

Estimation of the contribution of private providers in tuberculosis case notification and treatment outcome in Pakistan

A.A. Chughtai,¹ E. Qadeer,¹ W. Khan,² H. Hadi¹ and I.A. Memon¹

تقدير إسهام مقدمي الرعاية في القطاع الخاص في الإبلاغ عن حالات السل وحصائل معالجتها في باكستان

أبرار أحمد شوقاتي، إعجاز قدير، وسبق خان، هـ. هادي، إي. أ. ميمون

الخلاصة: لقد أنشئ العديد من المشاريع المشتركة بين القطاعين العام والخاص في باكستان من أجل تحسين إسهام القطاع الصحي في البرنامج الوطني للسل، وذلك خلال الفترة 2004-2009. وقد أجرى الباحثون تحليلاً استعدياً للمعطيات لدراسة 6 نماذج مختلفة من الشراكات بين القطاع العام والخاص، للتعرف على مدى إسهام مقدمي الرعاية في القطاع الخاص في الإبلاغ عن حالات السل وعن حصائل معالجتها في باكستان. ووجد الباحثون أن عدد حالات السل التي أبلغ عنها القطاع الخاص قد ازدادت زيادة يُعتد بها إحصائياً من 77 حالة عام 2004 إلى 37 656 عام 2009. ومن بين هذه النماذج كان النموذج الخاص بالمنظمات غير الحكومية قد أحرز الإسهام الأكبر في الإبلاغ عن الحالات (58.3%)، تلاه النموذج المرتكز على المستشفيات (18.9%). كما كان نجاح المعالجة أعلى ما يكون في النموذج الذي تكون قيادته في المناطق (94.1%)، ويكون أقل ما يكون في النموذج المرتكز على المستشفيات (74.2%). ولقد ساهم القطاع الخاص مساهمة هامة في المعطيات الوطنية من خلال مختلف المشاريع المشتركة بين القطاعين العام والخاص. وقد ناقش الباحثون قضايا ضمان الاستمرار وفقدان الداعمين للمعالجة باعتبارها أسباب فشل بعض المشاريع.

ABSTRACT To improve involvement of the private sector in the national tuberculosis (TB) programme in Pakistan various public-private mix projects were set up between 2004 and 2009. A retrospective analysis of data was made to study 6 different public-private mix models for TB control in Pakistan and estimate the contribution of the various private providers to TB case notification and treatment outcome. The number of TB cases notified through the private sector increased significantly from 77 cases in 2004 to 37 656 in 2009. Among the models, the nongovernmental organization model made the greatest contribution to case notification (58.3%), followed by the hospital-based model (18.9%). Treatment success was highest for the district-led model (94.1%) and lowest for the hospital-based model (74.2%). The private sector made an important contribution to the national data through the various public-private mix projects. Issues of sustainability and the lack of treatment supporters are discussed as reasons for lack of success of some projects.

Estimation de la contribution des prestataires privés dans la notification de cas de tuberculose et dans l'issue du traitement au Pakistan

RÉSUMÉ Afin d'améliorer l'implication du secteur privé dans le programme national de lutte antituberculeuse au Pakistan, plusieurs partenariats public-privé ont été créés entre 2004 et 2009. Une analyse rétrospective des données a été menée afin d'étudier six modèles de partenariats public-privé différents dans la lutte contre la tuberculose au Pakistan et d'estimer la contribution des divers prestataires privés aux notifications de cas de tuberculose et à l'issue du traitement. Le nombre de cas de tuberculose notifiés par le secteur privé a augmenté considérablement, passant de 77 cas en 2004 à 37 656 en 2009. Le modèle des organisations non gouvernementales est celui qui a contribué le plus aux notifications de cas (58,3 %), suivi par le modèle en milieu hospitalier (18,9 %). Le modèle organisé par district affichait le taux de guérison le plus élevé (94,1 %) alors que le modèle en milieu hospitalier présentait le taux le plus faible (74,2 %). Le secteur privé a contribué de manière importante aux données nationales par le biais de divers partenariats public-privé. Les questions de pérennité de ces initiatives et l'absence d'accompagnateurs du traitement sont des causes en cours d'étude qui peuvent expliquer l'échec de certains projets.

¹National TB Control Programme, Islamabad, Pakistan (Correspondence to A.A. Chughtai: doctorahmad75@gmail.com).

²World Health Organization, Regional Office for the Eastern Mediterranean, Cairo, Egypt.

Received: 15/12/11; accepted: 26/02/12

Introduction

Global reports show that despite ongoing tuberculosis (TB) control efforts only 70% of cases are identified [1]. One reason for this is that TB services are usually provided in the public sector and few efforts have been made to involve the private sector in national TB control programmes (NTP). In most high-burden TB countries a large proportion of patients initially seek care from private providers who are outside the NTP networks and who do not follow the recommended DOTS strategy for management of TB [2,3]. These cases are usually partially treated and may be diagnosed at late stages of infection. In Pakistan approximately 420 000 new TB cases occur every year, with an incidence of 231 per 100 000 [1]. Most patients attending government TB centres have previously visited a health care provider [4–6], and in one study as many as 80% of TB cases detected had initially sought care in the private sector [6].

After achieving 100% DOTS coverage in the public sector in 2005, Pakistan started to develop some public–private mix (PPM) ventures to involve private providers in case detection. These included partnerships with nongovernmental organizations (NGOs), general practitioners (GPs), private hospitals, social franchising networks and parastatal hospitals. In the NGO model, TB service delivery was enhanced via NGOs with health outlets (e.g. the Pakistan Anti-TB Association, with around 56 health outlets throughout the country) as well as NGOs without health outlets (supporting existing health facilities in some cities). The Pakistan Anti-TB Association and The Agha Khan Health Services were supported through round 2 of the Global Fund to Fight AIDS, Tuberculosis and Malaria [7]. Then through the Global Fund round 3, the NTP engaged 1000 GPs in what is termed a franchise social marketing

model. The advocacy, communication and social mobilization activities were supported through 2 NGOs—the Asia Foundation and Basic Development Need. The government of Pakistan also allocated a substantial amount of money (39% of the total public sector budgetary allocation) for PPM activities in the 2005–10 development plan through a district-led model. These funds were mainly used for managing human resources, TB drugs, training of private providers and free or subsidized laboratory services. At a later stage, the NTP also promoted a hospital-based model by involving large private tertiary care hospitals in delivery of TB services. In addition, the NTP started a PPM initiative via public sector resources. This so-called parastatal model involved semi-government hospitals, such as social security hospitals, army (cantonment) hospitals and railway hospitals, which belong to Pakistan Railways. Finally, a number of pilot projects with GPs were set up with the support of the United States Agency for International Development (USAID).

The objectives of this study were to analyse the case notification trends in the private sector in Pakistan since the implementation of PPM projects and estimate the contribution of various PPM models in the TB case notification and treatment outcome in Pakistan.

Methods

The study was conducted from June to September 2010. Retrospective analysis of data was done to estimate the contribution of various types of private providers to TB cases notification and to analyse treatment success rates.

Data collection

The NTP uses the World Health Organization recommended recording and reporting system for TB surveillance. The private sector uses the same

recording and reporting tools for data collection and reporting. The district is main implementation unit for the NTP in the country. There are around 8 to 12 basic management units (BMUs) in a district. A quarterly report is prepared in each district, based on the reporting from all BMUs in the district. This report is entered into a Microsoft *Excel* spreadsheet, containing the data of the public and private sector BMUs. These reports are then compiled at provincial level and finally at national level. We used the spreadsheet of all districts to collect data of all BMUs.

Public and private sector data from 2004–09 were collected and analysed to estimate the contribution all private care providers. The data for 2008 and 2009 were analysed in more detail to include rates of case finding for 2008 and 2009 and treatment outcome for 2008. The data of the public and private sector BMUs were analysed on the basis of the following 6 PPM models:

- NGO model: included both NGOs with and without health outlets.
- Hospital-based model: including large private hospitals and private tertiary care hospitals.
- Franchise social marketing model: a franchise network of Green Star social marketing GPs.
- District-led model: implemented through the district health system by involving GPs.
- Parastatal model: included social security, army and other semi-governmental hospitals.
- GPs pilot projects: supported by NGOs.

Data analysis

The data were entered and analysed in *SPSS*, version 17. The chi-squared test was used to compare the 2008 and 2009 data of various models. Multivariate analysis was done through the regression method, to see the outcome of various models.

Results

The number of TB cases notified through the private sector increased significantly from 77 cases in 2004 to 19 456 cases in 2009. The private sector contribution for notification all types of TB cases increased from 0.1% to 14.1% (Table 1). The private sector contribution to case notification was generally lower for all types of TB cases than for sputum smear-positive (SS+) cases only. During 2009, for example, the private sector notified significantly fewer of all type TB cases (14.1%) than of SS+ cases (19.1%) (OR = 0.69; 95% CI: 0.68–0.70).

Among the 6 PPM models, the NGO model yielded the greatest number of cases (Table 2). Out of the total 20 565 SS+ cases notified in the private sector in 2008, 9585 (46.6%) were contributed by the NGO model. This was higher in 2009 and out of the total 19 456 SS+ TB cases, 11 346 (58.3%) were contributed by the NGO model. The contribution of the NGOs with health outlets was greater than the contribution of the NGOs without health outlets. In 2008, out of total 9585 NGO cases, 7369 (76.9%) were diagnosed by

the largest NGO, the Pakistan Anti-TB Association, which has health outlets. In 2009, out of total 11 346 NGO cases, 9045 (79.7%) were diagnosed by the Pakistan Anti-TB Association.

The hospital-based model and franchise social marketing model also contributed substantially to the national data in 2009 (18.9% and 15.2% respectively). The contribution of the district-led model was only 982 SS+ TB cases (5.0%). Compared with 2008, a significantly higher number of cases were notified through the NGO and district-led models ($P < 0.005$). The yield of other models was significantly reduced (Table 2). The main source of cases was the Gulab Devi hospital, a large private tertiary care hospital in Lahore: 4171 cases were diagnosed there in 2008 and 3031 cases were successfully treated; 832 cases (20.0%) defaulted.

Table 3 shows that treatment success was highest for the district-led PPM model (94.1%), followed by the parastatal model (88.9%), franchise social marketing model (88.0%) and NGO model (87.2%). The outcome was lowest for the hospital-based model (74.2%).

Multivariate analysis showed that the treatment success rate of the district-led model was significantly higher than the other models. The outcome was better for the hospital-based model (OR = 0.18; 95% CI: 0.13–0.26), followed by the NGO model (OR = 0.43; 95% CI: 0.30–0.61), social marketing model (OR = 0.47; 95% CI: 0.32–0.66) and parastatal model (OR = 0.50; 95% CI: 0.27–0.93) (Table 3).

Discussion

TB case notification in Pakistan has rapidly increased in the past few years due to the involvement of various private sector providers in the NTP. The number of TB cases notified through the private sector increased from 77 in 2004 to 19 456 in 2009. It is evident from the data that the contribution of the NGOs was significantly higher than the other intervention models. Out of total 19 456 SS+ TB cases in 2009 more than half (58.3%) were diagnosed through NGO outlets. The Pakistan Anti-TB Association was the main contributor to this rise. NGOs are also providing TB services in neighbouring countries

Table 1 Public and private sector contribution to case notification of sputum smear-positive (SS+) and all types of tuberculosis (TB) cases from Pakistan national data

Year	National data		Public sector		Private sector	
	No. of cases	No. of cases	%	No. of cases	%	
SS+ TB cases						
2004	31 557	31 480	99.8	77	0.2	
2005	48 220	45 794	95.0	2 426	5.0	
2006	65 711	45 229	68.8	20 482	31.2	
2007	88 747	65 779	74.1	22 968	25.9	
2008	100 103	79 538	79.5	20 565	20.5	
2009	101 887	82 431	80.9	19 456	19.1	
All TB cases						
2004	97 245	97 131	99.9	114	0.1	
2005	144 771	138 985	96.0	5 786	4.0	
2006	179 780	147 217	81.9	32 563	18.1	
2007	234 100	192 891	82.4	41 209	17.6	
2008	248 684	217 463	87.4	31 221	12.6	
2009	267 451	229 795	85.9	37 656	14.1	

Table 2 Public-private mix models contribution to case notification of all types of tuberculosis cases in Pakistan during 2008 and 2009

Model	Year				Multivariate analysis OR (95% CI)
	2008		2009		
	No. of cases	%	No. of cases	%	
NGO model	9 585	46.6	11 346	58.3	1.26 (1.23–1.28)
Hospital-based model	4 664	22.7	3 675	18.9	0.90 (0.88–0.74)
Franchise social marketing model	5 605	27.3	2 967	15.2	0.73 (0.71–0.74)
District-led model	557	2.7	982	5.0	1.43 (1.34–1.53)
Parastatal model	153	0.7	51	0.3	0.68 (0.63–0.74)
GP pilot projects	0	0.0	435	2.2	0 –
Total	20 564		19 456		

NGO = nongovernmental organization; GP = general practitioner; OR = odds ratio; CI = confidence interval.

[8]. These NGOs sometimes use public sector outlets as well mixed models [7]. The success can be linked to the fact that many NGOs were supported in the provision of TB services in round 3 of the Global Fund mechanisms.

Although the hospital-based model contributed to notification of 18.9% of TB cases, the main contribution was from one hospital—the Gulab Devi, a large private tertiary care hospital for specialized TB care situated in an urban town in Lahore district. Other hospitals in this group did not make a major contribution to the data. There are more than 50 tertiary care and teaching hospitals in the country, which could in theory yield far more cases than that of the NGOs. Although some of these hospitals are involved in TB case delivery, the number of cases reported was very low.

The franchise social marketing model yielded around 3000 SS+ TB cases during 2009, which was 15.2%

of the total case notification in the private sector. Keeping in mind the 1000 GPs involved, the contribution seems to be good, i.e. 3 cases per GP in a year. However, the results reiterate the need to involve more GPs to improve coverage and detect more cases. Currently around 100 000 GPs are working in Pakistan and only 1% are working with the NTP.

The district-led model, although started in 2006, did not make a major contribution to the total number of TB cases handled in 2009 (5.0% of the total). This presumably reflects operational issues due to the fact that the model could only be implemented in 9 districts. The same was true for the parastatal model in which the contribution was only 0.3% of cases, and can be explained by the involvement of very few parastatal hospitals.

Interestingly, the contribution of the private sector overall increased rapidly

from 2004 to 2006 and then remained static or decreased in some cases. This can be linked to funding opportunities. The number of cases notified increased rapidly during the period of the Global Fund round 2 and round 3 support and then become either static or decreased. The analysis of the various models showed that the number of cases increased significantly between 2008 and 2009 only in the NGO and district-led models. In all other models, the number of cases notified decreased. This may be an illustration of sustainability issues across the different models. NGO and district-led models are self-sustaining, reflected in an increasing number of cases, while the yield of other models decreased after cessation of funding. Another important finding was the high private sector contribution to the detection of smear-positive cases compared with all types of TB cases. This phenomenon was presumably again related

Table 3 Comparison of various public-private mix models to treatment success of tuberculosis cases during 2008

Model	Treatment success				Multivariate analysis OR (95% CI)
	Yes		No		
	No. of cases	%	No. of cases	%	
NGO model	8 361	87.2	1 224	12.8	0.43 (0.30–0.61)
Hospital-based model	3 461	74.2	1 204	25.8	0.18 (0.13–0.26)
Franchise social marketing model	4 933	88.0	672	12.0	0.47 (0.32–0.66)
District-led model	524	94.1	33	5.9	Ref
Parastatal model	136	88.9	17	11.1	0.50 (0.27–0.93)

NGO = nongovernmental organization; OR = odds ratio; CI = confidence interval.

to the Global Fund funding, in which the target was mainly SS+ TB cases. Studies show that there is still a need for greater involvement of the private sector in the NTP and that more proactive approaches are required from the programme [9].

The outcome of TB treatment is very important to ensure treatment completion and avoid default. If patients do not complete treatment there is a risk of death or the development of drug-resistant TB. Treatment success rates were generally high for all models (> 87%), except for the hospital-based model (74.2%). The multivariate analysis of the outcome according to various models showed that the treatment success rate of the district-led model (94.1%) was significantly higher than the other models. This illustrates the strength of DOTS and provides some evidence for the role of treatment supporters. The district-led model is operated through the district health authority and lady health workers are involved in DOTS treatment, whereas in the other models treatment support is generally lacking. The outcome was therefore lowest for the hospital-based model (OR = 0.18), followed by the NGO model (OR = 0.43), social marketing model (OR = 0.47) and parastatal model (OR = 0.50). As mentioned earlier, the hospital-based model yielded cases mainly through one hospital, the Gulab Devi hospital. The default rate of Gulab Devi alone was around 20%. Although the default rate of the Gulab Devi hospital

has decreased significantly in the past few years (49% in 2006 versus 19% in 2008) [NTP data, Pakistan Ministry of Health], it is important to reduce this rate of default. The high default rate in the Gulab Devi and other large hospitals can be explained by the lack of use of DOTS. In addition, patients come from remote areas and usually do not come again once their condition improves after a few months of treatment. Our study also supported previous studies showing that the private sector not only contributed to case finding, but also maintain good treatment outcomes [10–12].

Patients presenting to the private sector in many developing countries come from a low socioeconomic background. A study in India concluded that patients treated under the revised NTP through a PPM approach were predominantly poor and that many of them experienced considerable health expenditure before starting treatment [13]. Another study concluded that the PPM approach on a large scale in an urban setting can be cost-effective, and considerably reduces the financial burden of TB for patients [14]. It is therefore important to develop sustainable approaches for involvement of the various private providers.

Our study had some limitations. First, the analysis was based on reporting the number of cases from those NGOs, GPs and hospitals involved with the NTP. It did not comprise a random sample from each model. Therefore

the findings may not be generalized. Secondly, this was a quantitative assessment of the various models. A qualitative component to the study may strengthen the evidence. Finally, the study only focused on drug-sensitive TB. The PPM is a good approach for drug-resistant TB as well [15,16]. So there is a need to carry out a large-scale study on the various components of the TB programmes according to strengths and weaknesses of the private sector in the various components of the Stop TB strategy.

Conclusions

The private sector has made a significant contribution to the national TB case notification data in Pakistan and various PPM models are being implemented in the country. Most of the TB cases found in the private sector are being notified through the NGO model. The cases reported through the NGO and district-led models increased between 2008 and 2009, while the number of cases was reduced in other models. There is a still huge potential in the private sector, particularly in the large teaching and tertiary care hospitals, to manage more TB cases. Treatment outcome was good for all models except the hospital-based model. There is a need to assess the sustainability, efficacy and cost-effectiveness of various implementation models through large-scale qualitative and quantitative studies.

References

1. *Global tuberculosis control 2010*. Geneva, World Health Organization, 2010.
2. Involving private practitioners. In: *Tuberculosis control: issues, interventions, and emerging policy framework*. Geneva, World Health Organization, 2001 (WHO/CDS/TB/2001.285).
3. Uplekar M. Involving private health care providers in delivery of TB care: global strategy. *Tuberculosis*, 2003, 83:156–164.
4. Sadiq H, Mynck A. Health care seeking behavior of pulmonary tuberculosis patients visiting TB Center Rawalpindi. *Journal of the Pakistan Medical Association*, 2001, 51:10–16.
5. Khan M et al. Improvement of tuberculosis case detection and reduction of discrepancies between men and women by simple sputum-submission instructions: a pragmatic randomised controlled trial. *Lancet*, 2007, 369:1955–1960.
6. Marsh D et al. Front-line management of pulmonary tuberculosis: an analysis of tuberculosis and treatment practices in urban Sindh, Pakistan. *Tubercle and Lung Disease*, 1996, 77:86–92.
7. Baloch N, Gillan M. *Public-private partnership models, and operational and monitoring and evaluation guidelines for TB DOTS*. Islamabad, Technical Assistance Management Agency, 2006.
8. Kane S et al. Large-scale public-private partnership for improving TB-HIV services for high-risk groups in India. *International Journal of Tuberculosis and Lung Disease*, 2010, 14:1066–1068.

9. De Costa A et al. PPM: 'public-private' or 'private-public' mix? The case of Ujjain District, India. *International Journal of Tuberculosis and Lung Disease*, 2008, 12:1333-1335.
10. Murthy KJ et al. Public-private partnership in tuberculosis control: experience in Hyderabad, India. *International Journal of Tuberculosis and Lung Disease*, 2001, 5:354-359.
11. Newell JN et al. Control of tuberculosis in an urban setting in Nepal: public-private partnership. *Bulletin of the World Health Organization*, 2004, 82:92-98.
12. Dewan PK et al. Improving tuberculosis control through public-private collaboration in India: literature review. *British Medical Journal*, 2006, 332:574-578.
13. Pantoja A et al. Economic evaluation of public-private mix for tuberculosis care and control, India. Part I. Socio-economic profile and costs among tuberculosis patients. *International Journal of Tuberculosis and Lung Disease*, 2009, 13:698-704.
14. Pantoja A et al. Economic evaluation of public-private mix for tuberculosis care and control, India. Part II. Cost and cost-effectiveness. *International Journal of Tuberculosis and Lung Disease*, 2009, 13:705-712.
15. Lönnroth K. *A PPM approach to scaling up programmatic management of drug-resistant TB—lessons from the Philippines* [mission report]. Geneva, World Health Organization, 2008.
16. Lönnroth K. *Assessment of involvement of private health care providers in the programmatic management of drug resistance tuberculosis in Bangladesh*. Dhaka, World Health Organization, County Office for Bangladesh, 2009.

World TB Day: 24 March 2013

World TB Day is an opportunity to raise awareness about the burden of tuberculosis (TB) worldwide and the status of TB prevention and control efforts. It is also an opportunity to mobilize political and social commitment for further progress.

Progress towards global targets for reductions in TB cases and deaths in recent years has been impressive. But the global burden remains huge and significant challenges persist:

- in 2011, there were an estimated 8.7 million new cases of TB and 1.4 million people died from TB;
- over 95% of TB deaths occur in low- and middle-income countries. Poor communities and vulnerable groups are most affected, but this airborne disease is a risk to all;
- TB is among the top three causes of death for women aged 15 to 44;
- there were an estimated 0.5 million cases and 64 000 deaths among children in 2011;
- there is slow progress in tackling multi-drug resistant TB (MDR-TB): with 60 000 patients enrolled in treatment by end 2011 – this is only one in five of the notified TB patients estimated to have MDR-TB;
- provision of antiretroviral therapy (ART) for TB patients known to be living with HIV needs to double to meet WHO's recommendation that all TB patients living with HIV promptly receive ART; and
- the African and European regions are not on track to meet the target of halving deaths from TB between 1990 and 2015.

Source: WHO media centre (http://www.who.int/mediacentre/events/annual/world_tb_day/en/index.html)