

## Short Communication

# Seroprevalence of HIV infection among tuberculosis patients in Kassala, eastern Sudan

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There is strong need to address the tuberculosis (TB) and human immune deficiency (HIV) virus infection convergence. Aiming to investigate the seroprevalence of HIV among TB patients all notified cases of TB that were reported in Kassala Teaching Hospital, eastern Sudan, during January 2008–through December 2010 were reviewed and analyzed. There were 858 TB patients enrolled in the study, of these 152 (17.7%) were counseled, 109 (12.7%) underwent HIV testing. The overall HIV infection rate was 18.3% among the investigated patients while the type of the disease was not associated with HIV co infection. Low CD4 ( $< 200 \text{ cu.mm}^3$ ) count was significantly associated with HIV co infection (*P value* 0.5 and 0.000 respectively). In conclusion there is high seroprevalence rate of HIV among TB patients in Kassala, eastern Sudan; thus urgent intensified intervention is needed including voluntary screening for all tuberculosis patients.

**Key words:** Tuberculosis, HIV, morbidity, mortality, Sudan.

## INTRODUCTION

Tuberculosis (TB) is a major cause of morbidity and mortality and the control of the concomitant of HIV and tuberculosis epidemics is a major challenge facing countries in sub Saharan Africa (Corbett et al., 2003). In sub-Saharan Africa many patients notified with tuberculosis are also co infected with HIV there fore there is strong need to increase the effort to address the convergence of tuberculosis and HIV (WHO, 2004).

Early detection of HIV among TB patients is very important for preventive purposes; it offers an opportunity to introduce prophylactic therapy and antiretroviral treatment that reduces the morbidities and mortality (Havlir et al., 2008). Testing of HIV, care and treatment services preceded by access to HIV counseling is adopted and rapidly expanding under the National AIDS Control Programmes (NACP, 2008)

The first case of HIV and AIDS in Sudan was reported in 1986 and Sudan is an endemic area of tuberculosis however there are few published data -none is available in Sudan- concerning TB –HIV co infection (UNAIDS, 2004; Ahmed et al., 2006; Khan et al., 2001). The aim of

the present study was to investigate seroprevalence of HIV among tuberculosis patients in Kassala, eastern Sudan.

## MATERIALS AND METHODS

Kassala, eastern Sudan, is 42282 square kilometer, populated by 1.8 million and it is nearly 600 kilometer from Khartoum, capital of Sudan with a prominent diversity in culture, religion, language and ethnicity. Eastern Sudan is bordered by two African countries having a high prevalence of HIV infection (Nasir et al., 2008). All notified cases of tuberculosis (pulmonary and extra pulmonary) that were reported in Kassala Teaching Hospital during the period of January 2008 through December 2010 were reviewed and analyzed. A structured questionnaire was used to gather the socio-demographic characteristics, CD4 count and HIV co-infection and these data were compared between different groups of patients. HIV statuses was defined as positive or negative and at the time of their two month follow up, all tuberculosis patients were offered a free, voluntary HIV screening after verbal justification and consent. This screening programme was introduced by Tuberculosis Control Programme, Ministry of Health in Kassala, eastern Sudan since January 2010 and it was explained that non compliance would not influence the clinical management of the patients (Rifampicin + Isonid + Pyrizinamide + Streptomycin) in any way. HIV screening was conducted by qualified and trained staff and initial testing was performed using rapid assay, reactive specimen was retested by Enzyme-Linked ImmunoSorbent Assay (ELISA). The CD4 cells were calculated as a number of cells in a cubic millimeter ( $\text{cu.mm}^3$ )

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**Table 1.** Comparison between HIV –ve and HIV +ve tuberculosis patients.

Variable	HIV +ve cases [(N=20) (%)]	HIV –ve cases [(N=89) (%)]	P
Age	34.4(8.9)	33.2(8.8)	0.9
Male patients	17(85)	51(57.3)	0.01
Urban residence	6 (30)	58(65.2%)	0.004
Illiteracy	13 (65)	64 (71.9)	0.3
Extrapulmonary disease	3 (15)	15 (16.9)	0.5
CD4, < 200\cu.mm <sup>3</sup>	12(60)	10(11.2)	000

of blood and CD 4 < 200\cu.mm<sup>3</sup> was used as indicator for immune damage.

Data were entered into a computer database and SPSS software (SPSS Inc., Chicago, IL, USA, version 13.0) and double checked before analysis. Means and proportions for the socio-demographic characteristics, type of disease and CD4 count were compared between the groups of the study using student and  $\chi^2$  test, respectively and  $P < 0.05$  was considered significant.

The study received ethical clearance from the Health Research Board at Ministry of Health, Kassala, eastern Sudan.

## RESULTS

During the study period there were 858 reported tuberculosis patients. Although 152 (17.7%) of these 858 TB patients agreed to do HIV test initially, only 109 (12.7%) had done the test and twenty out of the 109 tested TB patients had HIV co-infection yielding a prevalence rate of 18.3%. The age of the enrolled TB patients ranges between 18 – 62 year with mean (SD) 33.4 (9.2), the majorities of these patients had education < secondary levels (694, 81%), female (441, 51.4%) and of rural residence (483, 56.3%). Only 83 (9.7%) of these patients were governmental employees.

Pulmonary tuberculosis accounts for 83.5% and extra pulmonary disease for 16.5%. All the enrolled patients were on antituberculous drugs (rifambicin+isonid and ethambutol).

Among the investigated patients while low CD4 count (<200\cu.mm<sup>3</sup>) was significantly associated with HIV co infection, the type of the disease was not ( $P$  value 000 and 0.5 respectively) and the seroprevalence was higher among male rather than female TB patients (Table 1).

## DISCUSSION

This study represents the first reported HIV-prevalence data among tuberculosis patients in Sudan and it showed high seroprevalence of HIV among tuberculosis patients. This is nearly 4 times the threshold (5%) at which the WHO recommended intensified intervention to address HIV-tuberculosis, including voluntary screening for all tuberculosis patients (WHO, 2004), thus this finding support the recent decision of the Ministry of Health to adopt the screening programme among tuberculosis patients. Yet, it might be difficult to expand such

programme among tuberculosis patients like other African countries because Sudanese people had poor uptake for HIV testing and counseling (Mahmoud et al., 2007).

Like other studies in different developing countries the HIV co infection in our study showed more prevalence among male tuberculosis patients (Ramachandran et al., 2003). HIV infection among TB patients remains surprising, it has been reported that more than 1 in 6 TB patients aged 25 – 44 year infected with HIV, moreover HIV infection among TB patients was observed in all age groups (NACP, 2008). Although HIV testing in this study was reasonable efficient, still the HIV status of 87.2% TB patients remained unknown and like neighboring Ethiopia, this might indicate the possibility of gap between initial willingness for the screening and actual attendance for the test (Jerene et al., 2007).

Several studies reported that the HIV prevalence is more common among patients with extra pulmonary tuberculosis (Kipp et al., 2008) in comparison with pulmonary disease, however the results in our current study is in consistent with this observation, it is likely this joint association of extra pulmonary tuberculosis and HIV is due to immunosuppression, we feel this is likely since there is significant association between the HIV-tuberculosis co infection and CD4 count, but many factors might affect the host immunity regardless the type of the disease like genetic variation, host immunity response, and other confounding factors like ethnicity and nutritional status of the patients.

In conclusion there was high seroprevalence of HIV among tuberculosis patients in Kassala, eastern Sudan. It was 4 times the threshold at which the WHO recommended voluntary screening and more common among male patients, while CDS count was significantly associated with HIV-tuberculosis co infection, extrapulmonary disease was not.

Our study was a hospital-based one; which might not reflect what was at the community level thus more research is needed.

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## REFERENCES

- Ahmed SMM, Aro AR, Sodemann M (2006). Evaluation of tuberculosis control programme in Khartoum state for the year 2006. *Scnd J. Public Health.*, 37(1): 101 – 8.
- Corbett E, Watt CJ, Walker N, Maher D, Lazzari S (2003). The growing burden of tuberculosis: global trends and interactions with HIV epidemics. *Arch Int. Med.*, 163: 1009-1021.
- Havlir DV, Getahun H, Sanne I, Nunn P (2008). Opportunity and challenges for HIV care in overlapping HIV and TB epidemics. *JAMA*, 300: 423-430.
- Jerene D, Endale A, Lindijorn B (2007). Acceptability of HIV counseling and testing among tuberculosis patients in South Ethiopia. *BMC Int. health Hum. Rights*, 7: 4.
- Khan M, Pillay T, Moodley JM, Connolly C (2001). Maternal mortality associated with tuberculosis-HIV-1 co-infection in Durban South Africa. *AIDS*, 15: 1857–63.
- Kipp AM, Stout JE, Hamilton CD, Rie AV (2008). Extra pulmonary tuberculosis, human immunodeficiency virus, and foreign birth in North Carolina, 1993-2006. *BMC Public Health.*, 8: 107.
- Mahmoud MM, Nasr AM, Gasmelseed DE, Abdalhafiz MA, Elsheikh MA, Adam I (2007). Knowledge and attitude towards HIV voluntary counseling and testing services among pregnant women attending a prenatal clinic in Sudan. *J. Med. Virol.*, 79: 469-73.
- Nasir EF, Astrom AN, David J, Ali RW (2008). HIV and AIDS related knowledge, source of information and reported need for further education among dental students in Sudan- a cross sectional study. *BMC Public Health*, 8: 286.
- National AIDS Control Organization (2008). UNGASS Country Progress Report 2008-India. New Delhi: Ministry of Health and Family Welfare, Government of India. <http://data.unaids.org/pub/report/2008/india>.
- Ramachandran R, Datta M, Subramani R, Baskaran G, Paramasivan CN (2003). Seroprevalance of human immunodeficiency virus (HIV) infection among tuberculosis Patients in Tmil Nadu. *Indian J. Med. Res.*, 118: 147-151.
- UNAIDS U, WHO (2004). Assessment of the epidemiological situation UNAIDS; 2004.
- World Health Organization (2004). Intenrim Policy on Collaborative TB\HIV Activities. Geneva. WHO\HTM\TB\2004.330.