WHO [15].

Cured: (finished treatment with negative bacteriology result of the treatment).Treatment completed (finished treatment but without bacteriology result of their treatment). Defaulted: (patients who interrupted their treatment for two consecutive months or more after registration).Treatment failure :-(-remaining smear-positive at five months despite correct intake of anti-TB medication). Died: (patients who died from any cause during the course of treatment).Transferred out: (patients whose treatment result is unknown due to transfer to another health facility).Successfully treated (a patient who was cured or completed treatment), and Unsuccessful treatment: (Patients, whose treatments were interrupted, transferred out or failed on treatment). Patients provided with free TB medications for a period of 6 to 8 months by the DOTS center in the hospital. Patients followed up regularly until completion of their treatment [15].

Statistical analysis

All the data entered on Microsoft Excel spreadsheets and analyzed using the Stata Version 12, software package. For categorical outcomes, we used proportions with 95% confidence interval, Odds ratio and tested the differences using the Chi-square test or the Fisher exact test to compare different groups. To ensure the quality of data entered into the computer, two people were independently crosschecks each entry. Multi-variate analysis using logistic regression model used to analyze the association between treatment outcome and potential predictor variables. P-values of less than 0.05 considered statistically significant.

Ethical permission

The Institutional Ethical Clearance Committee, Aklilu Lemma Institute of Pathobiology, Addis Ababa University, ethically cleared the study and a working permission obtained from the Gambella regional Health Bureau.

Results

Demographic characteristics of study targets

From 1,156 TB patients documented at the Gambella Regional Hospital between January 2011 and June 2013, males comprised of 698 (60.38%) while females 458 (39.62%). Regarding TB type 905 (78.29%) cases were PTB and 251 (21.71%) were EPTB patients. The mean age of the patients was 26.64 years, ranging from 0.5 to 85 years. Around 776 (67.13%) of the patients were in the age group of 15-44 years. Out of 1,156 patients registered with residential area indicating 1,071 (98.61%) from urban while 15 (1.38%) from rural area (Figure 2).
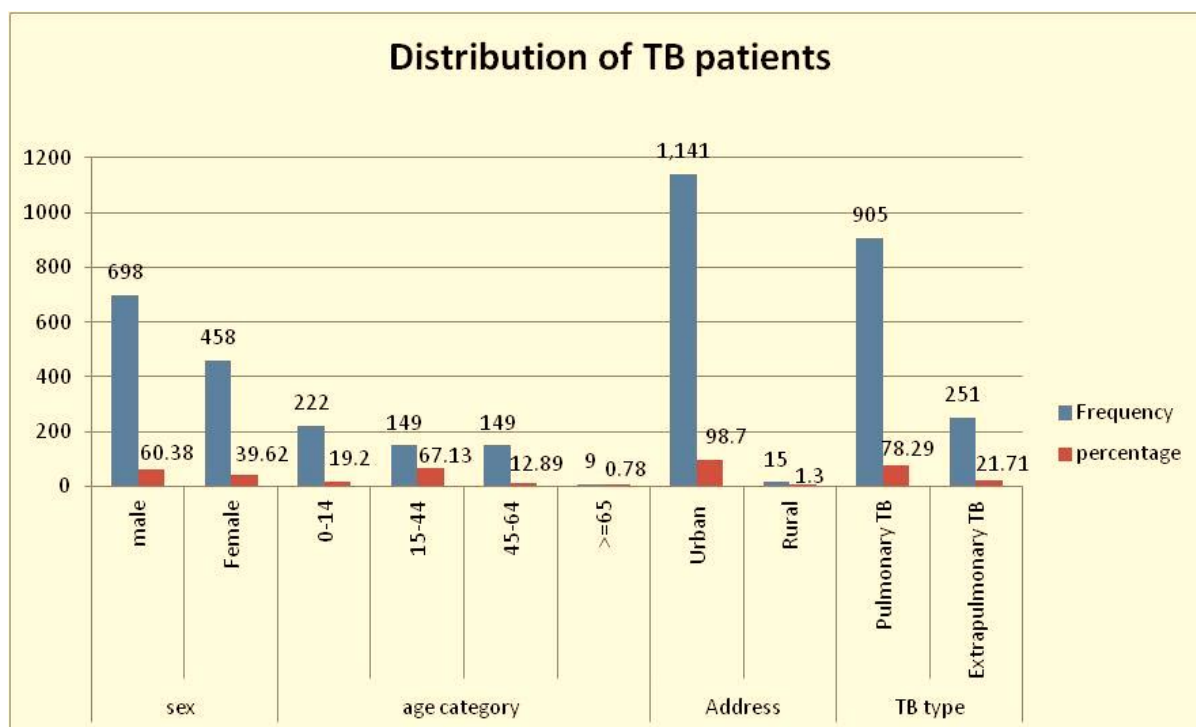

Figure 2: Distribution of TB patients (n=4224) by sex, age category, patient's residence, TB type and Patient type in Gambella regional Hospital, Southwest Ethiopia, Gambella town from January 2011 to June 2013.
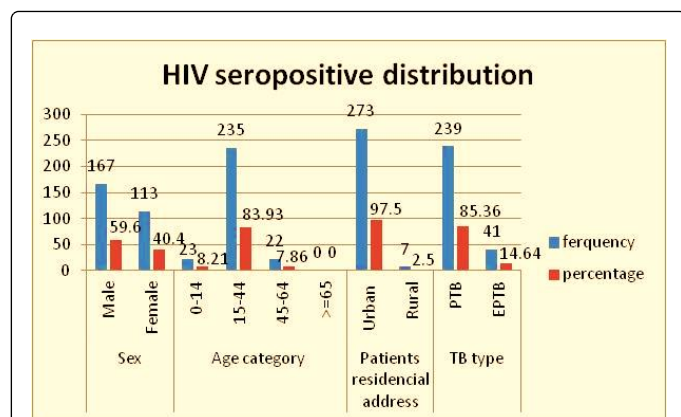
Figure 3: Seropositvity distribution of TB Patients (n=280) by sex, age groups, patients residence and TB type at Gambella Regional Hospital, South West Ethiopia, from January 2011 to June 2013.

Figure 3 shows the HIV positive status of the TB patients in the hospital. Two hundred eighty (26.12%) were HIV seropositive, of these, 167 (59.6%) were males and 113 (40.4 %) were females. From these seropositive individuals 273 (97.50%) of the subset were from urban areas and the majority of them were also in the age group of 15 to 44 (Figure 3).

Treatment outcomes

This secondary study result showed the treatment outcomes of 1,156 TB patients as shown in Table 1. A successful treatment outcome was seen in 814 (70.42%) of the cases in the study. In the meantime, 97 (8.39%) defaulted cases, 198 (17.13%) transferred out cases in another health center/hospital within /or another region, 43 (3.72%) death cases and 4 (0.35%) treatment failure cases of the presented TB patients.

Treatment outcome	Proportions N (%)
Successfully treated	814(70.42)
Died	43(3.72)
Failure	4(0.35)
Defaulted	97(8.39)
Transfer out	198(17.13)

Table 1: Proportions of treatment outcomes in Gambella Regional hospital from January 2011 to June 2014.

Discussion

TB is one of the chronic infectious diseases, which remained a significant cause of morbidity and mortality for poor nations [16]. Recently aggravated by the HIV/AIDS epidemic, this remains a major public health problem in developing countries including Ethiopia [17]. WHO 2012-reported treatment success rate of TB among all new cases in 2010, from the 22 high burden countries, eight of them including Ethiopia reported lower than 85%. This study found the successful

treatment rates of all TB cases 814(70.14%) treated at the DOTS clinic in Gambella Regional Hospital, which, is lower than the national report by [2] and a study result obtained from Northwestern Ethiopia at Kolla Diba health center that exceeds 85%[18]. This lower treatment outcome may be due to high transfer rate, default, and death rates (Table 1).

Meanwhile the treatment success rate of this study is similar in a study conducted in rural parts of Ethiopia by [19] and report of [15], as 70 and 78 % respectively. Similarly, the success rate found to be similar with Switzerland (70%) [20]. On the contrary, the treatment success rate of present study was found lower than a surveillance and outbreak report conducted in three European countries (85%) [21], Brazil (75.9%) [22] and Spain 82% [23]; however, it is lower than reports in California (97.8%) and WHO target success rate in developing settings (90%) [24].

The result of this study was higher in treatment success rate than a similar study conducted by [25] in Gambella Regional hospital, which was 63.40%.

Increased number of transferred out [198(17.12%)] and default cases [97(8.4%)] may contribute for lower treatment success rate in this study. In the present study, it found a high death rate (3.7%), which is in agreement with a result of [18] conducted in Dembia District Northwest Ethiopia. High death rate observed in the age groups 15-44 groups 29(2.51%) which is similar with other studies [26]. The death rate is somehow lower than a study finding from an Eastern Taiwan and Northwestern Ethiopia at University of Gonder teaching hospital [27,28].

In our study treatment, 4(0.35%) of failure rate is observed, which is lower than a study by [26] which was 0.5% conducted in northwest Ethiopia. HIV-negative cases found to show high treatment success rate compared to their counter parts. The treatment success rate for HIV positive and negative cases were 17.26% and 54.85 % respectively that indicate HIV testing before TB treatment starts is essential (AOR=1.6, 95% CI=1.20-2.14, p=0.001). Patients in the age group 45-64 had significantly lower treatment success rate compared to the age groups of 0-14 years (AOR=0.58, 95% CI=0.35-0.93, p=0.026), which may be due to the chance of HIV co-infection, and other general physiological deterioration with age, that demands special attention[27].

Studies showed that HIV infection increases the chance of TB reactivation and infection [19]. The HIV prevalence rate in the present study recorded among TB patients was 24.2% which is much lower than reports from Gondar of 52.1% [29], and higher than in reports by[26] (1.7%), while, it is found similar in another study conducted in Northwest Ethiopia [26]. The treatment success rate of all TB-HIV co-infection cases treated under the DOTS program in the health institute 17.3% (n=185). The death rate among TB-HIV co-infection was 7.85%, the failure rate was 0.3%, and defaulted rate was 10.71%, which shows that a close special attention to HIV-positive TB cases is required in the study area. This study showed that patients with PTB-HIV co-infection were more likely to have favorable treatment outcome (56.42%) than EPTB-HIV co-infection cases (9.6%), possibly because their illness is more severe and symptomatic [30, 26] or probable the increased number of PTB-HIV co-infection may contribute for the difference (Tables 2-4).

Characteristics	Treatment outcomes						
	Cured N(%)	Treatment competed N(%)	Failure N(%)	Defaulted N(%)	Died N(%)	Transferred out N(%)	Total
Sex							
Male	154(13.32)	334(28.89)	1(0.09)	59(5.10)	24(2.08)	126(10.90)	698
Female	108(9.34)	218(18.86)	3(0.36)	38(3.29)	19(1.64)	72(6.23)	458
Age (years)							
0-14	11(0.95)	158(13.67)	-	15(1.30)	7(0.61)	31(2.68)	222
15-44	225(19.46)	316(27.34)	3(0.26)	68(5.88)	29(2.51)	135(11.68)	776
≥ 65	-	5(0.43)	-	1(0.09)	-	3(0.26)	9
Residence							
Urban	258(22.32)	549(47.49)	4(0.35)	97(8.39)	43(3.72)	190(16.44)	1,141
Rural	4(0.35)	3(0.26)	-	-	-	8(0.69)	15
TB type							
PTB	252(21.80)	391(33.82)	4(0.35)	77(6.66)	34(2.94)	147(12.72)	905
EPTB	10(0.87)	161(13.93)	-	20(1.73)	9(0.78)	51(4.41)	251

Table 2: Treatment outcome of TB patients (n=1,156) by sex, age group, residence, and TB type, at Gambella Regional Hospital, Southwest Ethiopia, January 2011 to June 2013.

Characteristics	Treatment outcomes						
	Cured N(%)	Treatment competed N(%)	Failure N(%)	Defaulted N(%)	Died N(%)	Transferred out N(%)	Total
sex							
Male	34(12.14)	75(26.79)	-	20(7.14)	12(4.29)	26(9.29)	167
Female	26(9.29)	50(17.86)	1(0.36)	10(3.57)	10(3.57)	16(5.71)	113
Age (years)							
0-14	1(0.36)	14(5.00)	-	3(1.07)	2(0.71)	3(1.07)	23
15-44	55(19.64)	99(35.360	1(0.36)	24(8.57)	18(6.43)	38(13.57)	235
≥ 65	4(1.43)	12(4.29)	-	3(1.07)	2(0.71)	1(0.36)	22
Residence							
Urban	58(20.71)	123(43.93)	1(0.36)	30(10.71)	22(7.86)	39(13.98)	273
Rural	2(0.71)	2(0.71)	-	-	-	3(1.07)	7
TB type							
PTB	59(21.07)	99(35.36)	1(0.36)	27(9.64)	17(6.07)	36(12.86)	239
EPTB	1(0.36)	26(9.29)	-	3(1.07)	5(1.76)	6(2.14)	41

Table 3: Treatment outcome of seropositive TB patients by sex, age group, residence, and TB type (n=280), Gambella Regional Hospital Southwest Ethiopia, January 2011 to June 2013.

Characteristics	Treatment success			OR	95 (%) CI	P-value	AOR	95 % CI	p-value
	Yes N=814 (%)	No N=342 (%)	Total N=1,156(%)						
Sex									
Male	488(42.21)	210(18.17)	698(60.38)	1					
Female	326(28.20)	132(11.42)	458(39.62)	1.1	(0.82-1.73)	0.64	1.05	(0.80-1.37)	0.72
Age category									
0-14	169(14.62)	53(4.58)	222(19.20)	1					
15-44	541(46.80)	235(20.33)	776(67.13)	0.7	(0.51-1.01)	0.064	0.79	(0.55-1.14)	0.211
45-64	99(8.56)	50(4.33)	149(12.89)	0.6	(0.39-0.98)	0.042	0.58	(0.35-0.93)	0.026
≥ 65	5(0.43)	4(0.35)	149(12.89)	0.4	(0.10-1.51)	0.174	0.35	(0.08-1.50)	0.162
Residential area									
Urban	807(69.81)	334(28.89)	1,141(98.70)	1					
Rural	7(0.61)	8(0.69)	15(1.30)	0.4	(0.13-1.03)	0.058	0.37	(0.13-1.06)	0.065
TB Type									
PTB	643(55.62)	262(22.66)	905(78.29)	1					
EPTB	171(14.79)	80(6.92)	251(21.71)	0.9	(0.64-1.17)	0.37	0.72	(0.52-1.00)	0.051
HIV status									
HIV positive	185(17.26)	95(8.86)	280(26.12)	1					
HIV negative	588(54.85)	204(19.03)	792(73.88)	1.5	(1.15-2.00)	0.003	1.6	(1.20-2.14)	0.001
OR: Odds Ration ; CI: Confidence Interval; AOR: Adjusted Odds Ratio									

Table 4: Association between different factors, which may affect treatment outcome among TB patients (n=1,156), Gambella Regional Hospital Southwest Ethiopia, January 2011 to June 2013.

In summary, this study shows that TB patients' treatment success rate treated at the Gambella Regional Hospital DOTS clinic in South West Ethiopia found below the national rate (70.42%). The treatment outcome in the clinic showed 3.72% of death, 8.39% defaulted, 0.35% treatment failure, and 17.13% transferred out cases. This study also revealed positive association of treatment success rate with that of HIV-negative cases. Older age groups showed a decreased treatment success rate compared to younger groups. Treatment of HIV-TB co-infection cases needs a better attention in the study area with coordinating and monitoring treatment outcome of TB control program. As a recommendation, further research should be done to identify causes of a common reason for unsuccessful treatment outcome in TB patients and working on the awareness of the disease in the community.

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