



Research Article

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Determinants of Defaulting Tuberculosis Treatment in Hosanna town health facility, Hadiya Zone, South Ethiopia

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Abstract

Background: Treatment non-adherence leads to continuing tuberculosis (TB) transmission, development of drug resistance, resulting in serious risks for patient and for community. **Objective:** To assess determinant factors of TB defaulting among TB patients in Hosanna town health facility, South Ethiopia. **Method:** an unmatched case control study was conducted from January 1, 2010 to December 30, 2012. Bivariate and multivariate logistic regression analysis were performed to determine final predictors of defaulting variable at P-value < 0.05 and 95% CI. **Result:** A total of 128 respondents were included. Among those, 64 of them were controls and 64 were cases. Patients who live in private house and in relative house were 4.12 [AOR (95%CI) = 4.12 (1.1, 15, 4)] and 42.7 [AOR (95%CI) = 42.7(8.5, 213)], times more likely to default as compared to patients who live in their own house respectively. Patients who haven't experience of stigma were found to decrease odds of defaulting [AOR (95%CI) = 0.1(0.03, 0.44)] and patients who have no awareness of TB treatment period were 22 times more likely to default [AOR (95%CI) = 22.6 (4.3, 118)]. **Conclusion:** Inadequate knowledge about TB treatment period, housing status, and experience of stigmatization were found to be statistically significant with defaulting TB drug.

Keywords: Defaulting; Adherence; Tuberculosis; Treatment; Hosanna town.

INTRODUCTION

Tuberculosis (TB) is endemic in the majority of sub-Saharan African countries where the highest global annual incidence rates are recorded [1]. Tuberculosis treatment default is defined as any interruption of ant tuberculosis treatment for at least 2 months following treatment initiation [2].

The directly observed treatment (DOT) strategy has been recommended by the WHO [3] for improving the outcome of care for tuberculosis.

Ethiopia announced DOTS approach in 1993 [4] and it was announced in 1996 in the southern region of Ethiopia [5] Eighty two percent (82%) of TB patients have failed to adhere to treatment of TB before use of DOTS in Ethiopia [6].

Anti-tuberculosis treatment discontinuation is associated with disease reoccurrence following treatment, increased mortality, maintenance of micro-organism reservoirs and emergence of drug-resistant species of mycobacterium [7]. Lack of family support, side effects of medications, healthcare system factors and patient misinformation were some of factors linked to discontinuation of TB treatment in sub-Saharan Africa [8].

Multi drug resistant TB (MDR-TB) have developed and distributed dangerously. 20% of cases were resistant to first line treatment and 2% were also resistant to second-line treatment during 2000–2004. Despite treatment failure, extensively drug-resistant TB may be a possible challenge in Ethiopia [9].

DOT is one of the essential mechanisms for confirming treatment adherence [10]. Despite continued DOT TB treatment practice, the default has not been assessed yet in the area. Therefore, the aim of this study was to determine defaulting factor of tuberculosis treatment among TB patients and associated factors in the past two years in the study area.

MATERIAL AND METHODS

Study area: Hosanna town health center which is governmental and it is located 232 km. Southwest of Addis Ababa and 168 kilometers from Hawassa.

Study design and period: Unmatched case control study design was conducted from January 1, 2010 to December 30, 2012.

Study population: All patient cards/charts of tuberculosis registered and put on DOTS in the hospital during the study period

Inclusion criteria: All patient cards/charts of tuberculosis registered from January 1, 2010 and completed before January 1, 2014.

Exclusion criteria: Incomplete patient cards were excluded from the study.

Sample size determination and sampling procedure

By assuming 71.3 % exposed among controls, 80% power, 95% CI, a 5% alpha error, $r = 1$ and odds ratio of 4.5 (here the main exposure variable for defaulting is low income and a case: control ratio of 1:1, 64 cases and 64 controls (total 128 study subjects) constitute the sample. Finally, the study sample was selected accordingly by applying simple random sampling by preparing sampling frame for both case and control.

Data analysis

After data collection, each structured data sheet was checked for its completeness before the data entry. Data was coded, edited and entered into a computer database by using EPI Info version 3.5.3 and then analyzed by using SPSS version 22.0. Descriptive summary values such

as frequency and percentage were used to describe the study variable. Binary logistic regression was performed to assess the association of independent variable with outcome variable. Then those variables which showed significant association with the outcome variable ($p < 0.05$) was included in multivariable logistic regression analysis to identify significant predictor of treatment default. Finally, the results were presented by text and tables.

Ethical approval

Ethical clearance was obtained from the Ethical review committee of Wachemo University, College of medicine and health sciences and a written formal letter of permission was given to Hosanna town health center administrator to permit accessing of the data. As the study was carried out through a review of records, written informed consent was obtained from each study participant. Privacy of data was also assured and collected anonymously.

RESULT

Socio-demographic factors

A total of 128 respondents were included with response rate of 100%. Among those, 64 were control and 64 were case group. More than half of respondents were male in both groups (Table 1).

Therapy and Patient-related factors

More than half of respondents in both case 51(79.7%) and control 50(78.1%) group had awareness of tuberculosis. However, 1(1.6%) of control group did not know the duration of tuberculosis treatment compared to 23(35.9%) case. (Table 2).

Table 1: Socio-demographic characteristics of participants at TB clinic of Hosanna town health facility from January 2010 to December 2012.

Characteristics		Respondent status			
		Cases(n=64)		Controls(n=64)	
Sex	Male	N (%)		N (%)	
			34	53.1%	39
	Female	30	46.9%	25	39.1%
Age	<24	22	34.4%	29	45.3%
	25-34	22	34.4%	15	23.4%
	35-44	12	18.8%	16	25.0%
	45-59	8	12.5%	4	6.2%
Educational level	illiterate	8	12.5%	5	7.8%
	read and write	12	18.8%	1	1.6%
	primary school	19	29.7%	30	46.9%
	secondary school	19	29.7%	20	31.2%
	college and above	6	9.4%	8	12.5%
Marital status	single	35	54.7%	40	62.5%
	divorce	27	42.2%	20	31.2%
	widowed	2	3.1%	4	6.2%
Occupational Status	farmer	8	12.5%	6	9.4%
	merchant/trade	22	34.4%	4	6.2%
	governmental employer	1	1.6%	10	15.6%
	unemployed	23	35.9%	38	59.4%
	housewife	10	15.6%	6	9.4%
Religion	protestant	42	65.6%	44	68.8%
	orthodox	21	32.8%	12	18.8%
	Muslim	1	1.6%	8	12.5%

Table 2: Therapy and patient characteristics of participant at TB clinic of Hosanna town health facility from January 2010 to December 2012.

Characteristic		Respondent status			
		Case (n=64)		Control (n=64)	
Awareness of tuberculosis	Yes	51	79.7%	50	78.1%
	No	13	20.3%	14	21.9%
Is tuberculosis curable?	Yes	53	82.8%	62	96.9%
	No	11	17.2%	2	3.1%
Knowledge of tuberculosis symptom.	yes	51	79.7%	62	96.9%
	No	13	20.3%	2	3.1%
Perceive tuberculosis like as other disease	Yes	45	70.3%	62	96.9%
	No	19	29.7%	2	3.1%
Knowing of treatment period	Yes	41	64.1%	63	98.4%
	No	23	35.9%	1	1.6%
Can we prevent tuberculosis?	Yes	53	82.8%	60	93.8%
	No	11	17.2%	4	6.2%
Face of drug side effect	Yes	12	18.8%	10	15.6%
	No	52	81.2%	54	84.4%
Knowledge of drug side effect	Yes	11	17.2%	12	18.8%
	No	53	82.8%	52	81.2%
Using alcohol	Yes	11	17.2%	1	1.6%
	No	53	82.8%	63	98.4%
Cigarette smoking	Yes	9	14.1%	2	3.1%
	No	55	85.9%	62	96.9%
Experience of stigmatization	Yes	17	26.6%	3	4.7%
	No	47	73.4%	61	95.3%

Table 3: Health care system characteristics of participant at TB clinic of Hosanna town health facility from January 2010 to December 2012

Characteristics		Respondent status			
		Case (n=64)		Control (n=64)	
Good Staff relation	Yes	59	92.2%	62	96.9%
	No	5	7.8%	2	3.1%
Need of public transport	Yes	9	14.1%	7	10.9%
	No	55	85.9%	57	89.1%
Walking distance in hour	<=2 hr.	62	96.9%	62	96.9%
	>2 hr.	2	3.1%	2	3.1%
Waiting time	<1 hr.	61	95.3%	62	96.9%
	>=1 hr.	3	4.7%	2	3.1%
Drug unavailability	Yes	5	7.8%	0	0%
	No	59	92.2%	64	100%
HIV/AIDS	Yes	21	32.8%	18	28.1%
	No	43	67.2%	46	71.9%
Tb type	Pulmonary	22	34.4%	50	78.1%
	Extra pulmonary	42	65.6%	14	21.9%
Treatment phase	Intensive phase	23	35.9%	10	15.6%
	Continuous phase	41	64.1%	54	84.4%
Treatment observed by	Patient himself	17	26.6%	59	92.2%
	Health professional	45	70.3%	1	1.6%
	Relative	2	3.1%	4	6.2%

Table 4: Factors associated with TB treatment defaulting at TB clinic of Hosanna town health facility from January 2010 to December 2012

Characteristics		Respondent status				COR(95%CI)
		Case (n=64)		Control (n=64)		
Educational level	illiterate	8	12.5%	5	7.8%	1
	read and write	12	18.8%	1	1.6%	7.5 (0.73-76.73)
	primary school	19	29.7%	30	46.9%	0.39 (0.11-1.39)
	secondary school	19	29.7%	20	31.2%	0.59 (0.17-2.12)
	college and above	6	9.4%	8	12.5%	0.47 (0.10-2.19)
Occupational Status	Farmer	8	12.5%	6	9.4%	1
	Merchant/trade	22	34.4%	4	6.2%	4.13 (0.92-18.5)
	Governmental employer	1	1.6%	10	15.6%	0.08 (0.01- 0.76)
	Unemployed	23	35.9%	38	59.4%	0.45 (0.14-1.46)
	Housewife	10	15.6%	6	9.4%	1.25 (0.29-5.41)
Religion	Protestant	42	65.6%	44	68.8%	1
	Orthodox	21	32.8%	12	18.8%	1.83 (0.80-4.19)
	Muslim	1	1.6%	8	12.5%	0.13 (0.02-1.09)
House status	Own	22	34.4%	53	82.8%	1
	Rental	9	14.1%	6	9.4%	3.6 (1.15-11.37)
	Government	1	1.6%	4	6.2%	0.6 (0.06-5.7)
	Family	32	50.0%	1	1.6%	77 (9.91-599.7)
Family Size	<= 4	11	17.2%	25	39.1%	1
	>=5	53	82.8%	39	60.9%	3.09 (1.36-7.02)
Is tuberculosis is curable	Yes	53	82.8%	62	96.9%	1
	No	11	17.2%	2	3.1%	13.08(1.63-104)
Knowledge of tuberculosis symptom	Yes	51	79.7%	62	96.9%	1
	No	13	20.3%	2	3.1%	16.1 (2.03-126)
Perception of tuberculosis	Yes	45	70.3%	62	96.9%	1
	No	19	29.7%	2	3.1%	26.6(3.44-205)
Knowledge of treatment period	Yes	41	64.1%	63	98.4%	1
	No	23	35.9%	1	1.6%	35.3 (4.59 -271)
Experience of stigmatization	Yes	17	26.6%	3	4.7%	1
	No	47	73.4%	61	95.3%	0.14(0.04- 0.49)
Tuberculosis type	Pulmonary	22	34.4%	50	78.1%	1
	Extra pulmonary	42	65.6%	14	21.9%	6.8 (3.11-14.96)
Treatment phase	Intensive phase	23	35.9%	10	15.6%	1
	Continuous phase	41	64.1%	54	84.4%	0.33 (0.14-0.77)

Table 5: Predictors of defaulting tuberculosis treatment at TB clinic of Hosanna town health facility from January 2010 to December 2012

Characteristics		Respondent status				COR (95%CI)	AOR (95% CI)
		Cases(n=64)		Controls(n=64)			
House status	own	22	34.4%	53	82.8%	1.00	1
	Rented	9	14.1%	6	9.4%	3.6 (1.15-11.37)	4.12(1.1-15.4)
	Government	1	1.6%	4	6.2%	0.6 (0.06-5.7)	1.69(0.24-12)
	Relative	32	50.0%	1	1.6%	77 (9.91-599.7)	42.7(8.5-213)
Knowledge of treatment period	Yes	41	64.1%	63	98.4%	1.00	1
	No	23	35.9%	1	1.6%	35.34 (4.59-271)	22.6 (4.3 -118)
Experience of stigmatization	Yes	17	26.6%	3	4.7%	1.00	1
	No	47	73.4%	61	95.3%	0.14 (0.04-0.49)	0.1(0.03-0.44)

Health care system factors

Majority of participants, 59 (92.2%) of case compared to 62(96.9%) control group had good relation with staff during tuberculosis treatment. Among case group, 55(85.9%) did not need public transport from treatment place compared to 57(89.1%) control group. (Table 3).

Factors associated with defaulting TB treatment

Association of educational level, occupational status, knowledge of TB symptom, treatment phase, experience of stigmatization, and TB type/category was assessed with TB treatment default through bivariate analysis. Unawareness of tuberculosis treatment period [COR =26.6(95% CI= 3.44-205] and stigmatization [COR =0.14(95% CI =0.04-0.49)] were associated with default (Table 4).

Predictors of defaulting TB treatment

House status, knowledge of treatment period, experience of stigmatization was found significantly associated with defaulting treatment in bivariate analysis and found to be independent predictors of defaulting TB treatment. Participants who live in rented house were 4.12 times more likely to default as compared to participants who live in their own house [AOR (95%CI) = 4.12 (1.1- 15.4)]. Participants who live in relative house were 42.7 times more likely to default as compared to live in their own house [AOR (95%CI) = 42.7(8.5-213)]. Participants who hadn't experience of stigma was found to decrease odds of defaulting as compared to participants who had experience of stigma [AOR (95%CI) = 0.1(0.03-0.44)]. Participants who had no awareness of tuberculosis treatment period were 22 times more likely to default as compared to participants who had awareness [AOR (95%CI) = 22.6 (4.3-118)] (Table 5).

DISCUSSION

In this study, stigmatization, house status, and knowledge of treatment period have been identified as independent predictors of defaulting.

Stigmatization was associated with default. This is found to be in line with a study done in Berlin [11] as stated by [12] that discrimination is found to exacerbate compliance issues of tuberculosis treatment. Compliance with tuberculosis behavior of drug taking was found to be exacerbated by discrimination on disease basis at health facilities as stated by [11]. Privacy during drug collection schedules is from important measures to be taken to overcome the problem. Usually, TB diagnosed patients are categorized by their communities as, sexual and social misfits in the society, then exclusion from social relationships and interactions is followed [13].

House status is associated with default. This is found to be similar with studies done in Nepal [14] and Ethiopia [15] stating that economic problem like occupation was reported to be one of the cause of default in TB treatment which indirectly affect house status of patients. This might be challenging financially for some patients since most TB patients are from the lower economic status in the society as shown from previous studies. [16] In Ethiopia specifically in the area where this research conducted, Occupation is highly related with income. So, those occupations listed in result is known to pay low relatively. This brought economic problem to the workers, so that put them in difficulty to pay for their rent. This is not a problem with patients having a high status occupation hence has high probability that treatment will be completed.

Participants who had no awareness of tuberculosis treatment period were 22 times more likely to default as compared to participants who had awareness. It is logical to put low literacy rate among defaulted patients as a contributing factor for lower awareness of tuberculosis treatment. Since it limits their access to various information sources [17]. This led us to a conclusion that literacy is as important as interpersonal communication of the health workers as it enable them to share knowledge about TB with professionals easily.

Unawareness is one from the risk factors of TB treatment default. Patients who had no awareness of tuberculosis symptoms [COR =16.1(95% CI= 2.03-126)] were at high risk of defaulting compared to patients who had awareness. Similarly [18] came up with the above outcome. Not perceiving tuberculosis like as other disease and unawareness of tuberculosis treatment period were some from factors associated with default.

CONCLUSION

The early default might be as a result of inadequate pretreatment health education and counseling, and poor defaulter tracing mechanism resulting from less motivation of health care personnel, and feeling better after medication for a while. Housing status, inadequate knowledge about TB treatment period, and having experience of stigmatization were found to be predictive factors for default. Patients need to be educated on possible anti-TB drugs treatment period. The community and health care personnel should support and handle them. The policy maker, regional health office and FMOH (federal ministry of health) should develop appropriate IEC/BCC intervention and promotion activities to take away ignorance about need for treatment compliance (stigmatization).

Data availability

The datasets during and/or analyzed during the current study available from the corresponding author on reasonable request.

Conflicts of Interest

The authors declare that they have no conflicts of interest

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REFERENCES

1. WHO. TuberculosisProfile,Cameroon.<https://extranet.who.int/sree/Reports> (accessed 26 Jun 2011).
2. Muture BN, Keraka M, Kimuu PK, Kabiru E, Ombeka VO, Oguya F. Factors associated with default from treatment among tuberculosis patients in Nairobi province, Kenya: A case control study. *BMC Public Health*. 2011; 11:696.
3. Demissie M, Lindtjorn B, Berhane Y. Patient and health service delay in the diagnosis of pulmonary tuberculosis in Ethiopia. *BMC Public Health* 2002; 2: 23.
4. Demissie M, Lindtjorn B, Berhane Y. Patient and health service delay in the diagnosis of pulmonary tuberculosis in Ethiopia. *BMC Public Health* 2002; 2: 23.
5. Shargie EB, Lindtjorn B (2005) DOTS improves treatment outcomes and service coverage for tuberculosis in South Ethiopia: A retrospective trend analysis. *BMC Public Health* 5:62.
6. Tekle B, Mariam DH, Ali A (2002) Defaulting from DOTS and its determinants in three districts of Arsi Zone in Ethiopia. *Int J Tuberc Lung Dis*. 6: 573–579.
7. Maartens G, Wilkinson RJ. Tuberculosis. *Lancet* 2007; 370: 2030e43.
8. Castelnuevo B. A review of compliance to antituberculosis treatment and risk factors for defaulting treatment in Sub Saharan Africa. *Afr Health Sci* 2010;10:320e4.
9. Centers for Disease Control (CDC) Emergence of mycobacterium tuberculosis with extensive resistance to second-line drugs—Worldwide, 2000–2004. *MMWR Morb Mortal Wkly Rep*. 2006; 55:301–305.

10. Sumartojo E .When tuberculosis treatment fails: a social behavioral account of patient adherence. *Am Rev Respir Dis* 1993, 147: 1311–1320.
11. Ingengo A, Mattosovich D, Kiasekoka MJ, Caprara A, Dedri S, Tap G: AIDS patients in Abjan: Social dynamics and care process. Abstract number (PO-D 20-4014), Berlin 1993.
12. Kaona FA, Tuba M, Siziya S, Sikaona L. An assessment of factors contributing to treatment adherence and knowledge of TB transmission among patients on TB treatment. *BMC Public health*. 2004 Dec; 4(1):68.
13. Glynn JR, Caraël M, Auvert B, Kahindo M, Chege J, Musonda R, Kaona F, Buvé A, for the Study Group on Heterogeneity of HIV Epidemics in African Cities: "Why do young women have a much higher prevalence of HIV than young men? A study in Kisumu, Kenya and Ndola, Zambia". *AIDS* 2001, 15(Suppl 4):S51-60.
14. Mishra P, Hansen EH, Sabroe S, Kafle KK. Socio-economic status and adherence to tuberculosis treatment: a case-control study in a district of Nepal. *The international journal of tuberculosis and lung disease*. 2005 Oct 1; 9(10):1134-9.
15. Shargie EB, Lindtjörn B. Determinants of treatment adherence among smear-positive pulmonary tuberculosis patients in Southern Ethiopia. *PLoS medicine*. 2007 Feb 13; 4(2): 280-286.
16. World Health Organization Group at Risk. WHO's Report on the Tuberculosis Epidemics. WHO, Geneva. (1996), 42-55
17. Tekle B, Mariam D, Ali A. Defaulting from DOTS and its determinants in three districts of Arsi Zone in Ethiopia. *The International Journal of Tuberculosis and Lung Disease*. 2002 Jul 1; 6(7):573-9.
18. Liam CK, Lim KH, Wong CM, Tang BG. Attitudes and knowledge of newly diagnosed tuberculosis patients regarding the disease, and factors affecting treatment compliance. *The International Journal of Tuberculosis and Lung Disease*. 1999 Apr 1; 3(4):300-9.