

and 12.8% said they will face the situation confidently. When enquired about their feeling towards people with PTB, 28.4% said they would feel compassionate but tend to stay away from the infected people. Desire to help the patients was expressed by 30.1% of the subjects. Nearly 17.3% expressed fear as the patients might infect them and 10.1% denied having any particular feeling towards PTB patients (Table 3).

Table 3. Participants' attitude towards pulmonary tuberculosis (PTB), (n=335)

Characteristics	Frequencies (n=335)	Percentages (%)
Opinion about seriousness of TB disease		
Very serious	152	45.4
Somewhat serious	118	35.2
Not very serious	45	13.4
Don't know	20	6.0
Anybody can get PTB		
Yes	70	20.9
No	180	53.7
Don't know	85	25.4
Reaction if diagnosed with PTB		
Fear	96	28.7
Surprise	59	17.6
Confident	43	12.8
Hopelessness	47	14.0
Embarrassment	57	17.0
Don't know	33	9.9
Feeling towards people with PTB		
Compassion and desire to help	101	30.1
Feel compassion, but tend to stay away from them	95	28.4
It is their problem; I can't get TB	18	5.4
I fear them because they may infect me	58	17.3
No particular feeling	34	10.1
Don't know	29	8.7

Practices of the participants towards Pulmonary Tuberculosis are summarized in Table 4.

When asked who you would talk to if you had PTB. Nearly 44.8% of the subjects said Doctor or other medical workers. When asked what you would do if you thought you had symptoms of PTB. 52.8% said they go to health facility, 23.6% said they go to traditional healers and 2.7% said they don't know. Regarding the symptoms of PTB, when asked if you had symptoms of PTB, at what point would you seek medical help? 42.7% of the participants said when treatment on my own doesn't work and 37.0% said as soon as I realize my symptoms might be related to TB and 2.4% said they don't know (Table 4).

Table 4. Practices of the participants towards pulmonary tuberculosis (PTB), (n=335)

Characteristics	Frequencies (n=335)	Percentages (%)
Who you would talk to if you had PTB?		
Doctor or other medical workers	150	44.8
Spouse	31	9.3
Parent	99	29.5
Close friend	42	12.5

Don't know	13	3.9
What would you do if you thought you had symptoms of PTB?		
Go to health facility	177	52.8
Go to pharmacy	70	20.9
Go to traditional healers	79	23.6
Don't know	9	2.7
If you had symptoms of PTB, at what point would you seek medical help?		
When treatment on my own doesn't work	143	42.7
When symptoms that look like PTB last for >2 weeks	60	17.9
As soon as I realize my symptoms might be related to TB	124	37.0
Don't know	8	2.4
Behaviour of the Community towards people with PTB		
People in the village reject him/her	83	24.8
People are friendly but they try to avoid him/her generally	124	37.0
People mostly support and help him/her	102	30.4
Don't know	26	7.8

Discussion

This study conducted among 335 adults in a rural area of Gulu shows the present status of knowledge, attitude and practices related to TB in the study population with varied and interesting outcomes, which are discussed below.

Knowledge regarding PTB

Our study showed that the knowledge on the bacteria as the cause of TB was limited, as many of them suggested other causes like cold air, hot climate, tobacco smoke and food shortage. This low awareness on the cause was also reported in a Sudanese study in which only 2% respondents and in the Ethiopian study in which 22.9% respondents had knowledge on the cause of TB [Tolossa et al, 2014, Elbur et al, 2007]. A similar study among sandstone quarry workers in Rajasthan reported very low awareness (1.6%) on the cause of TB [Yadav et al, 2006] On the other hand, Koay et al in their study in Malaysia and Malhotra et al in their study in Delhi stated that nearly half of the participants were aware of the cause of TB [Koay, 2004, Malhotra et al, 2002]. Easwaran et al in his study in a similar rural setting reported a much lower percentage of awareness (10.6%) on the causation [Easwaran et al, 2015]. Awareness on the causal factor of disease is very essential as it influences the patients' health seeking behaviour.

Regarding the awareness on PTB symptoms, 32.5% reported cough as the main symptom. In a study done by Konda in an urban township in Mumbai, 48.4% of the subjects, and in the study by Chinnakali et al in Puducherry, 82% of the subjects, and in the study by Tolossa et al in Ethiopia, 72.4% of the subjects mentioned persistent cough as the most common symptom [Tolossa et al, 2014, Chinnakali et al, 2013, Konda et al, 2016]. The awareness on the symptoms varies widely with different study settings. Knowledge on the symptoms of PTB is very vital as it guides the patients in seeking medical care without delay. The fact that PTB is a transmissible disease was stated by 77.6% of the respondents. In the study by Konda, the knowledge on transmission was higher (87%) compared to our study [Konda et al, 2016]. This could be due to the difference in the study setting as their study was done in an urban township whereas our study was done in a rural area. Similarly, Tolossa et al reported 80% of awareness regarding PTB transmission in their study [Tolossa et al,

2014].

In our study, a smaller number of participants (49.3%) was aware that PTB transmission is preventable. Whereas in the study by Chinnakali et al, 75% of the subjects and in the study by Elbur et al, 58.6% mentioned that PTB can be prevented [Chinnakali et al, 2013, Elbur et al, 2007]. Knowledge that PTB is preventable was found to be very high (98.2%) in a study by Sharma et al among the general population of Delhi [Sharma et al, 2007]. About 83.3% of the subjects mentioned TB as a curable disease. Sharma et al, Chinnakali et al and Elbur et al, in their study in Delhi, Puducherry and Sudan respectively reported that 94.4%, 87% and 80.3% of the participants were aware that PTB is curable [Chinnakali et al, 2013, Elbur et al, 2007, Sharma et al, 2007].

In this study, 20.9% of the participant had secondary and above level of education. This is significantly associated with adequate PTB knowledge. Tolossa et al reported that people with high education level had increased odds of having good knowledge towards PTB [Tolossa et al, 2014]. Konda in their study found that low knowledge was associated with less education and low income [Konda et al, 2016].

Attitude towards PTB

Around 45.4% of the respondents considered TB as a very serious disease, whereas the Ethiopian study reported that 55.4% of the respondents considered TB as a very serious disease [Tolossa et al, 2014]. About 28.7% respondents reported that they would feel afraid if they were diagnosed with PTB and a very less proportion of participants (12.8%) said they would face the situation with hope and confidence. In the study by Tolossa et al, about 69.3% mentioned fear as their predominant feeling if they were found to have PTB [Tolossa et al, 2014]. Koay in his study reported embarrassment as the feeling of 41% of the study subjects if they were found to have PTB [Koay, 2004]. Compassion and desire to help the patients infected with TB was noted in only 30.1% of the subjects. The fear of getting infected by patients was mentioned by 17.3% of the participants. Having adequate knowledge on PTB and higher levels of socioeconomic status were found to be associated with a positive attitude. More awareness has to be created among the population to bring a positive attitude towards TB patients.

Practices related to PTB

With regard to the practices, in our study, about half of the participants said they would go to a health facility if they had symptoms of PTB. This proportion was high in the study by Tolossa et al, where 71% mentioned they would go to health facility in case of any symptoms suggestive of TB [Tolossa et al, 2014]. Whereas around 20.9% preferred pharmacy, self-treatment or traditional healers. Nearly 42.7% of the subjects said that they approach medical care only if their self-treatment options don't work. Work commitment, difficulties with travel to clinic, negative attitude of the health workers were the major reasons given by the subjects for not going to the health facility for care.

Regarding the cost of PTB treatment, only 20% knew that TB treatment is available free of cost in government health centres, whereas this was found to be 84% in a study by Chinnakali et al, 2013, 34% in a study by Kar et al, 2010, and 48.8% in a study by Mushtaq et al, 2010. This emphasizes the need to strengthen the health education activities, as nearly 80% of the subjects didn't know about the free anti-TB drugs provided by the government. Community support to the PTB patients was also found to be less as nearly half of the respondents said the villagers generally tries to avoid the PTB patients. Practices also varied with age and knowledge level of participants on PTB. The importance of social support to the patients affected with PTB needs to be inculcated in the minds of the population.

Limitations of the study

This study done in the rural field practice area with a sample of 335 adults from a population of 40,000 could have been planned on a larger scale, covering larger populations to have a better understanding on knowledge, attitude and practices related to PTB, so that the outcomes could be generalized to a larger study area.

Conclusion

The study showed that the overall level of knowledge was low and the overall attitude and practices related to PTB was highly inadequate.

These findings highlight the need to improve the awareness about TB, by giving greater emphasis on the causation, symptoms, early diagnosis and treatment for preventing and curing the disease. A positive attitude needs to be inculcated with the rural masses so that it leads to good practices in the management of TB patients in the Community, which would in turn help in achieving the goals and targets of the National Tuberculosis and Leprosy Control Program (NTBLCP). Hence the recognized gaps in the knowledge should be kept in mind while planning for TB awareness campaigns and information, education and communication (IEC) activities need to be intensified for the rural population to bring a meaningful change in their knowledge, attitude and practices towards PTB in the primary healthcare setting.

Data availability

The data used to support the findings of this study are available from the corresponding author upon request.

Authors' academic history/ information

Ph.D. Public Health, Master of Public Health (MPH), B.SC Public Health, Associate in Medical Laboratory Science (AMLS), B.SC Microbiology, Higher National Diploma (HND) in Environmental Health, Associate of Chartered Institute of Environmental Health and Safety (ACIEHS), United States of America

Acknowledgments

I am grateful to thank the study participants and acknowledge the team of research assistants.

References

- [1]. Bhuyan KK. Health promotion through self-care and community participation: Elements of a proposed programme in the developing countries. *BMC Public Health* (2004); 4:11.
- [2]. Cegielski JP, McMurray DN. The relationship between malnutrition and tuberculosis: evidence from studies in humans and experimental animals. *Int J Tuberc Lung Dis Off J Int Union Tuberc Lung Dis.* (2004);8(3):286–98.
- [3]. Chinnakali P, Ramakrishnan J, Vasudevan K, Gurusurthy J, Upadhyay RP, Panigrahi KC. Level of awareness about tuberculosis in urban slums: Implications for advocacy and communication strategy planning in the National program. *Lung India off Organ Indian Chest Soc.* (2013); 30(2):139–42.
- [4]. Demissie M, Getahun H, Lindtjørn B. Community tuberculosis care through “TB clubs” in rural North Ethiopia. *Soc Sci Med* (1982). (2003); 56(10):(2009)–18.
- [5]. Easwaran M, Ramachandran D, Ramasamy R, George N, Mathew M, Bazroy J, et al. Knowledge, attitude, and practice regarding tuberculosis among rural population in Tamil Nadu. *Int J Med Sci Public Health.* (2015); (4):1681–4.
- [6]. Elbur A, Yousif M, Ottoa P, Bayoumi A. Knowledge of Tuberculosis: A Survey among Tuberculosis Patients in Omdurman, Sudan. *Sudan J Public Health.* (2007); 2:21–8.
- [7]. FMOH, (2004). National Tuberculosis and Leprosy Control Programme: Worker’s Manual.4th Edition.
- [8]. FMOH, (2006). Advocacy, Communication and Social Mobilization Component: National Tuberculosis Control Programme.
- [9]. Hassmiller KM. The association between smoking and tuberculosis. *Salud Pública México.* (2006); 48: s201–16.
- [10]. Health seeking behavior. *Int J Tuberc Lung Dis* (2001); 5(7):619-27.
- [11]. Hill PC, Stevens W, Hill S, Bah J, Donkor SA, Jallow A, et al. Risk factors for defaulting from tuberculosis treatment: a prospective cohort study of 301 cases in the Gambia. *Int J Tuberc Lung Dis Off J Int Union Tuberc Lung Dis.* (2005); 9(12):1349–54.
- [12]. Implementing the WHO Stop TB Strategy: A Handbook for National Tuberculosis Control Programmes.

- Geneva: World Health Organization ;(2008). Involvement of communities and patients in tuberculosis care and prevention. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK310754/>. Accessed 31 May (2018).
- [13]. Javaid Ahmed Khan¹, Muhammad Irfan¹, Amna Zaki¹, Madiha Beg¹, Syed Fayyaz Hussain¹, Rizvi² N. (2006) Knowledge, Attitude and Misconceptions regarding Tuberculosis.
- [14]. 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); 4:68.
- [15]. Kar M, Logaraj M. Awareness, attitude and treatment seeking behaviour regarding tuberculosis in a rural area of Tamil Nadu. *Indian J Tuberc*. (2010);57(4):226–9.
- [16]. Koay TK. Knowledge and attitudes towards tuberculosis among the people living in Kudat District, Sabah. *Med J Malaysia*. (2004); 59(4):502– 11.
- [17]. Lienhardt C. From exposure to disease: the role of environmental factors in susceptibility to and development of tuberculosis. *Epidemiol Rev*. (2001); 23(2):288–301.
- [18]. Malhotra R, Taneja OK, Dhingra VK, Rajpal S, Mehra M. Awareness Regarding Tuberculosis in A Rural Population of Delhi. *Indian J Community Med*. (2002); 27(2):62.
- [19]. Mesfin MM, Tasew TW, Richard MJ: The quality of tuberculosis diagnosis in districts of Tigray region of northern Ethiopia. *Ethiop J Health Dev* (2005), 19:13–20.
- [20]. Morgan DW and Krejcie, RV. (1970). Determining Sample size for research activities of Minnesota: USA.
- [21]. Mushtaq MU, Majrooh MA, Ahmad W, Rizwan M, Luqman MQ, Aslam MJ, et al. Knowledge, attitudes and practices regarding tuberculosis in two districts of Punjab, Pakistan. *Int J Tuberc Lung Dis Off J Int Union Tuberc Lung Dis*. (2010); 14(3):303–10.
- [22]. Sharma N, Malhotra R, Taneja DK, Saha R, Ingle GK. Awareness and perception about tuberculosis in the general population of Delhi. *Asia Pac J Public Health*. (2007);19(2):10–5.
- [23]. Tolossa D, Medhin G, Legesse M. Community knowledge, attitude, and practices towards tuberculosis in Shinile town, Somali regional state, eastern Ethiopia: a cross-sectional study. *BMC Public Health*. (2014);14.
- [24]. Tuberculosis (TB). World Health Organization. Available from: <http://www.who.int/news-room/fact-sheets/detail/tuberculosis>. Accessed 31 May (2018)
- [25]. Wandwalo, ER and Morkve, O. 2000. Knowledge of disease and treatment among tuberculosis patients in Mwanza, Tanzania. *International Journal for Tuberculosis and Lung Diseases* 4(11):1041-1046.
- [26]. WHO. (2006). The Global Plan to stop TB 2006-2015. World Health Organization, Geneva (WHO/HTM/STB/2006.35).
- [27]. WHO, (2007). Global Tuberculosis Control: Surveillance, Planning, Financing. WHO reports Geneva.
- [28]. WHO. Global tuberculosis report (2017). WHO. Available from: http://www.who.int/tb/publications/global_report/en. Accessed 31 May (2018)
- [29]. WHO. The End TB Strategy [Internet]. WHO. Available from: <http://www.who.int/tb/strategy/end-tb/en>. Accessed 31 May (2018).
- [30]. World Health Organization, Stop TB Partnership. Advocacy, communication and social mobilization for TB control: a guide to developing knowledge, attitude and practice surveys. Available from: http://apps.who.int/iris/bitstream/10665/43790/1/9789241596176_eng.pdf Accessed 31 May (2018).
- [31]. Yadav SP, Mathur ML, Dixit AK. Knowledge and Attitude towards Tuberculosis among Sandstone Quarry Workers in Desert Parts of Rajasthan. *Indian J Tuberc*. (2006); 53:187–95.