

**Management of TB in the private sector in Khartoum, Sudan:  
quality and impact on TB control**

Etilib H A<sup>1</sup>, Hameed N A<sup>2</sup>, Munim A<sup>3</sup>, Abdel Rahman E<sup>4</sup> Bassili A<sup>5</sup>

**Abstract:**

**Introduction**

Sudan has a large and growing private health sector. No survey was done in Sudan to show the extent of the use of private health care services by the population. Also precise data on tuberculosis (TB) diagnosis and treatment in the private sector are not available.

**Material and methods**

A facility-based cross-sectional survey was carried out during February 2007-June 2007 in Khartoum state, whereby consented private physicians working in the all private clinics (n=110) were interviewed.

**Results**

This study showed that a large private sector exist in the country and deliver care to TB patients and reported the non-adherence of this sector to National Tuberculosis Program (NTP) guidelines. 59.1% of the interviewed physicians correctly mentioned the TB treatment regimens, only 8(12.3%) physicians that reported management of TB patients actually prescribed these regimens to their patients. Similarly, only 10(15.4%) physicians requested sputum smear examination for TB diagnosis.

**Conclusion**

A considerable proportion of cases is inadequately managed by the private sector and is not notified to NTP. The information delivered by this study can be used to develop a workable Public-private mix (PPM) model with the private sector.

**Key words:** Isoniazid, Rifampicin, Pyrazinamide, Ethambutol.

**T**uberculosis (TB) is a major cause of illness and death worldwide, especially in Asia and Africa. Globally, 9.2 million new cases and 1.7 million deaths from TB occurred in 2006, of which 0.7 million cases and 0.2 million deaths were in HIV-positive people<sup>1</sup>. The Stop TB Strategy is the WHO recommended approach to reducing the burden of TB in line with the global targets. Globally, the rate of case detection for new smear-positive cases reached 61% in 2006

1. Chest physician, Sudan National TB control programme, Khartoum, Sudan

2. Sudan Federal Ministry of Health.

3. World Health Organization, Khartoum, Sudan

4. Sudan Federal Ministry of Health.

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

correspondence: e-mail: [hieltilib@yahoo.com](mailto:hieltilib@yahoo.com) Tel : (+249) 0912350387- 0918308198

(compared with the target of at least 70%) and the treatment success rate improved to 84.7% in 2005, just below the target of 85%<sup>1</sup>. Public-private mix (PPM) has been defined by WHO as a strategy that link all healthcare entities within the private and public sectors to national tuberculosis programs for expansion of DOTS activities<sup>2</sup>. Published reports of PPM projects indicate that the approach is feasible and effective, but previous evaluations are largely limited to local and individual experiences<sup>3-6</sup>. India has the largest collection of such experiences of PPM, few of which have been reported<sup>7-10</sup>.

Private health care plays a central role in health-care provision in many developing countries that are burdened by TB and is often preferred by patients. For example, 79% of first-line health care in Pakistan is provided

by private practitioners (PP), and in India 60-80% of out-patient health care is provided on a private basis<sup>11-14</sup>.

Most Private Practitioners are currently poorly regulated<sup>15-18</sup>. It is therefore timely to focus on the impact that PPM DOTS can have for those who are known to bear the highest burden of TB morbidity and mortality: the poor and vulnerable.

Sudan carries 8-11% of the TB burden in the Eastern Mediterranean Region (EMR), and is second to Pakistan in terms of the number of TB patients. In 2006, the estimated incidence of new smear-positive TB cases was 108 per 100,000 inhabitants, translating to almost 41,000 new smear-positive cases. Prevalence of all forms of TB is 419 per 100,000 population or 158,000 cases<sup>1</sup>.

In 2006, out of estimated 40,683 total smear positive cases, only about 12,194 were notified to the Sudan National Tuberculosis Program (SNTTP); a case detection rate of 30% that is far below the global target of 70%<sup>1</sup>.

At the same time, a treatment success rate of 82% was achieved among the small proportion detected<sup>2</sup>.

Sudan has a large and growing private health sector. No survey was done in Sudan to show the extent of the use of private health care services by the population. Also precise data on TB diagnosis and treatment in the private sector are not available.

This study aimed at mapping the private health care services in Sudan, and evaluate the adherence of private health care providers to NTP guidelines in the diagnosis and treatment of TB patients in a representative sample of health care facilities in Khartoum State. It also aimed at estimating the size of TB patients managed in the private sector and to use this information to obtain a rough estimate for the case detection rate.

## Material and methods

### Study design and setting

Khartoum state is one of the 26 states of Sudan. It is the political and commercial centre of Sudan.

There are 1171 clinics in Khartoum State, Khartoum state has seven localities, and of

these 110 clinics were eligible to the study (i.e. providing care to chest symptomatic individuals such as Chest, General Practice, Internal Medicine, Infectious Diseases).

A facility-based cross-sectional survey was carried out during February-June 2007 in Khartoum state, whereby consented private physicians working in all the eligible private clinics (n=110) were interviewed using a structured and pre-tested questionnaire including information on the extent of management of TB patients in their clinics and the adherence to NTP guidelines. Eligible physicians were those who deliver care to chest symptomatic patients, working in the clinic for 3 months or more. Mapping of all private healthcare facilities in the country was also done.

### Study definitions

- Adherence to treatment regimens was defined as prescribing any of the following regimens:
  - The NTP recommended eight-month regimens 2HRZS/6HE for Category one [CATI] (new cases)
  - 2HRZES/1HRZE/5HRE\* for CATII (previously treated cases)
- The case detection rate is defined as the percentage of notified cases out of all estimated cases in the country.

### Data management and analysis

Data were entered on SPSS version 11. Chi-square test was used to compare between proportions. 2-sided student *t* test was used and the 0.05 level of significance was used.

### Ethical considerations

The study obtained ethical clearance from the ethics committee of the Federal Ministry of Health. Informed consent was taken from the participating health workers.

## Results

The distribution of private health care facilities in Sudan shows that between 51% and 71% of clinics and hospitals, and around half of the private laboratories and private pharmacies and X-Ray units exist in Khartoum and the rest in the other states (Table 1).

A total of 1171 health care providers were mapped in Khartoum during 2007: around two-thirds deliver cares to chest symptomatic patients, one third are general practitioners and only 2.7% are chest physicians (Table 2). A total of 110 clinics were surveyed in Khartoum during the period February 2007 to June 2007.

Of these, 65(59.1%) were opening during the afternoon period, 43(39.1%) during morning and afternoon, and two during morning hours only. 74(67.3%) clinics reported treating TB patients during the study period: 20(18.2%) reported more than five cases and the rest between 1-4 cases.

Table 1. Distribution of the private health care facilities in North Sudan, 2006

State	Hospital& HC No. (%).	Specialist clinic No. (%).	GP clinic No. (%)	Private labs No (%)	Private pharmacy No. (%)	Public pharmacy No. (%).	X-ray units No. (%)
Khartoum	162(70.7)	684(67.5)	392(51.0)	447(45.4)	824(54.8)	25(18.0)	33(46.5)
Gezira	36(15.7)	80(7.9)	97(12.6)	162(16.5)	189(12.6)	15(10.8)	8(11.3)
West Nile	1(0.4)	34(3.4)	6(0.8)	56(5.7)	34 (2.3)	13(9.4)	4(5.6)
Blue. Nile	2(0.9)	12(1.2)	14(1.8)	21(2.1)	16(1.1)	2(1.4)	0(0.0)
Sinnar	4(1.7)	17(1.7)	23(3.0)	33(3.4)	42(2.8)	4(2.9)	2(2.8)
River Nile	8(3.5)	27(2.7)	18(2.3)	30(3.0)	35(2.3)	12(8.6)	6(8.5)
Northern	2(0.9)	23(2.3)	8(1.0)	22(2.2)	27(1.8)	2(1.4)	2(2.8)
Kassala	3(1.3)	10(1.0)	43(5.6)	27(2.7)	61(4.1)	7(5.0)	2(2.8)
Gedarif	2(0.9)	27(2.7)	31(4.0)	18(1.8)	38(2.5)	6(4.3)	2(2.8)
Red Sea	2(0.9)	15(1.5)	10(1.3)	31(3.2)	46(3.1)	22(15.8)	1(1.4)
N.Kordofan	1(0.4)	43(4.2)	63(8.2)	55(5.6)	85(5.6)	8(5.8)	4(5.6)
S.Kordofan	0(0.0)	6(0.6)	6(0.8)	28(2.8)	18(1.2)	5(3.6)	1(1.4)
N. Darfur	1(0.4)	17(1.7)	14(1.8)	26(2.6)	22(1.5)	9(6.5)	4(5.6)
S. Darfur	3(1.3)	14(1.4)	26(3.4)	9(0.9)	40(2.7)	3(2.2)	2(2.8)
W. Darfur	1(0.4)	4(1.7)	4(0.5)	6(0.6)	13(0.9)	5(3.6)	0(0.0)
Upper Nile	1(0.4)	0(0.0)	13(1.7)	13(1.3)	15(1.0)	1(0.7)	0(0.0)
Total	229(100)	1013(100)	768(100)	984(100)	1505(100)	139(100)	71(100)

HC= Health Centers, GP= General Practitioner

(Annual Health Statistical Report 2006, National Health Information Centre, FMOH)

Table 2. Mapping of private health care facilities in Khartoum, 2007

Specialty	Khartoum	Bahry	Omdurman	Total	%
General Practitioners	123	103	183	409	34.9
Chest Physicians	14	10	8	32	2.7
Medicine	72	21	37	130	11.1
Pediatrics	39	17	23	79	6.7
Community Medicine	5	2	4	11	0.9
Family Medicine	0	1	0	1	0.1
Occupational Medicine	0	1	0	1	0.1
Others	269	82	157	508	43.4
Total	522	237	412	1171	100

Similarly, during the previous quarter before the survey period, 71% of the clinics reported

having registered TB patients for treatment and around one quarter have registered more

than five cases (Table 3). There was no significant difference in the case load during the two periods ( $P>0.05$ ).

Although 59.1% of the interviewed physicians correctly mentioned the TB treatment regimens, only 8(12.3%) physicians prescribed these regimens to their patients. Similarly, only 10(15.4%) physicians requested sputum smear examination for TB diagnosis. However, around two-thirds of physicians followed up their patients during the treatment period (Table 4).

Table 3: Tuberculosis case registered load in the private health care facilities, Khartoum State, 2007

No of TB cases in the clinic	During the survey period N=110(%)	Before the survey period (1/4yr) N 110(%)
1- 5 cases	54(49.1)	50(45.5)
> 5 cases	20(18.2)	28(25.5)
No cases	36(32.7)	32(29.1)

N= No of clinics. Chi-square=1.38, P=0.5

Table 4. Adherence of the private health care providers to NTP guidelines in Khartoum State

Items	Total	No. (%)
Correct knowledge about treatment regimens	110	65(59.1)
Adherence to treatment regimens	65	8(12.3)
Sputum smear examination as the basis of diagnosis	65	10(15.4)
Follow-up during treatment period	65	40(62.0)

Estimation of the total number of TB patients treated by the private sector in Sudan is shown in Table 5 as follows:

- Since the study interviewed the physicians about their management to

TB patients during a 5 month period as well as retrospectively during the preceding quarter, the average number of clinics that delivered care to 1-5 TB patients was 52(47%), and those that registered more than 5 patients were 24(22%);

- Therefore, the minimum number of TB patients during one year (consisting of 3 time periods: study period+ preceding quarter+ the rest of the year) would be 3 per clinic for the clinics that reported managing at least one case, and 18 per clinic for those that reported managing at least 6 cases;
- Since the total number of clinics delivering care to chest symptomatic patients in Khartoum amounts to 663 in 2007, therefore the number of clinics delivering care to at least one TB case would be  $(663 \times 47\% = 312)$ , and the number of those delivering care to at least five TB cases would be  $(663 \times 22\% = 361)$ ;
- Accordingly, the estimated number of TB cases in Khartoum would be:  $312 \times 3 = 935$  (for the clinics treating at least one case) and  $361 \times 18 = 6498$  (for the clinics treating at least six cases);
- Since the number of clinics in Khartoum represent 60% of all clinics in Sudan, therefore, the estimated number of TB cases in North Sudan in 2007 would be:  $935 / 0.6 = 1,558$  (for the clinics treating at least one case) and  $6498 / 0.6 = 10,830$  (for the clinics treating at least six cases). Therefore, the estimated number of TB cases treated in the private sector would be at least:  $1,558 + 10,830 = 12,388$  during 2007.

Table 5. Estimating the number of TB cases detected by the private sector during 2007

**Discussion**

This study showed that a large private sector that exists in the country and delivers care to TB patients does not adhere to NTP guidelines.

This was consistent with previous reports from developing countries<sup>19</sup>. Although 59.1% had adequate knowledge regarding the TB treatment protocol and guidelines, only 12.3% prescribed the recommended regimens for their patients and

15.4% requested sputum examination for TB diagnosis. This was consistent with reports from other developing countries<sup>16</sup>. The patients treated in the private healthcare facilities obtain their drugs from the private pharmacies.

Table 5. Estimating the number of TB cases detected by the private sector during 2007

Number of TB cases registered in the clinic	During 8 month period		Minimum number of cases detected in one year (study period+ previous quarter+ the rest of the year)	Number of private facilities delivering care to chest symptomatic patients in Khartoum (total =663)	Estimated number of cases detected in the private facilities delivering care to chest symptomatic patients in Khartoum	Estimated number of cases detected in the private facilities in North Sudan
	No.	%				
1- 5 cases registered	52	47	=1cases X 3 time periods=3	Assuming 47% register from 1-5 TB cases = $663 \times 0.47 = 312$	= $312 \times 3 = 935$	As 60% of the private facilities exist in Khartoum, the total estimated number in N Sudan will be= $935 / 0.6 = 1,558$
More than 5 cases registered	24	22	6X3 time periods=18	Assuming 47% register >5 TB cases = $663 \times 0.22 = 361$	$361 \times 18 = 6498$	$6498 / 0.6 = 10,830$
						Total estimated=12,388

The “Main Drugs Company” provides Rifina (300mg Rifampicin+150 mg Isoniazid) to the private pharmacies. According to their data, four million tablets of Rifina were dispensed in the private market during the period January 2004 to April 2006. This may indicate that a considerable proportion of TB cases are managed in the private sector. This situation constitute an economic burden to TB patients, and from the discussion with the private physicians, poverty is one of major causes of interruption of treatment when the patients feel better. Nevertheless, around two-

thirds of the doctors arrange for follow up for their patients, which is not free of charge. Almost all of the physicians refuse the idea of free follow up of patients as they have many expenses to run their clinics, and almost all of them stated that no patient was followed up till the end of the treatment (personal communication with doctors during the interview). This is also consistent with reports from other developing countries<sup>20, 21</sup>. By extrapolating the number of cases treated in the surveyed clinics to the North Sudan, a minimum estimate of 12,388 TB cases would

be treated in the private clinics in one year period, apart from those managed by traditional healers and public non-NTP sector. These cases were not routinely notified by their physicians and the number that reached the NTP to obtain free treatment was not investigated in this study. These results suggest that a considerable proportion of cases are managed outside the national TB control program, and that they are not adequately managed according to the NTP guidelines. According to a community based survey on the use of health services by the community in Sudan<sup>22</sup> around 50% of the community has access to health services. Accordingly, the total number of TB cases notified to the NTP (24,142 cases of all TB forms in 2007) and detected in the private sector (12,388 cases as estimated by the current study); amounting to 36,530 would roughly represent around 50% of cases in North Sudan during 2007. The total number of cases would be therefore cases in North Sudan during 2007, and the case detection rate of all TB forms would be:  $24,142/73,060 = 33\%$  (32.7%-33.3%). These findings validate the low case detection rate of 30% (for all TB forms and smear positive pulmonary TB) reported by WHO in 2006<sup>1</sup>. These results indicate that a considerable proportion of cases are managed in the private sector which is generally not notifying its cases to the NTP. However, the prospects of engaging these providers in PPM initiative are quite high since 60% of the clinics exist in Khartoum, and their number is not huge.

### Conclusions

A considerable proportion of cases is inadequately managed by the private sector and are not notified to NTP. The information delivered by this study can be used to develop a workable PPM model with the private sector. The enabling factors are: the majority of clinics are in Khartoum state and their numbers are relatively limited; the patients cannot afford buying the anti-TB drugs; and the physicians need to keep their follow-up on the patients.

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\* = Two months of Isoniazid ,Rifampicin, Pyrazinamide & Streptomycin / Six months of Ethambutol and Isoniazid (Ethina)

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