SORT IT KB Key Population

Tuberculosis in key populations in Tajikistan – a snapshot in 2017

Zulfiya Tilloeva[1], Seda Aghabekyan[2,3], Karapet Davtyan[2,3], Olga Goncharova[4], Olim Kabirov[5], Bobojon Pirmahmadzoda[6], Asliddin Rajabov[6], Azamdzhon Mirzoev[7], Garry Aslanyan[8]

[1] Institute of Gastroenterology, Dushanbe, Tajikistan
[2] Tuberculosis Research and Prevention Center NGO, Yerevan, Armenia
[3] FMD KL Europe LLC, Yerevan, Armenia
[4] National Center of Phthisiology, Bishkek, Kyrgyzstan
[5] National Tuberculosis Reference Laboratory, Vahdat city, Shifo, Tajikistan
[6] Republican Center of Protection of the Population from Tuberculosis, Dushanbe, Tajikistan
[7] Institute for Post-Diploma Education in Health Care, Dushanbe, Tajikistan
[8] Special Programme for Research and Training in Tropical Diseases, TDR, World Health Organization, Geneva, Switzerland

Abstract

Introduction: WHO End TB Strategy aims at achieving targets of 90% mortality reduction and 80% reduction in tuberculosis (TB) incidence by 2030, recommending better addressing TB and multidrug-resistant TB (MDR-TB) issues in key populations.

Aim: The study aimed at having a snapshot of the epidemiological characteristics of the key populations among the new TB patients, registered in Tajikistan during 2017.

Methodology: A cross-sectional study was conducted, using official TB registration data for all new TB case notification in Tajikistan in 2017.

Results: The key population included 1,029 (19.8%) patients among all 5,182 new TB cases registered in 2017. The following selected sub-populations were identified: migrant workers – 728 (70.7%), diabetics – 162 (15.7%), HIV-positive – 138 (13.4%), heavy drinkers – 74 (7.2%), drug users – 50 (4.8%), ex-prisoners – 50 (4.8%), and homeless – 9 (0.9%). Among the key population, 307 (29.8%) patients were smear-positive, 145 (14.1%) were drug-sensitive and 116 (11.3%) had MonoDR/MDR-TB. Time to treatment initiation for smear-positive cases was ≤ 5 days for 303 (98.7%) patients. Being a key population was inversely related to gender (female) (OR = 0.25, 95% CI (0.21, 0.29)) and population type (rural) (OR = 0.64, 95% CI (0.55, 0.74)).

Conclusion: Among the key population the identified overlaps of selected sub-populations would enable more efficiently reaching the certain groups. TB case detection at PHC levels needs to be targeted for improved rates for key population detection. In the key population sub-group of migrant workers' special migration destinations are recommended to be explored and find out possible associations with drug resistance.

Key words: Tuberculosis; Tajikistan; key population; operational research; SORT IT.

Introduction

Tuberculosis (TB) is one of the most important public health problems in the Republic of Tajikistan, a lower-middle income country in Central Asia [1].

In 2017, the estimated TB incidence was reported to be 85 per 100,000 population and the prevalence 126.9 per 100,000 population [2,3]. Although the prevalence rate of TB has dropped to 1.8-fold in the last twelve years (from 238 cases in 2005 to 126.9 per 100,000 population in 2017) the proportion of multidrug-resistant TB (MDR-TB) among new TB cases increased from 12.5% in 2010 to 20% in 2017 [3]. The proportion of MDR-TB among previously treated cases was 53.6% in 2010 and decreased to 45% in 2017

according to the National Drug Resistance Survey of Tajikistan [4].

According to the Stop TB Partnership, the Global Plan to End TB recommends to reach at least 90 percent of all people with TB placing them on appropriate therapy, including first- and second-line treatment and preventative therapy; to reach at least 90 percent of the key populations, and to achieve at least 90 percent treatment success for all people diagnosed with TB through affordable treatment, services, adherence to complete and correct treatment and social support [5].

The identified sub-populations that are more prone to TB either due to more environmental, biological or behavioral risks or barriers in accessing public services they face. Many of these key populations overlap and

are exposed to multiple risks making delivering TB services to them even more challenging [6]. Therefore, depending on a specific country, the various factors impacting a national the TB response among its key populations might differ [6].

In order to attain the WHO End TB Strategy and to achieve the target of 90% mortality reduction and 80% reduction in TB incidence by 2030, TB and MDR-TB issues would need to be better addressed in key populations [7,8]. The 2015-2020 National Strategic TB Prevention Plan in Tajikistan recommends special attention among TB special key populations, such as the HIV, migrants, prisoners and other groups, for ensuring access to quality TB diagnosis based on the demands of the special key populations [9].

According to the 2017 WHO Report on TB in Tajikistan, the incidence of HIV/TB coinfection was estimated to be 3.1 per 100,000 population, while the proportion of patients with HIV-positive status among new and relapsed TB patients was reported to be about 4% [10,11].

The proportion of the migrants among newly registered TB cases increased from 13.5% of all cases in 2011 to 19.7% in 2015 [12]. In 2017, the rate of TB among the migrant workers was reported to be 15.3% [10].

In the reviewed literature form PubMed on key populations in Tajikistan, it was found that the TB transmission risk is considerably higher for healthcare workers who are in close contact with TB patents such as in dedicated TB care facilities [13]. Tuberculosis notification rates among healthcare workers ranged between two and ten-fold compared to those of the general population (6-year average: 562/100,000 vs 88/100,000, respectively) during 2009-2014 [14].

According to the literature, the prevalence of the TB among the prisoners in Tajikistan was about 4.5%, which is estimated to be about 50 times more compared to the general population rate in 2010 [15].

No published information was identified regarding the TB rates among other TB key populations in Tajikistan, such as drug users and diabetics, heavy drinkers and homeless.

Therefore, defining and targeting the TB key populations and understanding situations faced by them will further foster risks identification, the factors driving these risks, the challenges in providing services to key populations as well as to further improve TB prevention and control programs in Tajikistan in general.

The aim of the study is to provide a snapshot of the TB key populations, by analyzing the epidemiological characteristics of the new TB patients registered in Tajikistan, during the year 2017.

This study is the first attempt to identify and quantify the key populations in Tajikistan, among the new TB cases in 2017, including: HIV-positive, drug users, heavy drinkers, diabetics, migrant workers, ex-prisoners and homeless; demographic characteristics of the key populations are compared to non-key population.

Methodology

Study Design

This is a cross-sectional study, based on the official TB registration data for all new TB case notification in Tajikistan in 2017.

Study Setting

General

The Republic of Tajikistan is a mountainous country (93% of mountains) in Central Asia covering an area of 142,600 km^2. The population is approximately 9 million, of which 5.9 million (73.6%) live in rural areas [3]. Tajikistan borders Afghanistan, Uzbekistan, Kyrgyzstan and China.

National Tuberculosis Program

In 2002 the country set up a National Tuberculosis Program which follows WHO guidelines for TB [16,17], and implementation of Directly Observed Treatment Strategy (DOTS) Strategy was applied country-wide from 2002 to 2004. The National Tuberculosis Program is implemented by Ministry of Health and Social Protection of Republic of Tajikistan that owes Republic TB Center coordinating, Oblast (regional) TB centres and Dushanbe (capital city) TB centre. For prisoners, Ministry of Justice is also collaborating with Ministry of Health and Social Protection.

National TB control measures are implemented by a network of TB facilities and through the primary healthcare system. The country operates 76 TB ambulatory centres, 4 regional centres and 34 TB hospitals [9]. The total number of beds in TB hospitals in the Republic is more than 1,500. The prison system has one TB hospital with a specific ward for patients with MDR-TB. Funding for TB activities is mainly from international donor organizations (about 80%). The TB patients, including patients with drug-resistant forms, receive standardized treatment regimens in accordance with national guidelines, which are based on the WHO TB guidelines [9,16,17]. According to the National TB control strategy in Tajikistan, for all new
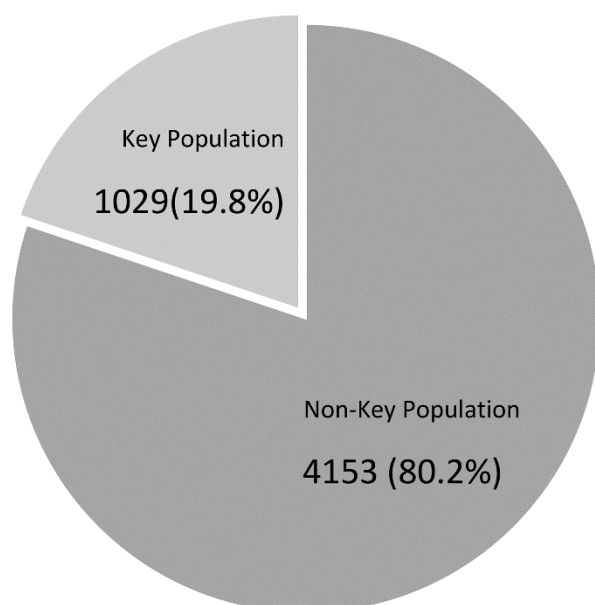
TB cases an official TB registration form-089 is completed by a TB specialists. The TB notification form includes demographic information, migration history, previous contacts with TB cases, history of imprisonment, drug and alcohol use, HIV positivity and main concomitant diseases, as well as results of laboratory tests (microscopy and Gene Expert (GX) of HAIN tests), facility that diagnosed TB case, circumstances of TB notification, presence of lung decay, etc.

The TB laboratory network in Tajikistan is organized as a three-level hierarchically organized diagnostic system, consisting of the NRL at the top level, three culture laboratories at medium level (the National Public Health Reference Laboratory in Dushanbe, the oblast reference laboratory of Kulyab, which serves the Khatlon oblast, and the reference laboratory of Digmoy, serving the Sugd oblast) and 72 microscopy laboratories at the base [18]. A diagnostic algorithm was developed to improve early detection of MDR-TB cases, using all available diagnostic methods. Besides smear microscopy, Xpert MTB/RIF is recommended for all suspected TB cases.

Study population

The research included the new TB cases registered in 2017 in Tajikistan. The exclusion criteria were the following: being imprisoned during the study period and "previously" treated TB patients, inadvertently reported as "new" cases on the national registration form.

Figure 1. Key population among all new TB cases registered in Tajikistan in 2017.

Data collection

Data from the official registration form-089 for all new TB case notification were collected and entered into EpiInfo database (version 7.1.5) by trained staff and then reviewed and compared to the original registration forms for accuracy.

Analysis and statistics

Variables on social, demographic and clinical characteristics of TB patients, related to the study objectives were collected. A variable of "key population" was obtained by combining variables reflecting selected key sub-populations defined above: HIV-positive, drug users, heavy drinkers, diabetics, migrant workers, ex-prisoners and homeless. A variable of "heavy drinker" was based on TB specialist's judgement based on patient's provided information on their alcohol usage, extent and not as a result of Drug Dispensary expertise. The variables of "drug user", "migrant worker", "ex-prisoner" and "homeless" were captured based on the reported information in registration form-089.

Summary statistics were used to report the results. Descriptive analysis (mean ± standard deviation (SD) for continuous variables and frequencies for categorical variables) was conducted for the variables of interest and relevant socio-demographic variables. Differences in characteristics between the key populations were compared using χ^2 and Fisher's exact test for categorical variables and t-test for numerical variables. EasySTAT web based statistical application was used for data analysis (available at https://easystat.app/).

Ethics approval

The ethical approval for this study was obtained from the biomedical Ethics Committee of the Academy of Medical Science of the Ministry of Health and social protection of population of the Republic of Tajikistan (protocol#7/2019). This study was based only on the data of the registers collected by TB specialists. Based on this information, the informed consent was not deemed necessary. The personal identifiers were not databased, and the anonymization of the data was ensued.

Results

Data on a total of 5,182 new TB cases were captured out of 5,231 registered cases (99.1%). The key population included 1,029 (19.8%) patients among all new TB cases registered for the year 2017 in Tajikistan (Figure 1).

The mean age for the key population was 36±14 years. Of these, 813 (79%) were males and 701 (68.1%) were rural population (Table 1). Among the key population 233 (22.6%) patients were employed and 468 (45.5%) were married.

Amongst the key population 307 (29.8%) patients were smear-positive, 145 (14.1%) patients were drug-sensitive and 116 (11.3%) had MonoDR/MDR-TB. Time to treatment initiation for smear-positive cases was ≤ 5 days for 303 (98.7%) patients and > 5 days for 4 (1.3%) patients. Of these, 325 (31.6%) cases were detected by public healthcare (PHC) facilities and 630 (61.2%) by specialized TB facilities.

The key population comprised of selected sub-populations, being the following: migrant workers – 728 (70.7%), diabetics – 162 (15.7%), HIV-positive – 138 (13.4%), heavy drinkers – 74 (7.2%), drug users – 50 (4.8%), ex-prisoners – 50 (4.8%), and homeless – 9 (0.9%). The overlaps in key population are provided in Table 2, represented as proportions of specific groups in each of selected TB sub-populations, As shown in Table 2, the predominating proportion among all sub-populations are migrant workers.

The characteristics of key population were compared to non-key population considering the following factors: age, gender, education level, marital status, employment status, population type, microscopy results, time to treatment initiation among smear-positive, drug resistance status, and TB detection facility. According to the results, females were by 75% (odds ratio (OR) = 0.25, 95% confidence interval (CI) (0.21, 0.29), p < 0.001) less likely to be a key population compared to males. Patients from rural areas were by 36% less likely (OR = 0.64, CI (0.55, 0.74), p < 0.001) to be a key population as compared to urban patients.

Discussion

This study aimed at identifying selected TB sub-populations as key population, including HIV-positive, drug users, heavy drinkers, diabetics, migrant workers, ex-prisoners and homeless, in order to more efficiently reach these groups to address targeted delivering of TB services, in accordance with WHO End TB Strategy [7,8]. The proportions of selected sub-populations were calculated, among which the data for drug users,

Table 1. Social, demographic and clinical characteristics of TB Key and Non-key populations in Tajikistan, 2017.

Variable	Level	Key population, n (%) N = 1029/5182	Non-key population, n (%) N = 4153/5182	OR, 95% CI	p-value
Age group	Under 18 years	21 (2%)	581 (14%)		
	From 18 to 54 years	848 (82.4%)	2777 (66.9%)		
	Over 54 years	160 (15.5%)	795 (19.1%)		
Gender	Female	216 (21%)	2154 (51.9%)	0.25 [0.21, 0.29]	< 0.001
	Male	813 (79%)	1999 (48.1%)	1	
Marital status	Married	468 (45.5%)	987 (23.8%)		
	Single	550 (53.4%)	3141 (75.6%)		
Education level	Higher	100 (9.7%)	191 (4.6%)		
	Secondary	570 (55.4%)	1263 (30.4%)		
Work status	Employed	233 (22.6%)	383 (9.2%)		
	Unemployed	796 (77.4%)	3770 (90.8%)		
Population type	Rural	701 (68.1%)	3195 (76.9%)	0.64 [0.55, 0.74]	< 0.001
	Urban	328 (31.9%)	958 (23.1%)	1	
Microscopy	Smear-negative	575 (55.9%)	1463 (35.2%)		
	Smear-positive	307 (29.8%)	1133 (27.3%)		
	Pulmonary TB without microscopy	16 (1.6%)	94 (2.3%)		
	Extra-pulmonary	131 (12.7%)	1463 (35.2%)		
Time to treatment initiation among smear-positive	> 5 days	4 (1.3%)	24 (2.1%)		
	≤ 5 days	303 (98.7%)	1109 (97.9%)		
Drug resistance status	Sensitive	145 (14.1%)	568 (13.7%)		
	MonoDR/MDR-TB	116 (11.3%)	359 (8.6%)		
TB detection facility	PHC facility	325 (31.6%)	1193 (28.7%)		
	TB facility	630 (61.2%)	2730 (65.7%)		
	Other	74 (7.2%)	230 (5.5%)		

Mono-DR/MDR-TB – mono-drug-resistant / multi-drug resistant tuberculosis; PHC – public healthcare.

Table 2. Number and proportion of specific groups in each of selected TB sub-populations.

Specific groups in key population, n (%)	HIV-positive	Drug user	Heavy drinker	Prisoners	Diabetes	Migrant workers	Homeless
HIV-positive: 138 (13.4%)		32 (23.2%)	25 (18.1%)	20 (14.5%)	2 (1.4%)	41 (29.7%)	7 (5.0%)
Drug user: 50 (4.8%)	32 (64.0%)		15 (30.0%)	10 (20.0%)	1 (2.0%)	16 (16.0%)	3 (6.0%)
Heavy drinker: 74 (7.2%)	25 (33.8%)	15 (20.3%)		18 (24.3%)	6 (8.1%)	29 (39.2%)	3 (4.1%)
Prisoners: 50 (4.8%)	20 (40.0%)	10 (20.0%)	18 (36.0%)		1 (2.0%)	23 (46.0%)	3 (6.0%)
Diabetes: 162 (15.7%)	2 (1.2%)	1 (0.6%)	6 (3.7%)	1 (0.6%)		10 (6.2%)	0 (0%)
Migrant workers: 728 (70.7%)	41 (5.6%)	16 (2.2%)	29 (4.0%)	23 (3.2%)	10 (1.4%)		3 (0.4%)
Homeless: 9 (0.9%)	7 (77.8%)	3 (33.3%)	3 (33.3%)	3 (33.3%)	0 (0%)	3 (33.3%)	

homeless, heavy drinkers and diabetics previously unreported in the literature.

Among the key population the high proportion (about 77%) of patients were unemployed, consistent with literature data [19]. Interestingly, approximately half of the key population (45.5%) were married: considering that about 70% of the key population were migrant workers, this could be explained by the need to migrate for work as a caregiver for family.

While in Tajikistan it is recommended to initiate a treatment after diagnosis not later than 5 days, interestingly, in only 4 (1.3%) cases among key population the time to treatment initiation for smear-positive patients was more than 5 days, which is indicative of adequate rates for treatment timely administration.

It was found out that PHC facilities detect about 30% of new cases among key population which implied TB case detection at PHC levels needs to be targeted in order to improve key population detection rates.

Since migrant workers represented about 70% of the key population, further study would be needed to define migration destinations (urban-rural, national and international) in the key population sub-group and find out possible associations with drug resistance.

The protective effect of being female for being a key population is explained by several patterns, like males being more vulnerable to TB due to gender-specific occupations, more likely to migrate for work, to smoke or use drugs in many societies and generally less likely to have their TB detected and reported than women [20]. For rural population the protective effect from being a key population might be explained by the fact of having more close communities in rural areas, where alcohol use, drug use, imprisonment, etc., are considered unfavorable behaviors.

Despite the sample size, there was a large amount of missing data, posing completeness and registration bias. This highlights the need for improved quality of data capture and more thorough reporting by TB specialists. Moreover, the collected information makes it unreasonable to suggest policy-related recommendations. However, characterization of the key population and calculation of selected sub-populations would enable reaching the certain groups more efficiently. Another limitation to consider would be the reporting and recall bias by the patients.

This study aimed at having a snapshot of the epidemiological characteristics of the key populations among the new TB patients in Tajikistan for the single year 2017, but does not describe any trends or time patterns in disease control protection of the population. Additionally, since outcome of the disease was not considered in the current study, further study on clinical outcomes and survival rates would be needed for a more comprehensive analysis of the situation in the country regarding targeting key populations.

Conclusion

In the current study the key population resulted to be about 20% of the whole new cases reported for the year 2017. Among the key population the overlaps of selected populations (HIV-positive, drug users, heavy drinkers, diabetics, migrant workers, ex-prisoners and homeless) were identified. This could enable further reaching the certain groups more efficiently for targeted delivery of TB services, in accordance with WHO End TB Strategy.

As observed by findings, in all the selected populations, the proportion of migrant workers predominated. This allows us recommending more proper targeting of this subgroup to more efficiently reach them. The obtained study results pose implications for practice for addressing the key population and its constituent sub-populations with high risk more efficiently. Additionally, case detection at PHC levels needs to be targeted for improved rates for key population detection. In the key population sub-group of migrant workers special migration destinations (urban-rural, national and international) are recommended to be researched further and find out possible associations with drug resistance.

References

1. The World Bank Data (2018) World development indicators. Tajikistan. Available: http://databank.worldbank.org/country/tajikistan. Accessed: 02 August 2019.
2. World Health Organization (2018) Global tuberculosis report 2018. Available: https://www.who.int/tb/publications/global_report/en. Accessed: 02 August 2019.
3. Agency on Statistics under President of the Republic of Tajikistan (2018) Morbidity of population with active tuberculosis, 1991-2017. Available: http://stat.ww.tj/library/en/active_tuberculosis.xls. Accessed: 02 August 2019.
4. Ministry of Health and Social Protection of Population of the Republic of Tajikistan (2018). National Drug Resistance Survey of Tajikistan, 2016-2017, 2016-2017гг., Tajikistan. Available from National Tuberculoses Control Program upon request. [Article in Russian]
5. Stop TB Partnership (2015). Global Plan to end TB: the paradigm shift, 2016–2020. Available: http://www.stoptb.org/global/plan/plan2/. Accessed: 03 September 2020.
6. Stop TB Partnership (2017) Data for action for tuberculosis key, vulnerable and underserved populations. Available: http://www.stoptb.org/assets/documents/communities/Data%20for%20Action%20for%20Tuberculosis%20Key,%20Vulnerable%20and%20Underserved%20Populations%20Sept%202017.pdf. Accessed: 22 July 2019.
7. Uplekar M, Weil D, Lonnroth K, Jaramillo E, Lienhardt C, Dias HM, Falzon D, Floyd K, Gargioni G, Getahun H, Gilpin C, Glaziou P, Grzemska M, Mirzayev F, Nakatani H, Raviglione M; for WHO's Global TB Programme (2015) WHO's new end TB strategy. Lancet 385: 1799-1801.
8. World Health Organization (2015) Tuberculosis action plan for the WHO European Region 2016-2020. Available: http://www.euro.who.int/__data/assets/pdf_file/0007/283804/65wd17e_Rev1_TBActionPlan_150588_withCover.pdf. Accessed: 02 August 2019.
9. Ministry of Health of Tajikistan (2014) National strategic plan to prevent the population from TB in Tajikistan for 2015-2020 (approved by National Coordination Committee from 18.07.2014 #26). Available: http://afif.tj/images/files/pdf/nac.strategicheskiy_plan_zashchity_naseleniya_ot_tuberkuleza_2015-2020.pdf. Accessed: 15 July 2020
10. National Tuberculoses Control Program (2018). Targets, the main objectives and priorities of the National Program for the protection of population against tuberculosis in Republic of Tajikistan for 2015-2020. Available from National Tuberculoses Control Program upon request. [Article in Russian],
11. World Health Organization (2018). Tajikistan Tuberculosis country profile. Available: https://worldhealthorg.shinyapps.io/tb_profiles/?_inputs_&lan=%22EN%22&iso2=%22TJ%22&main_tabs=%22est_tab%22. Accessed: 25 July 2020.
12. International Organization for Migration (2017) TB Control among Tajik Migrants Discussed in Dushanbe. |Available: https://www.iom.int/news/tb-control-among-tajik-migrants-discussed-dushanbe . Accessed: 03 September 2020.
13. Joshi R, Reingold AL, Menzies D, Pai M (2006) Tuberculosis among health-care workers in low- and middle-income countries: A systematic review. PLoS Med 3: e494.

14. Mirzoev A, Lucenko I, Pirov K (2016) A countrywide assessment of tuberculosis among health care workers in tuberculosis health facilities in Tajikistan, 2009-2014. Public Health Panorama 2: 74-80.

15. Winetsky DE, Almukhamedov O, Pulatov D, Vezhnina N, Dooronbekova A, Zhussupov B (2014) Prevalence, risk factors and social context of active pulmonary tuberculosis among prison inmates in Tajikistan. PLoS ONE 9: e86046.

16. World Health Organization (2010). Guidelines for treatment of tuberculosis. 4th ed. Available: https://www.who.int/tb/publications/2010/9789241547833/en / . Accessed: 03 September 2019.

17. World Health Organization (2008) Guidelines for the programmatic management of drug-resistant tuberculosis. Available: https://apps.who.int/iris/bitstream/handle/10665/43965/97892 41547581_eng.pdf. Accessed: 03 August 2019.

18. Dara M, Van den Boom M, Hasanova S, Mkrtchyan Z (2014) Extensive review of tuberculosis prevention, control and care in Tajikistan. Avalable : https://apps.who.int/iris/handle/10665/137463. Accessed: 15 July 2020.

19. Munch Z, Van Lill SWP, Booysen CN, Zietsman HL, Enarson DA., Beyers N (2003) Tuberculosis transmission patterns in a high-incidence area: a spatial analysis. IJTLD 7: 271-277.

20. Onozaki I, Law I, Sismanidis C, Zignol M, Glaziou P, Floyd K (2015) National tuberculosis prevalence surveys in Asia, 1990-2012: an overview of results and lessons learned. TMIH 20: 1128–1145. doi: 10.1111/tmi.12534.

Corresponding author

Seda Aghabekyan, MD, MPH
Tuberculosis Research and Prevention Center NGO, Yerevan, Armenia, FMD KL Europe LLC, Yerevan, Armenia
20/1 Kajaznouni Str. 19 Apt., 0018, Yerevan, Armenia
Phone: +37499221991
Email: seda.aghabekyan@gmail.com

Conflict of interests: No conflict of interests is declared.