

Research Article

Awareness Among Men About Tuberculosis, Its Spread and Electronic Media Impact in Pakistan: Pakistan Demographic and Health Survey 2012-13

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Abstract

Objective: Pakistan stands 5th among the highest TB burden countries in the world. The main objective of the study was to assess the impact of listening to the Radio and watching TV on awareness and knowledge about TB and its spread among men.

Methods: The study was based on data from third countrywide Pakistan Demographic and Health Survey (PDHS), 2012-13. From 12,943 occupied households, 13,558 ever-married women and 3,134 ever married men age 15–49 were interviewed. Men interviews record was selected and analysed for TB awareness and its relationship with electronic media. The relationship was tested by SPSS logistic regression analysis and the p-value of <0.05 was regarded as statistically significant.

Results: The study showed that daily watching TV was significantly higher in urban areas and created more awareness of TB and its spread than rural areas. In rural areas, Radio listeners were more than urban areas. 33.2% to 58.7% men had knowledge that TB spreads by touching a person who has TB disease while 81.3% to 99.5% men had an awareness that TB is not spread by sexual contact with TB diseased person.

Electronic media especially watching TV was statistically significant with awareness of TB and its spread.

Conclusion: Men from urban areas, daily TV watchers and occasionally radio listeners had significantly high awareness about TB spread by air. Misconceptions about TB spread by utensils, sexual contact and touching TB person prevail. Radio and TV can play a vital role, through education, to control TB spread and taking complete treatment.

Keywords: Tuberculosis, Pakistan, Electronic Media, Awareness, History

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Introduction

Tuberculosis (TB) is caused by bacteria *Mycobacterium tuberculosis*. It has been affecting human health since ancient times. In a study, DNA from five *M. tuberculosis* genetic loci was detected and pathological changes in some of the bones of the Levantine population of the Pre-pottery Neolithic C period, which was more than 8000 years ago, confirmed the presence of the tuberculosis disease.¹

It mainly affects the lungs, but it can affect any part of the body including the abdominal glands, bones, and nervous system. A person needs to inhale only a few of these germs to become infected. When a person develops TB disease, the common symptoms such as cough, low-grade fever, night sweats, and weight loss are observed. Without proper treatment of the disease, about 45% of people with TB and nearly all HIV-positive people with TB die. Now, there are threats and challenges of multidrug-resistant (MDR)

and extensively drug-resistant (XDR) TB.

World Health Organisation (WHO) estimated that one-quarter of the world's population has latent TB and they are at risk of the development of active TB in their lifetime. It is an estimation that in 2017 about 1.3 million HIV-negative people and around 300,000 HIV-positive people died due to TB. In 2017, globally 6.4 million new cases of TB were reported², and 87% of these new TB cases occurred in the 30 highest TB burdened countries. Globally, Pakistan was among eight countries who had two third of these new TB reported cases.³ WHO new post-2015 Global TB Strategy aimed to end the global TB epidemic, with targets to reduce TB deaths by 95% and to cut new cases by 90% between 2015 and 2035⁴.

According to the National TB Control Program of Pakistan (NTP), Pakistan stands 5th amongst the high burdened countries in the world. In Pakistan, the prevalence of TB is 348, while incidence is 276 and 34 mortalities per 100,000 population per year. NTP is making efforts for making TB free Pakistan by reducing 50% prevalence of TB in the population by 2025⁵.

For this reason, proper knowledge about the disease is crucial to decrease TB cases among the general population and sustained awareness of TB has an importance⁶. People have no proper knowledge and information about TB, its mode of spread and treatment but have misconceptions about symptoms, diagnosis, treatment and effects of TB.⁷ Health communication campaigns through media are an effective way for awareness and change in health-related behaviour.⁸

Mycobacterium tuberculosis has gradually become deadlier organism due to drug resistance. A study of university students in Lahore revealed that only a few persons knew about treatment duration of TB and MDR TB while most respondents were unaware of XDR TB. Misunderstanding and limited knowledge related to TB are great risks for TB spread and drug-resistant TB. Different health information programmes can create awareness through electronic media to remove misapprehensions and misconceptions.⁹

Most people have lack of awareness about the disease, its complete treatment importance, and follow-ups. Media messages, particularly by televi-

sion (TV), can play an important role in creating awareness and giving knowledge about TB, its spread and cure.¹⁰

Although free treatment for TB is available in Pakistan, unfortunately, high rate of unsuccessful TB treatments has been observed. In a study in Bahawalpur, it was found that 40% of patients did not get proper TB treatment.¹¹ Due to lack of knowledge and awareness, patients generally do not complete TB treatment. They are unaware of the effects of incomplete treatment. They are ignorant that they could have MDR TB.¹² Mass media campaigns can create awareness about it.

The main objective of the study is to assess the impact of listening to the Radio and watching TV on awareness and knowledge about TB and its spread among men.

Methods

This study is based on the data of Pakistan Demographic and Health Survey (PDHS) 2012-13. The PDHS 2012-13 was the third survey conducted in Pakistan as part of the MEASURE DHS international series. The funding for the survey was provided by the United States Agency for International Development (USAID) through the Inner-City Fund (ICF) International. Pakistan's Ministry of Planning and Development executed this survey. The investigators were National Institute of Population Studies (NIPS), Ministry of National Health Services and Regulations and Coordination (NHSRC) affiliated with the Government of Pakistan.

It was a countrywide survey. The survey was conducted in all regions of Pakistan except Azad Jammu and Kashmir (AJK), Federally Administered Tribal Area (FATA), and some restricted military and protected areas. In the survey, team members interviewed, after taking consent, and filled questionnaires. There were four types of questionnaires which were translated in Urdu and Sindhi languages: Household Questionnaire, Woman's Questionnaire, Man's Questionnaire, and Community Questionnaire.

A sample size of 14,000 households from urban and rural areas, in the country, was estimated sufficient and reasonable for interviews to fill all questionnaires. The survey was carried out in a total of 498

areas of the country. At each sampling area/point, by application of a systematic sampling technique with a random start, 28 households were selected for interviews. In this way, 14,000 households, 6944 households in urban areas and 7,056 households in rural areas, were selected while 12,943 households were found occupied.

A total of 20 trained teams were formed to collect data; each team comprised of a supervisor, a field editor, one male interviewer, and three female interviewers. All teams after completion of clusters electronically transferred the data to the central office. The fieldwork was monitored and carried out from October 2012 to March 2013, and only one team in Balochistan completed its fieldwork in the third week of April due to security reasons. Data quality was ensured through different levels of supervisions.

Only ever-married women and men age 15-49 from occupied households were included in the survey for interviews. All questionnaires were filled during these interviews. From 12,943 occupied households, 3,991 men were identified as eligible to be interviewed. Of these men, 3,134 were successfully interviewed, and the response rate was 79 percent. While 14,569 ever-married women were eligible for interviews, 13,558 were successfully interviewed and the response rate was 93 percent. For this study, men's interviews record was selected and analysed.

Statistical Package for the Social Sciences (SPSS) version 21 was used to analyse the data of men interviews record from PDHS 2012-13. Tables were

formed by cross tabulation to assess the impact of electronic media on awareness of TB & its ways of spread in all regions of the country. SPSS logistic regression analysis were done for statistical significance, association, and the relationship of awareness about TB with electronic media. A p-value of <0.05 was considered statistically significant.

Results

Table 1: This table is about awareness of TB and its mode of spread in all regions of the country. It shows that 86.6% to 98.6% people heard about the disease and the lowest percentage was in Gilgit Baltistan.

Regarding awareness about TB spread by air; coughing and sneezing, urban areas respondents were more aware than rural areas respondents. Awareness about TB spread by sharing utensils, touching TB patient is almost at the same level among all respondents and no marked difference seen.

The interesting thing is the remarkable difference of responses between touching TB patient and sexual contact with a person having TB disease. Respondents ranged from 33.2% to 58.7% have knowledge that TB spreads by touching person having TB and from 81.3% to 99.5% respondents have an awareness that TB is not spread by sexual contact with a person having TB. It is significant finding of awareness.

Table 2. It is about electronic media (radio and TV) exposure and awareness among respondents about TB and its spread. It reveals that occasional listeners of radio of all regions of the country have heard more

Table 1: Awareness Among Men about TB and its Spread in all Regions of the Country-PDHS 2012-13

| Regions | Yes Responses in % | | | | | |
|-------------------------|--------------------|----------------------------|------------------|-----------------|----------------|------|
| | Heard of TB | TB spreads by | | | | |
| | | Air: coughing and sneezing | Sharing utensils | Touching person | Sexual contact | |
| Islamabad ICT | | 98.8 | 63.2 | 41.1 | 33.2 | 9.3 |
| Punjab | Urban | 98.4 | 67.0 | 55.2 | 58.2 | 8.8 |
| | Rural | 95.5 | 45.0 | 45.8 | 52.7 | 4.7 |
| Sind | Urban | 97.1 | 62.7 | 31.0 | 44.0 | 18.8 |
| | Rural | 95.9 | 22.0 | 51.6 | 49.9 | 12.6 |
| Khyber | Urban | 97.4 | 73.0 | 51.5 | 45.9 | 0.5 |
| Pakhtunkhwa | Rural | 93.0 | 59.5 | 41.5 | 51.8 | 4.0 |
| Balochistan | Urban | 95.1 | 82.5 | 52.6 | 51.1 | 6.7 |
| | Rural | 94.7 | 72.2 | 54.1 | 58.7 | 8.9 |
| Gilgit Baltistan | | 86.6 | 39.4 | 50.0 | 43.9 | 9.3 |
| N | | 3132 | 3125 | 3128 | 3128 | 3128 |

Table 2: Awareness of TB among Men in all Regions of the Country and Electronic Media (Radio and TV) Impact - PHDS 2012-13

| Awareness questions | Electron media exposure Frequency of listening to radio | Regions and Yes responses in % | | | | | | | | | |
|--|--|--------------------------------|--------|-------|-------|-------|--------------------|-------|-------------|-------|-----------------|
| | | Islamabad ICT | Punjab | | Sind | | Khyber Pakhtunkhwa | | Balochistan | | ilgit Baltistan |
| | | | Urban | Rural | Urban | Rural | Urban | Rural | Urban | Rural | |
| Heard of TB (N:3130) | Occasionally | 50.7 | 26.2 | 26.8 | 18.8 | 29.3 | 28.3 | 16.8 | 41.2 | 32.8 | 29.7 |
| | Once a week | 2.2 | 0.3 | 1.5 | 1.0 | 2.1 | 0.5 | 0.4 | 0.4 | 2.2 | 0.9 |
| | Daily | 8.7 | 2.3 | 2.8 | 3.0 | 6.1 | 7.9 | 2.9 | 4.3 | 12.7 | 6.1 |
| TB spreads by air: coughing & sneezing (N:3126) | Occasionally | 50.3 | 22.9 | 27.5 | 14.9 | 21.3 | 28.7 | 15.6 | 45.2 | 30.0 | 29.9 |
| | Once a week | 1.7 | 0.0 | 1.8 | 0.8 | 2.7 | 0.7 | 0.6 | 0.5 | 2.5 | 2.1 |
| | Daily | 8.5 | 2.9 | 3.2 | 2.3 | 10.7 | 8.4 | 3.4 | 4.1 | 15.3 | 10.3 |
| TB spreads by sharing utensils (N:3126) | Occasionally | 47.0 | 27.2 | 32.9 | 25.6 | 36.9 | 25.7 | 16.8 | 39.7 | 30.3 | 32.8 |
| | Once a week | 1.7 | 0.0 | 1.8 | 0.8 | 2.3 | 0.0 | 0.0 | 0.7 | 2.2 | 1.6 |
| | Daily | 11.3 | 1.8 | 2.2 | 3.1 | 5.7 | 8.9 | 1.6 | 6.4 | 9.2 | 6.6 |
| TB spreads by touching person (N:3126) | Occasionally | 44.1 | 25.8 | 34.0 | 24.0 | 38.8 | 34.4 | 15.4 | 33.8 | 27.9 | 31.5 |
| | Once a week | 5.4 | 0.0 | 0.8 | 1.1 | 4.1 | 0.0 | 0.0 | 0.7 | 2.4 | 1.9 |
| | Daily | 10.8 | 2.2 | 2.7 | 2.7 | 4.7 | 8.9 | 3.2 | 3.4 | 13.9 | 8.3 |
| TB spreads by sexual contact (N:3126) | Occasionally | 30.8 | 18.5 | 30.4 | 17.9 | 4.9 | 0.0 | 4.7 | 44.4 | 8.0 | 39.1 |
| | Once a week | 0.0 | 0.0 | 4.3 | 2.6 | 2.3 | 0.0 | 0.0 | 0.00 | 4.0 | 4.3 |
| | Daily | 7.7 | 0.0 | 4.3 | 6.4 | 4.7 | 0.0 | 0.0 | 11.1 | 0.0 | 8.7 |
| | Frequency of watching television | | | | | | | | | | |
| Heard of TB (N:3129) | Occasionally | 23.9 | 30.0 | 43.0 | 19.3 | 34.4 | 30.4 | 40.7 | 11.8 | 24.0 | 27.7 |
| | Once a week | 4.0 | 5.0 | 4.7 | 0.7 | 7.3 | 2.1 | 3.2 | 0.8 | 0.00 | 2.8 |
| | Daily | 67.4 | 58.6 | 34.9 | 73.8 | 29.9 | 44.5 | 23.9 | 81.2 | 43.8 | 54.5 |
| TB spreads by air: coughing & sneezing (N:3125) | Occasionally | 19.2 | 30.2 | 42.8 | 12.6 | 20.0 | 31.5 | 39.7 | 9.0 | 22.7 | 20.6 |
| | Once a week | 3.4 | 4.9 | 2.3 | 0.8 | 5.3 | 0.7 | 1.7 | 0.9 | 0.0 | 5.2 |
| | Daily | 73.4 | 60.0 | 42.3 | 81.6 | 38.7 | 44.1 | 27.4 | 86.0 | 47.8 | 66.0 |
| TB spreads by sharing utensils (N:3125) | Occasionally | 23.5 | 31.4 | 45.8 | 20.9 | 30.7 | 30.7 | 38.4 | 9.9 | 22.5 | 28.5 |
| | Once a week | 4.3 | 3.6 | 6.2 | 0.8 | 9.1 | 2.0 | 1.6 | 0.0 | 0.0 | 1.6 |
| | Daily | 69.6 | 60.9 | 35.1 | 68.2 | 33.0 | 41.6 | 32.0 | 86.5 | 45.0 | 53.7 |
| TB spreads by touching person (N:3125) | Occasionally | 30.1 | 32.0 | 45.9 | 16.9 | 35.9 | 34.4 | 37.8 | 11.7 | 20.0 | 29.6 |
| | Once a week | 3.2 | 4.5 | 4.6 | 1.1 | 10.0 | 1.1 | 1.9 | 1.4 | 0.0 | 1.9 |
| | Daily | 62.4 | 58.4 | 35.9 | 78.1 | 33.5 | 45.6 | 25.0 | 80.0 | 47.0 | 55.6 |
| TB spreads by sexual contact (N:3125) | Occasionally | 19.2 | 29.6 | 43.5 | 15.4 | 32.6 | 0.0 | 33.3 | 0.0 | 20.8 | 26.1 |
| | Once a week | 0.0 | 3.7 | 4.3 | 0.0 | 7.0 | 0.0 | 8.3 | 0.0 | 0.0 | 4.3 |
| | Daily | 80.8 | 63.0 | 43.5 | 84.6 | 32.6 | 100 | 41.7 | 94.4 | 50.0 | 56.5 |

about TB and know its spread than daily and weekly radio listeners. Occasional radio listeners have more awareness about TB spread by air than other radio listeners.

Respondents who watched TV daily in urban areas of the provinces have significantly higher awareness

about TB and its spread by air than rural areas respondents.

Table 3. It shows statistical significance about the relationship of electronic media (radio and TV) with awareness of TB and its ways of spread. SPSS logistic regression analyses were done, and results of likeli-

hood ratio tests reveal that TV watching is more statistically significant than radio listening in the relation to TB spread awareness. Radio listening has only statistically significance with TB spread by air; coughing and sneezing.

Table 3: Statistical Analyses and Association of Awareness About TB and its Spread (DVS) With Electronic Media (radio And Tv) Exposure (IVS) (Likelihood Ratio Tests Results)

| Awareness questions about TB | Electronic media exposure | | | |
|--|---------------------------|---------|---------------------|---------|
| | Listening to radio | | Watching television | |
| | Chi-Square | p-value | Chi-Square | p-value |
| Heard of TB | 6.422 | 0.093 | 86.674 | 0.001* |
| TB spreads by air: coughing & sneezing | 9.036 | 0.029* | 161.380 | 0.001* |
| TB spreads by sharing utensils | 5.425 | 0.143 | 7.643 | 0.054 |
| TB spreads by touching person | 3.715 | 0.294 | 16.244 | 0.001* |
| TB spreads by sexual contact | 3.890 | 0.274 | 30.089 | 0.001* |

Ivs - Independent variables; DV - dependant variable

*p-value of <0.05 is statistically significant.

Discussion

The results show that men from urban areas had significantly high awareness about TB spread by air; coughing and sneezing than men from rural areas. Those who watched TV daily in urban areas had appreciably higher awareness about TB and its spread by air than rural areas TV watchers. While daily TV watchers had more misconceptions than other TV watchers about TB spread by other methods. Occasional radio listeners had more awareness about TB spread by air than other radio listeners. Statistically, watching TV was more significant and associated with TB awareness than listening to the radio.

This study shows that in rural areas in the country, more misconceptions are about spread of TB by sharing utensils, sexual contact and touching a person. A study in Sindh Province supports our study and it revealed that people living in rural areas have their own concepts about diseases and they prefer to go to Hakims, Homeopaths, and Spiritual healers. They have no proper knowledge of Tuberculosis and its spread. They have a lack of understanding that a

TB patient, without treatment, can spread the disease to healthy persons¹³. There is a need to change their wrong concepts by giving proper information about TB.

Different TB control programmes decreased the number of potential new cases of the disease and deaths. However, the emergence of multidrug-resistant TB has become a new threat and delayed the progress towards the elimination of TB¹⁴. In a study in Punjab, the high death rate was found among patients who got drug-resistant tuberculosis treatment¹⁵. It can be controlled by creating awareness of getting complete TB treatment.

In a study, in Muzaffarabad district AJK, to assess the knowledge about Tuberculosis and its spread, it was found that males had more awareness than females¹⁶. In our study men in urban areas had more knowledge and awareness about TB spread and they have important role in the family. Being head of a family, in Pakistani society, males' awareness about the disease would be beneficial for the families.

Our study showed that mostly men had lack of knowledge about TB spread by utensils, sexual contact and touching a TB patient. If they had lack of knowledge about TB spread, then how they would have knowledge about benefits of taking complete TB treatment. A study in Rawalpindi showed that limited knowledge of TB patients, financial burden, social stigma and long distance travelling to health facilities for getting medicines were the main barriers for TB treatment continuity and completion.¹⁷

Electronic media has got fast growth in Pakistan, in a few years, and a large number of electronic channels have been established. So electronic media role has become significant. Television and Radio have power-ful effects on audiences in rural and urban areas so can be used for creating awareness and changing health-related behaviours¹⁸. Our study showed that TV and radio have an important role in awareness about TB spread by air.

The increased incidence of Tuberculosis in Pakistan can be due to the delays in its detection and spread by incomplete TB treatment. In a study in Mansehra district, it was found that 41.2% of pulmonary TB patients completed treatment, and 50.6% were declared cured in the register. This shows the majority

of TB patients did not complete their treatment¹⁹. They were unaware of importance of completing treatment.

Improvement in the tuberculosis control programme in the country could be by Government prioritisation of TB control programme at national and provincial levels.²⁰ The priority action areas should include (a) proper planning and providing services near door-steps (b) providing treatment facilities, without interruption, to hard-to-reach groups (c) management of drug-resistant TB (d) proper surveillance and monitoring of the programme. The overall approach to control TB should be multisectoral.²¹ The collaboration between private and government sectors for TB patient's treatment would be beneficial to control TB in the country.²²

The electronic media influence has grown significantly with the passage of time. We live in a society that depends on information and communication for our daily activities. The beliefs and values now based on what information we have information/know. However, the influence of electronic mass media has touched every sphere of the human aspect.

TV has become the strongest form of media, due to the impact of pictures, for information, education, influence, and entertainment. To reduce the burden of Tuberculosis, messages through media campaigns for rural and urban communities should include accurate information about the disease.²³ Our study showed that daily TV watchers had significantly high awareness about TB spread by air. Our study also discovers need of proper education about TB and its spread by electronic media.

The results of our study show that Radio listeners are more in rural areas and can be approached by this mode for creating awareness about TB, its spread, treatment importance and drug-resistant TB. In rural areas in Pakistan Radio is the major source of information and entertainment due living closely culture and being relatively economical. Broadcasts carry news, analyses, commentaries, information programmes, and advertisements.

A study revealed that people with the access to Radio had more information, due to educational programmes, on Tuberculosis and its transmission compared to those who had no access to Radio.²⁴ So,

by targeting rural areas by educational programmes by radio and urban areas through TV will educate people about TB, its spread, importance of completing treatment, and drug-resistant TB.

In PDHS 2012-13, the sample size of men was lesser than women. The interviews data was from all parts of the country and taken with proper planning, so it was helpful to assess awareness about TB and its spread.

Conclusion

Men from urban areas, daily TV watchers and occasional Radio listeners had significantly high awareness about TB spread by air. Misconceptions about TB spread by utensils, sexual contact and touching TB person prevail. Radio and TV can play a vital role, through education, to control TB spread and taking complete treatment.

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References

1. Hershkovitz I, Donoghue HD, Minnikin DE, May H, Lee OY, Feldman M, Galili E, Spigelman M, Rothschild BM, Bar-Gal GK. Tuberculosis origin: the Neolithic scenario. *Tuberculosis*. 2015; 1(95): S122-6.
2. World Health Organisation. Global tuberculosis report 2018. Executive summary. Available from: http://www.who.int/tb/publications/global_report/tb_18_ExecSum_web_4Oct18.pdf?ua=1 (Accessed 07 Nov 2018).
3. World Health Organisation. Media centre. Tuberculosis. Available from: <http://www.who.int/mediacentre/factsheets/fs104/en/> (Accessed on 07 Nov 2018)
4. World Health Organisation. Tuberculosis (TB). WHO End TB Strategy. Available from: http://www.who.int/tb/post2015_strategy/en/ (Accessed on 01 Nov 2017)
5. NTP. National TB Control Programme of Pakistan. <http://www.ntp.gov.pk/cmsPage.php?pageID=7> (accessed 01 Nov 2017)
6. Biya O, Gidado S, Abraham A, Waziri N, Nguku P, Nsubuga P, et al. Knowledge, care-seeking behavior, and factors associated with patient delay among newly-diagnosed pulmonary tuberculosis patients, Federal Capital Territory, Nigeria, 2010. *The Pan African medical journal*. 2014;18(Suppl 1).

7. Gilani SI, Khurram M. Perception of tuberculosis in Pakistan: findings of a nation-wide survey. *J Pak Med Assoc.* 2012;62(2):116-20.
8. Robinson MN, Tansil KA, Elder RW, Soler RE, Labre MP, Mercer SL, et al. Mass Media Health Communication Campaigns Combined with Health-Related Product Distribution A Community Guide Systematic Review. *Am J Prev Med.* 2014;47(3):360-71.
9. Javed H, Tahir Z, Hashmi HJ, Jamil N. A cross-sectional study about knowledge and attitudes toward multidrug-resistant and extensively drug-resistant tuberculosis in a high-burden drug-resistant country. *Int J Mycobacteriol.* 2016 ;5(2):128-34.
10. Nasir JA, Imran M, Zaidi SA. TB knowledge and perception in Pakistan. *J Uni Med Dent Coll.* 2016; 7(1):6-11.
11. Atif M, Bashir A, Ahmad N, Fatima RK, Saba S, Scahill S. Predictors of unsuccessful interim treatment outcomes of multidrug resistant tuberculosis patients. *BMC Infect Dis.* 2017;17(1):655.
12. Smith C, Abubakar I, Thomas HL, Anderson L, Lipman M, Reacher M. Incidence and risk factors for drug intolerance and association with incomplete treatment for tuberculosis: analysis of national case registers for England, Wales and Northern Ireland, 2001–2010. *Thorax.* 2014;69:956–958.
13. Ali Warsi SM, Danish SH, Ahmad F, Khan AI, Khan MP, Bano S, et al. Tuberculosis knowledge and health seeking behaviour: A tale of two districts of Sindh, Pakistan. *J Pak Med Assoc.* 2016;66(9):1120-1126.
14. Sotgiu G, Sulis G, Matteelli A. Tuberculosis-a World Health Organization Perspective. *Microbiol Spectr.* 2017;5(1).
15. Kanwal S, Akhtar AM, Ahmed A. Factors associated with mortality to drug-resistant tuberculosis and their programmatic management in treatment centres of Punjab, Pakistan. *J Pak Med Assoc.* 2017;67(6):858-862.
16. Abbasi A, Rafique M, Saghir A, Abbas K, Shaheen S, Abdullah F. Gender and occupation wise knowledge, Awareness and prevention of tuberculosis among people of district Muzaffarabad AJ & K. *Pak J Pharm Sci.* 2016 ;29(6):1959-1968.
17. Soomro MH, Qadeer E, Mørkve O. Barriers in the management of tuberculosis in rawalpindi, pakistan: a qualitative study. *Tanaffos.* 2013;12(4):28-34.
18. Ali Z, Janand M, Bukhari SQ. Role of electronic media in changing value system in Pakistan. *The Int Asian Res J.* 2013: 01(01):59-65.
19. Kamal M, Ali S, Hussain SJ, Abbasi MA. Demographics of Tuberculosis in District Mansehra. *J Ayub Med Coll Abbottabad.* 2015;27(4):890-3.
20. Khan WM, Smith H, Qadeer E, Hassounah S. Knowledge and perceptions of national and provincial tuberculosis control programme managers in Pakistan about the WHO Stop TB strategy: a qualitative study. *JRSM Open.* 2016;8(1): 2054270416675084.
21. Lönnroth K, Migliori GB, Abubakar I, D'Ambrosio L, de Vries G, Diel R, et al. Towards tuberculosis elimination: an action framework for low-incidence countries. *Eur Respir J.* 2015;45(4):928-52.
22. Khan AH. Tuberculosis control in Sindh, Pakistan: Critical analysis of its implementation. *J Inf Pub Health.* 2017;10(1):1-7.
23. Naidoo P, Simbayi L, Labadarios D, Ntsepe Y, Bikitsha N, Khan G, et al. Predictors of knowledge about tuberculosis: results from SANHANES I, a national, cross-sectional household survey in South Africa. *BMC Public Health.* 2016;16:276.
24. Ismail A, Josephat P. Knowledge and perception on tuberculosis transmission in Tanzania: Multinomial logistic regression analysis of secondary data. *Tanzan J Health Res.* 2014;16(1):29-37.