Predictors of Poor Tuberculosis Treatment Outcome at Arba Minch General Hospital, Southern Ethiopia: A Case-Control Study

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Abstract

Introduction: Tuberculosis (TB) is a major public health problem throughout the world. About a third of the world's population is estimated to be infected with TB and hence at risk of developing active disease. Ethiopia ranks seventh among the world's 22 countries with a high burden of TB. This study was aimed at assessing the predictors of poor TB treatment outcome at Arba Minch General Hospital (AMGH), Southern Ethiopia.

Methods:

Several reasons and risk factors for poor TB treatment outcome have been reported by previous studies in other settings. Male sex, lack of education, old age, multidrug resistance, HIV co-infection, accessibility of health facilities, low socio-economic status, low awareness to the disease and its treatment [4-7]. Studies in southern Ethiopia [8-11] identified re-treatment, positive smear at 2nd month of follow-up, having smear-negative pulmonary TB and being male as independent risk factors for poor treatment outcome. However, the previous studies in the region lack information on HIV co-infection, initiation of Highly Active Anti-Retroviral Therapy (HAART) and Cotrimoxazole Prophylaxis Therapy (CPT) for TB/HIV co-infected patients, and drug use related factors on the treatment outcome. In addition to this, risk factors associated with poor outcome are likely to be different in different settings [12]. In this context, therefore, updated information is needed on predictors of poor treatment outcome that can help to identify those patients that are at a higher risk of poor treatment outcome while being treated with anti-TB drugs. Therefore, the aim of present study was to assess predictors of poor TB treatment outcome at Arba Minch General Hospital, Southern Ethiopia.

Materials and Methods

Study area and period

This hospital based case-control study was conducted at Arba Minch General Hospital, Southern Ethiopia from January 30 to February 28, 2014. Arba Minch is the capital of Gamo Gofa Zone, located approximately 500 km to the South of Addis Ababa and 275 Kms away from the Regional capital, Hawassa. Arba Minch General Hospital is located in Arba Minch town, and has 158 beds and serves 1.5 million people. The treatment of TB in Arba Minch General Hospital follows the guidelines from the National TB and Leprosy Control Program of Ethiopia (NTLCP). TB can be diagnosed using different methods using bacteriological, molecular, histopathology and radiological diagnostic methods. Sputum microscopy is the mainstay of diagnostic methods for TB in Ethiopia. It is the most efficient and applicable method to identify infectious TB cases in peripheral laboratories. It is used for diagnosis, monitoring and defining cure.

Results

Socio-demographic characteristics of study subjects

e present study enrolled 672 study subjects, 224 cases with poor outcome and 448 controls with successful outcome, 380 (56.5%) of all study subjects were males. Males were s̶g̶n̶]̶f̶ c̶t̶n̶t̶l̶m̶ higher in the case group compared to control group (65.6% vs. 52.0%; P=0.001). Patients in cases group were s̶g̶n̶]̶f̶ c̶t̶n̶t̶l̶m̶ older than controls (mean age ± SD of 37.9 ± 14.4 vs. 28.9 ± 13.4, P<0.001). S̶g̶n̶]̶f̶ c̶t̶n̶t̶l̶m̶ higher proportion of study subjects in the case group were from rural area compared to the control group (51.8% vs. 39.3%; P= 0.003). e̶re was no mean weight d̶]̶ erence between cases and controls (50.8 ± 9.3 vs. 51.9 ± 13.4, P=0.235) (Table 1).

Patient characteristics	Case group	Control group N (%)	Total N (%)	P-value	X2 value (df)
Number of cases	224(100)	448(100)	672(100)		
Sex					
Male	147(65.6)	233(52.0)	380(56.5)	0.001*	8.9 (1)
Female	77(34.4)	215(48.0)	292(43.5)		
Age (years)					
14	5(2.2)	44(9.8)	49(7.3)		
15-24	38(17.0)	141(31.5)	179(26.6)		
25-34	52(23.2)	130(29.0)	182(27.1)		
35-44	56(25.0)	71(15.8)	127(18.9)		
45-54	38(17.0)	43(9.6)	81(12.1)		
55-64	23(10.3)	8(1.8)	31(4.6)		
65	12(5.4)	11(2.5)	23(3.4)		
Mean ± SD	37.9 ± 14.4	28.9 ± 13.4		0.000*	¶
Area of residence					
Urban	108(48.2)	272(60.7)	380(56.5)	0.003*	8.9 (1)
Rural	116(51.8)	176(39.3)	292(43.5)		
Baseline weight(kg)					
30-May	7(3.1)	40(8.9)	47(7.0)		
31-54	141 (62.9)	203(45.3)	344 (51.2)		
55	76(33.9)	205(45.8)	281(41.9)		
Mean ± SD	50.8 ± 9.3	51.9 ± 13.4		0.253	¶

NB: SD- Standard Deviation,   - chi-square, ¶ - T-test Statistic for independent sample test used

Table 1: Socio-demographic characteristics of study subjects, Arba Minch general hospital, Southern Ethiopia, 2014 (N=672).

Clinical characteristics	Case group N (%)	Control group N (%)	Total N (%)	P-value	X2 value(df)
New case	192(85.7)	416(92.9)	608(90.5)	0.001*	14.6 (2)
Retreatment	19(8.5)	10(2.2)	29(4.3)		
Transfer in	13(5.8)	22(4.9)	35(5.2)		
PTB+	25(11.2)	127(28.3)	152(22.6)	0.000*	25.2 (2)
PTB-	151(67.4)	243(54.2)	394(58.6)		
EPTB	151(67.4)	78(17.4)	126(18.8)		

Smear result at 2nd/3rd month (N=151)					
Negative	9(36.0)	120(95.2)	129(85.4)	0.000*	54.2 (1)
Positive	16(64.0)	6(4.8)	22(14.6)		
Smear at 5th month					
Negative	0(0)	124(100)	124(96.1)	NA	NA
Positive	5(100)	0(0)	5(3.9)		
Smear at 6th /8th month					
Negative	0(0)	107(100)	107(99.1)	NA	NA
Positive	1(100)	0(0)	1(0.9)		
HIV Negative	116(51.8)	346(77.2)	462(68.8)	0.000*	45.1 (2)
HIV Positive	87(38.8)	82(18.3)	169(25.1)		
No HIV result	21(9.4)	20(4.5)	41(6.1)		
CPT initiated for HIV+ (N=169)					
NO	19(21.8)	7(8.5)	26(15.4)	0.019*	4.76 (1)
Yes	68(78.2)	75(91.5)	143(84.6)		
HAART initiated for HIV+ (N=169)					
No	33(37.9)	16(19.5)	49(29.0)	0.014*	6.09 (1)
Yes	54(62.1)	66(80.5)	120(71.0)		

NB: -chi-square, CPT-Cotrimoxazole prophylactic therapy, HAART-Highly Active Anti-Retroviral Therapy, PTB-: pulmonary tuberculosis, EPTB: Extra Pulmonary Tuberculosis, NA- Not Analyzed because of missing values

Table 2: Clinical characteristics of study subjects, Arba Minch general hospital, Southern Ethiopia, 2014.

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RH	105(46.9)	318(71.0)	423(62.9)		

NB: *Significant p < 0.05, - chi-square, -Fishers exact test, E- Ethambutol, H- Isoniazid, R- Rifampicin, S- Streptomycin, Z- Pyrazinamide

Table 3:

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18. Babalık A, Kılıçaslan Z, Kızıltaş S, Gencer S, Ongen G (2013) A retrospective case-control study, factors U ect]ng treatment outcomes for pulmonary tuberculosis in istanbul, Turkey. Balkan Med M