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Research Article

Knowledge, Attitudes, and Prevention Practices towards Tuberculosis in Northeastern Ethiopia, Amhara Regional State: Implications for TB Prevention and Control Efforts

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Abstract

Background: Tuberculosis (TB) is a major public health problem in Ethiopia. Assessment of knowledge, attitude, and health-seeking practice in this area is essential to plan, implement, and set preventive practice through community mobilization. The aim of this study was to assess the level of knowledge, attitude, and preventive practices among TB patients in northeastern Ethiopia.

Methods: A structured and pre-validated questionnaire was used for the assessment of patients' awareness towards the disease. The data were collected cross-sectionally from 384 tuberculosis patients between April 2015 and January 2017. The outcome variables were defined considering the basic elements about the disease. Descriptive analysis was computed to determine the proportion of awareness and preventive practice toward the disease.

Results: The number of new TB cases in the study area is higher than those of retreatment ones. Major proportion of tuberculosis patients (70.4%) heard about the disease before they were sick. on the contrary, less proportion of the patients (21.3%) heard on drug resistance *Mycobacterium.* As the level of education increased the number of TB patients was decreased. The knowledge of tuberculosis patients who do not know as it is contagious and treatable disease was 22.9% and 18.7%, respectively. About 27% of the patients didn't go to the health institute for early diagnosis although they had prolonged cough.

Conclusion: Patients' awareness towards the disease specifically to the drug resistant *Mycobacterium* was low. Health centers and other stakeholders should provide health education for the overall community in the area to enhance TB prevention and control program.

Keywords: *Awareness; Contagious; Drug Resistance; Mycobacterium; Northeastern Ethiopia; Tuberculosis*

Introduction

Tuberculosis is an airborne infectious disease that cause a leading ill health and death from a single infectious agent globally. *Mycobacterium tuberculosis (M. tb)* is the principal etiologic agent of the disease where as the less likely TB causing *M. tb* complex includes *M.*

bovis which is principally responsible for bovine tuberculosis and include the vaccine strain *M. bovis* BCG; *M. africanum*, the main causative agent of TB in west Africa; *M. canettii*, a rare *M. tb* complex strain that produces smooth and glossy colonies; *M. microti*, which is a pathogen of voles that rarely infects humans; *M. orygis* and *M. caprae*, primarily isolated from goats; *M. pinnipedii*, also known as the seal bacillus; *M. suricattae* and *M. mungi* [1].

Best estimates of death from TB for 2020 was 1.3 million among HIV-negative people (up from 1.2 million in 2019) and an additional 214 000 among HIV-positive people (up from 209 000 in 2019). Each day, over 4100 people lose their lives to TB and close to 28,000 people fall ill with this preventable and curable disease. On the contrary, there is a continuous decrease of TB incidence rate annually. Ethiopia has transitioned out of the global 30 high MDR/RR-TB burden countries, but the country still remains as one of the 30 high TB and TB/HIV burden country [2].

Community mobilization and creating awareness toward the disease specifically in developing countries is too vital for the global target of the end TB program. Enhancing awareness has a powerful weapons in the fight against the disease and the knowledge level has an impact on TB transmission in culturally diversified countries like Ethiopia [3]. The number of people acquiring TB infection and developing the disease can be reduced by increasing the communities' awareness. This is important for early diagnosis and serves as one of the pillars for the End TB Strategy. Different studies revealed that the literacy status, socio-cultural differences, gender, exposure to the disease and spatial variations were reported as to be factors affecting TB knowledge, attitude and preventive practices (KAP). Favorable attitude towards TB patients was significantly associated with high educational level of the study done (AOR = 4.78, 95% CI, 1.78 to 12.83). In addition, being relatively well educated than being illiterate (AOR = 3.08, 95% CI, 1.09 to 8.68, p = 0.001) had good level of overall knowledge about TB and vital for the prevention status leading to the reduction of tuberculosis prevalence. such intervention implied that increased awareness is closely related to reduced prevalence [3-5].

Although TB is a preventable and treatable disease, its awareness by societies is not clearly known in most parts of the country. Awareness toward drug resistant *Mycobacteria* and the way to recognize the signs and symptoms of both pulmonary and extra-pulmonary TB are important for early diagnosis and treatment of the disease [6]. This study gathers information about what the respondents know concerning TB, what they think about people with TB or about the health system response to TB, and what they actually do with regard to seeking care or taking other action related to TB. The study identified knowledge gaps, cultural beliefs, or behavioral patterns that may facilitate understanding and action, as well as pose problems or find out solutions for improving proper care and on time treatment of the disease. As far as this study is concerned no assessment of KAPs has been conducted among TB patients in South Wollo and Oromia Special Zone, Northeastern Ethiopia. Thus, this study was designed to assess the awareness toward TB and related issues which is critical to plan, implement and evaluate the level of disease prevention and control program.

Materials and Methods

The study area and data collection sites

The study was conducted in Oromia Special Zone (OSZ) and South Wollo Zone (SWZ) of the Amhara Regional State, Northeastern Ethiopia. Kemise and Bati Town health centers were the data collection sites from OSZ where as Dessie Referral Hospital (DRH), Bikat Higher Diagnostic Laboratories (BHDL), Dessie Health Center (DHC) and Boru Meda Hospital (BMH) were an additional data collection sites from South Wollo. Kemise Town is the administrative center for the Oromia Special Zone since 1994 with a latitude of 10°43'27.4"N and longitude of 39°52'24.03"E. The town is found at an altitude of 1447m a.s.l and a distance of 325 km Northeast of Addis Ababa. On the other hand, Dessie Town is the capital of South Wollo Zone having a north latitude and east longitude of 11°8' and 39°38', respectively. Dessie has an average altitude of 2475 m a.s.l and located 401 km Northeast of Addis Ababa [7].

Study population and sample size determination

All TB cases confirmed by the health personnel (pathologist, medical doctors, health officers, nurses and laboratory technologists) from April 2015 to January 2017 and those who fulfilled the inclusion criteria as age greater than or equal to 18 years, patients who easily communicate and can understand the contents of the questionnaire, and patients who voluntarily agree to participate in the study and can truly express their views for the assessment of KAP were included. The number of valid questionnaires collected from TB positive patients within the study period was 384.

Study design, data collection and analysis

A cross-sectional study design was used to collect the data from TB positive patients using questionnaires. The questionnaire had both closed and open-ended questions which was designed in order to collect data on socio-demographic characteristics and assessment of knowledge, attitude and practice about the cause, mode of transmission and preventive methods of tuberculosis. In addition, issues like educational level, occupation, known contact of TB patients and prior *M. tb* infection were assessed. The questionnaire was prepared in English and then translated into the local languages (Amharic and Afaan Oromo) by an expert who was fluent in both languages to maintain its consistency. It was filled independently by health professionals at the time when the respondents were not perfect enough to read and write.

The recorded data from the questionnaire was checked for completeness and consistency, and then entered into Microsoft Excel 2007 spreadsheets. The data was then exported to IBM SPSS Statistics for Windows, Version 25.0. (Armonk, NY: IBM Corp., USA) program for analysis. Descriptive statistics was used to determine frequency and percentage.

The study was carried out after obtaining ethical clearance from the Institute Review Board of College of Natural and Computational Sciences, Addis Ababa University (Ref. No. CNSDO/392/07/15) and later renewed in July, 2019 (CNSDO/668/11/2019). Letter of permission was also obtained from the health bureaus of the study sites. Prior to conducting the study, objectives of the study were clarified to the study participants and written informed consent was obtained. Subject confidentiality, any special data security requirements were maintained and ensured to the participants. Positive TB case participants were referred to the DOTs program for possible treatment and follow up.

Results

Socio-demographic characteristics and tuberculosis infections

A total of 384 TB cases took part in the study with majority of the participants as males (55.5%). Ages of the study participants ranged from 18 to 75 years and the mean age was 33.7 (SD = 12). There was no significant difference among males (mean = 34.5, SD = 12.3) and females (mean = 32.7, SD = 11.4). The prevalence of TB cases was highest (67.0%) within the age range of 18 - 37 years. The study found that the proportion prevalence of TB cases among the non-educated, elementary, high school and higher institutes was 43.13% (157/364), 30.22% (110/364), 17.58% (64/364) and 9.06% (33/364), respectively.

Assessment of knowledge, attitude and preventive practice toward tuberculosis

Majority of tuberculosis patients 70.4% (243/345) had heard about the disease TB before they were sick and a number of patients also know TB as a contagious but treatable disease. On the contrary, less number of the patients 21.3% (72/338) heard about drug resistance bacteria and half of the respondents saw TB patients elsewhere before they were sick. Greater proportion of the respondent patients were new cases than retreatment ones. Interestingly, more than half of the patients had check up for TB at the health institutes as they have prolonged cough (more than 2 weeks) (Table 1).

	Questions	Responses		
		Frequency (%)		
No.	**Knowledge based**	**Yes**	**No**	**Don't know**
1	Have you ever heard about TB?	243/345 (70.4)	102/345 (29.6)	-
2	Is TB contagious?	260/340 (76.5)	2/340 (0.6)	78/340 (22.9)
3	Is TB a treatable disease?	262/363 (72.2)	3/363 (0.8)	68/363 (18.7)
4	Have you heard drug resistant TB bacteria before?	72/338 (21.3)	266/338 (78.7)	-
5	Is TB a zoonotic disease?	28/314 (8.9)	113/314 (36.0)	173/314 (55.1)
No	**Practice based**	**Yes**	**No**	**Sometimes**
1	Have you seen TB patients before?	171/337 (50.7)	166/337 (49.3)	-
2	Have you been sick of TB before this?	34/320 (10.6)	286/320 (89.4)	-
3	Do you check for TB at health institution when you have prolonged cough (more than 2 weeks)?	207/339 (61.1)	39/339 (11.5)	93/339 (27.4)

Table 1: *Knowledge and preventive practice related assessment results of tuberculosis patients toward the disease.*

Majority of the patients 60.4% (204/338) responded that drug resistant bacteria are transmitted from any form of TB patients where as only 2.4% (8/338) responded it comes from those patients who had drug resistant bacterial infections. The remaining 28.7% (97/338), 1.5% (5/338) and 0.6% (2/338) of the respondents replied drug resistance is caused by incorrect use of the antimicrobial drugs, non-adherence of the drugs to the prescribed regimen/natural phenomenon due to mutation and do not know how drug resistance is developed, respectively. About 6.5% (22/338) of the patients responded that drug resistance is caused by any of the above two or more alternatives.

More than half 122/213 (57.3%) of the patients know TB is caused by bacteria but greater proportion of them didn't identify the foremost body organs infected by the *Mycobacterium*. Although a large proportion 274/342 (80.1%) were aware that using specific drugs prescribed by health physicians can cure the patients, a number of patients do not know the length of time it took for the treatment of drug resistant and non-resistant bacteria (Table 2).

Majority of the respondents 72% (252/350) replied that tuberculosis is non-selective and any person can be infected by the disease. Less proportion of the respondents gave their views that TB infects poor, homeless, alcoholics, drug users, individuals living with HIV, 'Khat' users and others (Figure 1).

Discussion

Socio-demographic characteristics

The greater proportion of male patients 55.5% (213/384) to females might be due to biological, social and economic activities with many people which is in comparable proportion to 56.2% [8]. The disease was also more common within an active age group of the society which might be due to their vigorous movement from place to place for economic purpose leading to greater risk of exposure.

Tuberculosis patients awareness towards the disease

Majority of the TB patients 70.4% (243/345) heard about the disease where as lower proportion didn't hear until they went to the health institutes for treatment. This is in less proportion as compared to 99.6% (245/264) of a high school students study in southern

Variable	Responses	
	Frequency	(Percentage)
1. Causative agent of TB (n = 213)		
a) Bacteria/germ	122	(57.3)
b) Cold air	20	(9.4)
c) Shortage of food	3	(1.4)
d) Smoking	16	(7.5)
e) Chewing 'Khat'	2	(1.0)
f) Dust	49	(23.0)
h) Don't know	1	(0.5)
2. TB bacteria attacks (n = 328)		
a) Lung only	96	(29.3)
b) Other body part but not lung	20	(6.1)
c) Both lung and other body part	95	(29.0)
d) Don't know	116	(35.4)
e) Others (please specify)	1	(0.3)
3. How can someone with TB be cured? (n = 342)		
a) By using herbal remedies (traditional medicine)	5	(1.5)
b) Taking home rest without medicine	10	(2.9)
c) By praying	2	(0.6)
d) By using specific drugs given by health centre based on their prescription	274	(80.1)
e) Do not know	1	(0.3)
f) Other (please specify):	50	(14.6)
4. Drug resistant bacteria take (n = 340)		
a) Equal duration as non resistant ones for treatment	6	(1.8)
b) Less duration than non resistant ones for treatment	5	(1.5)
c) Greater duration than non resistant ones for treatment	58	(17.1)
d) Can't be treated	2	(0.6)
e) Don't know	269	(79.1)
5. Where do you go first when you feel sick? (n = 340)		
a) Traditional healers'	17	(5.0)
b) Religious beliefs	11	(3.2)
c) Private clinics	11	(3.2)
d) Governmental health institutions like health posts, clinics, health center or hospital	289	(85.0)
e) Clinics run by non-governmental organization	10	(2.9)
f) Others	2	(0.6)

Table 2: *Knowledge and preventive practice of tuberculosis patients in northeastern Ethiopia.*

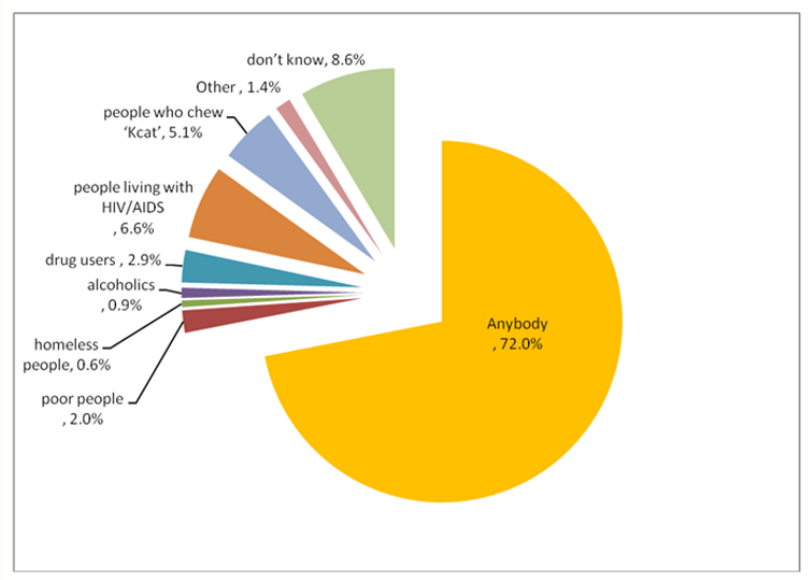

Figure 1: *Tuberculosis patients' reflection on TB infection in Northeast Ethiopia.*

Ethiopia [9] which implies students have a great opportunity to hear about the disease either through their education at school or through different media. Small proportion of the TB patients 21.3% (72/338) under study heard about drug resistant bacteria which might be due to lack of awareness either through healthcare workers or other different sources of information with regard to the resistant ones. This is likely supported by low proportion (36.4%) of university students in Pakistan that knew about drug resistant *M. tb* [10]. The implication of such low proportion toward drug resistance bacteria is that a lot of work is required in creating communities awareness to minimize the alarming drug resistant TB against the "End TB strategy" of WHO.

The etiologic agent of TB was known by 57.3% (122/213) of the patients. This is in less proportion to 81.7% (201/246) of the high school students in southern Ethiopia. On the contrary, there were low proportions of study participants to determine the correct etiologic agent as bacteria/germ among prisoners in northern [11], community participants in central [12] and East Shao Zone of Ethiopia [13] with a proportion of 37.7%, 34% and 31%, respectively. The final year university students in Iran [14], community studies in Malaysia [15], TB patients interviewed in South Sudan [16] and patients at primary health care in South Africa [17] detect the right etiologic agent of TB with greater percentage than our finding as 92.9% (130), 88.2% (90), 80.4% and 60.2% (305); respectively. Contrarily, there is low proportion of community participants 10.6% (215) that knew the causative agent of TB in India [18] and 11.5% among population based study in Lesotho [19]. Such variations showed educated participants have more awareness to tell the correct causative agent of TB. The contagious nature of the disease and its curability was well known by majority of the TB patient participants which in line with the highest proportion of other related studies [9,16,17,19].

Greater than half 61.1% (207/339) of the study participants in our study check for TB when they have prolonged cough (> 2 weeks). This is in less proportion to 66.7% (68) of a study in Malaysia [15] and 76.9% (1563) of a study among respondents in India [18] which might be due to lack of awareness. Some of the TB patients' understudy 10.6% (34/320) reported that they had a repeated history for TB

which needs great consideration for drug resistance. Majority of the TB cases in this study 60.4% (204/338) were not aware of the likelihood of being infected by drug resistant strains which is comparable to 63.7% among study prisoners in North Ethiopia [11]. In addition, most of the TB patients 79.1% (269/340) didn't know the required treatment duration for drug resistant TB contrary to 98% (246) of the drug resistant patients who knew the correct treatment duration. Such differences could be due to awareness disparity between drug resistant TB patients and others [20,21]. The KAP assessment also revealed that majority of the respondents 72.0% replied TB is not specific and anybody can be infected by the disease. In fact, low proportion of the TB patients under study didn't know who are susceptible to the disease which might be due to limited knowledge to susceptibility of the disease.

Conclusion

Assessment of KAP revealed that less number of the patients heard about drug resistant *M. tb*, the way it is transmitted and the duration of drug use for treatment. Thus, further consideration should be given toward drug sensitivity test to minimize drug resistant *M. tb* patients. Enhancing community's awareness focusing on drug resistant *Mycobacterium* is critically important for better prevention and control programs of the disease. Furthermore, policy makers might take into consideration the evidence provided by this KAP survey and adapt their strategies based on the identified gaps, promoting innovative approaches and empowering the communities as key stakeholders. It is important to develop education programs toward tuberculosis symptoms, causative agent, mode of transmission, treatment and preventive practices to reduce burden of the disease.

Limitations of the Study

In this study, the response of the questions by the participants might be dependent on the level of their understanding. The study has also potential limitations including lack of focus group discussion and interviews which might be used to triangulate our findings. The data was also conducted only on TB patients who are visiting the health facility and not at the community level.

Availability of Data and Materials

All the data sets on which my conclusion relayed on were presented in the main section of this manuscript.

Competing Interests

The author declare that he has no any competing interests.

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