

Original Research Article

Treatment outcomes of tuberculosis patients managed at the public and private DOTS facilities in Lagos Nigeria

Abstract

Setting: Public and private tuberculosis (TB) treatment facilities in Lagos State, Nigeria

Objective: This study compares the treatment outcomes of TB patients managed at the public and private treatment facilities in Lagos Nigeria.

Design: A descriptive comparative cross-sectional study to assess the treatment outcomes of patients managed at public and private treatment facilities in Lagos Nigeria

Results: A total of 470 new smear positive (358 public & 112 private DOTS facilities) TB patients aged 15 years and above were recruited from 23 public and 11 private DOTS facilities. The prevalence of TB/HIV co-infection among patients managed at the public and private DOTS facilities was 10.0% and 10.7% respectively ($P = 0.68$). There was no significant difference in the treatment success and defaulter rates of TB patients managed at the public and private DOTS facilities ($P > 0.05$). Supervision of treatment by a treatment supporter (OR 2.98, 95%CI 1.59 – 5.56) and not interrupting treatment (OR 21.27 95% 8.86 - 51.07) were predictors of treatment success

Conclusion: Treatment outcomes of TB patients treated at the public and private DOTS facilities were comparable. There is need for strategies to effectively track patients lost to follow up.

Key Words:PPM DOTS, Treatment outcomes, TB, Nigeria

Introduction

Health care providers in the private sector have increasingly become a significant part of the health care system providing health care services in many developing countries [1]. The private medical sector varies within and between countries in terms of size, composition, types of

services delivered, level of organization and socio economic groups served [2]. In the last few decades, the private sector has grown considerably in some resource poor settings [3,4] to become an important source of care for the poor even where public services are widely available [5]. These private health care providers (PHPs) outnumber public health care providers and usually were the first point of care by a large proportion of patients seeking care including TB patients. Although they offer better geographical access and more personalized care than the public facilities, they frequently do not often follow the national treatment guidelines for the management of TB patients, hence some of the TB patients they serve are usually deprived of the benefits of standard and rational treatment [1].

To ensure that all patients receive quality assured TB services, the World Health Organization (WHO) as part of the global response to TB control introduced the STOP TB strategy in 2006. One of the core elements of the strategy is the engagement of all care providers in TB control [6]. The public-private mix (PPM) links all healthcare providers within the private and public sectors to the national tuberculosis programme for the implementation of directly observed treatment (DOTS) activities [7]. The involvement of the private providers in the TB case notification and management is expected to increase case detection, reduce diagnostic and treatment delay and also enhance patient's access and acceptance of DOTS treatment. It is expected that this approach will result in reduction in disease transmission, improve treatment outcomes and reduce the workload on the public sector [8]. Published report of public-private mix projects in Asia however has shown that the approach is feasible and effective [9].

Nigeria launched the DOTS strategy for the management of TB in 1993 through the National Tuberculosis and Leprosy Control Programme (NTBLCP) [10]. The targets of the national TB programme are: to detect at least 70% of the estimated smear positive TB cases, to achieve at

least 85% cure rate of the smear positives, to halve by 2015 the prevalence and the mortality due to TB relative to 1990 levels and to eliminate TB as a public health problem by 2050 [10].

So far the National programme has achieved a case detection rate of 43%, treatment success rate of 84% and cure rate of 72% [11]. These achievements still fall below the global targets. However, failure to expand DOTS a service to the private sector has been identified as one of the reasons militating against the attainment of global targets [11]. In order to address the potential of the private sector which constitute about 60% of health service provision in Nigeria [10], the National TB and Leprosy Control Programme (NTBLCP) initiated the systematic engagement of private sector through the public–private mix to ensure effective and efficient delivery of TB services to the general population. Despite the engagement of the private sector in TB management, there has been concern if the treatment outcomes of patients managed at the private and public DOTS facilities are comparable [12]. This study compared the treatment outcomes of TB patients managed at the public and private DOTS facilities in Lagos Nigeria.

Methods

Study background

Lagos state is one of the 36 states in Nigeria and it is the commercial nerve centre of the country. There are 20 Local Government Areas (LGAs), and 37 Local Council Development Area (LCDAs) in the state. A report showed that the current population of Lagos State is about 21million [13]. Health care services in Lagos State were provided by both the public and private sector. In the public sector, services are organized at primary, secondary and tertiary care level. There were 288 public health care facilities (3 tertiary, 35 secondary and 253 primary health care), 1981 private health care facilities (1922 private for profit and 59 private not for profit) as of 2012. Lagos state accounts for 8.4% of the national TB burden. The total TB case notified in

73 2012 was 8455 which represented 11% of the national figure. The TB case detection rate was
74 20.7% and the TB/HIV prevalence was 19.7% in 2012.

75 The Lagos State TBL control programme (LSTBLCP) commenced in 2003 with the
76 collaboration between the State Government and international organization like the International
77 Union against TB and Lung Diseases (IUATLD), World Health Organization (WHO), Canadian
78 International Development Agency (CIDA) and the United States Agency for International
79 Development (USAID). The Lagos state PPM steering committee was inaugurated shortly after
80 the state had a consensus building /stakeholders meeting in 2008. The private health providers
81 (PHP) who were interested in partnering with the LSTBLCP were enlisted for training according
82 to National TB and Leprosy Control guidelines. Based on their capacity and interest, the private
83 health provider (PHP) were assigned to any of the three schemes for collaboration. In Scheme
84 one known as **“referral of patients suspected of having TB”**, the PHP refer patients or send
85 sputum of patients suspected of having TB to a NTBLCP approved treatment/microscopy center.
86 Those engaged under scheme two known as **‘Provision of Directly Observed treatment’**,
87 provide DOTS to patients as per the NTBLCP guidelines. Those under scheme three can either
88 serve as an approved microscopy center under NTBLCP (**Microscopy center only**) or serve both
89 as **treatment and microscopy center**. The PHP were provided with recording and reporting
90 materials, drugs and other consumables to commence TB services in their facilities. At the end of
91 2011, The LSTBLCP had 130 TB treatment facilities offering directly observed treatment short
92 course (DOTS). There were 99 public, 31 private health care facilities (20 PFP and 11 PNFP). Of
93 the 11 PNFP health facilities only 2 participated in TB treatment prior to 2008.

94 The TB patients attending PHP facilities do not pay for anti-TB drugs supplied by the National
95 TB programme but the patient were required to pay for consultation fee. In addition, private for

profit (PFP) facilities that have laboratory services were allowed to charge an agreed fee for sputum AFB. This is because the reagents and consumables for sputum AFB are freely supplied to these facilities by the LSTBLCP. The PHP were also allowed to charge patients for other investigations required by the attending physician such as chest x-ray, ESR, etc especially in smear negative TB patients. The duration of treatment was eight months. The treatment regimen consisted of two months intensive phase of Rifampicin, Isoniazid, Pyrazinamide and Ethambutol as fixed dose combination and six months continuation phase of Rifampicin and Isoniazid as fixed dose combination.

Study design

A descriptive comparative cross sectional study was conducted to evaluate treatment outcomes of TB patients managed at the public and private DOTS facilities in Lagos state. A sampling frame of 130 DOTS facilities provided by the Lagos state programme officer (99 public and 31 private DOTS facilities) was used to select, 34 DOTS facilities (23 from public and 11 private) that served as both microscopy and treatment centers and were involved in the DOTS programme for at least 2 years. Using the sample size formula for comparing proportions, statistical power of 95%, cure rates of 87% (public DOTS facilities) and 60.9% (private DOTS facilities) from previous studies [14,15] and attrition rate of 25%, a sample size of 100 was obtained for each group. All consenting new smear positive TB patients aged 15 years and above were consecutively recruited between October 1 to December 31 2012 from the selected public and private DOTS facilities respectively.

On recruitment into the study, a semi structured questionnaire was administered on all the patients after written informed consent was obtained. The weight, sputum and HIV test results were recorded at baseline, before patients were commenced on eight months anti-TB regimen.

119 The decision to have treatment supervised either by the health worker at the DOTS facilities or
 120 treatment supporter was made by the patients. For patients with no treatment supporter, drug use
 121 was directly observed during the intensive phase by a health worker, however during the
 122 continuation phase; patients were given one month appointment. For patients with treatment
 123 supporter, drugs were given to cover for two weeks to the patient or the treatment supporter who
 124 supervised the treatment at home and charted the drug intake on a card which was presented with
 125 empty drug blisters before drug refill.

126 Health facility record of the patient was updated from the treatment supporter card. Sputum AFB
 127 test results and weight measurements done at the second, fifth and seventh month of treatment by
 128 health workers were recorded on a treatment monitoring form. The treatment outcomes of TB
 129 patients managed at the public and private DOTS facilities were compared after the completion
 130 of treatment.

131 **Evaluation of treatment outcome**

132 The treatment outcome was divided into six categories according to the WHO and NTBLCP
 133 guidelines [16].

- 134 • Cured: Defined as the number of patients among smear positive patients that complete
 135 treatment and had at least two negative smears with an interval of at least one month, one
 136 of which should be obtained at the end of treatment.
- 137 • Treatment completed: This is the number of patients that complete treatment but sputum
 138 examination results are not available.
- 139 • Treatment failure: This is the number of patients who are still sputum smear positive

at five months or more after the start of chemotherapy, or who interrupted treatment for more than 2 months after completing one month of chemotherapy, returned to treatment and are found to be smear positive.

- Defaulter: This is the number of patients that did not take drugs for two consecutive months or more.
- Transferred out. This is the number recorded that moved out of the health facility catchment area.
- Treatment success. Defined as the sum of the cases that were cured and that completed treatment.

Data Analysis

Data was analysed using the Statistical Package for Social Sciences (SPSS) version 19. Mean and standard deviation were calculated for numerical data while percentages were calculated for both numerical and categorical data. Chi square was used to compare categorical data. Logistic regression was used to assess predictors of treatment success. Variables significantly associated with treatment success on bivariate analysis were entered at once into the regression model as predictors. The confidence interval was set at 95% for all statistical tests.

Ethical approval

The study was approved by the Health Research Ethics Committee of the Lagos State University Teaching Hospital. Written Informed consent was obtained from all respondents before recruitment into the study.

Results

Four hundred and seventy new smear TB positive patients were recruited. Out of which 358 (76.2%) and 112 (23.8%) were from the public and private DOTS facilities respectively. The

mean age of TB patients treated at the public and private DOTS facilities was respectively 33.5±12.1 years and 31.2±10.1 years. The male:female ratio of TB patients managed at the public and private DOTS facilities was respectively 1:0.7 and 1:0.6. The proportion of patients with TB/HIV co-infection was 10% at the public and 10.7% private DOTS facilities ($P = 0.68$) as shown in Table 1. There was no significant difference in the treatment outcomes of patients managed at the public and private DOTS facilities. The cured, treatment completed, treatment success and defaulter rates of patients managed at the public and private DOTS facilities was 65.4% vs 63.4%, 21.8% vs 22.3%, 87.2% vs 85.7% and 9.7% and 13.4% respectively as shown in Table 2. Table 3 and 4 shows the category of person that supervised treatment and non-interruption of treatment were associated with treatment success. ($P = 0.05$). The odd that a TB patient supervised by a treatment supporter will have treatment success is about three fold more than if the treatment was supervised by a health worker (OR 2.98, 95% CI 1.59 – 5.56). In addition, the likelihood of having treatment success is 21 times higher among patients that did not interrupt treatment compared with patients that interrupted treatment (OR 21.27, 95%CI 8.86 – 51.07).

Discussion

This study found that the cured, treatment completed and treatment success rates of patients managed at the public and private DOTS facilities were comparable. Similar finding was obtained in studies conducted in India and Kenya [17-19]. However other studies conducted in Nigeria, Thailand and Vietnam [14,15 20,21] showed that cure rates were higher in patients managed at the public DOTS facilities compared with those managed at the private DOTS facilities. This finding may be because of the affordable cost of TB treatment at the private DOTS facilities. TB patients attending private DOTS facilities do not pay for anti-TB drugs supplied by the national TB Programme. However, they are required to pay a token as service

charge for sputum AFB. A study from Vietnam attributed the better cure rates observed in patients managed at the public DOTS facilities to the cost of treatment [21]. While treatment at the public DOTS facilities were funded by the NTP, patients attending the private DOTS facilities pay the full cost of treatment [21]. Generally, the proportion of patients lost to follow up at the public and private DOTS facilities in this study was high. The long duration of treatment may be responsible for this finding. However, the proportion of patients lost to follow up at the private DOTS facilities were higher compared with those managed at the public DOTS facilities ($P = 0.24$). This is consistent with findings from studies conducted in Thailand, Vietnam and India [20,21,22]. Private DOTS providers unlike the public DOTS providers do not have effective mechanism to track TB patients lost to follow up [22]. A study showed that payment for services at the private DOTS facilities may be responsible for the higher proportion of patients lost to follow up [21].

In this study non-interruption of treatment and supervision of treatment by treatment supporters were associated with treatment success. A significantly high proportion of TB patients managed at the private DOTS facilities were not adherent to treatment ($P < 0.001$). This finding is similar to what was obtained in a study from Russia which reported that treatment failure rate was high among TB patients who had treatment interruption especially during the intensive phase [23]. This may be because the LSTBLCP did not provide the private DOTS providers the necessary logistics to effectively track patients lost to follow up.

Another factor associated with treatment success in this study was the supervision of patient's treatment by treatment supporters. The objectives of the supervision of TB treatment by treatment supporters are to improve adherence of TB patients to treatment and reduce the proportion of patients lost to follow up. A significantly higher proportion of patients whose treatment were supervised by treatment supporters had successful treatment compared with those

supervised by the health workers ($P < 0.001$). The conventional DOTS approach which patients obliged to attend the health facility each day to obtain medication was difficult for patients because of their poor physical condition, distance and lack of funds to pay for travel [24]. The patient centred approach allows TB patients choose where TB drugs intake is supervised and by who. Supervision could be undertaken either by a health worker at a health facility or at home by a supporter of the patient's choice. This approach could positively impact treatment adherence. Studies have shown that adherence to treatment and treatment success was higher with treatment supporters than the conventional health facility based DOTS [25-27].

Conclusion

Treatment outcomes of TB patients managed at the public and private DOTS facilities were comparable. Effort should be made to track patients lost to follow up especially those managed at the private DOTS facilities.

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Table 1: Socio demographic characteristics of new smear positive TB patients attending the DOTS facilities studied

Variable	Public (n= 358) Freq (%)	Private (n=112) freq (%)	χ^2	p
Age Group in yrs				
< 20	41 (11.5)	14 (12.5)	3.23	0.5199
20 – 29	116 (32.4)	39 (34.8)		
30 – 39	108 (30.2)	36 (32.1)		
40 – 49	49 (13.7)	16 (14.3)		
>50	44 (12.3)	7 (6.3)		
Mean age	33.5±12.0	31.2±10.1		
Gender				
Male	211 (58.9)	69 (61.6)	0.25	0.6154
Female	147 (41.1)	43 (38.4)		
Educational Qualification				
None	20 (5.6)	9 (8.1)	3.09	0.3783
Primary	68 (19.0)	16 (14.3)		
Secondary	196 (54.7)	58 (51.8)		
Tertiary	74 (20.7)	29 (25.9)		
Alcohol Intake				
Yes	45 (12.6)	11 (9.8)	0.61	0.4332
No	313 (87.4)	101 (90.8)		
Cigarette smoking				
Yes	25 (7.0)	4 (3.6)	1.72	0.1903
No	333 (93.0)	108 (96.4)		
HIV status				
Positive	36 (10.0)	12(10.7)	0.17	0.680
Negative	30 (85.5)	88 (75.6)		
Not done [#]	16 (4.5)	12 (13.7)		
Who supervised Treatment				
Treatment supporter	194 (54.2)	40 (35.7)	11.65	0.001

346	Health worker	164 (45.8)	72 (64.3)		
347					
348	Treatment interruption				
349	Yes	128 (35.8)	58 (51.8)	9.196	0.002
350	No	230 (64.2)	54 (48.2)		
351					

Table 2: Treatment outcomes of TB patients attending the DOTS facilities studied

356	Treatment Outcomes	Public DOTS (n= 358) Freq (%)	Private DOTS (n=112) freq (%)	χ^2	p
357					
358					
359					
360					
361	Cured	234 (65.4)	71(63.4)	0.15	0.703
362					
363	Treatment completed	78 (21.8)	25(22.3)	0.01	0.905
364					
365	Defaulted	35 (9.7)	15(13.4)	1.39	0.239
366					
367	Died	3 (0.8)	0.0 (0.0)	0.94	0.441 ^x
368					
369	Transferred out	3 (0.8)	0.0 (0.0)	0.94	0.441 ^x
370					
371	Treatment failure	5 (1.4)	1(0.9)	0.17	0.561 ^x
372					
373	Treatment Success	312 (87.2)	96 (85.7)	0.154	0.695
374					

NB: x = Fisher's exact

Treatment success was defined as the sum of the cases that were cured and that completed treatment.

Table 3: Factors associated with treatment success at the DOTS facilities

383	Variable	Treatment Success		χ^2	p
384		Yes (%)	No (%)		
385		(n=408)	(n=62)		
386					
387	Age group				
388	Less than 20 years	45(11.1)	10 (16.1)	2.435	0.656
389	20 – 29	135 (33.1)	20 (32.3)		
390	30 – 39	126 (30.9)	18 (29.0)		
391	40 – 49	59 (14.5)	6 (9.7)		
392	50 years and above	43(10.5)	8 (12.9)		
393	Mean±SD	33.1±11.5	32.1±12.8		

394	Gender				
395	Male	249 (61.0)	31 (50.0)	2.719	0.099
396	Female	159 (39.0)	31 (50.0)		
397					
398	Alcohol intake				
399	Yes	48 (11.8)	8 (12.9)	0.066	0.797
400	No	360 (88.2)	54 (87.1)		
401					
402	Cigarette smoking				
403	Yes	22 (5.4)	7 (11.3)	3.234	0.072
404	No	386 (94.6)	55 (88.7)		
405					
406	Who supervised treatment?				
407	Health worker	191 (46.8)	43 (69.4)	10.939	0.001
408	Treatment supporter	217 (53.2)	19 (30.6)		
409					
410	Treatment interruption				
411	Yes	130 (31.9)	56 (90.3)	76.919	<0.001
412	No	278 (68.1)	6 (9.7)		
413					
414	HIV status	n = 385	n = 57		
415	Positive	40 (10.4)	8 (14.0)	0.68	0.409
416	Negative	345 (89.6)	49 (86.0)		
417					
418	On ARV	n = 40	n = 8		
419	Yes	21 (52.5)	1 (12.5)	4.297	0.055 ^x
420	No	19 (47.5)	7 (87.5)		

Table 4: Predictors of treatment success among Tb patients in DOTS facilities

Predictors	B	Wald	p	odds ratio	95% CI
Treatment Supervised by Treatment supporter	1.090	11.716	0.001	2.976	1.594 – 5.556
No treatment Interruption	3.057	46.806	<0.001	21.269	8.859 – 51.07

Note: B = Logistic regression coefficient
Wald = Chi Square