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The prevalence and socio-demographic determinants of HIV among tuberculosis patients and intravenous drug users (IDUS) in Hospital Universiti Sains Malaysia, Kelantan Malaysia

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Abstract— This study determines the prevalence and socio-demographic of HIV among tuberculosis patients and intravenous drug users (IDUs) in Hospital Universiti Sains Malaysia (HUSM), Kubang Kerian, Kelantan Malaysia. All the data collected was entered in MS Excel Database. After that, data entry and analysis were conducted using Statistical Packages for Social Sciences (SPSS) version 26. The continuous variables were expressed as mean (SD), and categorical variables were expressed as frequencies and percentages. The result showed that The mean age of HIV among tuberculosis patients was 33 years old. Most of the patients were male (82%), Malay (90%), non-Malay patients is 10% only, half of all HIV among TB patients have a low CD4 count of fewer than 200 cells/mm3, 24 percent of HIV cases are reported due to heterosexual, 3% of HIV among TB patients were infected through blood transfusions and most patients were smoker (65%). In conclusion, as the prevalence of TB/HIV co-infection is associated with the prevalence of HIV in the general population, and antiretroviral therapy is effective in treating both diseases, HIV-infected patients should begin treatment as soon as possible.

Keywords: HIV, Tuberculosis, Prevalence, Socio-Demographic

1. Introduction

Globally, tuberculosis is estimated to cause 8 million new cases per year, with 3 million deaths. In countries with a high prevalence of both tuberculosis and HIV infection, there has been an increase in tuberculosis incidents. TB is the leading cause of death among HIV-positive people. Co-infection with tuberculosis and HIV is a significant setback for tuberculosis and HIV infection control programmers [1]. HIV infection is also a vital risk factor for tuberculosis and contributes to the development of active TB from latent and exogenic re-infection [2].

At the end of 2000, approximately 12 million of the 36 million HIV-infected individuals worldwide were co-infected with Mycobacterium tuberculosis, with 8.4 million (70.0 percent) of those co-infected residing in Sub-Saharan Africa. Most tuberculosis patients are also HIV positive in countries with advanced HIV epidemics, particularly those in Sub-Saharan Africa [3]. HIV infection is transmitted through bodily fluids such as blood, sperm, vaginal fluids, and breastmilk. This means that HIV can be passed down from mother to child through sexual contact, blood-borne transmission, or vertical transmission during childbirth. Men who have sex with men (MSM), people who inject drugs (PWID), people in prison or other congregate settings, transgender people, and sex workers and their clients are critical risk factors for HIV globally. HIV transmission can also be spread through unprotected sex, other STIs, sharing needles or other injecting equipment or drug solutions, unsafe blood transfusions or organ transplantations, and accidental needle stick injuries [4].

The risk of HIV infection is higher for sex between men than for heterosexual contact, and transmission

from men to women is more likely than transmission from women to men. For sex between women or oral sex acts, the risk of HIV transmission is low, but anal sex has a higher risk [5]. AIDS is the most severe clinical stage of HIV infection, characterized by severely impaired immunity (CD4 count 200 cells/l) or AIDS indicator diseases, typically opportunistic infections, certain cancers, or other severe clinical manifestations. Severe infections such as pneumonia, tuberculosis, esophageal candidiasis, cryptococcal meningitis, or cancers such as Kaposi's sarcoma and lymphomas are typical. HIV infection, diabetes, malnutrition, alcoholism, and tobacco or other substance use are major risk factors for tuberculosis (TB). High smoking rates may also impact both local lung immunity and TB transmission [6].

Malaysia had first reported of HIV case in 1986. Since then, the number of new cases has continued to increase, and it reached the highest peak in 2002, where a total of 6978 new HIV infections were reported. In 2008, the number of new HIV infections cases reported was 3692 cases. Since 2006, Kelantan has been the highest contributor to new HIV infections in Malaysia. In 2008, Kelantan reported 792 new HIV infections, a 20.0% contribution of all new HIV infections in Malaysia[7]. To determine the prevalence and socio-demographic of HIV among tuberculosis patients and intravenous drug users (IDUs) in Hospital Universiti Sains Malaysia (HUSM), Kubang Kerian, Kelantan Malaysia.

2. Methodology

The design of the study was retrospective record review (RRR). HIV patients who registered at Hospital Universiti Sains Malaysia, Kubang Kerian, Kelantan. This study included all HIV patients and have a history of injection drug use (IDU). From the patient's records, HIV status, age, sex, ethnicity, low CD4 count, heterosexual transmission, blood transfusion and smoking status were collected. The details of the data are shown in Table 1 below.

Table 1: Description of Data in Study

Variables	**Description**
HIV Status	0 = HIV positive without TB 1 = HIV positive with TB
Age	Age of HIV patients
Sex	0 = Female 1 = Male
Ethnic	0 = Non-Malay 1 = Malay
Low CD4 count (< 200 cells/mm^3)	0 = No 1 = Yes
Heterosexual Transmission	0 = No 1 = Yes
Blood Transfusion	0 = No 1 = Yes
Smoking Status	0 = No 1 = Yes

2.1 Sample Size Calculation

The sample size was determined by using the formula single proportion.Level of significance, $\alpha = 0.05$, absolute precision (Δ) = 4.0%, $Z\alpha = 1.96$ and anticipated population proportion (p) = 7.2% [8].

$$n = [\left(\frac{1.96}{0.04}\right)^2 (0.072)(1 - 0.072)]$$

$$n = 160\ patients$$

After adding 10% of estimated missing data, the minimum sample size needed in this study is n= 176 of HIV patients.

All the data collected was entered in MS Excel Database. After that, data entry and analysis were conducted using Statistical Packages for Social Sciences (SPSS) version 26. The distribution and frequencies were examined. The continuous variables were expressed as mean and categorical variables were expressed as frequencies and percentages (%).

3. Results

One hundred and seventy-six patients were diagnosed with HIV positive. Among them, only fifty-four were infected with TB. This chapter gives a brief description of the prevalence of TB among people with HIV positive based on demographic characteristics in terms of HIV status, age, sex, ethnicity, low CD4 count, heterosexual transmission, blood transfusion and smoking status.

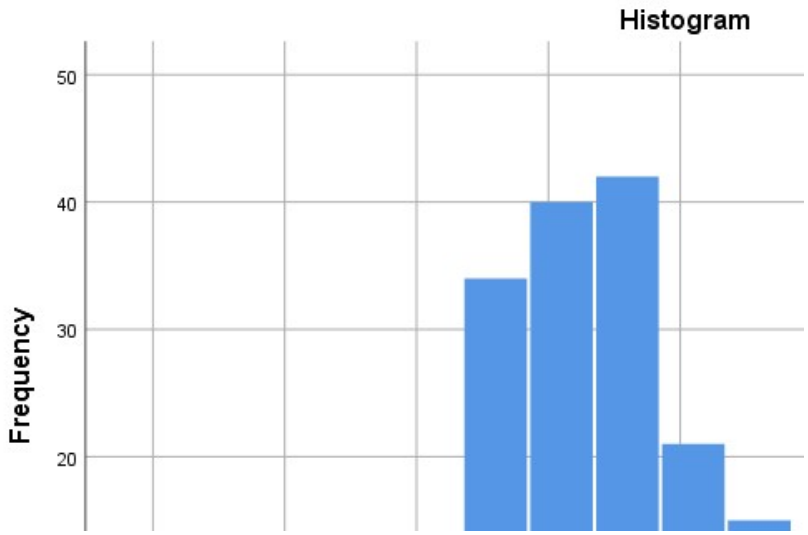

Figure 1: Age distribution of HIV among Tuberculosis patients

The mean age of HIV among tuberculosis patients was 33 years old and with a standard deviation of 9.96,ranging from 1 to 63 years old. The age distribution shows the largest number in the groups between 25-40 years.

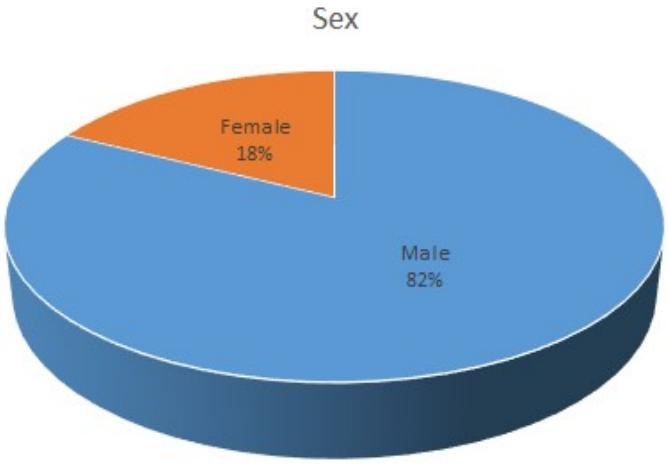

Figure 2: Gender distribution of HIV among Tuberculosis patients

Most of the patients were male (82%), and female were 18%.

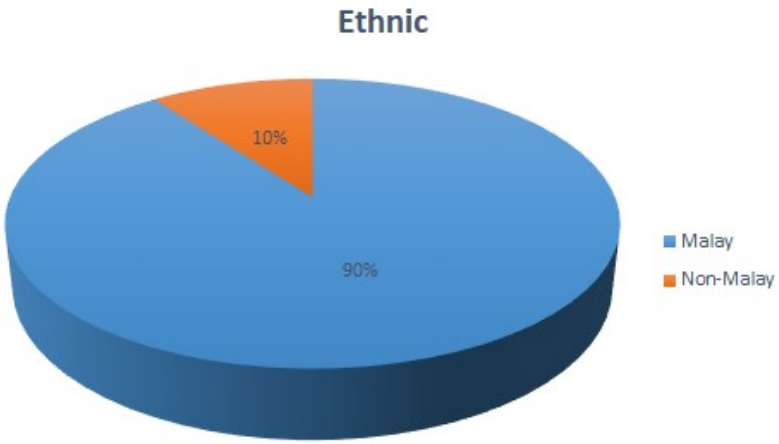

Figure 3: Ethnic distribution of HIV among Tuberculosis patients

Most of the patient's HIV among Tuberculosis patients were Malay, 90%. Non-Malay patients included Chinese, Indian and others are 10% only.

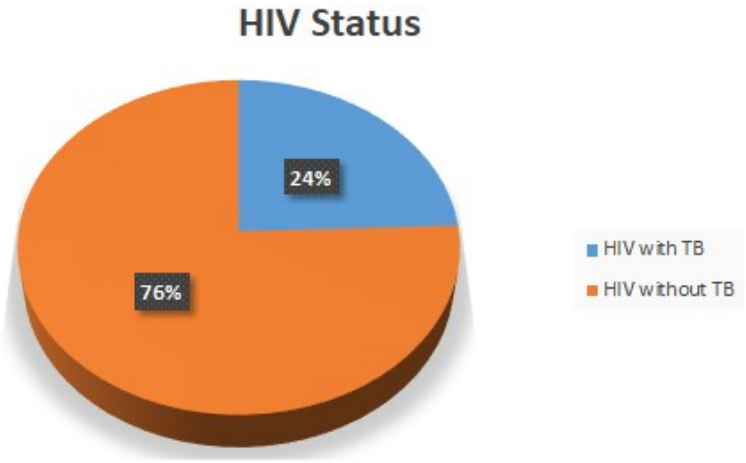

Figure 4: HIV Status distribution

The highest number of patients' HIV without tuberculosis with a percentage of 76% compared with HIV with tuberculosis (24%).

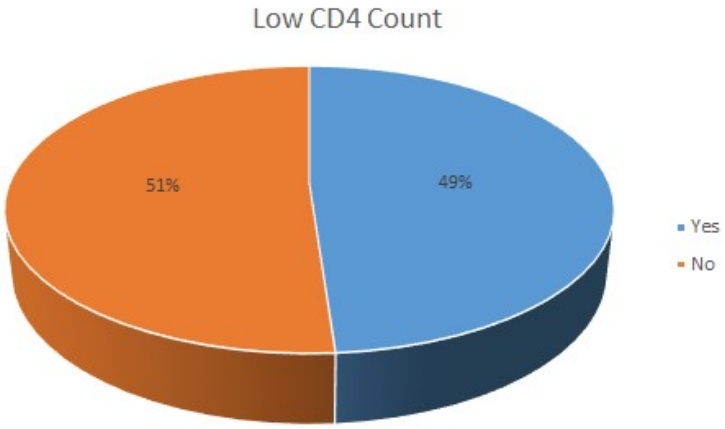

Figure 5: Low CD4 Count distribution of HIV among Tuberculosis patients

Half of all HIV among TB patients have a low CD4 count of fewer than 200 cells/mm^3. At the same time, another 50 percent had a CD4 count above 200 cells/mm^3.

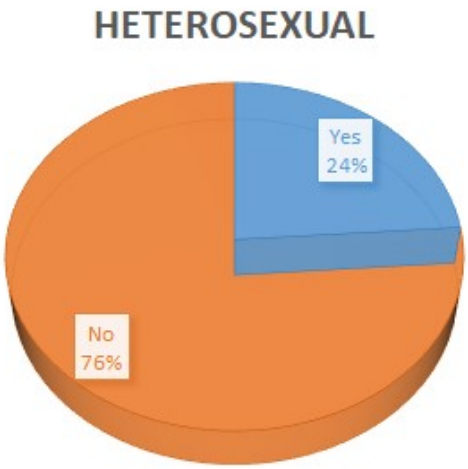

Figure 6: Heterosexual Transmission distribution of HIV among Tuberculosis patients

As many as 24 percent of HIV cases are reported due to heterosexuality. At the same time, as many as 76 percent of patients had no relationship with heterosexuals.

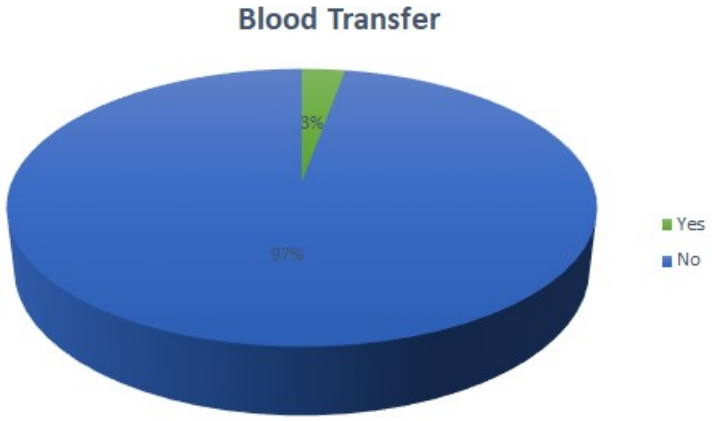

Figure 7: Blood Transfusion distribution of HIV among Tuberculosis patients

In this study, only 3% of HIV among TB patients were infected through blood transfusions.

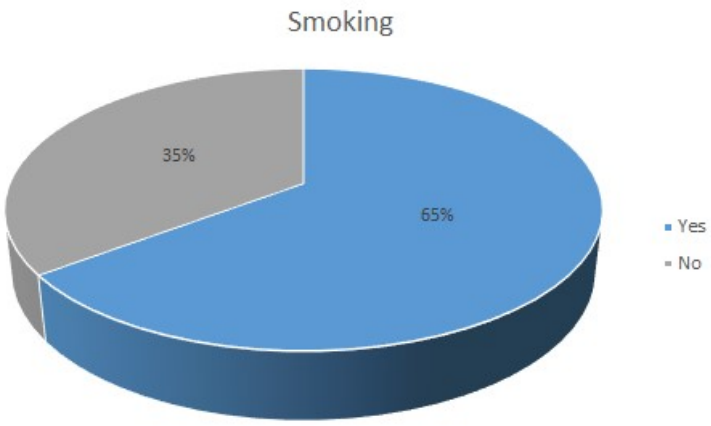

Figure 8: Smoking distribution of HIV among Tuberculosis patients

Most HIV among tuberculosis patients were smokers (65%), and only 35% were not smoking.

4. Discussion

TB has now emerged as the most common opportunistic disease associated with HIV infection in many developing countries. The characteristics of HIV-positive patients in this study may represent the actual scenario in this country, where most of them are from younger age groups, male, Malay, low CD4 count cell, heterosexual transmission, blood transfusion and smoking [9]. Fenner et al. [10] studies have reported that the risk of M. tuberculosis/HIV co-infection increases with male sex, age, and tobacco use, as was the case in our study. The finding from the present study revealed that the mean age of TB among HIV-positive patients was 33.38 years old and consistent with finding in other studies. In the Malawian survey, the co-infection most frequently affected age groups 30-44 years old [11].

In this study, more than two-thirds of HIV-positive patients with TB were male. Globally, male TB cases exceedthe number of cases among women in all age groups except children [12]. This could represent either probability of transmission or diagnosis and notification, but male predominance appears more likely to reflect a genuine difference in risk given the consistent pattern. A possible explanation for higher incidence among men is most of them are smokers. The other study states that in Malaysia, most infected cases are males, who accounted for more than 90.0% of those living with HIV and AIDS in 2003 [7]. The majority of patients were Malay (85.2%), followed by non-malay (14.8%). The ethnic distribution was similar to the ethnic distribution in Kelantan (Department of Statistic, 2002). A previous study showed that the Malay ethnic in Malaysia had a higher incidence rate of HIV with TB (69.6%) [13].

In Malaysia, the cumulative number of reported HIV cases up to 2002 comprised most Malays, primarily young men. This may reflect a bias because of a focus on the testing of drug users, the majority of whom are Malays, particularly IVDUs. Drug dependence is a social problem that has persisted in Malaysia since the 1970s and even before. Comparing the three major ethnic groups, there is a noticeable difference in the distribution of HIV cases by probable mode of transmission or risk groups. While most Malays and Indians living with HIV are categorized under IVDU, a substantially larger proportion of infected Chinese Malaysians fall under the heterosexual risk group. Only 40.0% of Chinese HIV cases were IVDUs,

compared with twice as many among Malays and Indians [7].

On the other hand, current studies have shown that the risk of M. tuberculosis/HIV co-infection is higher among people who are immunosuppressed or live in close contact with people who have active TB or have a CD4 cell count below 200 cells/mm^3 [14]. Our results were consistent with these findings. Multivariate analysis indicated that previous TB infection and CD4 cell count less than 350 cells/mm^3 substantially increased the risk of TB in people living with HIV. They reported an inverse association between the prevalence of M. tuberculosis/HIV co-infection and CD4 cell count, such that the risk of co-infection increased as the CD4 cell count decreased. This finding is consistent with the current evidence [14].

5. Conclusion

In conclusion, our findings suggest that in countries with high HIV/AIDS prevalence, it is critical to prioritize HIV/TB co-infection, particularly TB/HIV co-infection screening using methods with high sensitivity, specificity, and predictive values. Because the prevalence of TB/HIV co-infection is associated with the prevalence of HIV in the general population, and antiretroviral therapy is effective in treating both diseases, HIV-infected patients should begin treatment as soon as possible.More large-scale or even countrywide studies are needed to ensure a precise estimate of the epidemic status of co-infection. Such studies will provide more concrete proof in promoting the development of effective diagnosis and surveillance strategies. Still, they will also be critical in reducing TB and HIV/AIDS prevalence and improving prognosis.

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