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Tuberculosis Case Detection among HIV Positive Persons in the Oromiya Region of Ethiopia

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Abstract

Background: *Ethiopia has TB/HIV co-management guidelines but it was unknown whether these guidelines are being implemented at ART clinics. To identify whether Ethiopia's TB/HIV co-management guidelines were implemented at one ART clinic and whether the correct TB diagnostic procedures were used.*

Methods: *A total of 300 HIV-positive patient's records were reviewed by using purpose-designed checklists.*

Results: *Almost all patients (99.3%) were screened for TB on the day of their HIV-positive diagnosis. Patients completed questionnaires for TB screening. No additional investigations were recorded. Out of the 300 reviewed records, 84.3% of the patients did not have TB, 11.7% were TB suspects and 4.0% suffered from TB. Only 60.9% of patients for whom TB had been excluded, commenced with Isoniazid preventive treatment (IPT).*

Conclusion: *Ethiopia's TB/HIV co-management guidelines were not fully implemented at the study site. Screening HIV-positive persons for TB by symptom assessments only is inadequate and should have been augmented by sputum analysis and chest x-rays. Not all HIV-positive persons who tested negative for TB commenced with Isoniazid preventive treatment, increasing these persons' and their communities' risk of suffering from TB.*

Keywords: *Isoniazid preventive treatment (IPT), TB case detection, TB/HIV collaborative management, TB/HIV co-infection in Ethiopia*

Abbreviations:

AIDS – Auto Immune Deficiency Syndrome
FHAPCO – Federal Ministry of Health and Federal HIV/AIDS Prevention Control Office (of Ethiopia)
FMOH – Federal Ministry of Health (of Ethiopia)
HCT - HIV counselling and testing
HIV – Human Immune Deficiency Virus
IPT – Intermittent preventive treatment
MDR-TB – multi-drug resistant tuberculosis
TB - tuberculosis
VCT – voluntary counselling and testing
WHO – World Health Organization
XDR-TB – extremely multi-drug resistant tuberculosis

1. INTRODUCTION

Human Immune Deficiency Virus (HIV) infection is the infection with the highest mortality rate followed by tuberculosis (TB)[1]. Provided that TB is treated effectively, a person suffering from TB can get cured with approximately six months' treatment and can become non-infectious within 72 hours of commencing treatment. Multidrug-resistant TB (MDR-TB) and extensively drug-resistant TB (XDR-TB), HIV-associated TB, and weak healthcare systems pose major challenges for the effective implementation of TB control programmes[1,2,3,4].

HIV not only increases a person's susceptibility to TB infection but also the risk of rapid progression of TB as well as TB relapses and TB re-infections[5].

The FMoH and FHAPCO[7] and the WHO[4] guidelines for rendering collaborative TB/HIV services emphasise that TB case-finding should be prioritised among HIV-positive patients and IPT should be administered where relevant, surveillance of HIV prevalence among TB patients should be maintained at every stage of the disease[3]. Based on the TB screening results, patients will commence with IPT if they do not have TB, or be treated for TB treatment if TB has been diagnosed. The diagnostic methods used to confirm or exclude TB are microscopic examination of sputum smears, radiological investigations, acid-fast bacillus (AFB) culture, and histopathology, all of which are available in Ethiopia[5].

TB/HIV collaborative activities were implemented at centres providing anti-retroviral treatment (ART) throughout Ethiopia in 138 hospitals and at 280 health centres/ private clinics[7] during 2007. According to the Ethiopian Federal Ministry of Health (FMoH)[2], during 2010, only 44% of HIV-positive patients in Ethiopia were screened for TB, and only 6.6% of them received isoniazid prophylactic therapy (IPT)[6].

Ethiopia has reported adequate TB treatment outcomes (85%), but the TB case detection rate was only 35%, remaining below the WHO standard of 70%[1,2].

This study aimed to identify the procedures implemented to detect TB among HIV-positive persons at one Ethiopian hospital by attempting to identify whether:

- the TB/HIV management guidelines were implemented during TB case detections among HIV-positive persons
- the correct TB diagnostic procedures were used among HIV-positive persons
- HIV-positive persons were referred for TB investigations within a six months of their HIV-positive diagnosis.

2. Materials And Methods

A descriptive, quantitative and contextual research design was adopted to identify TB diagnostic procedures implemented among HIV-positive patients in one Ethiopian hospital. Record reviews were conducted of registered HIV-positive patients to ascertain whether Ethiopia's TB/HIV collaborative guidelines were implemented.

One hospital, in the Oromiya region of Ethiopia, providing services to an estimated 3000 patients per month, comprised the study site and the target population for the current study.

The researcher assessed TB diagnostic and treatment procedures recorded in the files of these PLWHIV provided they had had been diagnosed with TB at least six months prior to data collection.

The file number of each patient, visiting the ART clinic on a specific date, was placed into a container. An independent person blindly drew 15 numbers indicating 15 patients' files to be included in the current study on that specific day. Patients' files were excluded from the current study if the patient concerned had not been diagnosed HIV-positive at least six months ago, or if any patient was younger than 18 years of age. Additional numbers were then blindly drawn from the container until 15 files had been selected every day, for 20 days, comprising a sample of 300 files, amounting to 10% of the estimated 3 000 follow-up HIV patients who visited this ART clinic during the data collection month of November 2012.

A pre-tested checklist was used to record relevant information from the selected patients' files. The checklist's different sections required information about the patients' personal characteristics, TB screening, diagnostic and treatment procedures, and whether the FMoH's relevant guidelines had been followed.

Experts in Ethiopia's collaborative TB/HIV services confirmed that the checklist had face and content validity because every item related to TB/HIV collaborative services. The checklist's construct validity was confirmed because the expert reviewers agreed that every item on the checklist related to the FMoH guidelines on TB/HIV collaborative activities. The checklist was pre-tested on 10 HIV patients' files that were excluded from the actual study. No data recording or data analysis problems were encountered.

The first author kept a list correlating each checklist's number with the corresponding patient's file number. This list was protected by a secure password to which only the researchers and the statistician had access. A statistician checked the data entries from the completed checklists and assisted with the calculation and interpretation of the statistics.

Self-designed checklists were completed by the first author to record information from the patients' files without mentioning any patient's or any healthcare worker's name. The Higher Degrees Committee of the Department of Health Studies at the University of South Africa approved the proposal and granted ethical clearance. Permission to conduct the study was also granted by the management of the participating hospital (study site) and by the relevant Provincial Ministry of Health Administration.

3. Results And Discussion

3.1. Demographic Information

Of the 300 respondents' files, 56.2% (n=168) were females. The adult HIV prevalence rate in Ethiopia's urban areas for females was reportedly 9.25% compared to 6.2% for males[8]. This finding is similar to that reported by the 2012 demographic health survey conducted in Ethiopia indicating that generally HIV prevalence was higher for women than for men in most age groups[9].

Respondents' ages ranged from 18 till older than 50 years of age with a mean of 36.47, median of 35.5 and standard deviation of 9.42. Most respondents resided in urban areas (76.3%; n=229) probably attributable to the study site being part of an urban hospital. Of the respondents 50.7% (n=152) were married, 19.3% (n=58) were divorced or separated, 16.3 % (n=49) were widowed and 13.7% (n=41) were single. As many as 20.7% (n=62) of the respondents did not complete primary school while 37.3% (n=112) had done so, 31.3% (n=94) had completed secondary school, and 10.7% (n=32) had undergone some (unspecified) tertiary education. A respondent's education level might be irrelevant to his/her level of HIV/AIDS-related knowledge as shown in Bangladesh[10].

3.2. TB Screening Procedures Followed at the HIV Clinic

Almost all (99.3%; n=298) the HIV-positive persons had TB screening tests performed on the day when they commenced treatment at the participating ART clinic. Ethiopia's TB/HIV guidelines[11] specify that all HIV-positive patients should be screened by the HIV clinic, which was almost fully achieved by the HIV clinic. According to Assefa[12], out of 300 patients attending an Ethiopian HIV clinic between 80% and 95% were screened for TB at enrolment at the HIV clinic and at three monthly follow-up visits and 11% (n=34) were diagnos ed with TB.

3.3. Methods Used for Tb Screening

Only clinical assessments were reportedly used for TB screening in the current study. The patients merely completed a questionnaire requesting information about potential TB symptoms. No laboratory tests were conducted. The WHO recommends that TB screening should investigate four symptoms (current cough, fever, weight loss and night sweats) and prescribe IPT if these symptoms are absent[5]. This symptom-based screening questionnaire could facilitate TB screening in clinics where the prevalence of TB among PLWA is 5% or higher[1]. However, in resource-constraint areas with high HIV prevalence, the WHO recommends that additional investigations should be conducted besides clinical symptom assessments, such as acid-fast bacillus sputum test, sputum cultures and chest x-rays[5].

In Ethiopia routine data indicated that as many as 41% of TB patients were HIV-positive[8]. Therefore, delayed TB diagnosis and treatment might contribute to increased mortality rates among PLWHIV[1]. For HIV-positive persons in WHO stages 1 and 2, Ethiopia's FMoH[11] suggested clinical screening with sputum examinations. However, for HIV-positive patients in WHO stages 3 and 4, clinical assessments (including sputum examinations, chest x-rays and laboratory tests) should be conducted to enhance correct diagnoses of TB and the implementation of effective anti-TB treatment[11]. The FMoH's[11] guidelines were not fully implemented at the current study's site.

3.4. Outcomes of Tb Screening

The outcomes of the TB screening procedures, recorded in the 300 examined files, indicated that 84.3% (n=253) did not have TB; 11.7% (n=35) were TB suspects, and 4.0% (n=12) had been diagnosed as suffering from TB.

Out of the 253 patients who did not have TB, 60.9% (n=154) started IPT of whom 98.1% (n=151) completed their treatment, 1.3% (n=2) were still on IPT, and 1.3% (n=2) had disrupted their IPT. Namuwenge's[13] retrospective Ugandan cohort study reported that out of 586 patients who started IPT, 58.2% had defaulted, 33.6% completed IPT, 4.9% had discontinued taking IPT and 3.2% had died.

IPT reduces the risk of developing active TB[14]. Consequently, IPT is critical for reducing TB-related morbidity and mortality rates among HIV-positive patients. Preventing and curing TB

among PLWHIV help to reduce the global TB burden and to improve the quality of life of PLWHIV.

Out of the current study's 38 respondents who were treated for TB, 86.8% (n=33) completed their treatment, 7.9% (n=3) were successfully cured, and 5.3% (n=2) were still on treatment when data collection took place during November 2012. According to Hannock[15], out of 2 361 TB patients, 86% were cured or had completed their treatment, 5% died, 6% were lost to follow-up, 1% failed treatment, and 2% transferred to areas beyond the reach of the clinic providing TB treatment.

3.5. Challenges and Limitations of Tb-Related Activities

Almost all the patients' (98.3%; n=295) initial TB screenings were conducted by nurses, 1.0% (n=3) were screened by doctors and 0,7% (n=2) by community health workers. Only one patient's contacts were traced and found to be suffering from TB. Anti-TB category two drugs were prescribed for two patients because they had TB re-infections despite having been treated for TB.

In this study, in terms of patients' CD4 count at the point of the start of their HAART treatment, 72.1 %(n=214) were under 200, 23.2% (n=69) within the range of 200-349, and 4.7% (n=14) had CD4 counts greater than or equal to 350.

The measures of central tendency of the respondents' CD4 counts when ART was commenced included a mean of 172.34, median of 124.5 and standard deviation of 80.86. These statistics indicate that the average CD4 count of the current study's respondents was 172.34 (mean) and that 50% of the respondents had CD4 counts of less than 124.5 while 50% of respondents had greater than 124.5 CD4 counts (median).

3.6. Tb/HIV Co Management

In the current study, 95.7% (n=287) of the patients commenced taking HAART based on their CD4 counts while for 60% (n=180) clinical assessments were recorded in addition to their CD4 counts.

According to Salim et al[17] a randomised, controlled trial in Durban, South Africa, reported that using ART during anti-TB treatment improved HIV-positive patients' survival rates. According to Sileshi et al[18], mortality rates in Northwest Ethiopia were high among TB-HIV co-infected patients, despite available treatment, and associated with the lack of ART during TB treatment.

If TB is diagnosed in patients already receiving ART, TB treatment should be commenced immediately[19]. However, in such cases it should be considered whether ART requires modifications to counteract potential drug–drug interactions or to reduce the possibility of compounding potential toxicities, since both ART and anti-TB treatment can be hepatotoxic. If active TB occurs in a patient on ART, this could be regarded as ART failure requiring a changed ART regimen. If Nevirapine is used with Rifampicin and INH, severe hepato-toxicity can occur[19]. Thus for TB/HIV co-infected patients, an Efavirenz-based regimen should be used.

Reportedly [20] 49 AIDS patients, with active TB, were treated with Rifampin 600mg, Isoniazid 400mg and Pirazinamide 2g daily in addition to ARVs, consisting of Efavirenz (600mg/day) plus 2 NRTIs. Efavirenz at a daily dose of 600 mg was found to be sufficient and safe for treat ing TB/HIV co-infected patients using a rifampicin-containing regimen.

In the current study all patients with newly commenced ART regimens, did not include any Nevirapine-based regimens. This practice for TB/HIV co-management is commendable as there would be no need to change the patient's ART regimen when anti-TB treatment commences. INH, the main anti-TB drug used with a HAART regimen containing Nevirapine, increases the chances of hepatotoxicity[5], necessitating careful clinical management.

4. Conclusion

Almost all (99.3%) of the HIV-positive patients were screened for TB on the day that they commenced treatment at the HIV clinic. It was unknown why the other 0.7% (n=2) patients were not screened on that day as required in terms of the FMoH's guidelines[11]. The outcomes of the TB screening of HIV patients included that for 84.3% TB was excluded, 11.7% were TB-suspects and 4% were diagnosed as suffering from TB.

Out of the 256 patients who did not suffer from TB, 60.2% (n=154) had started IPT to prevent the potential progression of latent TB to active TB, and to help reduce the transmission rate of TB cases in communities. Those 102 patients

(39.8%) who did not start taking IPT, risked developing TB with potential negative consequences for their own quality of life and for spreading TB in their communities. It could not be determined why 39.8% of these patients did not receive IPT, but this situation might have been influenced by the potential hepatotoxicity of some ARVs combined with some anti-TB medications. Quality TB/HIV collaborative care should succeed in suppressing the patient's viral load to an undetectable level and to cure TB, but no reasons were recorded in these patients' files. Qualified and trained health workers could improve the quality of patients' lives through decreasing the morbidity of both HIV and TB[21].

This traditional symptom screening, conducted by patients' completion of a questionnaire, is insufficient for detecting TB among HIV-positive persons, especially at advanced WHO stages. In addition to the questionnaire, chest x-rays and sputum examinations could enhance the early diagnosis and timely treatment of TB. These additional diagnostic measures could prevent the inappropriate implementation of INH prophylaxis for HIV-positive patients suffering from undetected TB based on the completion of questionnaires only. This would cause delayed anti-TB treatment allowing the disease to progress and the patient's condition to deteriorate (with an increased viral load and a decreased CD4 count). The late implementation of anti-TB treatment is more problematic and more expensive than early initiated treatment with the risk that some people might have been infected with TB by the untreated TB patients.

4.1. Limitations of the Study

The study was conducted at one site where TB/HIV collaborative management had been implemented and cannot be generalised to other Ethiopian facilities providing such services.

Reviews of 300 HIV-positive patients' records were done. No information was collected from health professionals, and no observations were done, about the actual performance of HIV/TB collaborative practices in the participating clinic.

4.2. Recommendations

The hospital should be equipped to test HIV-positive patients for TB by using chest x-rays, sputum smears and microscopic cultures and sensitivity examinations.

IPT should be given to all HIV-positive patients for whom TB has been excluded and reasons should be recorded in patients' files for failure to do so.

Diagnostic tests that are sensitive and specific and easy to use in resource- constrained settings should be developed as a matter of great urgency.

The association should be investigated between the status of HIV-positive TB-excluded patients who commenced IPT early and completed the prophylactic regimen, and patients who did not do so.

Reasons should be investigated as to why only patients' completed questionnaires were accepted as clinical assessments of TB screening. The possibility of using x-rays and laboratory tests should also be investigated as well as the cost-effectiveness of implementing these additional diagnostic measures.

TB should be diagnosed and treated early among HIV-positive patients, and that IPT should be administered early to prevent the development of TB in HIV-positive patients who do not suffer from TB. However, IPT must be avoided in all persons already suffering from TB[22] as these patients require effective anti-TB treatment

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