

Factors determining non-adherence to drug treatment among tuberculosis patients in Halaba special woreda: a case-control study

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Abstract

Introduction: Adherence is defined as the extent to which patients take anti-tuberculosis drugs as prescribed by their health care providers for the entire length of time. Non-adherence is the patient's inability or refusal to take anti-tuberculosis drugs as prescribed by health professionals. It adversely affects treatment success rate and increases the risks of morbidity, mortality, and multi drug resistance tuberculosis both at the individual and community levels.

Objective: To identify factors that determine non-adherence to anti-tuberculosis treatment among tuberculosis patients in Halaba special woreda.

Methods: Facility based unmatched case control study was conducted in eight- governmental health facilities. One hundred sixty six cases and 166 controls were participated in the study since 2-27, March 2014. Both cases and controls were selected from standardized tuberculosis registration book. Data were entered to Epidata version 3.5.1 database and analyzed using SPSS windows version 16. Descriptive statistics was performed to measure summary of data. Binary logistic regression analysis was conducted to see the association between independent and dependent variables. Significant variables with their $p < 0.05$ in bivariate analysis were entered to multivariable logistic regression and final model was constructed.

Result: Males constitute 50.6% (84) of the cases and 57.8% (96) of controls. Major predisposing factors to anti-tuberculosis treatment non-adherence were anti-tuberculosis drug side effect (AOR=5.46, 95% CI: 2.03-14.63), Pills burden (AOR=5.09, 95% CI: 2.94-8.82), Feeling better (AOR=4.04, 95% CI: 1.48-11.04), and lack of service satisfaction (AOR=3.27, 95% CI: 1.71-6.26).

Conclusion: The major risk factors for non-adherence among the study participants were anti-tuberculosis drug side effect, pills burden, feeling better, and lack of service satisfaction

Key words: Non-adherence to drug treatment, tuberculosis

Introduction

Tuberculosis (TB) is a chronic infectious disease caused by *Mycobacterium tubercle* (MTB). Typically it affects the lungs but also other parts of the body. It is transmitted via infectious droplet when people with pulmonary TB expel the bacilli. A relatively small proportion of people infected with the bacilli will develop the disease. However, the probability of developing TB incidence is much higher among people infected with HIV and especially it is also more common among economically productive age group men (WHO 2013). According to the World Health Organization (WHO) Report, there were 8.6 million new cases and 1.3 million deaths due to TB including HIV positive in 2012 (WHO 2013). Africa covers 27% of global TB incident next to South-East Asia, which accounts 58%. Ethiopia ranks 8th in the list of 22 high TB burden countries, and 3rd in Africa (next to Nigeria and South Africa), with an estimated prevalence of (all forms of TB) 394 per 100,000 populations (FMOH 2011). Short-course regimens of first-line drugs cure around 90% of TB cases (WHO 2013). However, the number of TB deaths is unacceptably large since people have no access to health care for a diagnosis and the right treatment (WHO 2013). The Ethiopian

TB guideline recommends treatment of all new TB cases by direct observable therapy (DOT) approach for two months (intensive phase) which comprising chemotherapy of Rifampicin, Isoniazid, and Pyrazinamide (RHZ) plus Ethambutol or Streptomycin (FMOH 2013). During intensive phase, health care providers directly observe patients for consecutive two months while they are taking daily treatment and that followed by a continuation phase of four months on EH, at which time drugs to be collected every week for self-administered treatment and subsequently it endorsed by the WHO Stop TB Strategy in 2006 (WHO 2013; FMOH 2011; FMOH 2013; WHO 2008). However, WHO established DOTs strategy for improving treatment adherence but patients interrupt and stop their medications prior to its completions due to long duration of treatment regimen and lack of treatment awareness. Adherence to treatment is following the recommended course of treatment by taking all the prescribed medications doses for the entire length of time without any missing that will cure 90% of TB cases (Awofeso 2008). Non-adherence is the patient's inability or refusal to take anti-TB drugs as prescribed by health professionals. Non-adherences could be results from not filling the prescribed drugs on time, not initiate it, skip dose or

taking incorrect doses (Walid et al. 2009). A number of factors may have been reported to contribute to patients Non-adherence. These include patient related factors, health facility related, health care provider related and social environments related factors. Non-adherence is one of the reasons for emergency of multi drug resistance TB (MDR-TB) and extra multi drug resistance-TB (XMDR-TB) (Mitchison 1998). Many studies reported that diverse treatment outcomes such as treatment failure and development of MDR-TB are associated with non-adherence (Walid et al. 2009; Leimane et al. 2005; Monica et al. 2009).

Studies indicate that, in the United States out of all hospital admissions, 33% to 69% patients were admitted due to non-adherence to their medication which costs approximately \$100 billion a year (Walid et al. 2009; Lars et al. 2005). Some studies revealed that patient readiness to follow prescribed treatment could be influenced by lack of access to health facility, financial burden, and low awareness of treatment. Clinical trial studies showed that globally, average non-adherence rates for various chronic disease treatment was 22% to 57% (Lars et al. 2005). Various studies conducted in different parts of Africa including Ethiopia had shown that long duration of treatment and feeling better promote non-adherence among TB patients (FMoH 2011; Sabat 2003; Tobias et al. 2013). First-line anti-TB drug treatment has a potency for rapidly removing 90% of symptoms and bacterial load for new cases that encourage patients to feel better or cured from disease (WHO 2013; Gebretsadik et al. 2012). Another study conducted in 2011 revealed that prevalence of MDR-TB was 11.8% and non-adherence to their treatment was the possible cause (FMoH 2011). However, DOTS in Southern Nation Nationality and People's Region (SNNPR) region was significantly attributable for reduction of defaulter from 38% to 18% but still this study, one out of five patients were non-adherent for their treatment (Estifanos et al. 2007).

Materials and Methods

Health facility based case control study was conducted among new TB patients aged >15 years from March 2 to 27, 2014. Data on patients registered on DOTS regimen in Halaba special district, SNNPR from January 2012 to December 2013 were abstracted. DOTs program initiated in all health facilities (in ten-health centers and in one primary hospital) of the district. TB patients who interrupt 10% and above dose of anti-TB treatment were considered as cases or "non-adherent to anti-TB treatment" and TB patients who interrupt below 10% dose of anti-TB were taken as "adherent to anti-TB treatment" (Weiguo et al. 2009). All TB patients who registered on DOTs program of

Halaba special district were the source population. Patients who transferred in from health facilities within district were included in the study. Patients who were on treatment during the study period, or registered as dead, or who had incomplete information or/and patients who had started treatment but transferred out were excluded from the study.

The sample size was calculated using Epi-Info7.1.0.6 statistical software by using two-population proportion sampling statistical techniques. Distance from a health facility was considered as main exposure variable for the determination of the sample size from previous study (Estifanos and Bernt 2007). Prevalence of exposure variable in control group was 21.36% that give maximum sample size to detect odds ratio of 2.0 with level of significance 0.05 at 95% CI and 80% power. Study participants were selected from the sampling frames of the selected health facilities (kulito hospital, Ashoka health center, Guba health center, Konicha, Tuka, Beshano, Arsho and Halaba health centers) by using simple random sampling techniques. Control to cases ratio was 1:1. Accordingly, the total sample size for this study was 360 (180 cases or non-adherent and 180 controls or adherent). Data were entered in to Epi-data version 3.5.1 software and then edited, coded, cleaned and analyzed using SPSS version 16 software database. Descriptive statistics were used to obtain summary values for cases and controls separately. Statistical significance was set at $p < 0.05$ and 95% CI as a cut-off point for decision-making. Binary logistic regression was performed for each independent variable with dependent variables to identify their association. Independent Variables with $P < 0.25$ during bivariate analysis were selected for multivariate analysis. The final model was constructed by using backward stepwise logistic regression method. Ethical review was obtained from Jimma University.

Results

Out of 180 sampled, for each cases and controls, 166(92.2%) cases and 166(92.2%) controls were traced and interviewed successfully. Out of study participants, males constitute 50.6 % (84) of the cases, and 57.8%(96) of the controls. The mean age for cases was 32.14 (SD+13.5) years and 32.4 (SD +12.8) years for the control group. One hundred and fifteen (69.3%) cases and 100 (60.2%) controls were rural residents. Ninety two (55.4%) cases and 72(43.4%) controls were unable to read and write (Table 1). Estimated average monthly income for cases and controls was 416 and 566 ET Birr respectively. Average family size for cases were six whereas for controls were five (Table1).

Table 1: Socio-demographic characteristics and their association with non-adherence to anti TB treatment in Halaba woreda, March 2014.

Variable	Cases n=166(%)	Controls n=166(%)	AOR (95% CI)	p-value
Sex				
Male	84(50.6)	96(57.8)	1.00	0.187
Female	82(49.4)	70(42.2)	1.34(0.86-2.06)	
Age(means +SD)	32.14(+13.5)	32.41(+12.82)	0.99(0.98-1.01)	
Residence				
Rural	115(69.3)	100(60.2)	1.48(0.95-2.34)	0.085
Urban	51(30.7)	66(39.8)	1.00	
Educational status				
Literate	74(44.6)	94(56.6)	1.00	0.029
Illiterate	92(55.4)	72(43.4)	1.6(1.05-2.501)	
Marital status				
Married	124(74.7)	122(73.5)	0.939(0.5-1.5)	1.00
not married	42(25.3)	44(26.5)	1.00	
Employment				
Employed	58(34.9)	69(41.6)	1.0	0.215
Unemployed	108(65.1)	97(58.4)	1.32(0.85-2.00)	

Patients' health and behavior on TB treatment non-adherence: Twenty two (13.3%) cases and 9 (5.4%) controls disclosed their disease status to their family. Eighteen (10.8%) cases and 11(6.6%) controls were reported that they faced stigma from their friends during treatment regimens. Sixty-seven (40.4%) cases and 54 (32.5%) controls stopped taking anti-TB drugs because they felt better or they felt they were cured

from the disease. Majority of cases (94%) and controls (93.4%) responded that they believe TB is curable disease. Forgetfulness among cases was 86(51.8%) compared to 59 (35.5%) for controls. Chat chewing among cases was 53(32.1%) compared 48(28.9%) for controls. Most patients, 102(61.4%) cases and 102(61.4%) controls, have social support from their relatives (Table2).

Table 2: Behavioral related factors characteristics distribution and their association to Non-adherence in Halaba special woreda, March 2014.

Variable	Cases n =166 (%)	Controls, n=166(%)	AOR (95% CI)	p-value
Experience of stigma				
Yes	18(10.8)	11(6.6)	0.58(0.26-1.27)	0.178
No	148(89.2)	155(93.4)	1.00	
Have you disclosed your disease status to your family				
Yes	22(13.3)	9(5.4)	1.00	0.017
No	144(86.7)	157(94.6)	2.66(1.188-6)	
Feeling better, stop taking your TB drug				
Yes	67(40.4)	54(32.5)	0.54(0.25-1.13)	0.103
No	99(59.6)	112(67.5)	1.00	
Believe TB is curable disease				
Yes	156(94)	155(93.4)	1.00	1.00
No	10(6)	11(6.6)	0.903(0.37-2.2)	
Alcohol use				
Yes	11(6.7)	10(6)	1.11(0.46-2.7)	0.811
No	154(93.3)	156(94)	1.00	
Chat chewing				
Yes	53(32.1%)	48(28.9)	1.16(0.73-1.9)	0.53
No	112(67.9)	118(71.1)	1.00	
Social support				
Yes	102(61.4)	102(61.4)	1.00	1.00
No	64(38.6)	64(38.6)	0.64-1.55	

Effect of social environment on TB treatment non-adherence: Seventy six (45.8%) of cases and 104 (62.7%) of controls had their own shelters. Twenty-six (15.7%) cases and 35(21.1%) controls had TV in their houses. In terms of access to safe drinking water, controls were more unlikely to have access for safe drinking water 104(62.7%) than cases131 (78.9%).

Effect of medication on TB treatment non-Adherence: Among respondents, 61(36.7%) cases and 41(24.7%) controls had faced anti-TB drug side effect. Drug side effect was 2.53 times more frequent among

cases as compared to the controls, (AOR=2.53; 95% CI: 1.25-5.11). About 107(64.5) cases and 51(30.7%) controls reported that they had additional drugs during their anti-TB treatment. One hundred sixteen (69.9%) cases and 124(74.7%) controls knew duration of treatment. Among study participants, 99(59.6%) cases and 101(60.8%) controls had taken HIV counseling and testing during medication period. Among study subjects, 107(64.5%) cases and 51(30.7%) controls were reported that they had additional drugs (pill) burden during treatment period (Table 3).

Table 3: Medication related factors distribution and their association to non-adherence in Halaba special woreda, March 2014

Variable	Cases n=166(%)	Controls n=166(%)	AOR(95% CI)	p-value
Medication has side effects				
Yes	61(36.7%)	41(24.7%)	2.53 (1.25-5.11)	0.03
No	105(63.3%)	125(75.3%)	1.00	
Knowledge about treatment durations				
Yes	116(69.9)	124(74.7)	1.00	0.327
No	50(30.1)	42(25.3)	1.27(0.78-2.06)	
Other drugs with anti-TB drugs (pills burden)				
Yes	107(64.5)	51(30.7)	4(2.6-6.5)	0.001
No	59(35.5)	115(69.3)	1.00	
HIV test during medications				
Yes	99(59.6)	101(60.8)	0.95(0.67-1.47)	0.823
No	67(40.4)	65(39.2)	1.00	
ART enrolment				
Yes	37(11.1)	21(12.5)	0.74(0.37-1.46)	0.38
No	295(90.4)	145(87.3)	1.00	
Availability of drug in the health facility				
Yes	2(1.2)	1(0.6)	1.00 0.18-22.4	0.57
No	164(98.8)	165(99.4)		

Health care provider related factors: One hundred forty-one (84.9%) cases and 149(89.8%) controls had got counseling service from health care providers. Fifty-two (31.3%) cases and 28(16.9%) controls were not satisfied with health care providers' service. One hundred and twelve (67.5%) of controls and 88(53%)

cases had good communications with health care providers. Most of the controls (91.6%), and 136 (82%) cases reported that they had chance to ask health care providers about their health status and benefit of medications (Table 4).

Table 4: Health care provider related factors and their association to non-adherence for drug treatment, March 2014 Halaba special woreda

Variable	Cases n=166 (%)	Controls n=166(%)	AOR (95% CI)	p-value
Getting counseling services				
Yes	141(84.9)	149(89.8)	1.00	
No	25(15.1)	17(10.2)	1.55(0.80-3.00)	0.19
Ensure privacy during counseling				
Yes	128(71.1)	145(87.3)	1.00	
No	38(22.9)	21(12.7)	0.95(1.14-3.67)	0.88
Keeping privacy during medication				
Yes	139(83.7)	138(83.1)	1.00	0.88
No	27(16.3)	28(16.9)	0.95(0.53-1.70)	
Have you ever given the chance to ask questions				
Yes	136(81.9)	152(91.6)	1.00	0.011
No	30(18.1)	14(8.4)	2.39(1.2-4.7)	
Satisfaction with health care provider service				
Yes	114(68.7)	138(83.1)	1.00	0.002
No	52(31.3)	28(16.9)	2.24(1.33-3.78)	
Communications with health care providers				
Good	88(53)	112(67.5)	1.00	0.007
Poor	78(47)	54(32.5)	1.83(1.17-2.87)	

Effects of health facilities on patients' non-adherence: Cases were more likely than controls to report that, they have traveled 5.3 kilometers distance on average to the nearest health facility, whereas controls traveled 4.2 kilometer, the difference was statistically significant ($p < 0.002$). Eighty (48.1%) cases and 76 (45.8%) controls were reported that public transport was available to go health facility. An average time required to reach health facility was sixty minute for cases and fifty minute for controls.

Factors which independently predicting to non-adherence among TB Patient: As Table 5 shows, females were more likely to be non-adherent as compared to males. Odds for non-adherence among female was 1.87 times more likely than male,

(AOR=1.87; 95% CI: 1.06-3.29). Among study subjects, those who had forgotten to fill anti-TB drugs from health facilities were nearly three times more likely to be non-adherent as compared to those who did not (AOR=2.79;95%CI:1.57-4.93). Other predisposing factor that associated with non-adherence was "feeling better". Patients who had better feeling about their health (perceived cured from the disease) were four times more likely to be non-adherent as compared to those who felt otherwise (AOR=4.04; 95% CI:1.48-11.04). Medication side effect was other predisposing factor that independently associated with non-adherence. Cases who were experienced anti-TB drug side effect were nearly six times more likely to be non-adherent as compared to controls who did not

have anti-TB drug side effect (AOR=5.46;95% CI:2.03-14.63).

Those who had pills burden or additional drugs beside anti-TB drugs were nearly five times more likely to be non-adherent as compared to those who did not had pills burden, (AOR=5.09;95% CI:5.09-8.82). Among study subjects, those who did not satisfied with health care provider service were three times more likely to be non-adherent as compared to those who satisfied with health care provider services and it was

independently associated with non-adherence, (AOR=3.27; 95% CI:1.71-6.26). Individuals who have no their own home were 2.6 times at higher risk for non-adherence as compared to those who have their own home (AOR=2.63;95%CI:1.5-4.6). Lack of access to safe drinking water and forgetfulness to anti-TB treatment independently associated with non-adherence- 2.58(AOR=2.58; 95% CI: 1.41-4.72and 2.79 (AOR=2.79; 95 % CI: 1.57-4.93) respectively associated with non-adherence.

Table 5: Multivariate analysis factors independently associated to non-adherence for anti-TB drug treatment among TB patients, Halaba special woreda, May 2014.

Variables	Cases n=166(%)	Controls n=166(%)	AOR(95%CI)
Medication Sid effect			
YES	61(36.7%)	41(24.7%)	5.46(2.03-14.63)
NO	105(63.3%)	125(75.3%)	1.00
Pills burden anti TB rugs			
YES	107(64.5)	51(30.7)	5.09(2.94-8.82)
NO	59(35.5)	115(69.3)	1.00
feel better stop TB drug			
YES	67(40.3)	54(32.5)	4.04(1.48-11.04)
NO	99(59.7)	100(67.5)	1.00
satisfaction to health service			
YES	114(68.7)	138(83.1)	1.00
NO	52(31.3)	28(16.9)	3.27(1.71-6.26)
Own Shelter (home)to live			
YES	76(42.2)	104(57.8)	1.00
NO	90(59.2)	62(40.8)	2.63(1.5-4.6)
Lack of safe water			
YES	62(37.3)	35(21.1)	1.00
NO	104(62.7)	131(78.9)	2.58(1.41-4.72)
Distance to health facility(mean)	6	5.3	1.18(1.08-1.28)
Forget fullness medication			
YES	86(51.8)	59(35.5)	2.79(1.57-4.93)
NO	80(48.2)	107(64.5)	1.00
Sex			
Male	84(46.7)	96(53.3)	1.00
Female	82(53.9)	70(46.1)	1.87(1.06-3.29)

Discussion

Non-adherence to anti-TB medication often leads to treatment failure, treatment relapse and MDR-TB development (Estifanos and Bernt 2007). The study showed that the odds of non-adherence due to ant-TB drugs side effect among cases was 5.46 times higher than among controls. One of the reasons for such incidence of drug side effects perhaps could be giving medication on empty stomach which is a common practice during anti-TB treatment. The DOT providers need to provide adequate orientation regarding possible side effects. The frequently reported minor side effects could be successfully managed with proper instructions on drug consumption and prompt symptomatic treatment. Finding was supported by similar case-control study from Oromia region, Ethiopia (Tekle et al. 2002) and India (Sophia et al. 2010) that reported drug side effect to independently associate with non-adherence, (AOR=4.2; 95%CI1.51-11.66) and (AOR=2.56; 95%CI 1.87-

3.47), respectively. Meta-analysis and qualitative studies done in China also reported that drug side effect was independently associated with non-adherence (Weiguo et al. 2009).

This study established that pills burden or additional drugs with anti TB drug was factor that independently associated with non-adherence. Additional drugs prescribed to treat illnesses other than TB may cause more drug side effect that may ultimately lead to non-adherence. Patients on tuberculosis treatment usually experience an increased appetite and also pills burden may need more adequate food but to the low-income group where access to food is a problem, inadequate food may pose a challenge to treatment adherence(AOR=5.09;95% CI:2.94-8.82). Studies conducted in Ethiopia and South Africa confirmed that the use of a multiple drugs independently associated to non-adherence (Tekle et al.2002; Naidoo et al. 2013).

The perception of "feeling better" was another factor that found to be associated with non-adherence. Thirty six percent of non-adherent reported that "feeling better" as the main reason for discontinuing treatment, the possible explanation for this finding might be during continuation phase most of the symptoms disappear and patients may believe that they are cured from disease. This may encourage patients to become reluctant to bear the extra burden of the cost of travel, time, and they may focus more on their daily work so that patients interrupt their treatment before completing the regimen. Study conducted in SNNPR stated that among defaulter, 26% interrupt their treatment due to perceived "feeling better" (Estifanos and Bernt 2007). A case control study was conducted in public and private hospitals at Java province, in Indonesia and reported that 47% of respondents were reported, the reason for non-adherence was feeling better (Bagoes 2009).

This study showed that lack of service satisfaction among TB patients was other factor that significantly associated with non-adherence. About 31.3% of cases were interrupted their medication due to dissatisfaction to health care providers. Possible explanations for dissatisfaction might emanate from shortage of health care providers, lack of staff motivation, negative attitude toward patients, poor administration and inconvenient time schedules. A similar finding reported from India stated that dissatisfaction for services delivered by health care providers was significantly associated with non-adherence. Moreover, studies conducted in SNNPR (Zekariyas 2013) and South Africa (Sophia et al. 2010) concluded that service satisfaction is key component to enhance adherences among TB patients. Health care providers should provide treatment related information timely and should facilitate treatment time schedules by discussion with them that increase service satisfactions among patients.

Present study also depicted that "forget fullness" to go to health facilities for filling TB drugs was other factor that associated with non-adherence. Fifty one percent (51.8%) of cases were missed their medication due to forgetfulness (AOR=2.8; 95%CI: 1.57-4.93). This might be an indication that dissemination of information including health education regarding TB medication was low. Health professionals should provide adequate information about anti-TB drug importance to patients and caretakers to remind patients for their medications. This finding shows remarkable difference with study that was done in Northwest Ethiopia stated that odds for non-adherent among study participants who forgot their anti-TB medication was 7 times more likely as compared who didn't, (AOR=7.04;95% CI:1.4-35) (Akilew et al.

2013). Similar studies from China and India also reported that forgetfulness is common patient related factor that is independently associated with non-adherence (Weiguo et al. 2009).

According to current study, lack of their own shelter was independently associated to non-adherence for anti-TB medications. As it clearly explained above homeless cases were 2.63 times more likely to be non-adherent as compared to controls. Homeless individuals have unstable conditions that might be a challenge for them to follow their medications according to health professional recommendations. It might therefore be a challenge to address health service accessibility or treating patient according to treatment guidelines. This finding provided pertinent information on how social environmental related factors indirectly contribute for non-adherence among TB patients. Studies conducted in India, Canada and Uzbekistan reported that lack of shelter was determinants for non-adherence (Kulkarni et al. 2013; Pamela 2010; Epco et al. 2008).

Nearly 62.7% of cases were discontinued treatment due to lack of access for safe drinking water. As far as our literature search, no documentation was obtained which support or oppose this idea. Getting safe drinking water is difficult in the study area, people get water from deep boreholes and patients waste their time looking for safe drinking water for their daily activity, which also might influence their adherence to anti-TB treatment.

Non-adherence was significantly higher among females as compared to males in this study. Among non-adherent women who participated from rural were 58.2%. This may indicate that rural mothers were busy with different homework like child bearing, food making and fetching water, economical-dependence, and inability to decide by themselves as result of gender inequality. This finding is supported by studies conducted in India and Zambia stated that being female was associated with 2.5 times more likelihood to be non-adherent than males. However, this finding was inconsistent with different studies that were conducted in Tanzania (Kaona et al. 2004) and Kenya (Muture et al. 2011). The possible explanation may be gender inequality, socio cultural and socio economic differences male and female.

Distance from home of respondent to the nearest health facility was other risk factor and statistically significant for non-adherence. This result was similar with pervious study that was conduct in SNNPR (Estifanos and Bernt 2007) and North West Gondar (Akilew et al 2013). "A review of compliance to anti-tuberculosis treatment and risk factors for defaulting treatment in Sub Saharan Africa" stated that distance

from the hospital to the patient home was one possible factor for non-adherence among TB patients (Castelnuovo 2010). Finally, this study used a sound study design (case-control design) which is one of the analytic epidemiologic study designs applied to identify potential risk factors that associated with non-adherence among TB patient. However, it has some limitations such as recall bias that is inherent to this study design. Incomplete information about adherence to drug treatment from documents was other limitation. Adherence was assessed from TB registration book that based on patient self-report and may lead to over estimation of adherence that might lead for misclassification among cases and controls considered as limitation for this study.

Conclusions and recommendations

The potential risk factors for non-adherence to drug treatment among TB patients were adverse medication side effect, pills burden, feeling better, lack of service satisfaction, forgetfulness of anti-TB medication, lack of their own home or shelter, lack of access for drinking water, gender or being female and distance to the nearest health facility. Therefore, health professionals should follow holistic mechanisms to mitigate anti-TB drug adverse effects and to implement DOTS strategy thereby to decrease the rate of non-adherences to anti-TB treatment based on national TB treatment guild line.

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