



Pattern of Reported Tuberculosis Cases in Iran 2009-2010

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Abstract

Background: Cooperation of all health sectors and early diagnosis of the disease are the key factors for controlling tuberculosis. This study assesses the patterns of reported tuberculosis cases in Iran.

Methods: This was a cross sectional study. Tuberculosis cases were defined according to World Health Organization and Iran's national TB guidelines. Final data were prepared for analysis using SPSS16 software.

Results: Public hospitals, public and private outpatient clinics reported 4111 (39.1%), 3007 (28.6%) and 2839 (27%) cases of TB, respectively. The highest number of reported TB cases was from the public healthcare system. One third of TB cases were reported by private outpatient clinics.

Conclusion: It is essential to make a plan such as public-private mix model in Iran. Because of high coverage of private physicians in our country and even in rural areas, it is quite necessary to involve private system in tuberculosis program.

Keywords: Tuberculosis, Public, Private, Epidemiology, Iran

Introduction

Tuberculosis (TB) is still an important global health problem (1-2) and kills about two million people annually (3). Tuberculosis is one of major health problems in Iran; however the problem is intensified by immigrants and pilgrims from Pakistan and Afghanistan. In TB program, cooperation of all health sectors and early diagnosis of disease are the key factors for controlling TB (4).

Based on World health organization (WHO) TB control program, at least 84% of TB smear positives within the society must be diagnosed, 87% of treatments must be successful, and TB incidence must have been reversed by 2015 (5-6). However, it will not be possible to accomplish these goals unless all involved health sectors work

together. Hence, it is important to evaluate the referral patterns in tuberculosis patients to make further plans and decisions. According to a study, 70% of positive sputum pulmonary TB patients in Iran had chosen private doctor's offices as the primary desired clinical unit when their disease started, and 50% of TB patients had been visited at least twice by physicians prior to diagnosis of their disease (7). It illustrates the importance of private sectors in controlling the disease.

Conducting this sort of studies is the first step for planning Public-Private Mix (PPM) program. This study can provide information about stakeholders reporting and referring behaviour in TB program for designing the PPM program. This program is proposed by WHO to strengthen the collabora-

tion of public (governmental) sectors and private sectors in the TB program (8).

Based on mentioned reasons, as designing such a program for surveillance system is one of the priorities of WHO (9), it is not possible to design an appropriate program without a clear knowledge about referral patterns of TB patients. Hence, this study assesses the status of referral patterns of patients registered in national TB control program in Islamic Republic of Iran.

Materials and Methods

In this cross sectional study all registered patients from 20 March 2009 to 20 March 2010 (one year) in all parts of the country were assessed. TB cases were defined according to WHO and Iran's national TB guideline (10).

TB suspected patients have been referred from all form of health/treatment systems (public or private) to the TB laboratories routinely in Iran. Laboratory can be public (health system Lab. and reference Lab.), private or other form (Fig. 1).

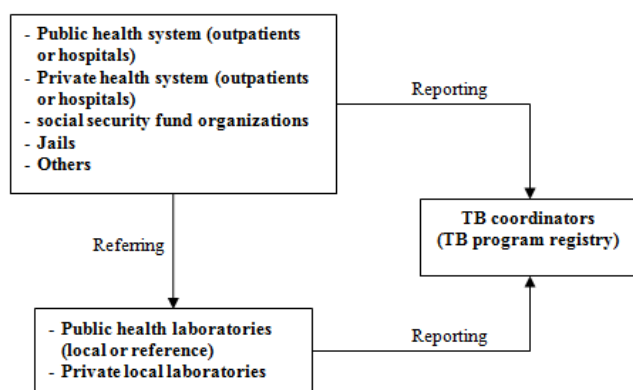


Fig. 1: Referring and reporting system for tuberculosis program in Iran

If TB was proved in suspected patients, it should be reported for registration in the TB program by the physicians or health care workers in any system. Then TB reported data was entered in TB register software via double-entry and then data was transferred to province level. Source of reporting for registration in tuberculosis program was defined “person or system that diagnosed TB

patients and reported the patients to the TB coordinator physician. Public health system was defined as system supported financially by government and it contains public hospitals (PHs) and public health outpatient system (PHO); public clinics or health centers. Private health system was divided to private hospitals and private outpatient system (PO) contains private clinics. Social security fund system was defined hospitals or clinics that are belong to social security fund organizations. Other reporting system contains charity and army forced clinic or hospitals. After a review in provincial level, data was sent to national center of disease control.

Results

From all diagnosed patients 147 (1.4%) were wrongly diagnosed as TB patients and were excluded from the study and 10525 TB patients were assessed. The mean of patients' age was 47.8 (± 21.6) years. From all, 5459 (51.9%) were female, 9032 (85.8%) were Iranian, 6985 (66.4%) were urban, 281 (2.7%) were prisoner, and 242 (2.3%) were HIV positive. 5702 patients (54.2%) were smear positive and 9802 (93.1%) were defined as new cases. 3251 (30.9%) patients were bedridden in hospitals (Table 1).

Referred TB patients to Laboratories

All smear positive, 1910 (94.2%) of smear negative and 1810 (64.8%) of extra pulmonary were assessed by laboratory test (smear, culture or pathology). One hundred eighteen (5.8%) of smear negative and 985 (35.2%) of extra pulmonary did not evaluated by any laboratory tests (smear, culture or pathology).

Totally, 3162 (55.5%) of smear positive TB patients were referred to sputum smear examination in the public health local laboratories and 425 (7.5%) were tested in private laboratories.

Eight hundred sixty nine (42.9%) of smear negative TB patients were referred to sputum smear examination in the public health local laboratories and 180 (8.9%) in private laboratories. From all smear negative patients 10.2% did not have any sputum smear examination (Table 2).

Reporting TB patients

PHs, PHO and PO reported 4111 (39.1%), 3007 (28.6%) and 2839 (27%), respectively (Fig. 2).

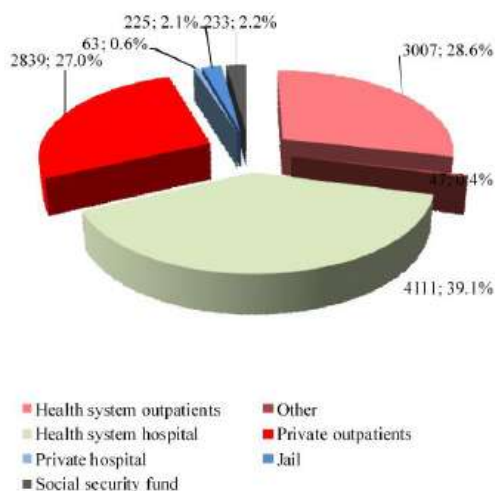


Fig. 2: Source of reported TB patients for registration in tuberculosis program

1982 (48.2%) of men and 2129 (51.8%) of women patients was reported by PHs (Fig. 3). PHO found 126 (52.1%) of HIV positive TB patients.

About 80.9% of extra pulmonary and 73.9% of smear negative TB were reported by PHs and PHO (Fig. 4). 71.5% of foreign TB patients were reported by PHs and PHO (Fig. 5).

All reported smear positive patients, 413 (20.4%) of reported smear negative and 1327 (47.5%) of reported extra pulmonary had at least one laboratory test confirming TB other patients did not have any laboratory test confirmation.

Table 1: Characteristics of registered tuberculosis patients

Variables	n	Percent
Sex		
Male	5066	49.1
Female	5459	51.9
Nationality		
Iranian	9032	85.8
Afghan	1452	13.8
Other	41	0.4
Residency		
Urban	6985	66.4
Rural	3540	33.6
Prison		
	281	2.7
Type of TB		
Smear Positive	5702	54.2
Smear Negative	2028	19.3
Extra pulmonary	2795	26.6
Group Classification		
New case	9802	94.7
Recurrent	323	3.1
Rupture	32	0.3
Other	189	1.8
Treatment Group		
Category I [†]	9825	93.3
Category II ^{††}	646	6.1
Other	54	0.5
HIV Positive		
	242	2.3
Hospital Admitted		
	3251	30.9

[†] treatment with Rifampin, Isoniazid, Pyrazinamide, and Ethambutol for two months then Isoniazid and Rifampin for 4 months. ^{††} treatment with Rifampin, Isoniazid, Pyrazinamide, Ethambutol and streptomycin for two months, one month without streptomycin then Isoniazid and Rifampin and Ethambutol for 5 months.

Table 2: Type of laboratory in which TB patients were evaluated by sputum smear test

Laboratory	Smear Positive n (%)	Smear Negative n (%)	Extra pulmonary n (%)	Total n (%)
No.	0 (0)	206 (10.2)	2108 (75.4)	2314 (22)
Health system Lab	3162 (55.5)	869 (42.9)	368 (13.2)	4399 (41.8)
Private Lab	425 (7.5)	180 (8.9)	93 (3.3)	696 (6.6)
Reference Lab	1216 (21.3)	398 (19.6)	140 (5)	1754 (16.7)
Other	899 (15.8)	375 (18.5)	88 (3.1)	1362 (12.9)

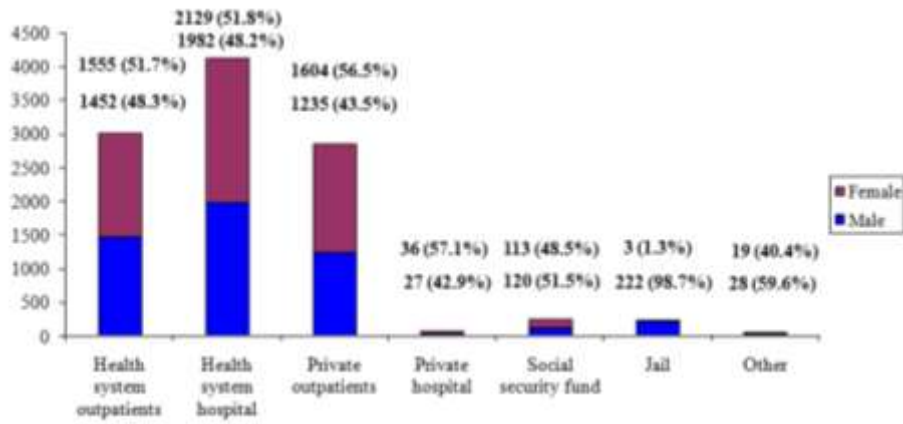


Fig. 3: Reported pattern of registered TB patients from different sources and comparison of sex between them

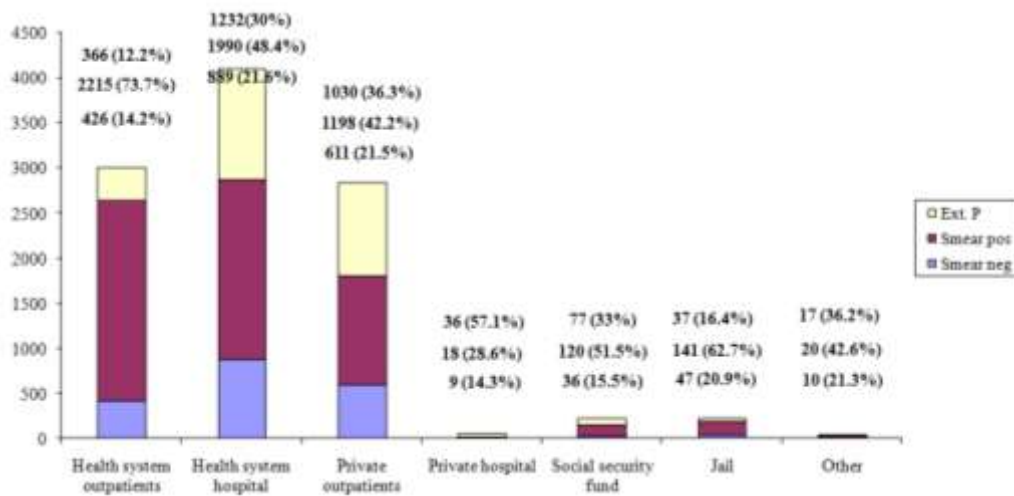


Fig. 4: Comparison of TB type in registered TB patients between different sources of reporting

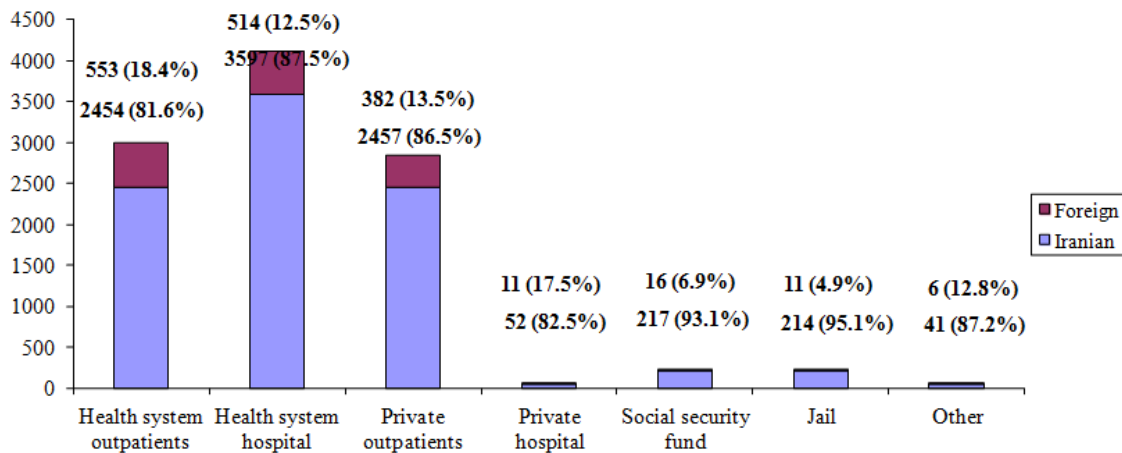


Fig. 5: Comparison of nationality in registered TB patients between different sources of Reporting

Discussion

Based on the results of this study, 14.2% were foreign, 66.4% urban, 2.3% HIV positive. 77.4% were pulmonary. PH system laboratories were common laboratories where patients were diagnosed. 79.6% of smear negative and 53.5% of extra pulmonary patients were diagnosed clinically (not laboratory).

The most common reporting system was PHs. The PO reported about one third of TB patients. Also about one third of the patients had been bedridden in hospitals. Except prisons, there was no difference between reporting system regarding gender. The ratio of males to females was 0.93 in this study. Typically, 5 to 10% of people exposed to mycobacterium are infected by TB, and usually 70% of infected cases are male (11). In other studies it is rarely less than one and usually number of male TB patients is more than female ones (1, 12). Such an index is observed in Iran, Pakistan, Afghanistan, and Iraq and this ratio is larger than one in other countries. Genetic, nutrition, hormones, health inequity and environmental conditions may be among the reasons.

The high percentage of TB patients was reported by PH (outpatient and hospital) and PO system. Remaining percentage was reported by other systems. Because of high coverage of health insurance system in our country and even in rural areas, it is quite necessary to involve insurance organizations in TB program. Contribution of private sector in diagnosing and reporting TB patients depends on the vast of private sectors and the condition of health system of that country. In other country private system have an important role in TB program (13-16). In most of countries, the role of private sectors is more significant. As 67.5% of patients in our country prefer to go to private sector when they have illness and TB diagnosis delay is high in these sectors (17), it seems that private sector is playing a very important role in TB program but their involvement in reporting smear positive TB is extremely less than PH system. One of the likely reasons is the lesser sensitivity of private sectors toward TB. Another possible reason is that private physicians work in

PHs as well. As physicians are working part time in the morning in PHs, and as most diagnosed TB patients are bedridden in public hospitals, it is likely that the patients who go to physicians' offices will be bedridden in PHs. In addition, medical students who will work in private system in the future, learn a little information about TB program. In a study in Iran, only 17% of them mentioned smear sputum as a method for TB diagnosis and only 7.5% knew the correct method of TB treatment (18). Hence, physicians may miss TB patients, therefore it must be seriously considered in TB program and retraining physicians. Since physicians work in both systems simultaneously, training in private sector could reinforce PH system as well.

PH laboratories (local and reference) are important in TB program. Also, private laboratories confirm 6.6% of reported TB patients therefore it is important to consider them in TB program. According to non-laboratory confirmation of high percentage of smear negative and extra pulmonary TB, it seems that it is essential to train physicians and pathologists in TB program and provide a strong reporting system in pathologic laboratories. In Lin et al. study (19) in Taiwan, 22.7% of diagnoses were wrong which is much higher than our study. Wrong diagnosis usually happens in extra pulmonary and smear negative cases, therefore, it may be greatly helpful to do TB confirming laboratory test in these cases or some advanced tests like polymerase chain reaction (PCR) and Adenosine Deaminase Activity (ADA), and in provinces with enough facilities, it is recommended to have private sectors to do this sort of tests. In addition, high percentage of TB patients was reported by hospitals. It seems delay in diagnosis of TB is an important problem in our country. As treatment of TB patients is cost-free in Iran and the expenses of hospitalized TB patients are paid by PH system, TB program budget is extremely inadequate. It is necessary to involve other organizations like insurance organizations for founding and education of physician in the TB program.

Concerning privatization policies within the country, if we do not take required action to empower

and include TB program in private sector now, we will face fundamental problems in the future. Participation of private sector in TB program could lead to improved diagnosis and treatment. Furthermore, contribution of private sector is needed to achieve specified targets (20). It is suggested to implement TB control and reporting system in private sectors in Iran and design and perform a Public-Private Mix program.

Conclusion

It is essential to make a plan such as public-private mix model in Iran. Because of high coverage of private physicians in our country and even in rural areas, it is quite necessary to involve private system in tuberculosis program.

Ethical considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc) have been completely observed by the authors.

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