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RESEARCH ARTICLE

PREVALENCE OF HUMAN IMMUNODEFICIENCY VIRUS INFECTION AMONG TUBERCULOSIS PATIENTS IN OMDURMAN - SUDAN

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ABSTRACT

Background: Co-infection with Human Immunodeficiency virus (HIV) and *Mycobacterium tuberculosis* has been referred to as the ''cursed duet'' because of the attendant high morbidity and mortality due to their synergistic actions.

Objective: The aim of this study was to determine the frequency of HIV among Tuberculosis (TB) confirmed patients attending the Tropical Diseases Hospital (Omdurman).

Methods: Blood samples were collected from 80 TB patients attending the Tropical Diseases Hospital in Omdurman from March to June 2013. HIV was detected by using DS-EIA-HIV-AG+AB kit (It is an enzyme immunoassay for simultaneous detection antibodies to Human Immunodeficiency Virus (HIV-1 and HIV-2), (HIV-1 group O and antigen p24 HIV-1 in human Blood serum or plasma).

The results: Out of the 80 patients screened, 9 (11.3%) were found HIV positive. The detection of co infection was higher among the male (11.5%) than the female (10.5%) patients and highest among those aged (less than 50 years old).

INTRODUCTION:

Tuberculosis (TB) has existed in humans since antiquity and has been reported as the most common expressive and infective respiratory disease that results from the inhalation of air droplets infected with tubercle *Mycobacterium tuberculosis* [1,2]. An estimated 1/3 of the world's population is infected with the bacterium with the highest prevalence of the disease found in sub-Saharan Africa and Asia [2,3]. More than half of these live in countries ravaged by HIV/AIDS [4]. The emergence of drug resistant strains has diminished the hope of completely eliminating the disease [5]. Similarly, the emergence of Human Immunodeficiency virus (HIV) has paved way for the resurgence of *Mycobacterium tuberculosis* infection. While HIV is the most powerful risk factor for the progression of *Mycobacterium tuberculosis* infection to TB disease TB accelerates the progression of HIV to AIDS and shortens the survival of such patients [6,8]. Being infected with both HIV and *Mycobacterium tuberculosis* is the world leading cause of death due to infectious agents [9]. Surveillance of HIV among TB patients has been recognized as important as the HIV epidemic continues to fuel TB epidemics. In many countries, HIV prevalence among TB patients is a sensitive indicator of the spread of HIV in to the general population [10]. Reports show that the sub-Saharan Africa, HIV prevalence rates among TB patients range from 24 - 67%, while lower rates of 0.4 - 20.1% have been reported in India [4]. In the San Francisco study, 3.7% of TB cases had HIV [11]. Likewise 30% Co-infection in Trinidad and Tobago [12] and 28.2% in Guyana [13] have been reported. The prevalence of HIV infection among TB patients in several African countries ranges from 20% to 60% [14]. The world health organization (WHO) estimates that about 8 million new cases of TB and nearly 2 million deaths from the disease occur each year [15]. Approximately 10 million people are estimated to be co-infected between TB and HIV and over 90% of these dually infected individuals reside in developing nations. The HIV epidemic has increased the global TB burden and focused attention on the need to strengthen links between TB and HIV/AIDS program. In response to these health emergencies, the WHO has developed an expanded strategy aimed at reducing the burden of HIV-related TB infection through close collaboration between TB and HIV/AIDS programs. The overlap of tuberculosis and HIV has ominous social and medical implications, particularly for the developing countries. The increase in tuberculosis cases has considerable pressure on the already fragile and over-stretched health services of such countries with more demand for diagnostic services, anti-tuberculosis drugs, hospital beds and other supplies and services [16]. Moreover, HIV infected patients have a higher frequency of extra-pulmonary tuberculosis, which is more difficult to diagnose than pulmonary tuberculosis [17]. Increasing numbers of AIDS and tuberculosis cases and deaths are

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likely to occur among young and adults in their economically most productive years. This has tremendous social and economic implications. Asserted that, the fear is also that the increasing numbers of HIV-positive patients with tuberculosis will lead to increase in the transmission of tuberculosis to the rest of the population, thereby resulting in an increased proportion of the population being infected with the tuberculosis bacilli in the future [18]. 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 [19,20]. The first case of HIV in Sudan was reported in 1986 and Sudan is an endemic area of Tuberculosis however there are few published data concerning TB –HIV Co-infection in Sudan [21,22]. The aim of the present study was to determine the frequency of HIV among Tuberculosis patients in Tropical Diseases Hospital, Omdurman, Sudan.

MATERIALS AND METHOD:

Subjects:

A total of 80 confirmed pulmonary TB patients were consecutively recruited for this study from March to June 2013. The diagnosis of TB in the chest clinic is based on patients providing 3 sputum specimens on 3 consecutive days, examined for acid fast bacilli (AFB) by using Ziehl-Neelsen Technique. Inclusion criteria included microbiological confirmation of pulmonary TB.

Sampling and HIV Detection:

Blood samples were collected from all of the consenting patients and screened for the presence of (HIV-1, HIV-2, Sub Group O and P24) using a chromatographic qualitative ELISA test kit (DS-EIA-HIV-Ag+Ab KITS is an enzyme immunoassay for simultaneous detection antibodies to human immunodeficiency virus 1 and 2 types (HIV-1 and HIV-2), HIV-1 GROUP O and antigen P24, HIV-1 in human blood serum or plasma. (DSI ELISA kits manufacture via Avolonteri , Saronno , Milan, Italy).

RESULTS:

As shown in table (1) out of the 80 patients 61 (76.3%) were males; while 19 (23.7%) were females. The patients median age was 30.5, about half of them were younger (less than 30 years), while elders represent 22.5%. HIV was detected in 9 (11.3%).

Table 1: Age, gender and HIV among study population

Characteristic	No. of patients	% of patients
Gender		
Male	61	76.3
Female	19	23.7
Age, years		
< 30	36	45.0
30 – 50	26	32.5
> 50	18	22.5
HIV		
Positive	9	11.3
Negative	71	88.7

As shown in table (2) there was no significant statistical relationship between HIV and age (*P Value:* 0.17), but elder were tending to be more susceptible.

Table 2: Relationship between HIV and age groups

		Age (years)			
		<30	**30 – 50**	**>50**	**Total**
HIV	Positive	**03** (03.8%)	**02** (02.5%)	**04** (05.0%)	**09** (11.3)
	Negative	**33** (41.2%)	**24** (30.0%)	**14** (17.5%)	**71** (88.7)
Total		**36** (45.0%)	**26** (32.5%)	**18** (22.5%)	**80 (**100)
P Value: 0.17					

As shown in table (3) there was no significant statistical relationship between HIV and gender (*P Value:* 0.6), but 7 out of 9 HIV infected patients were males.

Table 3: Relationship between HIV and gender

		Male	Female	Total
HIV	Positive	**07** (08.8%)	**02** (2.5%)	**09** (11.3%)
	Negative	**54** (67.5%)	**17** (21.2%)	**71** (88.7%)
Total		**61** (76.3%)	**19** (23.7%)	**80** (100%)
P Value: 0.6				

DISCUSSION:

In the present study HIV was detected in 9 (11.3%) out of 80 TB patients. This finding is relatively lower than that recently reported during 2011 by Abdalla *et, al.,* [23] who found that the frequency of HIV among TB patients in Kasala – Eastern Sudan was 18.3%. The two studies reported a high detection of HIV among TB patients in Sudan; thus this finding supports the recent decision of the ministry of health to adopt the HIV screening program among tuberculosis patients. In this study and like many other studies HIV infection among TB patients was observed in all age groups [24]. Result from this study nearly similar or higher to that of a study in Cambodia (9.9%) [25], South West Guatemala (10.8%) [26], San Francisco (3.7%) [11]. Although it was lower when compared with reports from other parts of the globe for example, 44.1% in Tanzania [27], 30.0% in Trinidad and Tobago [12] , 28.2% in Guyana [13] and 23.6% in Florida [28]

CONCLUSION:

Based on the finding of this study the frequency of HIV among TB patients is moderately high in Tropical Diseases Hospital (Omdurman). This is a great concern especially as it might affect both management public health prospective. Therefore, underscores the need for routine HIV serology on all TB patients. We recommend that there be strict compliance to the Centers for Disease Control and Prevention (CDC) recommendation that all newly diagnosed TB patients must be tested for HIV after counseling. Reactivation of TB among people living with HIV can be reduced by TB preventive therapy and by universal access to antiretroviral therapy.

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