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Original Research Article

Characteristics of human immunodeficiency virus infection/acquired immune deficiency syndrome patients with pulmonary tuberculosis co-infection in Yowari Regional General Hospital of Jayapura

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ABSTRACT

Background: Pulmonary tuberculosis (TB) is an opportunistic co-infection on patients with human immune-deficiency virus (HIV) infection. The risk of pulmonary TB significantly increases with an HIV infection. This study aims to determine the characteristics of patients with TB-HIV co-infection receiving treatment in Yowari Regional General Hospital, Jayapura from July to December 2022.
Methods: This is an observational descriptive study with cross-sectional design, using information of samples obtained from the medical records. Total sampling technique was used for this study.
Results: All patients with TB-HIV co-infection are used as samples for this study, with the total of 24 samples. In this study, 58% of the samples were men, 79% death occurred within the age group of 20-40 years old, 83% employed, 58% has finished high school, and 67% had normal body mass index (BMI) level.
Conclusions: Patients with TB-HIV co-infection in Yowari Regional General Hospital, Jayapura is mostly dominated with men, age of 20-40 years old, employed, has finished high school, and had normal BMI level.

Keywords: HIV, TB, TB-HIV co-infection

INTRODUCTION

Tuberculosis (TB) is an infection caused by *Mycobacterium tuberculosis*, which usually affects the lung parenchyma (pulmonary TB) but may also be found infecting other organ system (extrapulmonary TB).[1] In 2017, Global TB Report estimated that there were approximately 842,000 new TB cases (319 per 100,000) and 116,400 deaths by TB (44 per 100,000) in Indonesia alone.[2] Regardless of the advances of medical system, Indonesia still ranks third as a country with most TB cases in the world. This fact possesses one of the greatest challenges Indonesia is facing due to the high morbidity and mortality rates which requires attention from not only the medical sector but other sectors as well. TB also has the highest mortality rate after ischemic cardiac diseases and cerebrovascular diseases. In 2017, it is estimated that there were 3.6 deaths per 100,000 for patients with TB-HIV co-infection.[3]

HIV/AIDS epidemic appears in iceberg phenomenon. It causes a national multidimensional crisis particularly in the healthcare sector. It needs proactive responses from the society, along with proper healthcare planning from the government. If left untreated, HIV/AIDS infection easily opens a way for opportunistic infections. TB-HIV co-infection is difficult to be managed if left untreated.[4] To tackle this major problem, appropriate clinical approaches need to be done to understand the co-infection comprehensively, which can be used as one of the strategies to manage patients with TB-HIV co-infection.[5]

Therefore, this study is conducted to study the characteristics of patients with TB-HIV co-infection undergoing treatment in Yowari Regional General Hospital on July to December 2022.

METHODS

This is a descriptive observational study with cross sectional design to describe characteristics of TB-HIV co-infection patients undergoing treatment in Yowari Regional General Hospital, Jayapura, Indonesia. Total sampling technique was used for all TB-HIV co-infection patients from July to December 2022 which met the inclusion criteria. All patients with complete medical record data were selected as samples for this study. Exclusive criteria of this study include incomplete medical record data and indeterminate HIV patients. Secondary data used in this study were collected from the medical record, which is grouped into Microsoft Excel and then analyzed with statistical package for the social sciences (SPSS) software. Analyzed data were then displayed in tables and diagram to describe the characteristics of TB-HIV co-infection patients.

RESULTS

Over the period of July-December 2022, there were 34 patients with TB-HIV co-infection registered in Yowari Regional General Hospital, Jayapura, Indonesia. All 34 patients were described each based on sex, age group, employment status, education status, ARV regimen, and nutritional status by IMT.

Based on sex, the total 34 patients consist of 20 male patients (58.8%) and 14 female patients (41.2%) (Table 1).

Table 1: Characteristics of patients with TB-HIV co-infection based on sex.

Sex	Frequency	%
Male	20	58.82
Female	14	41.18
Total	34	100.00

Based on age group, the majority of the patients came from the age group of 20-40 years old, accounting for 27 patients (79.4%), followed by age group of <20 years old for 5 patients (14.7%), with the very least from age group of >40 years old for 2 patients (5.9%) (Table 2).

Table 2: Characteristics of patients with TB-HIV co-infection based on age group.

Age (year)	Frequency	%
0–20	5	14.71
>20–40	27	79.41
>40	2	5.88
Total	34	100.00

Based on employment status, 28 patients (82.4%) were employed, while the rest 6 patients (17.6%) were unemployed (Table 3).

Table 3: Characteristics of patients with TB-HIV co-infection based on employment status.

Employment status	Frequency	%
Employed	28	82.35
Unemployed	6	17.65
Total	34	100.00

The educational status of the samples on this study varies. 1 patient (2.9%) has not started school, 4 patients (11.8%) has finished junior high education, 19 patients (55.9%) has finished high education, and 10 patients (29.4%) has finished a degree in a university (Table 4).

Table 4: Characteristics of patients with TB-HIV co-infection based on educational status.

Educational status	Frequency	%
Has not started school	1	2.94
Junior high school	4	11.76
High school	19	55.88
University	10	29.41
Total	34	100.00

Based on nutritional status, most patients presented with underweight (BMI≤18.5) accounting for 21 patients (61.7%), followed with normal weight (BMI 18.6–22.9) for 10 patients (29.4%), overweight (BMI 23–24.9) for 2 patients (5.9%), and obese I (BMI 25–29.9) for 1 patient (3.0%) (Table 5).

Table 5: Characteristics of patients with TB-HIV co-infection based on nutritional status.

BMI (kg/m^2)	Frequency	%
≤18.5	21	61.76
18.6–22.9	10	29.41
23–24.9	2	5.88
25–29.9	1	2.94
≥30	0	0.00
Total	34	100.0

33 (97.1%) out of 34 patients was receiving TLE regimen of ARV, while only 1 patient (2.9%) was receiving ABC+NVP regimen (Table 6).

Table 6: Characteristics of patients with TB-HIV co-infection based on ARV regimen.

ARV regimen	Frequency	%
TLE	33	97.06
ABC+NVP	1	2.94
Total	100.00	34

DISCUSSION

HIV/AIDS and pulmonary TB infections mutually influences the development of each disease. The risk of developing active TB in immunocompetent individuals is estimated to be 5-10% over life, whereas in HIV-positive individuals the risk increases to 5-15%.[6] In people with HIV, there is a decrease in CD4 T-lymphocyte cells which causes a decrease in interferon (IFN-2) production. This decrease in IFN-2 production causes an increased risk of TB reactivation or reinfection.[7] Patients with *M. tuberculosis* infection also has an influence on the development of HIV infection. Proinflammatory cytokines produced by tuberculous granulomas, especially tumor necrosis factor-2 (TNF-2) are associated with increased viremia which will exacerbate immunosuppression.[8,9] TNF production as a response to *M. tuberculosis* infection is necessary to control bacterial growth, however, TNF is known to activate HIV replication in macrophages. HIV infection and stimulated *M. tuberculosis* retain TNF from infected cells. TNF will inhibit the growth of *M. tuberculosis* bacteria and at the same time increase HIV replication hence rising the cases of TB in the community.[7-9]

This study found that patients with TB-HIV co-infection is predominantly male, which constitutes for 20 patients (58.8%) compared to 14 female patients (41.2%). This finding is similar to a study by Wesnawa and Putra in 2015, which found that 68.6% of TB-HIV co-infection patient was male.[13] This argument is supported by a report by Indonesian Department of Health which also states that pulmonary TB co-infection is more commonly found in males compared to females.[14] A study in 2011 states that males have increased risk of tuberculosis due to the tendency to smoke. Smoking can cause cilia dysfunction leading to pulmonary malfunction, which is one of the risk of developing pulmonary TB.[15,16]

Most of the samples of the study were from the age group of 20-40 years old. This finding is similar to a study in Semarang in 2012 which states that the majority (59.0%) of TB-HIV co-infection patients were 15-35 years old.[6] Another study in Ethiopia in 2011 support this finding, in which the highest prevalence of TB-HIV co-infection comes from the age group of 15-35 years of age.[15] The WHO also reported that patients with TB in Indonesia were patients aged 40 years old and below.[2] This age group is believed to have increased mobility hence having an increased risk of transmission. In addition, this age group is a productive age group which also increases the tendency of sexual activities and injected drugs, which contributes to HIV infection.

The majority of patients in this study are employed (82.4%). A study in Semarang in 2012 supports this finding in which 68.5% of the samples are employed.[6] The risk of TB-HIV co-infection increases if the patients work in a humid and dense environment, especially if it lacks of sunshine. The work environment is also linked to unhealthy conditions and socioeconomic status.

This study has several limitations. Firstly, this is a descriptive study which was conducted in a short period of time, hence may not reflect the situation of TB-HIV co-infection in a long period of time. In addition, due to its characteristic of a descriptive study, results of this study could not be applied as representatives to the bigger population, and no hypotheses of the study were made.

CONCLUSION

There were 34 patients with TB-HIV co-infection in Yowari Regional General Hospital, Jayapura Regency, Indonesia. Most patients came from male sex, age group of 20-40 years old, employed, has finished high school, underweight, and is taking TLE regimen. Further studies are needed to confirm these findings.

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