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Research article

Clinical and demographical profile HIV and tuberculosis infection with special emphasis on the sputum and CBNAAT positivity in vindhya region of India

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ABSTRACT

One of the most prevalent opportunistic illnesses among Human immunodeficiency virus(HIV) positive people is tuberculosis. Numerous studies have demonstrated that HIV/Acquired immune deficiency syndrome(AIDS) is a significant public health issue in India. The World health organization(WHO) advised using Cartridge based nucleic acid amplification test (CBNAAT) in conjunction with Rifampicin resistance to identify pulmonary tuberculosis (TB).This cross-sectional research had 160 patients who were older than 15 years. The bulk of the patients, or 109 (68.12%), were in the middle age range of 26 to 45 years, with 135 (84.66%) of them being from rural areas. Low education status persons (primary and high school, 35% and 33.75% respectively) constitute the demographic that is most frequently impacted; nevertheless, among females, uneducated groups are more frequently afflicted. The shift in the distribution of HIV/AIDS and tuberculosis co- infection patients in India's Vindhya Region implies that the HIV/TB co-infection epidemic is spreading. CBNAAT reduces TB detection time while increasing sensitivity and positivity in HIV and TB co-infection. There is an urgent need for intervention to reduce dangerous sexual behaviors.

Keywords: Human immunodeficiency virus, Tuberculosis, Sputum, Acid fast bacilli, AIDS.

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INTRODUCTION

The pelvic floor is made up of connective tissues and muscles that support vital organs like the bladder, colon, and internal reproductive systems during a variety of activities of daily living. Pelvic floor muscle insufficiency results in poor control over continence during various activities (like coughing and sneezing) which involves a rise in intra-abdominal pressure. Delayed muscle recruitment, reduced tonic activity, and muscle weakness are some common characteristics of pelvic floor sufficiency [1,2]. Factors like obesity, chronic coughing, heavy weightlifting, frequent constipation, parity, number of childbirth, presence of low back aches, and many other health conditions are found to be related to pelvic floor dysfunction (PFD) [3-5]. PFD is an umbrella term that includes urge incontinence, stress incontinence, overactive bladder, and organ prolapse. The functioning of the pelvic floor becomes more important among females due to its high prevalence [6]. The prevalence of PFD in various forms varies from 14.2% to 34.3% [7]. Data for the Indian population is not available, but studies reported that prevalence at the district level is around 21% among women [8]. The actual prevalence may be higher in different ethnicity as women consider PFD as a normal part of life, hence remaining unreported.

Pelvic floor functions in synergy with the rectus and transverse abdominis muscle to control continence by regulating intra-abdominal pressure [9]. These muscles along with erector spinae play a key role in stabilizing the spine during various functional activities and postures. Co-contraction of various global and local muscles is required to have better spinal stability. The spinal stability gets compromised in case of high Body mass index (BMI), which in turn reduces the postural control ability of erector spinae. Global muscles functions to transfer the load to the pelvis while local muscles are responsible for segmental stability [10-13]. Optimal spinal stability facilitates pelvic floor functioning by improving lumbopelvic rhythm. This function of pelvic floor with co-contraction of abdominal muscles becomes more challenging in gravity-dependent postures like standing. The lumbar posture affects muscle recruitment and its tone to regulate spinal stability [14]. Limited mobility, weakness of muscles, and laxity in ligaments supporting the spine

results in a change in the normal curvature of the lumbar spine among menopausal women [15]. When this change in the lumbar spine becomes habitual, this not only affects the pattern of trunk muscle activation, but also the tonic activity of these muscle [16,17].

Study investigated the association between lumbar lordotic angle and spinal stability, but how spinal instability affects the trunk muscle activation remains unanswered [18]. Despite being the key stabilizer of the spine which in turns affects the lumbopelvic rhythm, evidence finding the association between trunk muscle activity with variety of habitual lumbar curvature among post-menopausal women are still lacking. Few studies also investigated the role of trunk muscle coactivation during pelvic floor functioning [9], but this coactivation of trunk muscle in presence of different lumbar spine curvature in sagittal plane is still no studied. Where the present literature studied and identified the association between trunk muscle activation with voluntary adopted lumbar posture and with pelvic floor functioning separately, none of them identified this muscle activation and pelvic floor function with respect to different habitual lumbar posture. In this study we tried to identify this gap that, how the variety of habitual lumbar posture effects the tonic activity of rectus abdominis and erector spinae along with intravaginal pressure as a function of pelvic floor muscle in antigravity position while standing still and doing the task which raises intra-abdominal pressure post-menopausal women.

MATERIALS AND METHODS

The present study was undertaken in Shyam Shah Medical College and Sanjay Gandhi Memorial Hospital, Rewa, in the department of medicine.160 TB patients who were HIV positive and had had prior treatment, were newly identified, or were being followed up were included in the research group.

These patients were either admitted to wards or attended the outpatient department or ART center.

Inclusion criteria

All patients with pulmonary TB who have been radiological, bacteriologically, or clinically verified and who are at least 15 years old and HIV positive.

All patients with pulmonary TB who also tested positive for HIV in the past, during follow-up testing, or recently.

Patients who provided informed written permission. Patients under the age of 18 have their parents or guardians' approval.

Exclusion Criteria

Patients with pulmonary TB who are HIV positive and under 15 years old.

People with extra-pulmonary tuberculosis.

Patients who resisted giving their permission.

HIV individuals without Anti tubercular treatment who have a history of pulmonary TB

All patients were selected without any prejudice of sex, duration of disease or with history of continuous treatment. In-depth information on the symptoms that were present and the type of exposure was transcribed, and a thorough general and systemic examination was performed.

The study was done after the ethical committee approval and uses statistical methods as chi square test to find association and use of p value <0.05 considered as significant association.

RESULTS & DISCUSSION

The largest rate of disease transmission is reported to be through sexual contact (73.12%), where men are more at risk (71.55%), and the lowest rate is among IV drug users (4.38%).CBNAAT positivity, 72 (45%), was found to be greater than sputum smear microscopy positivity, 24 (15%); this means that CBNAAT positive and sputum AFB negative cases are 31.2%, while CBNAAT negative and sputum AFB positive cases are 1.2%, demonstrating false negativity of sputum smear microscopy and high sensitivity and specificity of CBNAAT. In terms of CD4 count, the majority of patients have both CBNAAT and sputum AFB negative, whereas the minority have both CBNAAT and sputum AFB positive. Rifampicin resistance was discovered in 40 of the patients.

Table 1: Demographical distribution of patients

Gender distribution of patients		
Gender	No.of cases	Percentage
Female	44	27.5%
Male	116	72.5%
Age distribution of patients		
Age group in years		
15-25	19	11.87%
26-35	47	29.37%
36-45	62	38.75%
46-55	26	16.25%
56-65	5	3.12%
66-75	1	0.72%
>80	4	4%
Distribution of cases on the basis of residential area		
Residence		
Rural	136	85%
Urban	24	15%
Distribution according to Occupation Status		
Occupation		
Labourer/Agriculture	60	37.5%
Outside worker (factory workers and others)	12	7.5
Housewife	35	21.87%
Government Servant	12	7.5%
Truck Drivers	25	15.65%
Small Scale business and others	14	8.75%
Student	1	0.62%
Prisoner	1	0.62%

To investigate the CB-NAAT positivity in the sputum of HIV-positive TB patients, this study was carried out in the Department of Medicine at S.G.M.H. Rewa. The gold standard test for TB, the TB culture method, takes several weeks to generate results, delaying the start of therapy in addition to requiring technical

competence and raising biosafety issues. The WHO suggested using CB-NAAT in December 2010 in conjunction with Rifampicin resistance to identify pulmonary TB. Due to the decreased likelihood of caseous necrosis and sputum, AFB Sputum Microscopy Sensitivity is further diminished in HIV patients.

Table 2: Clinical distribution of patients

Distribution of cases according to CBNAAT		
CBNAAT	No. Of Case	Percentage
Positive	72	45%
Negative	88	55%
Distribution on basis of CD4 count		
CD4 count		
<200	68	42.5%
201-350	66	41.25%
351-500	13	8.12%
>500	13	8.12%
DistributionAccording To Mode Of Transmission		
Mode of transmission		
Sexual	117	73.12%
IV drug user	7	4.38%
Blood and it's product	36	22.5%
DistributionAccording To Chest X-Ray Pattern		
Chest X-Ray Findings		
Infiltration	104	65%
Infiltration with cavitation	32	20%
Normal X-ray	34	15%

In the current analysis, 68.12% of the HIV with pulmonary TB patients belonged to the 26–45 age range. 38.01 years old on average. It is analogous to R Dewan et al's work from June 2015 [14]. The study's participants had an average age of 35 + 9 years. The majority of patients (69%) belonged to the 20–40 age range. P Giri et al. (June 2013)[15] discovered that 58.10% of PTB/HIV patients fell into the 21–40 age bracket. According to Hussain T et al. (2006)[16], the prevalence of PTB among HIV-positive people in the 21–40 age range was extremely high (90.9%).

Out of 24 cases whose sputum smears were positive, 19 cases (79.16%) had CD4 levels over 200, while 5 cases (2.06%) had CD4 levels below 200. These findings were analogous to those of Singhal Set al. (2011)[17], who discovered that the ratio of AFB positive to negative in CD4 counts between 0 and200 was about 1:1, but it was 3:1 in cases with CD4 counts over 200.

Sputum smear positive is 24 (15%) and CBNAAT positivity is 72 (45%), demonstrating that CBNAAT has substantially higher specificity and sensitivity than sputum smear microscopy. These findings agreed with research conducted by R Dewan et al. in 2015[14]. According to their research, 11 individuals out of 100 (11%) tested positive for AFB by sputum microscopy, while 40% tested positive for CBNAAT. As a result, employing CBNAAT raised the incidence of TB detection by more than three times. If these patients didn't return for re-evaluation or really felt better with the initial therapy, there is a substantial risk of delays in TB treatment. In PLHIV, delaying the start of ATT is also linked to greater mortality.

Another study conducted by Ameet Vasantrao Khatawkar et al (2019)[18]found that out of 100 individuals who were HIV seropositive, 11 were newly diagnosed HIV cases and all of the patients underwent sputum AFB and CBNAAT. . D. Pragati Rao, K. Lakshmi Sowjanya, et al. (2016) [19] did another study. 59 instances (25.54%) of 231 HIV-positive individuals also had TB. AFB negative and GeneXpert positive sputum smear results were 45 (76.27%). Out of all TB patients, 51 (86.44%) were sensitive and 8 (13.55%) were Rifampicin resistant. Deepak Bansal, Sanjay Avashia, and Mitesh Karothiya carried out another study [20].

Table 3: Comparison Of Results Of Present Study With Previous Study

Study	**Sample Size**	**Positive for TB**	**AFB positive**	**CBNAAT positive**	**Resistant cases**
Present study	160	74(46.25%)	24(15%)	72(45%)	18(11.25%)
D Pragati Raoetal	231	59(25.54%)	14(6.06%)	59(25.54%)	8(3.4%)
Deepak Bansalet al	604	91(15.06%)	-	91(15.06%)	6(0.99%)
Prem Prakash Gupta et al	30	25(83.33%)	8(26.66%)	17(56.66%)	2(6.66%)
R Dewan et al	100	40(40%)	11(11%)	40(40%)	9(9%)

CONCLUSION

In less than two hours, CBNAAT can aid in the early diagnosis of TB. Sputum smear microscopy was less sensitive than CBNAAT for diagnosing TB in HIV positive subjects. It lowers the incidence of false negatives. The CBNAAT aids with the detection of MDR and mostly identifies rifampicin resistance. In addition, we must impart accurate information about TB/HIV, precautions, and disease- related treatments. Specifically to the 25–45 year age range, with a focus mostly on housewives who are more susceptible to sickness. Ensuring that rural residents have access to the amenities and education they need. The shift in the distribution of HIV/AIDS and tuberculosis co-infection patients in India's Vindhya Region implies that the HIV/TB co-infection epidemic is spreading. CBNAAT reduces TB detection time while increasing sensitivity and positivity in HIV and TB co-infection. There is an urgent need for intervention to reduce dangerous sexual behaviors.

Conflict of interest: No conflict of interest.

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