

ORIGINAL ARTICLE

The status of tuberculosis infection control measures in health care facilities rendering joint TB/HIV services in “German Leprosy and Tuberculosis Relief Association” supported states in Nigeria

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Abstract

Objective: To assess the status of tuberculosis (TB) infection control practice in health care facilities implementing joint TB/HIV activities.

Materials and Methods: A descriptive survey triangulating self-administered questionnaire (facility survey to Infection Control Officer, individual health worker to general health workers), review of facility case notes and participant observation techniques was carried out. Twelve health facilities from southern Nigeria were assessed.

Results: (1) Administrative and work practice control measure: Only 1 (8.3%) facility had a documented TB Infection control policy; 2 (16.7%) facilities had Infection Control Committee; 5 (41.7%) facilities had Infection Control Officer; 2 (16.7%) asked questions at the health records about cough; 1 (8.3%) facility had health workers intermittently checking for patients with cough in the waiting hall; and 2 (16.7%) facilities had Infection Control Officers who have attended some training on infection control. No facility had Information, Education and Communication (IEC) materials reminding patients and health workers of the possibility of TB transmission in the health care setting. While 86.4% of TB patients were screened for HIV, only 54.7% of HIV patients were tested for TB. (2) Environmental control measures: All the waiting halls were well ventilated. Though 66.7% of the consulting rooms were well ventilated, 25% of them were over crowded; 58.3% of the facilities managed sputum smear positive TB patients in the same ward with HIV-positive and other vulnerable patients; no facility had air cleaners.

Conclusion: Implementation of the different aspects of the administrative control and work practice component of TB infection control measure range from 8.3% to 41.7% of the facilities. Urgent measures should be taken to reverse this trend in the face of TB burden due to HIV.

Key words: Association-supported states, German leprosy and TB relief, infection control, Nigeria TB, TB/HIV joint services

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Introduction

The sub-Saharan African region has remained the epicenter of the twin epidemics of Human Immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) and tuberculosis (TB) and bears a disproportionate burden in the morbidity and mortality attributable to both diseases

globally. Thus, though the region constitutes only 11% of the world's population, it harbored 29% of the global TB burden and 34% of related mortality by the end of year 2006.^[1] Similarly, more than two-thirds (68%) of adults and nearly 90% of children infected with HIV globally live

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in the region, and about three in four (76%) AIDS deaths in the year 2007 occurred there.^[2]

The risk of TB infection and disease is amplified by the interaction between patients with active TB and those with HIV infection in clinics, hospitals, and the broader community. Thus, the unprecedented goal of “universal access to anti-retroviral therapy (ART) for all who need it by the year 2010”,^[3-4] being sponsored by many governmental and non-governmental organizations,^[5-9] is ironically creating unprecedented opportunities for persons with HIV-associated immunosuppression to be exposed to infectious TB within health care facilities, with the attendant risks of acquiring infection and of progression to active TB. Health care workers themselves may have HIV infection and thus might be subject to these increased risks.^[10]

In response to the growing public health problem of TB, the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) have developed and published TB infection control guidelines based on a three-level hierarchy of controls, including administrative or work practice control, environmental control, and respiratory protection control.^[11] Work practice and administrative control measures are the first line of defense against *Mycobacterium tuberculosis* transmission within facilities caring for people with HIV infection. Its two goals are to prevent exposure of staff and patients to TB and to reduce the spread of infection. These are achieved by ensuring rapid and appropriate diagnostic investigation and treatment of patients and staff suspected or known to have TB. This can best be accomplished through the prompt recognition and separation of persons with potentially infectious TB disease from vulnerable groups, followed by prompt provision of TB and probably HIV services. Components of good work practice and administrative control measure include^[12] an infection control plan, administrative support for procedures in the plan, including quality assurance, training of staff, education of patients and increasing community awareness and co-ordination and communication between the HIV and TB programs. Environmental controls are the second line of defense for preventing the spread of TB in HIV care settings. These include ventilation (natural and mechanical), room air cleaners [filters or ultraviolet germicidal irradiation (UVGI)], and use of interior space to reduce crowding. Respiratory protection for health care worker is the last line of protection. The goal of this is to reduce the chances that inhaled air will contain infectious tubercle bacilli.

The Federal Ministry of Health has drafted the policy of TB Infection Control in HIV care settings. Before implementation, it is important to document current TB infection control practices in centers implementing TB/HIV activities. This will serve as a baseline for evaluating

the success of measures stipulated by the policy to limit TB transmission in HIV care settings. This study is therefore aimed at assessing practices at TB/HIV care facilities, supported by the German Leprosy and TB Relief Association (GLRA) in southern Nigeria, which predispose to nosocomial transmission of TB to vulnerable groups.

Materials and Methods

Study design

This was a cross-sectional descriptive survey triangulating questionnaire (facility survey, individual health worker, check-list for review of patients' case notes/admission registers) and participant observation techniques of data collection.

Study population

This consisted of all TB/HIV care facilities reporting at least 10 TB cases per quarter in 16 states (GLRA-supported states) spread across south-east, south-south and south-west Nigeria.

Sample size and sampling technique

Twelve health care facilities were selected through a multistage sampling technique. The first stage selected one state from each of the three zones through a simple random sampling technique using the ballot method. The second stage stratified health facilities according to level of care (primary, secondary and tertiary) and ownership (public sector, Faith-based and Private for Profit). The last stage randomly selected at least one facility from each stratum (four health facilities in all from each state) reflecting primary, secondary, and tertiary; and public sector, Faith-based and Private for Profit facility.

Data collection and analysis

Four instruments were used for data collection: Facility survey and individual health worker questionnaires, checklist for clinic and ward records extraction and guide for observation of clinic sessions. These were validated through pre-testing at Ebonyi State University Teaching Hospital which was not one of the facilities selected for the study. The facility survey questionnaire sought information on the characteristics of the facility, the categories and number of health workers, the TB infection control measures available as well as the barriers if any in implementing the measures. This instrument was answered by the Infection Control Officer. In his/her absence, TB/HIV focal person, the officer in charge of the TB clinic or the officer in charge of the HIV clinic answered the questionnaire.

The individual health worker questionnaire sought information on the worker's socio-demographic characteristics, HIV and TB status, how recent the HIV

test was done (test done within the past 6 months was regarded as recent), reasons if any for not having done HIV screening test, and perception of factors militating against TB infection control practices in the facility. Three tests were used to ascertain TB status. These were Mantoux test, sputum smear for acid-fast bacilli (AFB × 3) and chest X-ray (CXR).

Clinic session observation documenting TB infection control practices took place at peak periods in a participant manner. Specifically, observation looked out for overcrowding in the waiting areas and deliberate efforts made to quickly identify and separate TB suspects who might be smear positive from HIV+ patients (e.g. did health records staff ask patients if they were coughing and the duration of such cough; intermittent checking for coughing patients at the waiting halls to separate them from others, shortening administrative protocols for TB suspects to fasten TB confirmation and commencement of anti-tuberculosis therapy). Patients were followed in a time motion fashion from the health records departments till they left the facility.

Data extracted from case notes and ward registers noted whether TB patients were nursed together with other vulnerable patients, the number and characteristics of TB and HIV case notifications in the previous 1 year as well as the proportions of the TB and HIV cases screened for HIV and tested for TB, respectively. Finally, data were collected on space and ventilation adequacy at the waiting halls, doctors' consulting rooms and wards.

Three resident doctors from the Department of Community Medicine, Ebonyi State University Teaching Hospital (EBSUTH), Abakaliki, southeast Nigeria, were recruited and trained as research assistants for this study. One research assistant was assigned to a state for data collection. The principal investigator supervised data collection in the three states. Data collection lasted 1 week. Quantitative data were analyzed using SPSS version 11.0 software package, by means of constructing simple frequency tables and charts. Proportions were determined and compared by use of the chi-square statistic or two-tailed Fisher's exact test as appropriate. Significance was set at $P < 0.05$. The denominator for every proportion corresponding to a question was represented by the number of facilities or health workers who answered that question.

Qualitative data (notes taken from observation) were arranged around the themes of study interest and coded in such a way that it was possible to count frequencies of the observed events and analyzed. This complemented findings from the survey data.

Ethical clearance

Ethical clearance for this study was obtained from the

Table 1: General characteristics of facilities

Characteristic	Frequency	Percentage
Level of care (category of facility)		
• Tertiary level of care (1 teaching hospital + 4 specialist hospitals)	5	41.7
• Secondary level of care (1 Faith-based and 2 PPM DOTS hospitals)	3	25
• Primary level of care (1 Faith-based and 3 public sector PHC centers)	4	33.3
Sub-total	12	100
Ownership pattern		
• Federal Government	3	25.0
• State Government	2	16.7
• Local Government	3	25.0
• Faith-based Organization (Church)	2	16.7
• Private for Private	2	16.6
Sub-total	12	100

research and ethics committee of EBSUTH, Abakaliki. Permission for the study was also obtained from each facility management.

Results

Characteristics of the facilities

This is shown in Table 1.

Characteristics of health workers

Age, sex and cadre distribution

A total of 173 health workers were interviewed. Their ages range from 20 to 57 years, with a mean \pm standard deviation of 37.1 ± 9.4 years. Majority of the health workers were females (69.9%) and nurses (31.8%).

Health workers' HIV status

Majority [141 (81.5%)] of the health workers have had an HIV screening test done, and out of these, 1 (0.71%) was positive and was already on anti-retroviral therapy.

Sex was significantly related to being screened for HIV as many more females than males had not been screened ($\chi^2 = 4.45$; $P < 0.035$). About half of those screened (79 or 57.2%) had a recent HIV screening. Sex of worker, ownership, and category of facility had no influence on how recently the health worker was screened, but cadre of worker did as pharmacists had the least proportion of those who had a recent HIV screening.

The reason for not being screened for HIV given by majority (17 or 54.8%) of the health workers was being faithful to one partner. Other reasons and number of health workers involved were fear of discrimination and stigmatization (10 or 32.3%) and cost of doing the test (4 or 12.9%).

Health workers' TB status

Only 51 (29.5%) health workers had done one or more of

these tests, while majority [118 (68.2%)] had not. Sex did not influence being tested for TB, but cadre of worker did. Thus, a higher proportion of doctors and nurses than the other categories had at least a test for TB ($\chi^2 = 9.73$; $df = 2$; $P = 0.008$).

Majority 20 (39.2%) of the health workers who had done any test for TB had done Mantoux test; 18 (35.3%) had done AFB x 3; and 13 (25.5%) had done chest X-ray. Of the 20 health workers screened with Mantoux test, 6 (30%) were positive, and 2 of them were confirmed TB with AFB and CXR. Those two confirmed TB cases were already receiving anti-tuberculosis treatment, and one was co-infected with HIV and was on anti-retroviral therapy.

Health workers' perception of factors militating against TB infection control practices

This is shown in Table 2. Majority of health workers (73.1%) perceive patients coming to the facilities not knowing their HIV status as the commonest factor [Table 2].

TB infection control measures in the facilities

Administrative measures

Only one facility (8.3%) had a documented TB infection control policy document and a work place policy on HIV/AIDS; 5 (41.7%) had designated a worker as an Infection Control Officer and 2 (16.7%) had established an Infection Control Committee. Other administrative control and work practice measures are shown in Table 2.

Prompt separation of TB patients from HIV patients

At the health records and waiting halls: Only in 2 (16.7%) facilities were patients asked questions concerning cough while obtaining a hospital card, and in one of them, the duration of the cough was also ascertained. However, in none of these two facilities were deliberate steps taken to fasten the administrative processes in order to investigate and confirm or rule out TB from such patients [Table 3].

Only in one (8.3%) facility were health workers intermittently

checking patients who were coughing at the waiting hall to detect those who might be TB suspects for quick attention and investigation to confirm the TB and shorten the patient's interaction with vulnerable patients and health workers [Table 3].

Patient education: None of the facilities had health education materials (posters, leaflets, etc.) educating patients and reminding health workers of the possibility of TB transmission within the health care setting.

Communication between the TB and HIV, and HIV and TB services

Majority [11 (91.7%)] of the TB units referred patients to the HIV units for screening in the facilities studied and as a result, a high proportion of TB patients were screened for HIV. Thus, of the 2401 TB cases notified in the past 1 year from the 12 facilities (1364 or 56.8% males; 1935 or 80.6% from public sector facilities; 2275 or 94.8% ≥ 15 years; 858 or 35.7% sputum smear positive), 86.4% were screened for HIV out of which 30.3% were HIV positive. Ownership of the facility influenced whether a TB patient would likely be screened for HIV, would likely be HIV positive, would likely be smear positive and would likely be a male. Thus, a higher proportion (77.1%) of the patients seen at privately owned facilities (PPM DOTS centers) were males ($\chi^2 = 25.87$; $df = 2$; $P < 0.000002$); the lowest proportion of patients aged 0–14 years (0.9%) was diagnosed at Faith-based facilities ($\chi^2 = 13.91$; $df = 2$; $P < 0.00095$); and the PPM DOTS centers had the least proportion (6.9%) of TB patients screened for HIV ($\chi^2 = 858.35$; $df = 2$; $P < 0.00001$).

In contrast, the HIV units were poorly screening and referring patients to the TB units for confirmation, as only in 6 (50%) of the facilities studied were HIV patients screened for TB and referred for confirmation for TB. From these six facilities, 783 HIV-positive patients were diagnosed out of which 428 (54.7%) were screened for TB and 151 (19.3%) confirmed to be co-infected with TB.

Table 2: Health workers' perception of factors militating against tuberculosis infection control practice

Militates against infection control			
Factor	Yes (%)	No (%)	Total (%)
Many patients in the GOPD do not know their HIV status	122 (73.1)	45 (26.9)	167 (100)
Lack of training of health workers on TB infection control measures	102 (61.1)	65 (38.9)	167 (100)
Few workers attending to many patients which results in TB suspects having longer interaction time with vulnerable patients	100 (59.9)	67 (40.1)	167 (100)
Unwillingness of health workers to declare their HIV status	99 (59.3)	68 (40.7)	167 (100)
Lack of adequate ward space encouraging HIV+ patients sharing ward with TB patients	87 (52.1)	80 (47.9)	167 (100)
Lack of facility for TB infection control	84 (50.3)	83 (49.7)	167 (100)
Lack of awareness of heightened vulnerability of PLWHA to TB infection	79 (47.3)	88 (52.7)	167 (100)
Lack of proper ventilation in the GOPD and the wards	70 (41.9)	97 (58.1)	167 (100)
Lack of National Policy guidelines on TB infection control	68 (40.7)	99 (59.3)	167 (100)
Lack of adequate space in the GOPD and other congregational places	67 (40.1)	100 (59.9)	167 (100)

Table 3: Administrative procedures in the facilities enhancing tuberculosis infection control practice

	Frequency	%
Presence of infection control unit or committee	1	8.3
Presence of infection control officer	5	41.7
Infection control officer attended course	2	16.7
Presence of work place policy document on HIV/AIDS	1	8.3
Presence of tuberculosis infection control policy document	1	8.3
	2	16.7
Qualification of infection control Officer: Doctor	1	8.3
Nurse	2	16.7
Community health extension Worker		

All of the co-infected patients had been placed on anti-tuberculosis treatment.

Environmental control measures at the waiting halls, consulting rooms and the wards: Majority [11 (91.7%)] of the waiting halls were well ventilated, and some of them in addition had ceiling fans for mechanical ventilation; 5 (41.7%) were overcrowded as at the time of the visits. Similarly, majority [8 (66.7%)] of the consulting rooms were well ventilated with two large windows providing cross ventilation with an additional ceiling fan providing mechanical ventilation; 3 (25%) were overcrowded with many doctors, nurses, patients and patients' relations sitting in one room during consultation at the time of the visit.

All the wards in the 12 facilities were well ventilated with natural and mechanical ventilation. However, 2 (16.7%) wards were overcrowded, while in 7 (58.3%) TB patients were nursed together with vulnerable patients such as HIV-positive patients. There were no air cleaners in any of the 12 facilities.

Respiratory control measures

None of the facilities were using any respiratory control measures.

Discussion

It is an established fact that of the three-level hierarchy of TB infection control measures, the administrative control or work practice measure is the first line of defense, the least expensive and easiest to implement and the most important.^[12] If administrative control and work practice measures are inadequate, the other levels of control might not be effective.

Most of the health facilities in this study were not implementing any of the components of the administrative control or work practice measures. Though the two commonest reasons given for this were having many patients to deal with in the GOPD and lack of training of health workers on TB infection control measures, it may have to do with the general attitude of health workers, especially

in public sector facilities. Studies of facility utilization in Nigeria have confirmed that most Nigerians perceive the services rendered by "Private for Profit" and Faith-based hospitals as of a better quality than those rendered by the public sector hospitals.^[13] This is corroborated by the findings of the present study where the only facility that has an infection control policy document, a work place HIV/AIDS control policy, where health workers routinely ask questions about cough and its duration at the health records, and where the workers periodically check patients who come to the waiting hall to detect suspected TB cases is a Faith-based Primary Health Care Center.

The general impression from the findings of this study is that there is no practice of periodic screening of health workers with Mantoux test for TB. It is significant that of the small number screened, 30% tested positive. It is obvious from this finding that if all the health facilities had a policy of performing TB screening on all health workers by Mantoux testing, the proportion of workers with a positive Mantoux test may have been higher. Studies^[14-17] have confirmed the higher occupational risk for TB infection among health care workers than the general population. The high proportion of positive Mantoux among the few workers who were screened might be an indication that the system may be missing many TB infections among health workers with grave consequences as a substantial number of the health workers last screened for HIV more than 6 months before the study. According to the guidelines from the CDC^[11] for preventing the transmission of *M. tuberculosis* in health care settings, periodic screening with TST (Mantoux) is recommended for all workers who have an occupational exposure to TB.

The finding that many more facilities were routinely screening TB patients for HIV than they were screening HIV patients for TB could be explained by the fact that HIV screening in a TB patient uses a single rapid test that will yield a valid result if the patient is infected, and in most centers, the test is free. On the other hand, Mantoux test in an HIV-positive patient may not be reactive due to anergy occasioned by immunosuppression. Moreover, the patient would have to pay for the test. The routine screening for TB recommended for HIV-positive patients is clinical screening with subsequent referral of TB suspects for laboratory investigations (either AFB test if they were having productive cough or CXR if they were not coughing). It is yet to be ascertained how many physicians perform this clinical screening for TB in an overcrowded busy clinic which the HIV clinics have become in Nigeria as a result of increased support from donor agencies.

The practice of nursing TB patients in the same ward with other vulnerable patients could be explained by the overstretching of facilities occasioned by the HIV epidemic. No matter what the reasons are, this is a practice

that would definitely increase nosocomial transmission of TB. It is therefore a practice that should be targeted for urgent change through expansion of facilities and through education.

Conclusion and Recommendations

From the findings above, we conclude that no health facility is implementing the three levels of TB infection control in GLRA-supported states in Nigeria. However, implementation of some aspects of the administrative control and work practice component of TB infection control measures range from 8.3 to 41.7% of the facilities.

We therefore recommend that the management of all health facilities ensure that these measures be instituted and enforced, and that training on TB infection control be conducted for all health workers to ensure effective TB infection control in TB/HIV settings.

We also recommend that all health workers in such settings undergo mandatory periodic Mantoux testing to ensure early detection, confirmation and treatment of TB infection among health workers.

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