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## Original Research Article

## A cross-sectional study on knowledge about transmission and prevention of HIV in patients of Tuberculosis attending a DOTS center of a tertiary care hospital

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## ABSTRACT

**Background:** TB-HIV coinfection imposes a double-edged sword effect on the patient's health. Awareness about HIV among the TB patients is very essential for prevention, early detection and appropriate therapy. We aimed to evaluate the knowledge about HIV prevention and transmission among TB patients.

**Materials and Methods:** A cross sectional study was done among the patients of Tuberculosis who attended the DOTS center at a tertiary care hospital. Patients who were HIV-TB coinfecting were excluded. A pretested questionnaire consisting of 13 questions regarding the HIV transmission, methods to avoid HIV, misconceptions and treatment was used.

**Results:** 53 patients were enrolled in the study. It was a predominantly young (mean age was  $34.69 \pm 14.18$  years) and male dominated (64%) population. Out of 53 enrolled patients, 42 (79.2%) were familiar with HIV infection. Among these 42 patients, more than 80% patients were aware about multiple transmission routes of HIV infection. Homosexual and mother to child transmission were less known. Awareness about use of condoms was present in 85.7% patients. On the contrary, misconceptions about HIV transmission (coughing, sneezing, shaking hands, use same toilets) was prevalent in 40% patients. Very few patients (12%) were aware about the Indian national HIV program. There was no difference in the knowledge and awareness among males and females. Literate patients and patients living in urban area had heard of HIV more as compared to their counterparts ( $p < 0.05$ ).

**Conclusions:** Myths and misconceptions about HIV transmission are widely persistent among TB patients even in urban cities of India. There is still a long way to go regarding the spread of awareness about HIV among TB patients despite its paramount significance in prevention, early diagnosis, and early appropriate therapy for the same.

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### 1. Introduction

Tuberculosis (TB) is a worldwide public health problem. As per Global TB report 2020, an estimated 10.0 million people diagnosed with TB in 2019. Among all those affected, 8.2% were living with HIV.<sup>1</sup> Tuberculosis (TB) and human

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immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) are among the top diseases causing the main burden of infectious disease in resource-limited countries like India. In India, over seventy thousand patients were diagnosed with TB-HIV coinfection in 2019. Among the drug sensitive TB-HIV patients, treatment success rate was 69%.<sup>2</sup> As per the 2019 report, the prevalence of HIV in India was 0.22% (0.17–0.29%).<sup>3</sup> In the individual host, the two pathogens, Mycobacterium tuberculosis and HIV, work in coalition to increase the morbidity and mortality.<sup>4</sup> Thus, in a country like India where there is a high prevalence of TB, HIV, and TB-HIV, knowledge about HIV transmission and prevention is necessary among the patients with TB to demolish the TB HIV coalition. This study was carried out to assess the level of knowledge about HIV transmission and prevention techniques among the patients of TB and to study the association between demographic profile and HIV awareness among the TB patients.

## 2. Materials and Methods

A cross-sectional study was done in a tertiary care hospital in Delhi over the period of two consecutive months among the TB patients. Convenience sampling method was used. The study was carried out in all the adult patients with confirmed diagnosis of TB coming to the DOTS center of the hospital during the two consecutive months duration of the research period provided they gave a written voluntary consent. The Institutional Ethical Committee granted the ethical clearance.

Patients who were previously diagnosed with HIV were excluded. Individuals diagnosed with any psychiatric comorbid condition and the patients who did not give their consent were excluded.

A self-administered, semi-structured, pre-tested questionnaire was used to assess the knowledge about HIV infection, transmission, prevalence of practices to prevent HIV infections and about the practice of drug abuse. The data was entered in the Microsoft Excel sheet and analysis was done with SPSSv24. Descriptive statistics were used along with Fisher exact test and Chi Square test were used to derive the statistically significant differences between the variables. P value of <0.05 was taken as the measure of statistical significance.

## 3. Results

Sixty patients visited the DOTS center of the hospital in the two months' duration. Seven patients did not give consent and were excluded. Therefore, 53 patients were enrolled for the study. The patients had mean age of  $34.69 \pm 14.18$  years with 19 (34.9%) females and 34 (64.1%) males. There were 20 (37.7%) smokers in our study. Thirty-nine (73.6%) patients belonged to the urban community. Among the enrolled patients, 34 (64.1%) were

literate. Thirty-nine (73.6%) patients were diagnosed cases of pulmonary tuberculosis and 14 (26.4%) patients were of extra-pulmonary tuberculosis.

After analyzing the responses of the participants, it was found that only 42 (79.2%) patients had heard of HIV/AIDS. Among these 42 patients, Television (37, 69.8%) and Billboards (29, 54.7%) were the most common sources of information. These 42 patients were given multiple choice questions to analyze their knowledge about the transmission, methods of protection, misconceptions and government program and treatment. The overall response of the questions was tabulated in Table 1. There was no difference in the knowledge and awareness among males and females (Table 2). Literate patients and patients living in urban area had heard of HIV more as compared to their counterparts ( $p < 0.05$ ) (Tables 3 and 4).

### 3.1. Knowledge about transmission of HIV

88% patients were aware that HIV transmission occurs through blood. On the contrary, knowledge about transmission of HIV infection due to intravenous drug abuse was present in only 27 (64.2%) patients and most of the patients (69.48%) interviewed were not aware whether homosexual relationships have any predisposition to transmission of HIV infection or not. Literate patients, however, were aware about avoiding sex with homosexuals to prevent HIV transmission ( $p = 0.01$ ) (Table 3). Similarly, urban patients were also aware about avoiding sex with homosexuals to prevent HIV transmission ( $p = 0.04$ ) (Table 4). Nearly 86% patients were aware that HIV infection could spread by sharing needles, razors, and other sharp objects with an infected person. 34 (80.9%) patients had knowledge about the mother to child transmission of HIV. On the contrary, knowledge about the spread of infection during delivery of baby and through breast milk was just 26.1% and 33.3% respectively. Among 19 females, only 5 females knew that HIV infection could spread through breast milk. There was no statistically significant difference found between gender and knowledge about the transmission of HIV (Table 2).

### 3.2. Knowledge about the methods of protection from HIV

Overall awareness about the usage of condoms for protection against AIDS was present in 36 (85.7%) patients. 86% patients believed that staying faithful to one partner is a method of protection against HIV infection. Only 50% patients believed that reducing the number of sexual partners is protective against HIV. 86% patients responded that avoiding sex with partners who have multiple sexual partners and avoiding sharing needles, razors, blades or other sharp objects like unsterilized needles and injections prevent from HIV. Males (70%) were more aware compared

to females (42%) but there was not statistically significant association found between gender and awareness (Table 2). Only 36% of illiterate patients in comparison to 85% of the literate population responded correctly it was not statistically significant.

### 3.3. Knowledge about false misconceptions

On enquiring about the common myths of spread of HIV infection, 24(57.1%) patients were informed that HIV infection does not spread by coughing and sneezing. 10(23.8%) patients thought that the HIV infection can spread through kissing and 18(42.8%) patients believed that it can spread through mosquito bite. 59.5% patients were aware that HIV infection does not spread by sharing food and water. Only 50% patients were aware that HIV infection does not spread by sharing toilet or swimming pool or pond with an infected person. 64% of the patients interviewed were aware that HIV infection does not spread by shaking hands or hugging an infected person. Knowledge about the misconceptions was not statistically significant different among the males and females. Literate patients were more aware about the false misconceptions as compared to the illiterate patients ( $p < 0.05$ ) (Table 3).

### 3.4. Knowledge about the Government program and treatment

Only 16(38%) patients responded affirmatively on enquiring about the cure of AIDS. Also, only 5(12%) out of 42 patients had awareness of any government program aimed at prevention against AIDS.

## 4. Discussion

This study was done to assess the knowledge about HIV transmission and prevention among the patients with TB attending DOTS center in a tertiary care hospital in Delhi. In the current study, 42 (79.2%) out of 53 patients had heard about AIDS or of HIV virus that cause AIDS. In a similar study in Peru,<sup>5</sup> out of 171 TB participants, the mean percentage of the correct answers regarding knowledge on HIV was 59%. In a study from Afghanistan, out of 1163 participants, only 23.3% TB participants had heard of HIV.<sup>6</sup> However, both these studies were carried out nearly a decade ago. TB/HIV integrated program has helped in creating awareness among the TB patients in India over the years. Despite this, India has wide variations in awareness across various states. In a study from Kerala, all 137 (100%) enrolled participants had heard of HIV.<sup>7</sup>

Our study population had mean age of 34 years and males were predominant. The demographic profile studied was similar to that studied in Peru.<sup>5</sup> The urban population had higher knowledge of HIV in comparison to rural, this finding was in lieu with a study in Afghanistan where residing in an urban area was independently associated

**Table 1:** Awareness of TB patients regarding HIV

Questions:	Yes	No	Not sure	Don't know
Have you ever heard of AIDS or of HIV virus that causes AIDS?	42	11		
If yes through which source, did you hear about it?				
Radio	28	11	3	
TV	37	5		
Bill board / Hand bill	29	13		
Spouse	12	30		
Newspaper/magazine	23	19		
Family member	14	26	2	
Infected persons	8	34		
Friends	10	32		
Community meetings	11	31		
Tell the ways by which a person can protect from getting HIV infection?				
Abstain from sex	24	10	2	6
Use condoms	36	1	0	5
Stay faithful to one partner	36	2	2	2
Limit the number of sexual partners	21	7	9	4
Avoid sex with persons who have multiple partners	36	0	2	4
Avoid sex with homosexuals	13	2	2	25
Avoid sex with those who inject illegal drugs intravenously	27	2	3	10
Avoid transfusion with blood that has not been tested for HIV?	37	3	0	2
Avoid kissing	10	21	4	7
Avoid mosquito bites	18	16	2	6
Avoid sharing needles, razors, blades or other sharp objects	36	2	0	4
Avoid unsterilized needles and injections	37	2	2	1
4) Can someone die from AIDS?	28	2	6	6
5) Is there a cure for AIDS?	16	9	3	14
6) Can appearance of a person indicate if he/she is HIV infected?	9	24	1	8
7) Can a mother transmit HIV infection to her baby?	34	7	0	1
8) If yes, how? a) During pregnancy	26	2	2	4
b) During labour/ delivery	11	10	3	10
c) Through breast milk	14	8	1	11
9) Are you aware of any government programs aimed at prevention against HIV/AIDS?	5	34	0	3
10) Coughing & sneezing can spread HIV	14	24	0	4
11) One can get HIV infection by sharing a glass of water with an infected person.	12	25	2	3
12) HIV infection can spread by sharing toilet seat/ swimming pool/pond with an infected person.	12	21	4	5
13) HIV infection can spread by shaking hands/hugging an infecting person.	8	27	3	4

**Table 2:** Association of gender with the awareness about the HIV transmission, protection, misconception, and treatment.

Question	Male (n=28)	Female (n=14)	P-value
Have you ever heard of AIDS or of HIV-Human Immunodeficiency virus that causes AIDS? (n=53) (If yes, further questions were asked)	28	14	0.45
Ways of protection from AIDS			
a. Abstain from sex	16	8	0.9
b. Use condoms	24	12	0.99
c. Stay faithful to one partner	23	13	0.9
d. Limit the number of sexual partners	13	8	0.56
e. Avoid sex with persons who have multiple partners	24	12	0.15
f. Avoid sex with homosexuals	10	3	0.36
g. Avoid sex with those who inject illegal drugs intravenously	19	8	0.51
h. Avoid transfusion with blood that has not been tested for HIV	26	11	0.31
i. Avoid kissing	14	7	1
j. Avoid mosquito bites	9	7	0.3
k. Avoid sharing needles, razors, blades or other sharp objects	24	12	1
l) Avoid unsterilized needles and injections	25	12	1
Can a mother transmit HIV infection to her baby?	23	11	0.9
If yes, how? a) During pregnancy	17	10	0.7
b) During labour/ delivery	8	3	0.71
c) Through breast milk	18	5	0.1
Can Coughing & sneezing spread HIV	16	8	0.9
One can get HIV infection by sharing a glass of water with an infected person.	16	9	0.7
HIV infection can spread by sharing toilet seat/ swimming pool/pond with an infected person.	11	10	0.1
HIV infection can spread by shaking hands/hugging an infecting person.	18	9	0.9
Are you aware of any government programs aimed at prevention against HIV/AIDS?	4	1	0.6
Is there a cure for AIDS?	5	4	0.45

with HIV awareness.<sup>6</sup> Education plays an important role in spreading awareness about HIV. In current study of 24 respondents having knowledge about HIV, 19 (79.16%) were literate. In a study from Peru, results showed an mean level of knowledge can be increased with higher education.<sup>5</sup>

In present study the overall awareness about the usage of condoms for protection against AIDS was present in 85.7% of the patients. In a study of 171 participants, 83 (48.5%) participants considered that the usage of condoms

**Table 3:** Association of literacy with the awareness about the HIV transmission, protection, misconception, and treatment.

Question	Literate (n=32)	Illiterate (n=10)	P-value
Have you ever heard of AIDS or of HIV-Human Immunodeficiency virus that causes AIDS? (n=53) (If yes, further questions were asked)	32	10	0.00007
Ways of protection from AIDS			
Abstain from sex	19	5	0.7
Use condoms	29	7	0.17
Stay faithful to one partner	29	7	0.13
Limit the number of sexual partners	17	4	0.71
Avoid sex with persons who have multiple partners	28	8	0.61
Avoid sex with homosexuals	13	0	0.01
Avoid sex with those who inject illegal drugs intravenously	21	6	0.72
h. Avoid transfusion with blood that has not been tested for HIV?	28	9	1
i. Avoid kissing	19	2	0.06
j. Avoid mosquito bites	14	2	0.26
k. Avoid sharing needles, razors, blades or other sharp objects	28	8	0.61
l) Avoid unsterilized needles and injections	29	8	0.57
Can a mother transmit HIV infection to her baby?	26	8	1
If yes, how?			
a) During pregnancy	20	6	1
b) During labour/ delivery	9	2	0.70
c) Through breast milk	11	3	1
Can coughing & sneezing spread HIV.	22	2	0.03
One can get HIV infection by sharing a glass of water with an infected person.	23	2	0.04
HIV infection can spread by sharing toilet seat/ swimming pool/pond with an infected person.	18	3	0.27
HIV infection can spread by shaking hands/hugging an infecting person.	24	3	0.02
Are you aware of any government programs aimed at prevention against HIV/AIDS?	5	0	0.31
Is there a cure for AIDS?	11	5	0.46

**Table 4:** Association of residency of the patients with the awareness about the HIV transmission, protection, misconception, and treatment.

Question	Rural (n=8)	Urban (n=34)	P-value
Have you ever heard of AIDS or of HIV-Human Immunodeficiency virus that causes AIDS? (n=53) (If yes, further questions were asked)	8	34	0.048
Ways of protection from AIDS			
Abstain from sex	4	20	0.7
Use condoms	6	30	0.31
Stay faithful to one partner	6	30	0.31
Limit the number of sexual partners	4	17	1
Avoid sex with persons who have multiple partners	7	29	1
Avoid sex with homosexuals	0	13	0.042
Avoid sex with those who inject illegal drugs intravenously	5	22	1
h. Avoid transfusion with blood that has not been tested for HIV?	7	30	1
i. Avoid kissing	2	19	0.23
j. Avoid mosquito bites	2	14	0.68
k. Avoid sharing needles, razors, blades or other sharp objects	7	29	1
l) Avoid unsterilized needles and injections	8	34	1
Can a mother transmit HIV infection to her baby?	6	28	0.633
If yes, how?			
a) During pregnancy	4	22	0.60
b) During labour/ delivery	2	9	1
c) Through breast milk	3	11	0.67
Can coughing & sneezing spread HIV.	2	22	0.02
One can get HIV infection by sharing a glass of water with an infected person.	3	22	0.23
HIV infection can spread by sharing toilet seat/ swimming pool/pond with an infected person.	3	11	0.12
HIV infection can spread by shaking hands/hugging an infecting person.	3	22	0.21
Are you aware of any government programs aimed at prevention against HIV/AIDS?	6	30	0.31
Is there a cure for AIDS?	5	22	1

for vaginal, anal and oral sex should be done, but only 55 participants (32.2%) used condom regularly.<sup>5</sup> Similarly, in another study, condom awareness in only 25% population in study and 11% reported ever having used condoms.<sup>6</sup> Among the youth, it was found that condom use was low and thereby putting them at a high risk of HIV.<sup>8–10</sup> In present study, the higher percentage of awareness reported could be attributed to larger number of literates and urban population in study.

The current study showed the knowledge of 4 common modes of transmission, sexual (67.9%), blood transfusion (88.8%), intravenous drug abuse (64.2%) and mother to child transmission (80.9%). Todd et al assessed the knowledge of transmission routes among the participants who were aware of HIV. Very few participants (13%) were aware of 3 correct transmission routes.<sup>6</sup> In another study, only 33.3% and 41.5% had awareness regarding knowledge of ways for HIV transmission and knowledge of preventive practices, respectively.<sup>5</sup> In present study, the higher percentage of awareness reported could be attributed to larger number of literates and urban population in study. Knowledge of HIV and common routes of transmission was high (>80%) among the literates and urban participants. In our study misconception about the HIV transmission was present in 40% patients. In another study, more than 60% participants had misconception about HIV transmission through hugging, handshake and mosquito bites.<sup>11</sup>

In various studies, it has been found that awareness about HIV and TB was quite low among the low income groups.<sup>12,13</sup> There are stigmata regarding HIV testing among patients of TB and the fear of HIV positivity create hurdles for the management of TB/HIV patients.<sup>14</sup> The collaboration between TB and HIV programs has yielded good results despite all hurdles and since 2005, globally more than 7.3 million lives of PLHIV have been saved globally through collaborative TB/HIV activities.<sup>15</sup> Established various HIV/TB coordination mechanisms at different levels, decentralization of treatment services, regular supervision and monitoring, newer initiatives like use of rapid diagnostics for early diagnosis of TB among people living with HIV, TB notification, etc. have led to success in combating the dual threat of HIV/TB in India.<sup>16</sup> We found that a high level of awareness about HIV was present among TB patients but a slightly low level of knowledge about modes of HIV transmission and prevention.

The study had few limitations; one of these was the sample size was not representative of TB population in India. In addition, HIV carries a stigma in our population, and the answers may be affected by information bias (specifically recall bias). Another limitation of our study and other similar studies was the absence of a standardized tool for assessing level of HIV knowledge, which made comparison across studies difficult. This study was carried out at a single centre and the results of multicentric study may differ. Literacy was evaluated among these patients and compared with the knowledge of HIV. These results cannot be generalized to the Indian population as rural areas have a lower literacy rate which indirectly indicates that the awareness and knowledge will be even lesser at the national level. This calls for a large-scale study across multiple urban and rural areas across the country.

## 5. Conclusions

The current study focused upon the knowledge of HIV among the TB patients and the results were encouraging. Still, a hard battle is going on between the National programs and TB/HIV, and winning this battle depends upon the awareness about these dreadful diseases. TB/HIV partnership should be broken and still role of prevention is as important as the treatment of these diseases.

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## 7. Conflicts of Interests

None.

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