Original Article

HIV Infection among Tuberculous Patients in Tertiary Care Centers Khyber Pakhtunkhwa

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ABSTRACT

Objective: To know the frequency of HIV infection among tuberculous patients, presenting to tertiary care hospitals in Khyber Pakhtunkhwa.

Study Design: Descriptive study

Place and Duration of Study: This study was conducted at Departments of Medicine in two tertiary level hospitals (Lady Reading Hospital Peshawar and Madan Medical complex Mardan in Khyber Pakhtunkhwa (KPK) from 1st October 2020 to 31st March 2021.

Materials and Methods: KPK is one of the four provinces of Pakistan situated on the northwest part of the country. KPK has an area of 101,741 Km^2 and comprises of thirty five districts. The estimated population was 35.53 million in the year 2017. These two hospitals provide clinical care, diagnostic and treatment services to TB and HIV infected individuals. Patients are referred from primary care physicians, private practitioners and TB centers.

Results: Study population comprised of 160 patients. Frequency of HIV was 8.1%. Most affected age group was 51 to 60 years. Of the 13 HIV – Positive cases in tuberculous patients, 10(76.9%) patients had pulmonary TB, whereas 03(23.0%) cases had extra pulmonary TB, including 02(66.6%) cases of tuberculouspleuritis and 01(33.3%) patient of TB lymphadenitis.

Conclusion: All newly diagnosed tuberculous patients should be assessed and screened for HIV co-infection.

Key Words: Tuberculosis, HIV Infection, Khyper Pakhtunkhawa

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INTRODUCTION

Tuberculosis (TB) is a diseases affecting mankind for very long time. Research studies performed on human skeleton predict that it has affected humans for thousands of years.[1]Its causative agent was unknown until 24 March 1882, when Dr. Robert Koch discovered the bacillus responsible it. Later on the bacillus was named Mycobacterium tuberculous. The disease spreads from one person to another when people who are sick with tuberculosis expel bacteria into the air by coughing or sneezing. Lungs are the primary organs affected by tuberculosis (pulmonary TB) but other organs can also be affected by it such as brain, bones, eyes etc., which is called extra pulmonary tuberculosis.[2]

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An estimated 10.0 million cases of tuberculosis were reported to World Health Organization (WHO) worldwide in 2019. Out of these cases of tuberculosis 8.2% were among people living with HIV.[3] Both HIV and tuberculosis are main public health problems throughout the world and have synergistic affect. The prevalence of tuberculosis in Pakistan is very high and it is ranked 5th (5.7%) among high burden countries in the world.[4] Co-infection with tuberculosis and HIV is an emerging challenge in poor and developing countries such as Pakistan. HIV and Acquired Immune Deficiency Syndrome prevalence among general population in Pakistan is less than 0.1% but it is increasing in our country in high risk population.[5] Estimated number of HIV positive cases were more than 130,000 in 2016. Coinfection with HIV among tuberculous patients showed an estimated prevalence of 0.42% in Pakistan.[6]

In our health care system patients with newly diagnosed active TB are not properly screened for HIV. Patients with active tuberculosis and a latent HIV infection leads to rapid deterioration of the immune system and hence causes increased mortality. The number of HIV cases has increased in Khyber Pakhtunkhwa province of Pakistan, with the number rising to as many as 4,600 patients, out of which 415 being reported in the past year. To be added 4.5% of all HIV cases reported in the country is from the our province .[7]

This study is aimed to highlight this hidden life-threatening infection in newly diagnosed tuberculous patients. There is scarcity of local data on the topic. This study may provide local statistics which may lead to further research. In the context of recent clusters of HIV cases in some parts of the country, the importance of this study is further emphasized.

MATERIALS AND METHODS

Study setting: This descriptive study was conducted at departments of Medicine in two tertiary level hospitals (Lady Reading Hospital Peshawar and Madan Medical complex Mardan in Khyber Pakhtunkhwa (KPK) from 1st October 2020 to 31st March 2021. KPK is one of the four provinces of Pakistan situated on the northwest part of the country. KPK has an area of 101,741 Km^2 and comprises of thirty five districts. The estimated population was 35.53 million in the year 2017 .[8]

These two hospitals provide clinical care, diagnostic and treatment services to TB and HIV infected individuals. Patients are referred from primary care physicians, private practitioners and TB centers.

Sampling methods and sample size: A total of 160 patients were observed to determine the frequency of HIV infection in patients diagnosed with TB. Consecutive non-probability sampling technique was used. Study duration was six months, from October 2020 to March 2021. Our study was approved by ethical committee of Bacha Khan Medical College/ Mardan Medical Complex, Mardan. All patients > 12 years of age of either gender who were diagnosed to have TB as per operational definition were included. Seriously ill, those who refused to consent to HIV screening and known HIV patients who developed TB were exclude

Data collection and Validation: Data was collected using a structured data collection form. For each participant included in the study; we determined the status of marriage, socioeconomics, travelling, drug use and co-morbidities such as diabetes mellitus (DM), history of surgery and sexual history. The study team included trained technical staff for Gene Xpert testing, sputum sample collection for Xpert testing, digital X-ray processing and laboratory techniques (RDT testing for HIV). A medical officer. Chest physician and medical specialist were available for clinical diagnosis and evaluations.

Operational definition: For the study purpose, we defined TB patients if any participant detected Mycobacterium Tuberculosis (MTB) by Xpert testing or clinically diagnosed by study physician after an abnormal finding on digital X-ray. HIV patients who confirmed on three serial testing RDTs.

Screening methods: Tuberculosis.

Digital Chest X-ray: All participants were screened through a digital X-ray machine connected with CAD4TB software in radiology departments of the two hospitals. The CAD4TB software gives a probability percentage of normal versus abnormal consistent with TB.[9]

Sputum analysis: As per National TB guideline presumptive TB cases identified by digital chest X-ray, were tested for tested for MTB assay by Gene X-pert machine. Samples of sputum were obtained through front-loading technique[10]. Samples were stored in specimen transporting boxes and transported to Xpert laboratory, located in Pulmonology units of both the hospitals. Sputum samples were processed on the same day.

Extra-pulmonary TB: Diagnosis of extrpulmonary TB was established by performing body fluid analysis, tissue biopsy or fine needle aspiration and cytology (FNAC) of lymph node.

HIV: Newly diagnosed tuberculous patients with informed consents were screened by third generation ELIZA method. All positive reported patients of HIV were confirmed by Western Blot technique.

Data analysis and statistics: Data was entered, validated and analyzed using statistical package for social Sciences (SPSS) Version 22. Categorical variables were summarized using frequency and percentages. Continuous variables were compared using a median test, while on the other hand categorical variables were compared using Chi-square test. The statistical significance level was defined as P value < 0.05.

RESULTS

Our study included 160 individuals who met eligibility criteria. The median age of study participants was 37 years with SD + 3.87. Among enrolled subjects, 90(56.2%) were males and 70(43.8%) were females. Majority of them were illiterate (70.6%). The socio-demographic characteristics are summarized in Table1.

Table No.1: Socioeconomic demographic characteristics of participants.

	Number(n)	**Percentage(%)**
Gender		
Male	90	56.2
Female	70	43.8
Total	**160**	**100**
Educational Status		
Literate	47	29.4
Illiterate	113	70.6
Total	**160**	**100**
Marital Status		
Married	115	71.9
Single	45	28.1
Total	**160**	**100**

Among 160 analyzed cases, 13(8.1%) of these were HIV positive, including 10(6.2%) males and 03 (1.9%) females. Of the 10 HIV–TB co-infected males,

08(80.0%) were laborers, and 02 (20.0%) were office workers. All 03 affected females were house wives. In terms of route of transmission, 07 patients were intravenous drug users, 05 had past history of surgery & blood transfusion and one had history of heterosexual relationships. The most commonly affected age group was 51—60 years (Table 2).

Table No.2: Stratification of Status of HIV * Age of the Participants (No 160)

		Age of the participants						Total
		14-20 Years	21-30 Years	31-40 Years	41-50 Years	51-60 Years	61-75 Years	
Status of HIV	Positive Count	0	0	1	0	10	2	13
	% within Status of HIV	.0%	.0%	7.7%	.0%	76.9%	15.4%	100.0%
	% within Age of the participants	.0%	.0%	2.4%	.0%	37.0%	16.7%	8.1%
	% of Total	.0%	.0%	.6%	.0%	6.2%	1.2%	8.1%
Status of HIV	Negative Count	18	39	41	22	17	10	147
	% within Status of HIV	12.2%	26.5%	27.9%	15.0%	11.6%	6.8%	100.0%
	% within Age of the participants	100.0%	100.0%	97.6%	100.0%	63.0%	83.3%	91.9%
	% of Total	11.2%	24.4%	25.6%	13.8%	10.6%	6.2%	91.9%
Total	Count	18	39	42	22	27	12	160
	% within Status of HIV	11.2%	24.4%	26.2%	13.8%	16.9%	7.5%	100.0%
	% within Age of the participants	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total	11.2%	24.4%	26.2%	13.8%	16.9%	7.5%	100.0%

*HIV= Human Immunodeficiency Virus

Of the 13 HIV – Positive cases, 10(76.9%) had pulmonary TB, whereas 03(23.0%) cases had extra pulmonary TB, including 02(66.6%) cases of tuberculouspleuritis and 01(33.3%) patient of TB lymphadenitis (Table 3).

Table No.3: Type of Tuberculosis in HIV Positive Patients

		Type of Tuberculosis		Total
		Pulmonary	Extra-Pulmonary	
Status of HIV	Positive Count	13	0	13
	% within Status of HIV	100%	0%	100%
	% within Type of Tuberculosis	14.9%	0%	14.9%
	% Total	8.1%	0%	8.1%
Status of HIV	Negative Count	74	73	147
	% within Status of HIV	50.3%	49.7%	100%
	% within Type of Tuberculosis	85.1%	100%	91.9%
	% Total	46.2%	45.6%	91.9%
Total	Count	87	73	160
	% within Status of HIV	54.4%	45.6%	100%
	% within Type of Tuberculosis	100%	100%	100%
	% Total	54.4%	45.6%	100%

*HIV= Human Immunodeficiency Virus

DISCUSSION

It is very important to know the HIV status in newly diagnosed tuberculous patients as the HIV epidemic continues to inflame the worldwide TB epidemic. The HIV prevalence in TB patients is a delicate marker of the spread of HIV in to the general population. Although TB cases are increasingly being detected in many districts of KP, the majority of HIV cases are not and newly diagnosed tuberculous patents are not screened for HIV. The present study describes the frequency of HIV-TB co-infection in patients among a dense population of Peshawar and Mardan, along with a comparative analysis of different earlier studies.

The overall frequency rate of HIV in newly diagnosed tuberculous patients was 8.1% in current study, which more or less reflects the prevalence in most of districts of KP. A figure (8.2%) of HIV-TB co infection was observed in a similar study in Vietnam in 2010.[11] In United Kingdom surveys revealed increase in HIV prevalence among TB patients from 5% in 2000 to 8% in 2005 .[12] The prevalence of co-infection in Sub-Saharan Africa in one study of about 41.2% [13]. Studies conducted in different regions of the world except few countries in Africa, have reported that HIV-TB co-infection is much higher among males than females[13]. Same pattern was observed in our study. Almost all males and females belonged to low socioeconomic background. It is imperative to note that the most affected age group in our study was patients aged 51-60 years.

As far as mode of transmission is concerned we found that, 07(53.8%) patients were intravenous drug abusers, 05 (38.4%) had past history of blood transfusion and surgeries, while 01(7.6%) patient declared history of heterosexual and extramarital relationship. In sub-continent, the most common route of HIV infection is through heterosexual transmission and sharing needles, followed by blood transfusion[14, 15]. In the United States of America the most common HIV transmission route is intravenous drug use.[16]

In the present study HIV was diagnosed in a significant number (8.1%) of newly diagnosed pulmonary and extra-pulmonary TB patients. This is most likely due deterioration of immune system associated with HIV infection. Similar pattern has been observed by Jain SK et al, Ahmad Z et al and Susheel B et al in their research work.[14, 1718,]

In our studied patients, we observed tuberculous-pleuritis (66.6%) as the common form of Extra Pulmonary tuberculosis, followed by lymphadenopathy (33.3%). However other researchers have reported the lymphatic system to be more common than pleural involment.[15,19,]

Our research work was conducted in two large hospital Medical and Teaching Instituting Lady Reading Hospital Peshawar and Mardan Medical Complex of district Mardan with a catchment area that includes Peshawar, Mardan, Kohat, Nowshera and Swabi districts. Hence, the study population may not exactly reflect the general population of Khyber Pakhtunkhwa which is limitation of this study.

CONCLUSION

It is concluded from our study that all newly diagnosed tuberculous patients should be assessed for risk factors for HIV and screening should be offered to them to detect the underlying HIV co infection in them. On the contrary, all HIV positive cases should be screened for TB.

Author's Contribution:

Concept & Design of Study:	Ziauddin
Drafting:	Naveed Iqbal, Shah Zeb, Jamal Nasir
Data Analysis:	Shahab Uddin Zia, Shah Zeb, Muhammad Abbas
Revisiting Critically:	Ziauddin, Naveed Iqbal
Final Approval of version:	Ziauddin

Conflict of Interest: The study has no conflict of interest to declare by any author.

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