Evaluation of outcomes of tuberculosis management in private for profit and private-not-for profit directly observed treatment short course facilities in Lagos State, Nigeria

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INTRODUCTION

The engagement of the private sector in tuberculosis (TB) control was part of the STOP TB strategy launched in 2006 by the World Health Organization (WHO) (adopted by the National TB and Leprosy Control Programme [NTBLCP]) to link all health-care providers within the private and public sector to the National Tuberculosis Programme (NTP) for the implementation of directly observed treatment short course (DOTS) activities.1,2 This was pertinent because private health practitioners provide as much as 60% of the health services in some part of the country.3 Also, they are preferred by many patients in some developing countries like Nigeria because they are more accessible and offered better-personalized care than the public health providers.4,5 However, the private sector have not

ABSTRACT

Background: The engagement of private practitioners in the public-private mix of tuberculosis (TB) management started in 2007 in Lagos State Nigeria. This study compared the treatment outcomes of patients managed at private for profit (PFP) and private not for profit (PNFP) directly observed treatment short course (DOTS) facilities.

Methods: A retrospective review of treatment cards of TB patients managed between January 1, 2012, and June 30, 2012, in seven PFP and four PNFP DOTS facilities that served as treatment and microscopy center under the Lagos State TB and Leprosy Control Programme (LSTBLCP) at least 2 years before data collection was conducted.

Results: A total of 372 treatment cards of TB patients were reviewed, of which 132 (35.5%) and 240 (64.5%) were from PFP and PNFP DOTS facilities, respectively. Treatment success rate was higher among patients managed at PFP (89.4%) DOTS facilities than PNFP (81.3%) DOTS facilities (P = 0.04). The proportion of patients lost to follow-up (12.5% vs. 8.3%), dead (3.3% vs. 1.5%) and treatment failure (2.5% vs. 0.8%) was higher among patients managed at PNFP DOTS facilities (P > 0.05). The odds that patients treated at PFP DOTS facilities had treatment success were about four times higher than PNFP DOTS facilities when other variables have been controlled for (P < 0.05).

Conclusion: There is need by the LSTBLCP to engage more private practitioners to increase case detection and improve treatment outcomes of TB patients.

Key words: Nigeria, private directly observed treatment short course, treatment outcomes, tuberculosis

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leverage on this opportunity because they have failed to provide the rational standardized care they are positioned to deliver. Many private health providers (PHPs) in Nigeria are known to diagnose and treat TB patients inappropriately which has often led to poorer treatment outcomes. Other studies have reported that private providers rarely monitor the effects of TB treatment, maintain clinical records, or notify diseases of public health importance.

In Nigeria, private providers are heterogeneous and may include untrained and informally trained practitioners, private industries and corporations, not for profit faith-based organizations and non-governmental organizations (NGOs). To provide standardized care to patients managed by the private health practitioners, increase case detection and capture TB patients managed by the private practitioners in the database of the state TB program, the STOP TB approach was adopted and the Lagos State TB and Leprosy Control Programme (LSTBLCP) commenced engagement of private practitioners into public-private mix (PPM) for TB management in 2007. This encompasses collaboration between all forms of Public–Private (between the NTP and private sector), Public–Public (between the NTP and Public sector care provider and Private–Private (between an NGO or private hospital and a neighborhood private providers) to provide standard TB care in the country.

Studies from high burden TB countries such as India, Nepal, and Vietnam have shown that involving the private sector in DOTS management of TB was cost-effective, increased case notification, and improved treatment success comparable to the public sector. Reports from Nigeria have also shown that treatment success of patients treated by private practitioners involved in PPM and public DOTS providers were not significantly different. To harness this great potential of the private sector, knowledge of treatment outcomes of the various groups that constitute the PHPs involved in PPM is necessary. This will enable decision makers to make informed decision that will make the collaboration more effective. This study compared the treatment outcomes of patients managed by the private for profit (PFP) and private not for profit (PNFP) DOTS providers and also determined the predictors of treatment success of patients managed by private DOTS providers involved in the PPM mix of LSTBLCP.

**Methods**

**Study design**

A retrospective review of treatment cards of patients managed for pulmonary TB between January 1, 2012, and June 30, 2012 was conducted, to assess treatment outcomes of patients managed by PFP and PNFP DOTS providers.

**Study background**

The study was conducted in Lagos State located in Southwest Nigeria with an estimated population of 21 million. Health care services in Lagos State were provided by the public and private sector. There were 288 public health care facilities (3 tertiary, 35 secondary, and 253 primary health care) and 1981 registered private health-care facilities (1922 PFP and 59 PNFP) in the state in 2012.

The DOTS management of TB commenced in Lagos State in 2003 and in 2007 the PPM mix for TB management commenced. At the end of 2011, the LSTBLCP had 130 TB treatment facilities offering DOTS services. Of these, 99 were public and 31 private health-care facilities (20 PFP and 11 PNFP). Of the 8455 TB patients notified by LSTBLCP in 2012, 10% was contributed by the PFP and PNFP DOTS facilities.

After initial assessment, interested PHPs were trained as per NTBLCP guidelines and enrolled into any of the three schemes for collaboration. Under Scheme one PHP refers patients or send sputum of presumptive TB patients to an NTBLCP approved microscopy center. Under Scheme two known as “Provision of Directly Observed Treatment,” PHP served as DOTS providers to patients. While those enrolled under scheme three either served as microscopy center under NTBLCP (Microscopy Center only) or as both treatment and microscopy center. After training and signing the memoranda of understanding, recording and reporting materials, TB drugs and other consumables were given to the PHP to commence TB services. Smear microscopy, Gene Xpert and drugs were provided to TB patients managed at the PHP under the PPM mix at no cost, but they were required to pay consultation fee, and other laboratory tests such as chest X-ray and erythrocyte sedimentation rate. The duration of treatment was 8 months. The treatment regimen consisted of 2 months intensive phase of rifampicin, isoniazid, pyrazinamide, and ethambutol as fixed dose combination and 6 months continuation phase of Ethambutol and Isoniazid as fixed dose combination.

HIV test was offered to all presumptive TB clients, Determine (determine HIV-1/2 Alere Determine™, Japan 2012) and Uni-Gold™ (Trinity Biotech PLC, Wicklow, Ireland 2013) were used and a concordance result was regarded as positive. However, in discordant cases, STAT-PAK® was used as tie-breaker.

**Coordination of tuberculosis control program**

TB control in the state is coordinated by the LSTBLCP. Each DOTS facility has TB focal person responsible for the day to day running of the facility and ensures that patient’s records are intact. Records of patients in DOTS facility within a local government area (LGA) was collated and sent to the state TB program by the LGA TB supervisors’ quarterly.
Population and sample
From a sampling frame of 31 private DOTS facilities provided by the Lagos State TB program officer, all (11) the DOTS facilities that served as both microscopy and treatment centers and had been involved in DOTS program under the LSTBLCP for at least 2 years before data collection were recruited into the study. Treatment cards of patients enrolled and treated for TB within the first two quarters of 2012 in the selected facilities were reviewed. Socio demographic and other relevant details including the treatment outcomes were assessed. Treatment cards with wrong or incomplete data were not analyzed.

Evaluation of treatment outcome
The treatment outcome was divided into five categories according to the WHO and NTBLCP guidelines.

- Cured was defined as the proportion of patients among smear positive patients that completed treatment and had at least two negative smears with an interval of at least 1 month, one of which should be obtained at the end of treatment
- Treatment completed were the proportion of patients that completed treatment, but sputum examination results were not available at the end of treatment
- Treatment failure was the proportion of patients who remained sputum smear positive at 5 months or more after the start of anti-TB drugs, or who interrupted treatment for more than 2 months after completing 1 month of chemotherapy, returned to treatment and were found to be smear positive
- Defaulter was the proportion of patients that did not take drugs for two consecutive months or more. Transferred out was the proportion recorded that moved out of the health facility catchment area
- Treatment success was defined as the sum of the cases that were cured and that completed treatment.

Data analysis
Data were entered and analyzed using the Statistical Package of Social Sciences (version 19; IBM, Armonk, NY, USA). Percentages, mean and standard deviation of numerical data were calculated. Chi-square was used to compare categorical data. Logistic regression was used to assess predictors of treatment success. All (independent) variables that were significant (P < 0.05) on bivariate analysis were entered at once (enter method) into the regression model as predictor variables at the beginning to assess their predictive ability while controlling for the effect of other variables in the model. Confidence interval was set at 95% for all statistical tests, and statistical tests were considered statistically significant if P < 0.05. Microsoft Excel was used to draw charts.

Ethical approval
Permission to collect data from the private DOTS facilities was gotten from the Lagos State Ministry of Health.

RESULTS
Three hundred and seventy-two treatment cards of TB patients were reviewed out of which 132 (35.5%) and 240 (64.5%) were from the PFP and PNFP DOTS facilities, respectively [Figure 1]. The mean age of patients managed at the PFP and PNFP was respectively 34.1 ± 13.6 and 31.1 ± 11.6 (P < 0.025). A higher proportion of males (55% vs. 42.4%), new cases (92.5% vs. 78.8%), smear positive (82.5% vs. 62.1%), and TB/HIV co-infected patients (12.5% vs. 3.0%) were managed for TB at the PNFP compared with the PFP DOTS facilities (P < 0.05) [Table 1].

Treatment success, default and death rate of patients managed at the private DOTS facilities was respectively

![Figure 1: Proportion of tuberculosis patients managed at the PFP and PNFP directly observed treatment short course facilities. PFP – Private for profit; PNFP – Private not for profit](image)

| Variable          | Type of private DOTS Facilities | Test     | P     |
|-------------------|---------------------------------|----------|-------|
| Age (mean±SD)     | PFP, n=132 (%), PNFP, n=240 (%) |          |       |
| Gender            |                                  |          |       |
| Male              | 34 (26.2)                       | 31 (13%) | 2.250* | 0.025 |
| Female            | 66 (76.6)                       | 212 (87%)| 5.388* | 0.020 |
| Treatment category|                                  |          |       |
| New cases         | 104 (78.8)                      | 222 (92.5)| 14.776*| <0.001|
| Retreatment cases | 28 (21.2)                       | 18 (7.5) |        |       |
| Type of TB        |                                  |          |       |
| Smear positive    | 82 (62.1)                       | 198 (82.5)| 18.399*| <0.001|
| Smear negative    | 59 (37.9)                       | 42 (17.5) |        |       |
| HIV status        |                                  |          |       |
| Negative          | 90 (68.2)                       | 164 (68.3)| 7.64*  | 0.006 |
| Positive          | 4 (3.0)                         | 30 (12.5) |        |       |

*Not included in the analysis, Chi-squared test, Student’s t-test. DOTS – Directly observed treatment short course; SD – Standard deviation; TB – Tuberculosis; PFP – Private for profit; PNFP – Private not for profit.
Table 2: Treatment outcomes at the different directly observed treatment short course facilities

| Treatment outcomes | Total, n=372 (%) | PFP, n=132 (%) | PNFP, n=240 (%) | χ² | P |
|--------------------|-----------------|---------------|-----------------|-----|---|
| Cure               | 350 (94.3)      | 28 (21.2)     | 322 (55.8)      | 31.05 | <0.001 |
| Treatment completed| 163 (43.8)      | 90 (68.2)     | 73 (30.4)       | 49.36 | <0.001 |
| Default            | 43 (11.8)       | 12 (8.3)      | 30 (15.2)       | 1.51  | 0.220 |
| Died               | 10 (2.7)        | 2 (1.5)       | 8 (3.3)         | 1.08  | 0.505** |
| Failure            | 7 (1.9)         | 1 (0.8)       | 6 (2.5)         | 1.40  | 0.420** |
| Transferred out    | 1 (0.3)         | 0             | 1 (0.4)         | 0.55  | 1.000** |
| Treatment success  | 313 (84.1)      | 118 (89.4)    | 195 (81.3)      | 4.23  | 0.040 |

*Fisher’s exact test. PFP – Private for profit; PNFP – Private not for profit

Table 3: Factors associated with treatment success in private directly observed treatment short course facilities

| Variables | Treatment success | χ² | P |
|-----------|-------------------|-----|---|
| Yes, n=313 (%) | No, n=59 (%) |

| Age group (years) | 30 | ≥30 | | 30 | ≥30 | | 30 | ≥30 |
|-------------------|----|-----|---|----|-----|---|----|-----|
| Yes               | 144 (79.1) | 38 (20.9) | 6.726 | 0.010 |
| No                | 169 (88.9) | 21 (11.1) | 0.113 | 0.737 |
| Gender            | Male | Female | | Male | Female | | Male | Female |
| Yes               | 157 (83.5) | 31 (16.5) | 0.312 | 0.576 |
| No                | 156 (84.8) | 28 (15.2) | 0.955 | 0.002 |
| Type of TB        | Smear positive | Smear negative | | Smear positive | Smear negative | | Smear positive | Smear negative |
| Yes               | 226 (80.7) | 54 (19.3) | 4.233 | 0.040 |
| No                | 87 (94.5) | 5 (5.4) | 0.550 | 0.430** |
| Type of DOTS facility | PFP | PNFP | | PFP | PNFP | | PFP | PNFP |
| Yes               | 118 (89.4) | 14 (10.6) | 4.233 | 0.040 |
| No                | 195 (82.3) | 45 (17.7) | 0.550 | 0.430** |

*Fisher’s exact test. TB – Tuberculosis; PFP – Private for profit; PNFP – Private not for profit; DOTS – Directly observed treatment short course facility

Table 4: Predictors of treatment success at private directly observed treatment short course facilities

| Variable | χ² | OR* | 95% CI |
|----------|----|-----|--------|
| ≥30 years | 4.01 | 1.011 | 0.985-1.037 |
| <30 years | 1 | 1 | |
| Smear negative | 1.58 | 1.604 | 0.832-3.091 |
| Smear positive | | | |
| Treatment at PFP DOTS facility | 0.007 | 3.733 | 1.430-9.750 |
| Treatment at PNFP DOTS facility | | | |

*Adjusted OR. OR = Odds ratio; CI = Confidence interval; PFP – Private for profit; PNFP – Private not for profit; DOTS – Directly observed treatment short course facility

84.1%, 11%, and 2.7% [Table 2]. However, the treatment success rate was significantly higher among TB patients managed at the PFP (89.4%) DOTS facilities compared with those managed at the PNFP (81.3%) DOTS facilities (P = 0.04). The proportion of patients lost to follow-up (12.5% vs. 8.3%), dead (3.3% vs. 1.5%), and those with treatment failure (2.5% vs. 0.8%) was higher among TB patients managed at the PNFP DOTS facilities (P > 0.05) [Table 2].

The age, smear status, and type of private DOTS facility where TB patients were managed were associated with treatment success. A significantly higher proportion of patients aged 30 years and above (88.9% vs. 79.1%), managed at the PFP DOTS facilities (89.4% vs. 81.3%), and smear-negative patients (94% vs. 80.7%) had treatment success compared with patients below 30 years of age, managed at PNFP DOTS facilities and smear-positive patients (P < 0.05) [Table 3]. Patients managed at the PFP DOTS facilities had about four-fold chance (odds ratio 3.73, 95% confidence interval [CI] 1.430–9.750) of having treatment success than those managed at the PNFP DOTS facilities [Table 4].

DISCUSSION

TB is still a major public health issue in Nigeria and predisposing factors such as poor hygiene, housing, nutrition, and poverty influences treatment outcome. The treatment success of patients managed at the private DOTS provider in this study was 84.1% which was similar to what was reported in studies from Nigeria among private DOTS providers, but lower than 90.9% reported from Ethiopia. The higher national treatment success rate for Ethiopia (89%) compared with Nigeria (86%) may be responsible for this finding.

In this study, treatment success was higher among patients managed at PFP DOTS facilities and their odds of having treatment success was about four fold higher than patients managed at PNFP DOTS facilities. A study from Nigeria showed that in places services were provided free-of-charge, the total cost of TB care per household was very high (about 37% of median annual household income). The extra cost of consultation fees and other laboratory tests charged by private DOTS providers may make the cost of services higher than expected especially at the profit driven PFP DOTS facilities. Patients managed at PFP DOTS facilities were probably richer, had better education, nutrition, and knowledge of TB than patients managed at PNFP DOT facilities consequently leading to better treatment outcomes.

In this study, the default, death, and treatment failure rate was higher among patients managed at the PNFP DOTS facilities compared with PFP DOTS facilities. This finding may be because of the difference in the socioeconomic status of patients managed at PFP and PNFP DOTS facilities. In addition, patients that could not afford the fees charged by PFP DOTS providers were probably referred to PNFP DOTS providers for management. Studies from Nigeria and elsewhere have shown that poverty and lack of education...
were associated with default. Another study from Nigeria showed that default from treatment was associated with the death.

Smear status of TB patients was associated with treatment success at private DOTS facilities similar to findings from study from Nigeria which reported that positive sputum smears was associated with treatment failure Smear negative pulmonary TB patient are known to have the lower bacillary burden and minimal pulmonary lesion which would imply that they probably responded to chemotherapy better than smear positive TB patients.

CONCLUSION

The proportion of patients with treatment success at PFP DOTS facilities was higher than PNFP DOTS facilities. There is a need for the LSTBLCP to engage more private practitioners to increase case detection and provide rational standardize treatment to TB patients in Lagos State.

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Conflicts of interest

There are no conflicts of interest.

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