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A Study of Existence of Tuberculosis in HIV Sero-Positive Patients and Comparative Study between Pulmonary and Extra Pulmonary Tuberculosis at M.B. Govt. Hospital, Udaipur, India

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Tuberculosis (TB) and HIV have been closely linked since the emergence of AIDS. Worldwide, TB is the most common opportunistic infection affecting HIV-seropositive individuals and it remains the most common cause of death in patients with AIDS. Aim is to determine the percentage of tuberculosis infection in HIV seropositive patients and to assess the type of pulmonary or extra pulmonary tuberculosis infection in Human immuno deficiency virus (HIV) seropositive patients in Udaipur zone. This study will be conducted in the Department of Microbiology, R.N.T. Medical College and associated groups of Hospital, Udaipur. The study was carried out for 6 months in 2016. During this period 5410 patient's blood were collected and processed The patient populations included in the study were HIV seroreactive by card tests and existence of Tuberculosis by data record which were confirmed by Ziehl Neelson staining and culture positive. Total 5410 samples were collected and processed, 500 were HIV seropositive. Seropositivity of HIV is 9.24%.Percentage of TB in HIV seropositive patients is 11.6%. Tuberculosis is also higher in males (77.5%) than females (20.68%). Most affected age group is 31-40 years followed by 21-30 years. Tuberculosis is high in Married (60.3%). Both HIV and Tuberculosis's patients education level is Non-literate (42%, 43.10% respectively) followed by primary level education and Tuberculosis also high in Non-agricultural labourer (25.8%) followed by Agricultural landholder (20.68%), Housewife (8.62%). Pulmonary TB (94.82) is more than extrapulmonary TB (5.17%) in our study and sputum negative (67.27%) ratio is more than sputum positive (32.72%), in extra pulmonary TB all cases (3) were from cervical region. Improvement of information, education, communication (IEC) and HIV/AIDS awareness and treatment through ICTC, ART and DOTS is one of the most effective strategies to control HIV/AIDS and TB.

Introduction

Tuberculosis is the most common HIV-related opportunistic infection in India, and caring for patients with both diseases is a major public health challenge. Tuberculosis (TB) and HIV have been closely linked since the emergence of AIDS. Worldwide, TB remains the most common cause of death in patients with AIDS. HIV infection has contributed to a

significant increase in the worldwide incidence of TB. By producing a progressive decline in cell-mediated immunity, HIV alters the pathogenesis of TB, greatly increasing the risk of disease from TB in HIV-coinfected individuals and leading to more frequent extrapulmonary involvement (1).

Tuberculosis (TB) is a highly prevalent chronic infectious disease caused by Mycobacterium tuberculosis an aerobic intracellular binding bacterium (bacillus) (2). Global propagation of TB more than any other disease is affected by social and economic factors. The persistence of TB is compounded by the fact that resources to combat TB in the affected countries are very scarce. With the emergence of HIV infection has made the situation worse (3).

HIV positive and HIV negative patients with active pulmonary TB generally manifest similar clinical features, namely cough, fever, night sweats, haemoptysis and weight loss. The presentation may sometimes vary with the degree of immune suppression (4).

In immune suppressed patients, the overall risk of TB is even higher, but it is more difficult to distinguish TB from other serious chest diseases. In persons with advanced HIV infection, disseminated and extra pulmonary TB (EPTB) are more common than in early HIV infection, and may be as common as pulmonary TB. The most common forms of EPTB seen are lymphadenitis, pleural effusion, pericarditis, miliary disease and meningitis. Smear-negative TB is as common as smear-positive TB. (5)

The Government of India announced its plan to eliminate tuberculosis (TB) by 2025 during the Union Budget address last month. The declaration is extraordinarily ambitious, considering that India accounts for 27% of the world's 10.4 million new TB cases, and 29%

of the 1.8 million TB deaths globally. India also accounts for 16% of the estimated 480 000 new cases of multidrug-resistant TB. The End TB Strategy by WHO aims to end the global TB epidemic, with targets to reduce TB deaths by 95% and to cut new cases by 90% by 2035 (6).

The main objectives of this study to determine the percentage of tuberculosis infection among Human immunodeficiency virus (HIV) seropositive patients in Udaipur zone and to assess the type of pulmonary or extra pulmonary tuberculosis infection in Human immuno deficiency virus (HIV) seropositive patients in Udaipur zone.

Materials and Methods

Patients enrolled in the study will from Integrated Counseling and Testing Centre (ICTC) of M.B. Govt. Hospital and T.B. & Chest hospital, Individuals attending OPD and IPD of R.N.T Medical College and associated group of hospital, Udaipur, with symptoms of fever, cough, night sweating, weight loss, any swelling. The patient populations included in the study were HIV seroreactive. Samples were subjected to card tests and existence of Tuberculosis by data record which were confirmed by Ziehl Neelson staining and culture positive. The study was carried out for 6 months in 2016. During this period 5410 patient's blood were collected and processed. Out of 5410 samples 500 were HIV seroreactive.

Serum sampling

About 3-5ml of whole blood collected aseptically in plain sterile vial, without anticoagulants, by vein puncture, leave to settle for 30 minutes for blood coagulation and then centrifuge. Serum was separated from clot as soon as possible (to avoid hemolysis) or within 4hours by centrifuging

at 1000rpm for 10 min. Negative and positive control test were put with each set for validation of tests, interpretation of test and method of testing were as per manufacturers instructions.

Interpretation was also done by using algorithm for HIV testing. Strategy III involves (a) all samples tested with one ELISA / rapid test; (b) reactive samples from the first test tested with different antigen or principle; (c) reactive samples from the second test are again retested with third system of different antigen or principle. After HIV test results were known post-test counseling was done and the results were declared. Confidentiality of the data was maintained. HIV seropositive patients were confirmed by three tests in our lab. In which we were use COMBAIDS-RS Advantage –ST (HIV 1+2 immunodot test kit) AIDSSCAN HIV-1/2 RAPID TRISPOT TEST KIT and SD BIOLINE HIV 1-2.

We had taken TB positive data from Records which were confirmed by Culture positive and Ziehl Neelsen staining. According to RNTCP guidelines Two sputum samples are recommended- spot samples and early morning sample (collected on the next day).In extrapulmonary tuberculosis depending on the site involved various specimens are collected such as lymph node aspirate, pleural fluid, urine, synovial fluid, cerebrospinal fluid, pus from cold abscess or tissue biopsies.

Results and Discussion

In our study total 5410 samples were processed. In these samples 500 were HIV seropositive. These 500 seropositive HIV also screened for Tuberculosis. Out of 500 samples of HIV seropositive, 58 (11.60%) were positive for Tuberculosis and 442(88.40%) were Tuberculosis negative. Out 58 patients, 55 (94.83%) had pulmonary

tuberculosis and 3 (5.17%) had Extra pulmonary tuberculosis. These 55 were again divided into on the basis of sputum, 18 patients had sputum positive pulmonary TB (32.72%) and 37 (67.27%) patients had sputum negative pulmonary TB (Table 1 and Chart 1).

In HIV-infected patients, progressive decline in their immunological response makes them susceptible to variety of common and opportunistic infections like TB. So percentage of TB in seropositive patients is 11.6%. It's closely similar to study done by Mulla *et al.,* (7) 2007 in Surat. Similarly studies done by Kennath *et al.,* (8) in South Sudan 2012 is 9%, Nayak *et al.,* (9) 2013 is 13.17% in Surat, Lata *et al.,* (10) 2015 in Akola (Maharashtra) is 17.93%, Ramchandra Kmath *et al.,* (11) 2013 in Karnataka is 18.9% and Seada Mohammad (12) 2015 Ethiopia is 20.3%.This variation may be due to the geographical and socio-economical status of the states. It has been noted that tuberculosis is seen more in states /countries that are poor.

Tuberculosis again subdivided into pulmonary and extrapulmonary TB. In our study percentage of Pulmonary TB is more than Extrapulmonary TB. Out of 58, 55 had pulmonary TB (94.82%) and 3 (5.17%) had extra pulmonary TB. In extrapulmonary mostly have cervical region TB is most common. This study is similar to Ranjani *et al.,* 2002(PTB 85%, ETB 15%) (13), Nayak *et al.,* 2013(PTB 81.82%, ETB 18.18%) (9), In this studies ratio of pulmonary TB is more than extrapulmonary TB. Reason is extrapulmonary TB's symptoms appearing late and it's remain undiagnosed upto late stage.

In the pulmonary TB again subdivided into sputum positive and sputum negative.18 (32.72%) had sputum positive, 37 (67.27%) had sputum negative TB. This is similar with

other studies of Naresh *et al.,* 2013, Saeda *et al.,* 2015, Sudha *et al.,*, Praveen Kumar *et al.,* 2002, Pratima *et al.,* 2005 (12,14,15,16) (Chart 3).

Out of 500 patients, 58 were Tubercular HIV seropositive, and 45(77.5%) were male and 12 (20.68%) were females and 1 (1.62%) was TS/TG. Similarly study was found in Naresh Gill *et al.,* 2013 (17) in Mumbai (males 73.8%, females 26.2%), Nayak *et al.,* (2013) (9) in Surat (males 72.73%, females 27.27%), Ragini *et al.,* 2009 in Vadodara (males 68.7%, females 31.3%), Lata *et al.,* 2015 (10) in Akola (Maharastra) (males 63.63%, females 36.36%). In their study had also reported more males than females. This may be due to common habits of man including smoking and alcohol intake as compare to females.

31-40 age group was mostly affected and percentage was 37.93% followed by 21-30 age group (24.13%) and then 41-50 age group were affected. Upto 20years and more than 60 years age group were least affected (0%) The explainable reason behind such findings might be the smoking habit and active participation in outdoor activity. Further, the involvement of present study showed that the smoking or/and alcohol drinking might have started the age after 21years and the intensity

of intake becomes maximum at the level of 31-60 years and that is why, maximum number of patients were included in 31-40 years followed by 21-30 years and 41-50 years. These findings were similar with Ragini *et al.,* 2009(13) (43.7%), Naresh *et al.,* 2013 (34.30%) (17), Purushotam *et al.,* (18)2013 (37.93%) (18) in 31-40 years age group. In some study this study is contrast because of age group involved might be attributed to the variation in the study group, socio-economic condition of patient population (Table 2). Out of 58 patients, 25 were illiterate and percentage was 43.10%. Then 22 were educated at primary school level (37.93%) and high school 6 (10.34%), secondary school level 5 (8.62%). 0% found in college and above. This slightly contrast with studies done by Mihir *et al.,* 2011 (19), Naresh *et al.,* 2013(17), Saeda *et al.,* 2015 (12) in which education level at primary level (60.9%, 34.5%, 32.7% respectively) followed by illiterate. This is because of mostly patient from poor background so unable to get education for awareness. TB affects low income and low education class. This illiterate found because Rajasthan is tribal area so people are unaware from education and don't want to study and other reason is poverty. So ill-literacy is found more (Table 3).

Table.1 Assess the percentage of tuberculosis and types of tuberculosis in total samples screened for tuberculosis

Total samples screened for TB	Total Tuberculosis patients positive in screened samples (n=58)			Percentage (%) of TB in total screened samples for TB
500	No. of Pulmonary TB patients(PTB) 55 (94.83%)		No. of Extra pulmonary TB patients (ETB) 3 (5.17%)	11.60%
	Sputum positive TB	Sputum negative TB		
	18 (32.72%)	37 (67.27%)		

Table.2 Agewise distribution of Tubercular patients in total HIV-TB seropositive patients (n=58)

Serial no.	Age group (years)	Total HIV-TB patients (M+F)	Percentage
1	Upto 20	0	0
2	21-30	14	24.13%
3	31-40	22	37.93%
4	41-50	11	18.96%
5	51-60	11	18.96%
6	>60	0	0
	Total	58	

Table.3 Distribution of Tubercular HIV seropositive patients according to occupation relationship (n=58)

Serial no.	Occupation	Total (M+F)	Percentage (%)
1	Agricultural labourer	0	0%
2	Non-agricultural labourer	15	25.8%
3	Domestic servant	1	1.72%
4	Housewife	8	13.79%
5	Skilled worker	0	0%
6	Semi-skilled worker	4	6.89%
7	Business	3	5.17%
8	Service	0	0%
9	Student	0	0%
10	Truck driver	5	8.62%
11	Local transport workers	3	5.17%
12	Hotel staff	2	3.44%
13	Agricultural cultivator/landholder	12	20.68%
14	Unemployed/Retired	5	8.62%
15	Others	0	0%
	Total	58	

Chart.1 Assess the percentage of tuberculosis and types of tuberculosis in total samples screened for tuberculosis
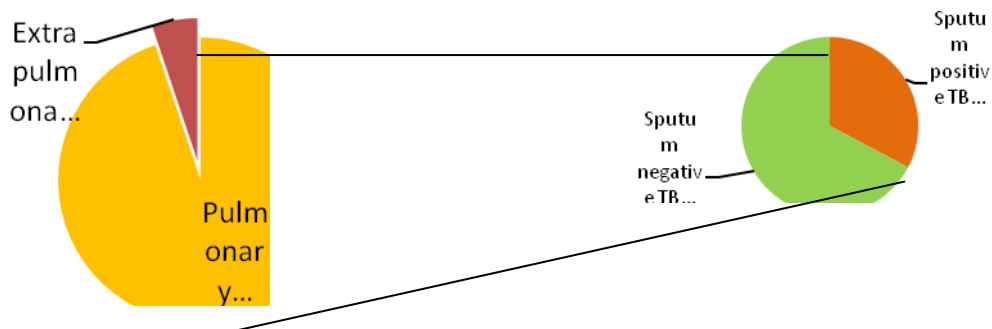
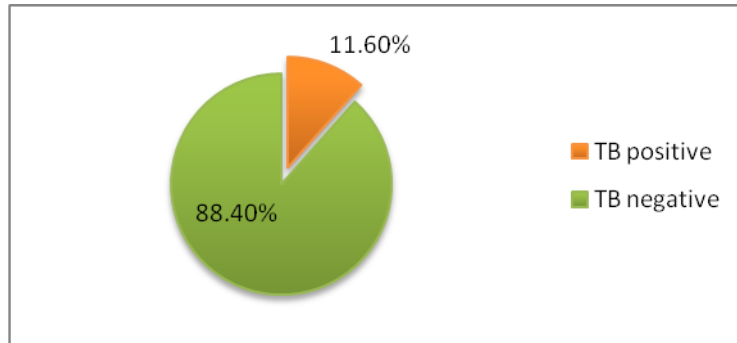**Chart.2** Total TB positive and TB negative patients in total samples screened for TB

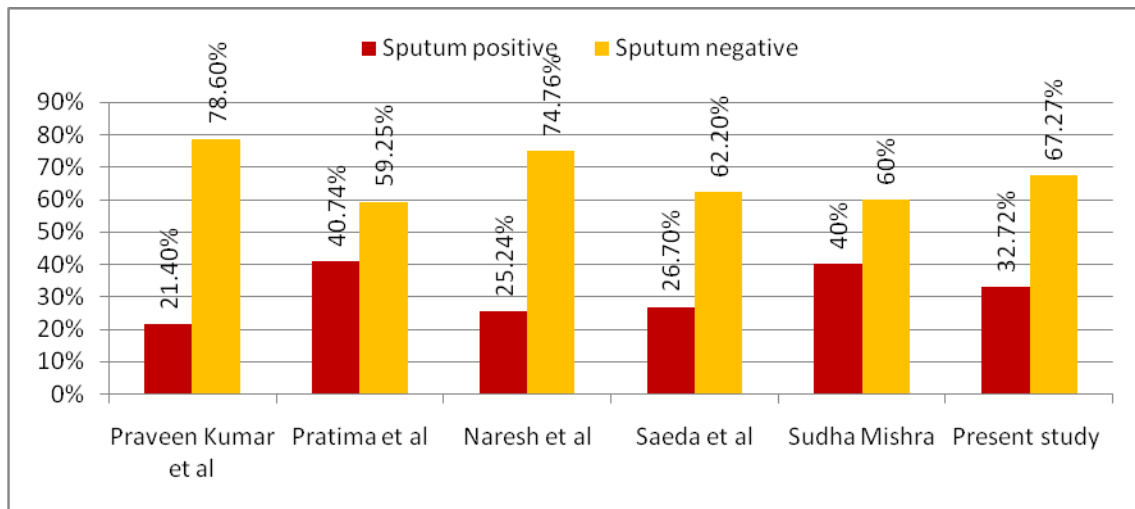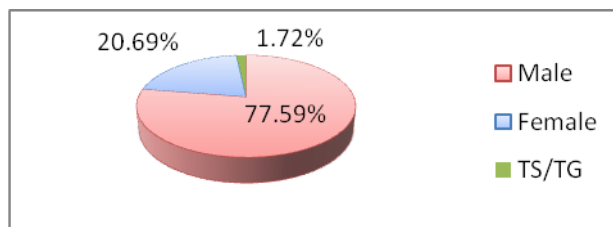**Chart.3** Comparison with other studies on the basis of sputum

Chart.4 Sexwise distribution of Tubercular patients in total TB-HIV seropositive patients

In our study out 58 patients 35 were married (60.3%). followed by widowed 13 (22.4%). This study is similar to Naresh *et al.,* 2013 (17) (married 63.95%), Purushotam *et al.,* 2013 (18) (63.95%) and Saeda *et al.,* 2015 (61.9%) (12). Married individuals were seen to have a higher rate of infection in comparison with single, divorced, or widowed individuals. This could be seen in light of the cultural drift toward the universality of marriage in the Indian context.

In present study out of 58 patients all were belong from different occupation. Mostly were Non-agricultural labourer 15 (25.86%) followed by Agricultural landholder 12

(20.68%), Housewives 8 (13.79%), Truck driver 5 (8.62%), semi-skilled worker 4 (6.89%), businessman 3(5.17%). In females mostly was Housewife 8 out of 12(13.79%). Then least occupations are service men, student and skilled worker (0%). Reason is ill-literacy and poverty and this state is tribal area. This study is contrast to Pratima *et al.,* 2005 (16) in which housewives percentage is more than other because mostly females are non-professional. They live in house and acquired infection from their husbands. So occupation of their husbands is also important in this case. Our study indicates that low education and low income sources causes unawareness from disease

In conclusion, since the increase in HIV infection rate leads to increase in tuberculosis disease, there is need to re-examine the strategies for their effective control. Integrated counseling testing center (ICTC) for HIV is a cost-effective intervention in preventing the spread of HIV transmission and is an integral part of HIV prevention program, which provides an opportunity to learn and accept the HIV status in a comfortable, convenient, and confidential manner..

The DOTS is found to be as effective in HIV seropositive, so it should be strengthened, in order to control the HIV-TB epidemic. Infectivity of HIV transmitters and the susceptibility of HIV-exposed persons. The most important aspect of this control program is public awareness and good health education on how tuberculosis and HIV are transmitted. Such programs will be more effective if conducted in local languages and using the locally derived data. At the same time, they must keep in mind the following: social norms, cultural beliefs, and sensitivities of the community. Such intensive IEC will improve the uptake of ICTC services by the target population.

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