



Provider-initiated HIV testing and counseling among tuberculosis patients in Kassala, Eastern Sudan

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Received 9 July 2011; received in revised form 30 September 2011; accepted 10 October 2011

KEYWORDS

Tuberculosis;
HIV;
PITC;
Uptake;
Sudan

Summary Because of the overlapping global incidence of tuberculosis (TB) and human immunodeficiency virus (HIV) infections, collaborative efforts are required for successful TB and HIV control programs. The current study was conducted at Kassala Hospital in Eastern Sudan and investigated the implementation of provider-initiated HIV testing and counseling (PITC) for patients infected with TB.

Using a cross-sectional study design, patients who had been recently diagnosed with TB between January and December 2010 were consecutively enrolled. A total of 858 newly infected TB patients were enrolled in the study. Of these patients, 152 patients (17.7%) were given counseling, and 109 patients (12.7%) underwent HIV testing. The overall HIV infection rate among those tested was 18.3%. From a multivariate analysis, female sex (OR = 17.0, 95% CI = 8.7–33.1; $P < 0.001$), education level below secondary education (OR = 2.6, 95% CI = 1.6–4.1; $P < 0.001$), rural residency (OR = 1.7, 95% CI = 1.3–2.9; $P = 0.001$), and non-governmental employee status (OR = 10.4, 95% CI = 6.7–16.3; $P < 0.001$) were each associated with lower rates of PITC.

Thus, in this setting, the frequency of PITC is low among TB-infected patients and is especially low for females, those of low educational status, and non-governmental employees.

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Introduction

The World Health Organization (WHO) has declared tuberculosis (TB) infection a global emergency, especially in countries with a high prevalence of human immunodeficiency virus (HIV) infection. Of the 9.27 million TB cases reported globally, 1.37

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million individuals (15%) were also HIV-positive, and the vast majority of these co-infection cases were in Africa [1]. The overlapping global incidence of TB and HIV necessitate collaborative actions between TB and HIV control programs to reduce the burden of both infections [2]. HIV testing and counseling for TB patients is an important method used to identify HIV-infected individuals who require medical care. The joint WHO and United Nations program on HIV-AIDS recommends provider-initiated HIV testing and counseling (PITC) for all TB patients [3]. Recently, rates of HIV testing among TB-infected patients were shown to be high in African countries with existing PITC strategies, as 59%, 65%, and 67.5% of TB patients had received HIV testing in Ethiopia, South Africa, and Uganda, respectively [1,4–6].

In Sudan, provider-initiated counseling and testing (PITC) was implemented in 2009, but standardized surveillance is currently lacking. Patients with TB and HIV co-infection have a higher mortality rate, and the total cost associated with the management of TB infection is significantly higher for HIV-positive patients compared with those who are HIV-negative [7,8]. However, no data have been published regarding the frequency of HIV PITC among TB-infected individuals in Sudan. The current study was conducted to investigate HIV PITC among TB-infected individuals at Kassala Hospital in Eastern Sudan to contribute towards an understanding of TB and HIV co-infections in Sudan [9,10].

Materials and methods

This was a collaborative study between the Ministries of Health (National TB Control Program and National AIDS Control Program) and Higher Education and Research in Sudan. Kassala, which is located in Eastern Sudan nearly 600 km from Khartoum, covers an area of 42,282 km² and has a population of 1.8 million. All patients infected with TB (pulmonary and extra-pulmonary) who had been documented at the Kassala Teaching Hospital between January and December 2010 were interviewed by professional counselors who were social science graduates from Kassala. The Received National Tuberculosis Control Program (RNTCP) provides patients with free TB health care, including diagnosis and treatment. All TB cases were reported, and all patients were offered PITC, according to the National AIDS Control Program (NACP) guidelines that include documented, informed consent. Pre- and post-HIV test counseling for all participants was provided, and HIV-infected patients had access to treatment and follow-up

care. These health centers are open daily from 8:00 am to 3:00 pm and serve all patients from both rural and urban areas of Kassala. The patients were initially assessed at the casualty department, and suspected TB cases were referred to the TB program referral clinic, which is open twice per week from 8:00 am to 3:00 pm, for further evaluation. A structured questionnaire was used to determine the patients' participation in PITC. After informed consent was obtained, pre-HIV test questionnaires were used to gather socio-demographic (age, education, residence, and employment) information as well as to explore the patient's willingness to undergo HIV testing. It was clearly explained to the patients that refusing PITC would not exclude the patient from free-of-charge TB treatment. HIV screening was conducted by qualified and trained staff using an enzyme-linked immunosorbent assay, and counselors reported the results to the patient on the day of the test.

Statistics

The data were entered into a computer database using SPSS software (SPSS Inc., Chicago, IL, USA, version 13.0). The means and proportions regarding age, gender, residence, education, and occupation were compared between those patients who accepted PITC and those who refused using Student's *t*-test and the χ^2 -test, respectively. Univariate and multivariate analysis were performed for cases where initiation of PITC was the dependent variable and age, gender, residence, and occupation were the independent variables. *P*-values < 0.05 were considered significant.

Ethics

Data from the program records were securely and confidentially held and maintained. The study received ethical clearance from the Health Research Board at the Ministry of Health in Kassala, Sudan.

Results

The ages of the 858 tuberculosis patients ranged from 18 to 62 years, and the mean (SD) age was 33.4 years (9.2). The majority of patients possessed below a secondary level of education (694, 81%), were female (441, 51.4%), and lived in a rural residence (483, 56.3%). Only 83 (9.7%) of these patients were government employees (Table 1). Although 152 (17.7%) patients initially agreed to have an HIV

Table 1 Demographic characteristic of TB patients in Kassala, Eastern Sudan.

Variable	Total TB patients (N= 858)	TB patients who accepted VCT (N= 152)	TB Patients who did not accept VCT (N= 706)	P
Age < 33.4 years	468(54.5)	79(52.0)	389(55.1)	0.5
Female	441(51.4)	84(55.3)	357(50.6)	0.3
Rural residence	483(56.3)	68(44.7)	415(58.8)	0.002
Education below a secondary level	694(81.0)	108(71.1)	586(83.0)	0.001
Employees	83(9.7)	63(41.4)	20(2.8)	<0.001

Table 2 Factors associated with poor uptake of HIV VCT in Kassala, Eastern Sudan according to univariate or multivariate analyses.

Variable	Univariate analysis			Multivariate analysis		
	OR	95% CI	P	OR	95% CI	P
Age < 33.4 years	1.1	0.7–1.6	0.4	1.18	0.8–1.7	0.3
Female gender	1.2	0.8–1.7	0.2	17.0	8.7–33.1	<0.001
Rural residency	1.7	1.2–2.5	0.002	1.7	1.3–2.9	0.001
Education below a secondary level	2.0	1.3–2.9	0.001	2.6	1.6–4.1	<0.001
No employees	2.4	1.8–3.1	<0.001	10.4	6.7–16.3	<0.001

OR, odds ratios; CI, confidence interval; P, probability.

test, only 109 (12.7%) were tested. Of the 109 TB patients who were tested, 20 (18.3%) were found to be HIV-positive. A lower education status, rural residence, and unemployment were significantly associated with a lower rate of HIV testing (Table 1).

Predictors of the lower rate of HIV testing

According to the multivariate analysis, female sex (OR = 17.0, 95% CI = 8.7–33.1; P < 0.001), low education level (below the secondary level) (OR = 2.6, 95% CI = 1.6–4.1; P < 0.001), rural residency (OR = 1.7, 95% CI = 1.3–2.9; P = 0.001), and non-governmental employee status (OR = 10.4, 95% CI = 6.7–16.3; P < 0.001) were associated with a lower rate of HIV testing (Table 2). However, age was not associated with PITC initiation.

Discussion

The main finding of the current study was that there is a lower PITC rate among patients with TB infection, and this was especially true for females, non-governmental employees, rural residents, and those with a lower level of education. Interestingly, the rates of HIV testing for TB-infected patients in other African countries are high, as this rate is 67.5% in South Africa [4], 65% in Uganda [5], and 59% in Ethiopia [6]. Previously, we reported that

one-third of pregnant women in Khartoum accepted HIV testing [9]. HIV testing in this study was reasonably efficient, but the HIV status of 87.2% of the TB-infected patients remains unknown. Similar to the situation in Ethiopia, this may be indicative of a gap between the patient’s willingness to be screened and his/her willingness to actually complete the HIV test.

In contrast to results obtained in South Africa suggesting that female sex and unemployment were patient factors associated with a higher rate of acceptance of HIV testing among TB patients [4], the results of the current study demonstrate the reverse, as female patients and those not employed by the government had a lower acceptance rate for HIV testing. However, in Ethiopia, government employees and merchants were more likely to be tested for HIV compared with jobless individuals [6]. The low rates of HIV testing among females in this setting may indicate that a female’s decision regarding HIV testing is influenced by her husband’s test status.

This study, as well as other studies in Ethiopia, found education to be a predictor of HIV testing among TB-infected patients [6]. Therefore, more effort should be directed towards improving the educational level of patients in this setting. HIV counseling and testing are two of the most effective HIV interventions that contribute to the prevention of infection.

In the HIV voluntary counseling and testing (VCT) model, health care workers question patients about whether they wish to receive HIV counseling and testing. The burden of decision making is placed on the individual patient, and the patient must accept this offer to receive HIV counseling. In June 2004, UNAIDS and the WHO [3] issued a policy statement in support of provider-initiated HIV counseling that would shift the burden of decision making from the patient to the health care provider. Here, patients retain the right to refuse testing or 'opt out' of a systematic testing procedure [3], but this approach has not been investigated in Sudan.

Conclusions

PITC had a low acceptance rate among TB-infected patients in this setting, and this was especially true for females, those with a lower educational level, and those not employed by the government.

Funding

No funding sources.

Competing interests

The authors declare that they have no competing financial interests.

Authors' contributions

TMA and IA designed the study. TMA and AAA conducted the clinical investigation. All authors

participated in the statistical analysis. All authors read and approved the final manuscript.

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