Delay in Seeking Health Care and associated Factors among Pulmonary Tuberculosis Patients in North Wollo Zone, Northeast Ethiopia: Institution Based Cross-sectional Study

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Abstract

Background: Tuberculosis is one of the leading infectious diseases in Ethiopia. Emergence of MDR TB worsened the countries strategies towards the control of the diseases. Delay in seeking health care may worsen the disease, increase the risk of death and aggravate tuberculosis transmission in the community.

Objective: This study was aimed at determining delay in seeking health care and analyzes factors influencing the delay from onset of symptoms of pulmonary tuberculosis until the presentation of modern health facilities.

Methods: Institution based cross-sectional studies were conducted in randomly selected TB clinics, which deliver both diagnosis and treatment for TB in North Wollo health departments. Delay has analyzed from a period between onset of TB symptoms to first visit of any health provider (health seeking period). Respondents have interviewed on the same date of diagnosis using a semi-structured questionnaire. Binary logistic regression analysis applied to analyze the factors of delays.

Results: Five hundred and twenty eight pulmonary TB patients aged 18 years and above enrolled in the study. Among these, 56.6% were males, 58.7% were married and 64% residing in rural areas. The median age was 33.5 (IQR=21) years. The median patient delay was 36 days and 62.3% of patients seek their first consultations after 30 days cut-off point. Long distance, rural residence, seeking treatment from traditional healers and poor knowledge about TB were associated factors that predict patient delay.

Conclusion: A substantial proportion of long patients delay observed in seeking health care after 30 days cut-off point. Local authorities should collaborate, intensified awareness raising efforts to reduce high prevalence of patient delay in seeking health care.

Keywords: Pulmonary tuberculosis; Chest pain; Tuberculosis; Infectious diseases; Haemoptysis

Introduction

Tuberculosis (TB) is a chronic infectious disease caused by *Mycobacterium tuberculosis* complex. The source of infection is untreated smear-positive Pulmonary Tuberculosis (PTB) patients who are discharging the bacilli [1]. Globally the burden of TB is increasing. A various reasons including poverty, migration, HIV/AIDS, population growth are the foremost factors for the unlimited risk of TB in the world, but a significant problem lies with the fact that many patients remain undiagnosed [2,3]. This could be patients delaying seeking health care in a timely manner [4]. The STOP Tuberculosis strategy was launched by WHO in 2006 to help achieving the TB related Millennium Development Goals by 2015 [5]. However, TB is remaining the major cause of morbidity and mortality worldwide followed by HIV in the world. The 2012 WHO report stated that there were a total of 8.7 million incident cases and 12 million prevalent cases of TB and 1.4 million deaths in 2011 [6]. To reduce the impact of TB, the United Nations involve TB prevention and control among its eight Millennium Development Goals, with a plan to reduce TB incidence to half the 1990 level by 2015. To evaluate and attain this, the World Health Assembly (WHA) used two indicators: 70% global and country case detection rates and 85% of successful treatment rates [7]. Nevertheless, despite of these efforts investing in TB control, the epidemic continued. Tuberculosis causes a challenge in the Horn of Africa with Ethiopia being the most affected where TB cases rise at the rate of 2.6% each year [8]. Ethiopia ranked 8th among high TB

Burden Countries (HBCs) in the world by WHO classifications [8].

The case detection rate at national is 36.8% which is two times far from the 70% rate of global target [9]. In Amhara region the case detection rate is between 25-28% and based on Zonal, E.C report the case detection rate in the study area is 17.9% [9,10]. This low case detection rate in Ethiopia indicates that early detection, initiation of treatments and ensuring cure should be the highest priority [7]. One of the challenges against attaining TB control program is delay in seeking health care to treatment by TB patients. It is predicted that an infected person who delayed for diagnosis and remains untreated can transmit the disease between 10 and 15 people per year, spreading the infection in the community [11]. This may raise the risk of the spread of infection in the community, threaten the success of treatment, and increases associated mortality [4,12].

In Ethiopia, where there are rising incidences of new infectious TB cases, some studies revealed that the median delay between the inception of TB symptoms and initiation of seeking health care ranges from four to thirteen weeks [13,14] which exceeds the 2-3 weeks detection of TB recommended by WHO [3,6,15,16]. A variety of reviews explained that there are many factors that increase delay [17-20]. To reduce the burden of TB disease, factors associated with delay in seeking heath care has clearly identified to improve the effectiveness of TB control program. A study done 10 years ago at Amhara region indicated that there is prolonged patient delay in seeking tuberculosis treatments. However, there is no recent study done to identify the extent of delay and associated factors of patient delay in seeking TB treatments contextual to Amhara region. Hence, this study aimed to assess the magnitude of delay in seeking treatment among pulmonary tuberculosis patients and associated factors in the study area. The finding from this study will be used to work towards reducing patient delay in seeking TB treatments, which will subsequently reduce the prevalence of it in the community of North wollo, which is concurrent with MDG goals for TB prevention and control programs.

Methods

Study setting and population

An institution based cross-sectional study was conducted from July 1 to September 30, 2013 among PTB patients in North Wollo Zone of Amhara region with a population of 1,551,692 [10]. To obtain representative sample for the study, we selected eight districts randomly out of 13 districts of the study areas by listing all TB diagnostic units, so we took 30 tuberculosis diagnostic public health institutions as study sites. Finally, we interviewed respondents who fulfill the criteria right after diagnosis. All PTB who were 18 years and above registered in the master registration book of NTLCP and those patients who transferred in during their intensive phase to the intended DOTS clinic were included in the study. Participants who were seriously ill to answer the questionnaire and unable

to hear, as well as those who were defaulted during data collection period were excluded.

The sample size was calculated using the formula required for determination of sample size for estimating single population proportion by taking a Proportion (P) of 79% from previous study done in Northern Ethiopia with health seeking delay for more than 30 days [21] and 95% CI and marginal error of 5%. The calculated sample size was 254. To improve the validity of our findings we increased the sample size by adding a non-response rate of 5% and design effect of 2 to allow for dropouts and to permit reliable estimates of the study that finally yield a sample size of 533.

Pre-tested and semi-structured questionnaire administered to collect the data. The questionnaire contained socio-demographics characteristics, major presenting symptoms of PTB, duration of presenting symptoms and the first date of health care seeking for each participant. The pulmonary symptoms asked for the enrollee were presence of cough for more than 3 weeks and other constitutional symptoms like fever, weight loss, chest pain, and haemoptysis. Questions related to knowledge of TB and stigma was included. In addition to HIV sero-testing, Body Mass Index (BMI) also computed to determine the nutritional status of respondents. Based on the WHO standard categorization, respondents were classified as normal (BMI 18.5 to 24.99), moderate (BMI 17.5 to 18.49) and severely malnourished (BMI less than or equal to 17.5) [22]. During the interview, data collectors crosschecked TB registration book and laboratory registries of the respondents'.

Generally, presentation to the health institutions is considered delay if the first visit of the respondents took place more than three weeks after onset of the first symptoms. But, to maintain comparability with other studies a patient delay between onset of first constitutional symptoms and first visit at public health institutions of >30 days was used as cut off points. Respondents presented more than this day referred as a prolonged patient delay. Diploma nurses who were working in the study area interviewed the respondents immediately after the diagnosis.

Definition of variables

Tuberculosis symptom onset: The time at which the first symptom (i.e. Cough and other constitutional symptoms like fever, weakness, and weight loss or chest pain) of the illness for which a patient's health care seeking began [23]. Pulmonary tuberculosis patient: is a patient with confirmed tuberculosis disease involving the lung parenchyma [6,24]. Patient delay is the time interval from the onset of symptoms of tuberculosis until the first visit to any formal health care facility within 30 days as cut off points [12,22]. Good knowledge about tuberculosis-Individuals answering 4 and above questions correctly among the designed questions were considered as having good knowledge about TB and the reverse is considered as having poor knowledge [25,26]. Regarding to the stigma of respondents with stigma score of higher or equal to the mean value is considered to be high stigma [4].

Statistical analysis

Double data entry used using Epi-info version 3.5.3 and SPSS version 20 applied for analysis. We used 30 days for patients delay as a cut of point to dichotomize the sample in to delay or non-delay period. The percentage of patients who delayed seeking care computed, crude odds ratio, and 95% CI were used to measure association between respondents socio-demographic and economic characteristics, presentation of TB symptoms and prolonged patient delays. Multi-variate logistic regression analyses employed to assess the relative effect of independent variables on the outcome variables. Variables with a p-value of < 0.05 considered statistically significant.

Ethical consideration

The study protocol reviewed and approved by the Institutional Review Board of the University of Gondar through the Institute of Public Health, Collage of Medicine and Health Science. Permission obtained from Zonal Health Office and the respective District Health Offices and Facilities. Study participants interviewed after obtaining verbal informed consent. Confidentiality of the information maintained throughout the study by maintaining anonymity, keeping their privacy by interviewing them in a separate room during the interview and locking records

Result

Socio-demographic characteristics

Five hundred and twenty eight PTB patients with a response rate= 99.1% were enrolled from 30 diagnostic centers. Among the participants, 56.4% were males. The median age was 33.5 (IQR=21) years. Based on their residence 64% of the participants' resides in rural areas and of which 57.6% settled beyond 10 km from public health institutions. With regard to education, 57.2% were unable to read and write. The respondents income distribution showed that 61.4% had an income of below 1US$ per month **(Table 1)**.

Co-morbidity and Behavioral characteristics of the respondents

Two hundred and thirty (43.6%) of the respondents drink alcohols currently prior to commencement of the anti-tuberculosis drugs and almost one fourth of them were smokers. Among total respondents who were measured to check their body mass index, 60.4% had normal BMI's between 18.5 and 24.99 kg/m^2, while one tenth of the respondents were severely malnourished. Based on HIV status 98.1% screened for HIV test. Among the respondents who screened for HIV test, 24.4% of tuberculosis patients co-infected with HIV, which is intervention area.

Two hundred and fifty two (47.7%) of the respondents were sputum smear positive and the remaining were sputum smear negative pulmonary cases. Around three- fourth of respondents heard about TB before. Owing to this fact, nearly two third of the respondents (62.5%) had good knowledge of the causes, symptoms, and transmission of tuberculosis. Regarding the level of stigma associated with TB, most 66% of the respondents practiced low or no stigma on tuberculosis **(Table 2)**.

Table 1 Selected demographic characteristics of the respondents in North Wollo Zone, Northeast Ethiopia, 2013 (n=528).

Variables	Frequency	Percent
Sex of the respondents		
Male	299	56.4
Female	199	43.6
Age of the respondents		
18-34 years	273	51.7
35+years	255	48.3
Marital status		
Married	310	58.7
Single	228	43.3
Educational status		
Unable to read and write	302	57.2
Primary	138	26.1
Secondary	88	16.7
Religion		
Orthodox	342	64.7
Muslim	154	29.2
Others	32	6.1
Income		
<310	324	61.4
310	204	38.6
Occupation		
Farmer	295	55.9
Employed	104	19.6
Student	62	11.7
Daily laborer	67	12.7

Patient delay

Most of the respondents, 62.3% had sought care in the public health facilities after 30 days of onset of symptoms. The median patient delay was 36 (IQR =36 days). The longest patient delay 90(median= 120 days) recorded were among patients who had been treated with wholly water. On the reverse side, respondents who made their first contact to drug store were the lowest patient delay with median delay of 17 days.

About half, of the respondents visited a modern health institution after the illness worsened. Two hundred and ninety two (55.3%) of the patients diagnosed in public hospital but only few of them, (36)6.8% were examined in the private health facilities. Even though (99)18.8% of respondents were perceived that they are not delayed to present to health facilities, and nearly half (257)48.7% of the respondents delayed in seeking health care hoping that the symptoms were disappearing **(Table 2)**.

Table 2 Clinical and Heath seeking behavior of the respondent's in North Wollo Zone, Northeast Ethiopia, 2013 (n=528).

Variables	Patient delay	
	>30 days	30 days
Type of Pulmonary tuberculosis		
Negative	200(75)	76(25)
Positive	129(51)	123(49)
Health facilities where PTB is diagnosed		
Public hospital	215(74)	77(26)
Health center	96(48)	104(52)
Private institutions	18(50)	18(50)
Perceived causes of delay		
Hoped symptoms go away	126(49)	131(51)
Perceived no delay	84(85)	15(15)
Shortage of money	80(82)	17(15)
Common illness	39(52)	36(48)
Reason of consultation		
Illness worsen	148(55)	121(45)
Family members	150(70)	64(30)
Community health promoters	31(69)	14(31)
Perceived stigma about tuberculosis		
Low	221(64)	127(36)
High	108(60)	72(40)
Knowledge about tuberculosis		
Good	186(56)	144(44)
Poor	143(73)	55(27)

Binary logistic regression analysis through backward likelihood ratio methods employed to assess the relative effect of the explanatory variables on the dependent variable. The predictive ability of the model tested with the goodness-of-fit with Hosmer-Lemeshow test; at a p-value of 0.57 suggesting a non-significant discrepancy between the observed and predicted scores.

On the bivariate analysis of socio-demographic factors unable to read and write and primary education had a

significant increase the risk of delay in seeking health care of TB treatments. Respondents with poor knowledge about tuberculosis, and those with prior attendance at holy water, traditional healers and nearby drug stores were associated with patient delay in seeking health care of tuberculosis treatments. Residence and distance in the environmental factors had also showed increasing risk of delay in seeking health care. Respondents with poor income were 1.7 times more likely to delay in seeking health care of TB treatments **(Table 3)**.

Table 3 Summary of Bi-variate and Multi-variate analysis of factors associated with delay in seeking health care among Pulmonary Tuberculosis patients in North Wollo Zone, Northeast Ethiopia, 2013(n=528).

Variables	Patient delay		COR (95%CI)	AOR (95% CI)
	>30 days	<30 days		
Education				
Illiterate	195	107	1.74(1.08,2.82)	1.04(0.48,2.25)
Primary	89	49	1.74(1.01,2.99)	1.28(0.64,2.55)
Secondary	45	43	1	1
Knowledge				
Good	186	144	1	1
Poor	143	55	2.01(1.38,2.94)	1.87(1.24,2.83)
Informal treatment sources				
Traditional healers	79	18	6.04(3.32,10.99)	6.80(3.62,12.79)
Holly water	114	54	2.91(1.86,4.55)	2.58(1.61,4.15)
Drug store	67	32	2.88(1.71,4.86)	2.69(1.55,4.66)
Health institution	69	95	1	1
Residence				
Rural	229	106	2.01(1.39,2.89)	1.59(1.03,2.45)
Urban	100	93	1	1
Walking distance				
>10 Km	214	90	2.25(1.57,3.23)	1.65(1.09,2.52)

On multi-variate analysis, traveling long walking distance and being rural were associated with delay in seeking health care of TB treatments. The odds of delay in seeking health care of TB treatments for those who traveled long walking distance longer than 10 Km were 65% higher than the odds of respondents travelled within 10 Km from the health institutions with [AOR: 1.65, CI (1.09, 2.52)]. The odds of delay in seeking health care of TB treatments for rural resident were also 59% higher than the odds of their counterparts with [AOR: 1.59, CI (1.03, 2.45)]. Prior attendance at holy water [AOR: 2.58, CI (1.61, 4.15)], at nearby drug store [AOR: 2.69, CI (1.55,

4.66)], and at traditional healers [AOR: 6.80, CI (3.62, 12.79)] had also shown association of patient delay in seeking health care of tuberculosis treatments. Having poor knowledge about tuberculosis was another important factor found to cause patient delay in seeking health care for TB treatments. The odds of delay in seeking health care of TB treatments for respondents with poor knowledge about TB were twofold times higher than the odds of delay in seeking health care of respondents with good knowledge about tuberculosis with [AOR; 1.87, CI (1.24, 2.83)]. Only variables, which were associated with patient delay in seeking health care of tuberculosis treatments for both Bivariate and Multivariate analysis displayed **(Table 3)**.

Discussion

The finding of this study indicated that there is a substantial prolonged delay in health care seeking of pulmonary tuberculosis patients after the onset of symptoms. World Health Organization (WHO) classifies unexplained cough with or without other symptoms lasting 2-3 weeks as TB suspect and the patient will seek treatments within the given period [15]. However, studies added extra margin of 7 days to take 30 days as cut-off to assess magnitude of patient delay: a delay > 30 days [4,12,19].

In this study, the magnitude of patient delay in seeking health care was 62.3%, with 95% CI(58.1%, 66.5%) which is in comparable with a study done in Addis Ababa (58%) [12] and longer than the previous studies in Amhara (4l.8%) [4] and Tanzania (31.5%) [3]. But it was lower than the study done in Bale Zone with prevalence of 89.9% [7]. The discrepancy is due to the study setting and geographical inaccessibility. This might be due to expansions of DOTS services in agrarian community, which made better accessibility in seeking health care for TB treatments compared to pastoralist communities in Bale Zone. Another possible reason might be this study includes some urban and most rural health facilities compared to a solely urban setting in Tanzania.

The median patient delay calculated in this study was found to be 36 days with a range of 17-120 days which was slightly longer than a study done in the same region Amhara, Southern Ethiopia, with median of 30 days [4,19] and Western Ethiopia with median of 28 days [13]. It was much longer than previous studies in Tanzania (median delay of 14 days) and Chad (median delay of 15 days) in African countries [3,16]. But it was much shorter than the previous studies done Bale Zone (median delay of 63 days) [7] and Dabat/Ethiopia median delay 13 weeks [14]. This discrepancy might be differences in sample size, study setting, dichotomization of cut-off points some used a median value of 21 days (like Bale, Chad respectively) and others used 30 days inclusive as cut-off points to determine delays. Cultural barrier of the respondents were also another probable reasons for patient delay in seeking health care of tuberculosis patients.

Long walking distance between health institution and patient's home was a risk factor for seeking health care of tuberculosis in the current study. In Ethiopia, access to health care defined as living within 10 km radius to the health institution [4,7,20]. Respondents who live beyond 10 Km from health institutions were 65% times higher delay in seeking health care of TB treatment compared to those who live within 10 km. This finding was consistent with studies done in Bale Zone and rural Nigeria [2,7]. This might be low inaccessibly in health service and scattered settlement of population; the population intensifies delay in health seeking health care of TB treatments.

Patients delay in seeking health care significantly varied with patient's area of residences. In the current study, 63.5% of patients reside in rural areas. Rural residents were 59% time's higher delay in seeking health care for TB treatment compared to their counter parts. This is consistent with the study conducted in Bale Ethiopia and Tanzania [7,19]. This can be because of comparison to unban; rural residents were less likely to have appropriate access to health information and health facilities.

Having good knowledge about tuberculosis is a prerequisite for early seeking of medical care. In this study, 37.5% of patients have poor knowledge about TB. Respondents with poor knowledge about tuberculosis were 87% times higher delay in seeking health care of tuberculosis treatments compared to those who had good knowledge. This is in line with previous studies conducted in Addis Ababa, North Ethiopia, Jigjiga/Ethiopia and Mozambique [12,22,25,26]. This might be respondents with good knowledge about TB might have better inclination for early seeking of medical care.

Use of an informal treatment sources was a strong predictor of patient delay in this study. In line with previous studies in Tigray, SNNPR and Bale in Ethiopia and rural Nigeria and Tanzania in African countries late presentation of patients for modern health care has been associated with the use of informal treatment providers [2,7,18,19,22]. In this study 32% of the respondents used holy water in their first consultation. The most widely faith-based therapy with holy water in Tigray region Ethiopia is also common in the current study [22]. Patients who used holy water as first consultations were 3 times more likely to delay in seeking health care compared to those who did not use. This is consistent with the previous studies in North Ethiopia [22]. Moreover, 18% of respondents consulting traditional healers as their first treatments delay in seeking health care for TB diagnosis. Respondents, whose first consultations in the traditional healers, were 7 times more likely to delay in seeking health care compared to those who did not. This is consistent with a study in Bale, Tigray/Ethiopia and rural Nigeria [2,7,22]. This might be low reliance of treatments in health facility and strong cultural bond in holy water and traditional healer treatments lead the respondents sought care for TB treatments after failure of treatments in informal sources.

Nineteen percent of respondents use drug store as primary sources of treatments in this study. Respondents, whose first consultations in drug store were three times more likely to delay in seeking health care of treatments compared to those who did not. This is in line with the study done in Northern Ethiopia and Bale [7,22]. This might be relative abundance of

drug store offers an advantage of proximity compared to diagnostic health facilities. Another probable reason might be drug store also have added advantages of cost minimization, as they do not charge for cards and laboratory services.

Female sex was found to be associated with delay in seeking health care of TB treatments in several studies of Tanzania and Nigeria in African countries [3,13] whereas male found to be associated with delay in studies of South Africa and Brazil [24,27]. In this study, sex was not associated with patient delay, which is in line with some studies in Tigray and SNNPR Ethiopia [19,22]. Moreover, more males (56.6%) detected than females (43.4%) in this study. Some studies found that the reason for female delay in seeking health care might be work overload, sub-servant role of a family, and limited role of women's decision-making power [4]. However, this idea needs further study.

Even though the level of stigma is seems high, it was not found to be associated with delay in the current study. This is in line with previous studies done in Western Ethiopia [13]. This can be due to selectively higher awareness about curability of TB, which countered the effect of stigma on patient delay.

HIV co-infected pulmonary tuberculosis patients did not show association of delay in seeking health care of TB treatments in this study. This is consistent with a study done in Tigray region [22]. Twenty two percent of pulmonary tuberculosis patients were found to have a TB/HIV co-infection. This finding is twofold lower than the finding in Northern Tigray (45%) [22]. This might largely due to the introduction of ART, which significantly reduced the proportion of TB/HIV co-infection among pulmonary tuberculosis patients.

Limitation of the study

There was some degree of recall bias while trying to remember the symptoms to approximate days of commencement of the symptoms, and starting of TB treatments. To minimize this, data collectors probe the clients with memorable dates like holy days and other religious calendar methods. Currently some private health facilities have started providing treatment services for TB. Although most of PTB patients came to public health facilities, it misses some patients who were getting service at private health facilities. Even though, the data were collected by trained diploma nurses there might be social desire bias on this study. To minimize this diploma nurses other than tuberculosis focal person in the study area and those who works in the adjacent health center were recruited for data collection.

Conclusion

Magnitude of patient delay in seeking health care of TB treatment is high despite a decade long awareness raising effort. Respondents who were far from the health facilities are lacking access to health information and early seeking health care. This resulted to have poor knowledge about tuberculosis

and good deals of the target audience were not yet reached with key messages to inform about the typical symptoms of tuberculosis. First consultation of treatments at holy water, nearby drug store and traditional healers were also other important factors that delayed respondents from presented and diagnosed in standard diagnostic and treatment services in the health facilities. Therefore, giving a due attention to the high magnitude of pre-seeking delay is crucial to access a simple and diagnostic test for TB that can be used at the periphery level in the administrative Zone. In additions to this encouraging a discussion among local drug sellers, traditional healers, religious leaders, improving access to DOTS at the lowest level and educating the public to raise the alertness on the symptoms and treatments of TB should be given due attentions. Conducting a well- designed study on health-system and provider delay among PTB patients, who sought more, explicate health-seeking behavior and highlight barriers to the health system were not involved in this study.

Competing Interests

The author(s) declare that they have no competing interests.

Acknowledgments

Author contributions

Dejen Tsegaye: Initiated the research, wrote the proposal, conducted the research, did data entry and analysis as well as wrote the manuscript.

Ephrem Abiy: Assisted in data collection, initiate to write the manuscript and edited the write up.

Tesfahun Mesele: Serve as co- adviser, assist write up of the proposal and data analysis.

Takele Tadesse: Served as main advisor and assist in the write up of the proposal, and analysis.

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