

**COST OF CARE AMONG PATIENTS WITH PULMONARY TUBERCULOSIS IN
LAGOS, NIGERIA**

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Abstract

Background

Tuberculosis (TB) is a global health challenge. Currently it is the 7th leading cause of death worldwide, and Nigeria ranks fourth amongst 22 high-burden countries for the disease. This study sought to appraise the direct and indirect costs borne by TB patients attending the Chest Clinics at the Lagos State University Teaching Hospital, Ikeja and Mainland Hospital, (formerly Infectious Disease Hospital), Yaba, both in Lagos, Nigeria.

Method

A cross-sectional study was conducted in July 2008, recruiting all consenting TB patients that had commenced treatment at the Chest Clinics of the Lagos State University Teaching Hospital, Ikeja and Mainland Hospital, Yaba, Lagos, Nigeria. Data were collected with the aid of 205 pre-tested, self-administered questionnaires and analysed with the Statistical Package for the Social Sciences (SPSS, version 12.0; SPSS Inc. 2003). Long-run average costs were employed in accordance with the World Health Organisation's (WHO) Guidelines for Cost and Cost-Effectiveness Analysis of Tuberculosis Control, converting at US\$1=₦120.

Result

Throughout the duration of treatment, the typical TB patient earned an annual income of fifteen thousand, seven hundred and ninety five thousand naira only (₦15, 795), equivalent to about one hundred and thirty-two dollars (US\$132) and spent 7% of this on transport fare to attend his clinic daily. Direct costs (medical and non-medical) ranged between US\$113 and US\$401 with an average of US\$161.28. This equates to 10% of the typical patient's annual income (123% of the mean monthly income).

Mean number of days lost from work due to TB was 45. TB disrupted working relationships, threatened jobs and led to actual loss of jobs (8%). Patients also lost about 13% of their annual income (US\$199) in indirect costs.

Conclusion

Direct and indirect costs of TB are exorbitant in Nigeria, and are especially due to poor social infrastructure and transport facilities.

Introduction

Tuberculosis (TB) is a global health challenge. According to the World Health Organisation (WHO), it is currently the 7th leading cause of death worldwide with about one-third of the world population being infected with the bacillus.¹ An estimated 8–10 million people develop overt tuberculosis annually². Nigeria ranks fourth amongst the 22 high-burden countries.³ TB control in Nigeria is poor due, among other factors, to patient delays in seeking medical treatment and health system inefficiencies.⁴ TB care in Nigeria is in accordance with the WHO DOTS programme (Directly Observed Treatment, Short-course). Essential components include diagnosis via sputum microscopy and chemotherapy under direct observation by persons accessible to the patient and accountable to the health system⁵. In Nigeria, patients report to designated DOTS clinics daily for the 2 months intensive phase and weekly for the 6-month continuation phase.

For effective disease control, it is ultimately necessary to consider patient-related cost information as this may impact on treatment adherence and completion. TB depletes patients' assets and increases expenditure, yet reduces their chances of making money. Unfortunately, the greatest impact of TB is on economically productive adults⁶ with a resultant effect on national economic development. Tuberculosis care implies three main types of costs: drugs, transportation and, most importantly, financial losses due to inability to work.⁷ The education and care of children of TB-infected parents are also affected, some discontinuing school or taking up employment to compensate for lost income.⁸ The economic burden of TB on patients creates barriers to prompt diagnosis⁹ and is likely to deter people from seeking treatment.¹⁰ The high rates of default from the DOTS program in developing countries may be a product of the exorbitant costs of care, causing continued transmission of the infection.

Patient-related cost of illness studies have been undertaken in different countries and settings, with assessment of direct and indirect costs, occasionally including costs pre-diagnosis.^{7, 11, 12, 13} Some investigators also assessed the cost of TB at the household level, compared them with the provider costs of the National Tuberculosis Control Programme (NTP) and extrapolated the average costs of periods of illness to patients and their families.⁷

This study sought to appraise the direct and indirect costs borne by TB patients attending the

Chest Clinics at the Lagos State University Teaching Hospital, (LASUTH) Ikeja, and Mainland Hospital (formerly Infectious Disease Hospital (IDH)), Yaba. It emphasizes the key role of patients as stakeholders in effective healthcare delivery, by outlining the economic contributions of patients to the implementation of DOTS. Hopefully it will guide public policy.

We are unaware of any similar study previously undertaken in Nigeria.

Methods

Nigeria is the most populous country in Africa, with a population of 140 million, occupying an important position in the African polity. A considerable proportion of Nigerians live in areas not covered by DOTS.³ Incidence of tuberculosis is 123 [63–186] per 100 000 persons per year, and the prevalence is 536/100 000 persons [254 – 846].¹ Of the 36 states of Nigeria, Lagos has the greatest population density and is the commercial nerve-centre of Nigeria.

This study was conducted at the state-owned urban referral chest clinics of Mainland Hospital (formerly Infectious Disease Hospital [IDH]) and Lagos State University Teaching Hospital (LASUTH). LASUTH is a tertiary care centre, attached to a medical school. It is situated in the state capital, Ikeja and provides medical care to about 5 million people⁴. IDH provides secondary level of healthcare, predominantly to patients with communicable diseases especially TB and human immunodeficiency (HIV) infection.

This is a cross-sectional study, conducted in the month of July 2008, recruiting patients from the designated DOTS clinics of both institutions. To be recruited, the patient would have been diagnosed with pulmonary tuberculosis and would have commenced treatment for at least one week. In Lagos State, tuberculosis care is free and the programme is run based on the guidelines of the National Programme on Tuberculosis Control.

Data were collected with the aid of 205 pre-tested self-administered questionnaires. Patients with limited literacy skills were guided by trained interviewers. Twenty-eight questions were asked covering patient's demographic details (9 questions), clinical presentation (1), direct (12) and indirect costs (6) of TB care to the patient. Analysis of questionnaires was done using the Statistical Package for the Social Sciences (SPSS, version 12.0; SPSS Inc. 2003). The results were presented in text and pictorial format (tables and charts). Direct costs of TB care were projected for the duration of treatment, (based on currency exchange rate of US\$1 to ₦120). Long-run average costs were employed in accordance with the WHO Guidelines for Cost and Cost-Effectiveness Analysis of Tuberculosis Control. For the purpose of this study, indirect costs referred to the amount of money actually or potentially lost from inability to work during care.

Bivariate analysis was done and significance was set at $p < 0.05$. Consent was obtained from the administration of the hospitals and the clinics and, verbally, from patients, before they were recruited for the study.

Results

a) Socio-Demographic Characteristics

Two hundred and five patients were recruited for this study; 102 from LASUTH and 103 from IDH. There were 123 males (60%) and 82 females (40%). See table 1. The mean age was 32.9 (± 12.3) years. Most of the patients in the study had secondary education or higher (81%). Above half of the study population were not married. About a third of the study population were heads of families (including married males, divorcees and widows). Forty percent of TB patients in the study were self-employed. A sizeable proportion of the study population lived within 20km of the hospital where they received care. However, about one-fifth (16%) lived in more distant areas or even outside Lagos state.

b) Clinical History of Patients

In both centres, weight loss was a very common presenting symptom among the patients (48%). Prolonged cough, the cardinal symptom of the disease, was however the commonest (61%). Most patients had a previous treatment experience (62%); 2% from non-medical institutions (traditional and others), 60% from medical institutions.

c) Patients' Income

Most patients were personally responsible for the expenditure on treatment (62%). Hospital costs for paediatric and geriatric patients were borne by the government. A non-governmental organisation (NGO) paid for the treatment expenses of two patients (one in each of the facilities). The costs for the other patients were borne by their parents (26%), spouses (10.5%), and other relatives and friends (11%). See Table 2. Many patients (70.5%) did not disclose their monthly income, most of these were self-employed (45.5%). The estimated mean monthly income (MMI) of the patients was ₦15,795, amounting to ₦189,540 annually (US\$ 132 monthly or US\$ 1,580 annually).

d) Estimation of Direct Costs of TB Care

In both centres, sputum tests were done free of charge for the patient; although patients paid for other investigations including chest radiographs. The mean cost of investigations per patient was

₦1,362 (US\$11). Thirteen patients (6%) had to buy first-line drugs, especially Pyrazinamide, when the government sources were out-of-stock. Apart from the regular first-line (DOTS) drugs, some patients had to procure other medications, including antimalarials, other antibiotics and haematinics (32.5%) when they were indicated. The estimated mean cost of the additional drugs per patients was ₦2,525 (US\$21). Twenty-five patients (12%) were admitted in hospital during the course of treatment on account of tuberculosis. Twenty-one of them specified that the cost of admission was an average of ₦19,981 (US\$ 167).

One hundred and sixty-nine participants were brought to the clinic by public transport (82%); but up to twenty-six people (13%) walked to the clinic. The estimated daily mean cost of transport was ₦211 ±172 (US\$ 1.8), although most patients spent between ₦101 and 200 (36%). See table 3. In the long run, for 64 clinic sessions which were held five times a week for the first 2 months, and once weekly till the end of treatment, about ₦13,504 (US\$112.53) was spent. Costs of transport incurred by patients were not significantly influenced by the centre where they were receiving treatment ($p>0.2$). Additional costs incurred on account of TB and its care (excluding drugs, tests and hospital admission) averaged ₦10, 803 (US\$ 90).

Patients' total direct cost was up to ₦48,175 (US\$ 401) with an average of ₦19,354 (US\$ 161.28). This approximates to 10.2% of the typical patient's annual income (123% of the mean monthly income).

e) Indirect Cost of Tuberculosis

About 27% of the study population spent more than 2 hours in the clinic daily. Time spent in clinic was not significantly determined by the chest clinic attended by the patient ($p>0.2$), as patients spent approximately the same amount of time in both centres. See table 4. The mean period spent by patients in the clinic was 105 minutes. Only 96 (47%) participants could report at work on clinic appointment days. The mean estimated number of missed days at work was 45 days. The longer a patient spent in the hospital, the more likely it was that the patient would be absent from work ($p=0.001$). See table 5.

Seventy-three respondents (35%) acknowledged a previous experience of disrupted working relationships. See table 6. The bosses of 22 (10%) patients complained, formally and informally about absenteeism. The salaries/allowances of 12 patients (6%) had been stopped and another 16 (8%) patients had been relieved of their jobs on this account. On the whole, twenty-five (12%) patients had changed jobs since commencing treatment, 15 (60%) solely for health reasons. By extrapolating from the mean monthly income and the mean number of missed days of work,

the indirect cost (of inability to work) was estimated to be ₦23,918 (US\$ 199). Total mean cost to the patient summed up to ₦43,272 (US\$ 361) i.e. 274% of mean monthly income, and 23% of annual income.

Direct cost to the nation, taking cognizance of the prevalence of the disease (536/100 000), was estimated to be over ₦14 billion (US\$121 million). Indirect costs were ₦23,918 per patient (US\$ 199) and therefore more than ₦17 billion (US\$150 million) for all TB patients in the country. The Gross Domestic Product (GDP) of Nigeria was USD165,690 million (2007 figures).¹⁷ TB and its care therefore prevent Nigeria from earning a whopping 0.09% of its GDP.

Discussion

Certain signs of pulmonary TB are quite specific: prolonged cough (more than 2 weeks), sputum production, and chest pain, while others are less so: weight loss, anorexia, fatigue, moderate fever and night sweats.¹⁴ This leaves room for numerous differential diagnoses. It was therefore not surprising that 60% of the patients sought help from other health institutions, orthodox and traditional, before presenting at the centres. This is similar to the 58% obtained in South Africa¹⁵, but less than 74% in Lagos, Nigeria⁴ and 70% in Malawi¹⁶.

Direct Cost of Tuberculosis care

TB impacts significantly on patients' income, and also prevents many patients from working. Most studies on the economic impact of the disease have been performed in developing countries and the findings can therefore be realistically contrasted with this study.

Medical costs were high in comparison with results from other studies, despite government subsidies. The mean cost of investigations per patient was ₦1,362 (US\$ 11) which is very costly when compared with US\$2 required in Tanzania for the same purpose. Cost of additional drugs (₦2,525; \$20.36) is comparable to US\$17-50 for consultation and drugs in Tanzania⁷. No fees were paid for consultation at the hospitals in our study. Patients who had a history of hospital admission (28.5%) spent a further ₦19,981 (US\$161.13) on the average. TB patients in Tanzania spent below US\$1 for the same purpose⁷. Healthcare is expensive in Nigeria and out-of-pocket payments remain the order of the day, despite the introduction of the National Health Insurance Scheme since 1999. Patronage of the scheme is currently dismal.

Non-medical costs (71%) were responsible for a significant proportion of direct costs in this study. The estimated daily mean cost of transport was ₦211 (US\$1.76), and about ₦13,504 (US\$117.33) in the long run. The observed cost of transport derived from this study is very high

compared to US\$13-20 in Tanzania⁷. The typical TB patient spends 7% of his annual income on transport alone, for direct observation of TB treatment to be possible (WHO-DOTS strategy). This exorbitant cost is a fall-out of the poor transport situation and high cost of living in the country.

Patients' total direct cost ranged from ₦13,504 to ₦48,175 (US\$113 to \$401), with a mean of ₦19,354 (US\$ 161) which is almost thrice the \$52 (Rs. 1824/-) from works by Chand et al¹³ and \$59 (Rs.2052/_) by Rajeswari et al¹⁷ in India.

Direct costs incurred during treatment by patients in this study were 123% of the mean monthly income, which is less than 158% in Zambia⁹. It also amounts to 10% of their annual income, a far lesser proportion compared to 40% noted in India^{13, 17}. Direct costs to the nation in this study was estimated to be in excess of ₦14 billion (US\$ 121 million), but government spending was only US\$36 million on tuberculosis in 2007³.

Indirect Cost of Tuberculosis

Tuberculosis care made a patient absent from work for 45 days, comparable to 48 days obtained in Zambia⁹, but less than 88 days obtained in India¹³. Missing days of work was found to be due to the long hours spent at the clinic. Although up to 35% experienced disrupted working relationships, only 8% were relieved of their jobs. This is small considering 31% job losses observed in Zambia⁹. In this study, 12% of respondents had changed jobs for different reasons since commencing treatment. Indirect cost was ₦23,918 per patient (US\$ 199), compared to \$154 to US \$1384 observed in Tanzania⁷.

Direct costs made up 45% of the total costs of TB in this study, which is less than 68-94% obtained in Tanzania⁷ and 60% obtained from Uganda¹⁶ and Thailand¹⁷.

Conclusions & Recommendations

This study revealed the high medical and non-medical costs of care borne by the patients, relative to their income, despite government subsidies. The "direct observation" component of DOTS leads to loss of income (13% of total annual income), disrupted working relationships in form of queries, withholding of salaries and allowances and loss of jobs. This amounts to 0.09% of the GDP of Nigeria.

Government should increase commitment to the TB Control Program and ensure sustained availability of all DOTS drugs all year round for all patients. The number of health institutions in which free treatment for TB can be obtained should be increased to include private hospitals,

clinics, and primary health centres in remote parts of the country. This will make the costs due to transport fares bearable. Patronage of the health insurance scheme should be encouraged to reduce out-of-pocket health spending. Measures to reduce the time spent by patients at treatment centres (for instance, establishing walk-in clinics), may drastically reduce absenteeism from work especially for patients who show good compliance.

Table 1: Socio-demographic Characteristics of TB patients

	Characteristics	Frequency (No.)	%
Sex	Male	123	60
	Female	82	40
Age	<10 years	2	1
	11-20	22	11
	21-30	77	38
	31-40	56	27
	41-50	29	14
	51-60	12	6
	>60	7	3
Education	None	10	5
	Primary	31	15
	Secondary	85	42
	Technical	10	5
	Tertiary	69	34
Religion	Christianity	140	68
	Islam	64	31
	Traditional	1	1
Marital status	Single	110	54
	Married	84	41
	Divorced	2	1
	Widowed	9	4
Employment	Self employed	81	40
	Employee of Private firm	47	23
	Government employee	17	8
	Student	40	20
	Unemployed	16	8
	Others	4	2

Table 2: Main sources of finance for TB care among patients

Sources of finance for TB care among patients	Frequency	%
Self	97	47
Parents	53	26
Relatives and friends	23	11
Spouse	22	11
Government	9	4
Support group/NGO	2	1

Table 3. Cost of Transport to clinic

Cost of transport	Total	%
N0.00	26	13
Less than N100	25	12
N101 – 200	73	36
N201 – 300	46	22
N301 – 400	9	4
> N400	26	13

Table 4: Duration of daily clinic attendance

Duration of clinic each day	Hospital		Total
	LASUTH	IDH	
<1 hour	37	43	80
1 - 2 hrs	37	32	69
3 – 4 hrs	24	24	48
> 5 hrs	4	4	8

Chi square 0.807 at df=3; p>0.2

Table 5: Time spent in clinic and patients' ability to work on clinic days

Time spent in clinic	Ability to work on clinic days		Total
	Yes	No	
2 hours or less	80	69	149
More than 2 hours	16	40	56
Total	96	109	205

Chi square 10.315 at df =3; p=0.001

Table 6. Disruption of working relationships by TB and its care

Disrupted working relations with:	Frequency	%
Employer/boss	22	10
Colleagues	18	9
Customers/clients	29	14
Others	4	2
Nobody	132	65

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