



Profile of Human Immunodeficiency Virus Patients with Opportunistic Mycobacterium Tuberculosis Pulmonary Infection at Keramat Jati Community Health Center, Jakarta, Indonesia

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aims: To determine the profile of co-infected patients with Human immunodeficiency virus and *mycobacterium tuberculosis* at Keramat Jati Community Health Center for the period January 2018 - January 2023 based on age, educational status, employment status, history of CD4 levels, and clinical stage.

Methodology: This research uses a retrospective methodology. The study population comprised patients who were diagnosed with HIV and TB infection at the Kramat Jati Community Health Center, East Jakarta. Based on calculations using the Slovin method, the research sample consisted of 34 HIV-TB patients. All sampling approaches are used to carry out the sampling process. HIV-TB patient medical records are one source of data. A total of 5 years, from January 2018 - January 2023.

Results: It was observed that the age group of 18-65 years recorded the highest rate at 94.1%, men recorded the highest lift at 79.9%, most worked as private employees at 79.4%, most got hemoglobin <11g/dL at 61.7%, Most high school education was higher with 58.8%, most patients with CD4 count <200 cells/mm³ at 58.8%, most got total lymphocyte count <1000 cells/mm³ at 82.4%, all patients got clinical stage III at 100%, most were get a positive BTA staining result of 100%. Key populations such as homosexuals, customers of FSW (female sexual workers), PWID (Injecting Drug Users), FSW customers (Female Sexual Workers), constituents (injecting drug users), discordant couples, children with ODHIV (people in the Human Immunodeficiency Virus) are one of the factors that have the potential to influence the number of HIV positive cases. The prevalence of HIV cases in Indonesia in the Homosexual group is 41.2%, in the FSW Customer group it is 11.8%, in FSW is 11.8%, in IDUs it is 23.5%, in discordant couples it is 8.8%, in PLHIV children it is 2.9%. Most of the HIV/AIDS cases with pulmonary TB co-infection in the Kramat Jati District Health Center for the period January 2018 - January 2023 were aged > 18-65 years, male, at least high school education level, and working status as private employees. Apart from that, the majority had Hb levels < 11 g/dl, CD4 count < 100 cells/mm³, total lymphocyte count < 1000 cells/mm³, BTA staining results positive, clinical stage III, and for the Key Population most frequently in homosexuals.

Keywords: HIV/AIDS-coinfection of pulmonary TB; CD4; BTA; lymphocytes; key populations.

1. INTRODUCTION

An infectious disease called Human Immunodeficiency Virus / Acquired Immune Deficiency Syndrome attacks white blood cells, lowering the human body's immunity and making people more susceptible to some other diseases. Acquired Immune Deficiency Syndrome (AIDS) is a group of signs and symptoms of a condition that develops as a result of decreased immunity caused by infection with the Human Immunodeficiency Virus (Health, 2020). Human Immunodeficiency Virus is a member of the retrovirus family, which includes viruses with enzymes (proteins) that can convert their genetic material, RNA, into DNA (Kusejko et al., 2020; Oloro et al, 2022; Reichenbach et al, 2019)). After infection, the reverse transcriptase enzyme converts Human Immunodeficiency Virus RNA into DNA. A sign of an advanced stage of HIV infection, AIDS is a syndrome or group of disease symptoms characterized by severe immune deficiency (Directorate General, 2014; Grouzard et al, 2016). Antibody-positive HIV is not the same as AIDS because AIDS and one or

more disease symptoms caused by cellular immune system deficits (Katiandagho, 2018; Zhang et al, 2022). Among the top five killers on a world scale, AIDS is in fourth place. Indonesia is one of the country that HIV/AID pandemic is spreading very fast. The African continent had the highest number of people infected with HIV in 2019 (25.7 million), followed by Southeast Asia (3.8 million) and the Americas (3.5 million). With 1.9 million people, the Western Pacific has the lowest population (Kamya et al, 2004). Considering the high number of HIV sufferers in Southeast Asia, Indonesia must increase awareness of the spread and transmission of this virus (Chinedum et al., 2018; Indonesian Ministry of Health, 2016).

Human Immunodeficiency Virus Increases the chance of patients to get more diseases. Tuberculosis (TB) is a disease co-infection that is often faced by HIV/AIDS sufferers (Klatt, 2016; Nasarudin et al, 2015; National Strategy for Tuberculosis, 2015). According to WHO figures, Tuberculosis kills 13% of AIDS patients (Janis et al, 2017; Joao et al, 2020; Jose et al, 2020).

Although using ART reduces the chance of contracting TB by 70-90%, TB is still the main cause of death among HIV patients (Health, 2020). The health problem of Tuberculosis (TB) continues to be a concern throughout the world today. Eradicating the global tuberculosis epidemic is one of the goals of the 2030 Sustainable Development Goals (SDG) to be achieved (WHO, 2016). It has been considered a worldwide emergency by the World Health Organization (WHO) since 1993 (Indonesian Ministry of Health, 2014). In Indonesia, there were 420,994 new cases of Tuberculosis in 2017 (Chakma et al., 2017; Cahyati F, 2018; Budisuari et al, 2011). Men experienced 1 to 4 times as many new Tuberculosis cases in 2017 as women, according to gender. Opportunistic infections (IO) are a common complication of HIV infection and occur naturally over time. One opportunistic disease, TB, is often found in people with HIV infection and can manifest before AIDS, which is often identified at the same time (Ajmal et al, 2019; An.H, 2019; Audu et al, 2021). In 2000, HIV plus TB caused 350,000 deaths globally (Health, 2020). Based on the description above, researchers consider it important to know the profile of sufferers of human immunodeficiency virus infection with Mycobacterium Tuberculosis infection in the Keramat Jati sub-district health center for the period January 2018 - January 2023.

2. MATERIALS AND METHODS

2.1 Research Design

This study employs a retrospective approach, focusing on examining past events by gathering information about the outcomes that have already occurred and then investigating the underlying causes or factors that contributed to these outcomes. Research Place: Kramat Jati Community Health Center, East Jakarta, time: April 2023 – May 2023.

2.2 Population and Sample

2.2.1 Population

The study population was all patients diagnosed with Human Immunodeficiency Virus Infection with Opportunistic Mycobacterium Tuberculosis Infection at the Kramat Jati Community Health Center, East Jakarta.

2.2.2 Sample

The sample was determined using a sampling technique using the Slovin formula, resulting in a total sample of 34 HIV-TB patient data.

Inclusion Criteria:

1. All HIV patients with TB opportunistic infections for the period 2018-2023.
2. Confirmed positive for HIV based on CD4 results.
3. Confirmed positive for Tuberculosis based on Acid Resistant Bacilli (ARB) or Rapid Molecular Test (RMT) results.

Exclusion Criteria:

1. Incomplete medical records, with some data missing

2.3 Data Collection

This study used secondary data, namely data collected from the medical records of the Kramat Jati District Health Center by collecting patients with human immunodeficiency virus infection with the opportunistic Mycobacterium Tuberculosis infection, data from patients who had HIV. Demographic data collected included age, educational status, employment status, history of parity, gestational age, number of fetuses, and no infections. Procedure for Data collection:

1. The approval for the research data collection was obtained from the Kramat Jati District Health Center.
2. Collected data in the medical records room of the Kramat Jati District Health Center.
3. The data obtained was then processed using the SPSS program

3. RESULTS AND DISCUSSION

3.1 Research Overview

This study aims to determine the relationship between HIV/AIDS sufferers and opportunistic infections caused by *Mycobacterium Tuberculosis* at the Kramat Jati District Health Center. A total of 34 HIV/AIDS patients were used as samples from January 2018 to January 2023.

From the data in Table 1 it can be seen that there were 27 male HIV-TB patients (79.9%), 7 subjects with a proportion of 20.6% were female. In terms of age, data was obtained that there were 2 HIV-TB patients aged 0-17 years with a percentage of 5.9%, while those aged 18-65 years were 94.1%. Meanwhile, in terms of education, there was one HIV-TB patient with an elementary school education level and a percentage of 2.9%, five patients with a junior high school education level and a percentage of 14.7%, twenty patients with a percentage of

58.8%, four patients with a percentage of 11.8% with an academic education level and four patients with a percentage of 11.8% who did not attend school. Furthermore, From the data it can also be seen that in terms of employment, HIV-TB sufferers are 27 private employees with a percentage of 79.4%, 1 person is a housewife with a percentage of 2.9%, 1 person is a restaurant employee with a percentage of 2.9%, 1 person is a housewife with a percentage of 2.9%, 1 person is a driver with a percentage of 2.9%, and 1 person is a student. people with a percentage of 2.9%, not working as many as 2 people with a percentage of 5.9%.

3.2 CD4 Distribution in HIV-TB Patients

In this study, it was found that the proportion of HIV-TB patients with CD4 levels below 200 cells/mm³ was 20, The frequency of patients with CD4 level of 200 cells/mm³ was 13 accounting for 38.2%, and the percentage of patients with CD4 levels above 200 cells/mm³ was 2.9%.

3.3 Distribution of positive results for Acid Resistant Bacilli (ARB) or Rapid Molecular Test (RMT) in HIV-TB sufferers

The Table 3 shows that the BTA and TMC results for HIV-TB patients were positive in all 34 individuals, yielding a 100% positivity rate.

3.4 Distribution of Lymphocyte Levels in HIV-TB sufferers

The Table 4 shows that; 5 HIV-TB patients (12.7%) had lymphocyte levels below 1000/mcL, 28 patients (82.4%) had lymphocyte levels between 1000/mcL and 1200/mcL, and 1 patient (2.9%) had lymphocyte levels above 1200/mc. There were 28 people with a percentage of 82.4%, with lymphocyte levels >1000/mcL there were 1 person with a percentage of 2.9%.

Table 1. Distribution of Respondent Demographic Data

Variable	Number (n)	Percentage (%)
Gender		
Male	27	79.4
Female	7	20,6
Age		
0-17 year	2	5.9
18-45 year	32	94.1
Education		
Elementary school	1	2.9
Junior high school	5	14.7
Senior high school	20	58.8
Academy	4	11.8
No School	4	11.8
Job		
Private sector employee	27	79.4
Housewife	1	2.9
Restaurant Employees	1	2.9
Janitor	1	2.9
Driver	1	2.9
Student	1	2.9
Doesn't work	2	5.9
Total	34	100

Table 2. CD4 Distribution in HIV-TB Patients

CD4	Frequency	Percentage
<200 sel/mm ³	20	58,8%
200 sel/mm ³	13	38,2%
>200sel/mm ³	1	2,9%
Total	34	100%

Table 3. Distribution of BTA and TMC in HIV-TB sufferers

Positive/Reactive	Frequency	Percentage (%)
Positive	34	100

Table 4. Distribution of Lymphocyte Levels in HIV-TB Patients

Lymphocyte Levels	Frequency	Percentage (%)
<1000 /mcL	5	12,7
1000/mcL-1200/mcL	28	82,4
>1200/mcL	1	2,9
Total	34	100

Table 5. Distribution of Hemoglobin Levels in HIV-TB Patients

HB Level	Frequency	Percentage (%)
<11 g/dL	15	61,7
11 g/dL	16	21,7
>11g/dL	3	16,5
Total	34	100

Table 6 Distribution of Clinical Stages of HIV-TB Patients

Clinical Stage	Frequency	Percentage
Sage 3	34	100%
Total	34	100%

Table 7. Distribution of Key Populations Suffering from HIV-TB

Key Populations	Frequency	Percentage
Homosexual	14	41,2%
WPS Customers	4	11,8%
IDU	8	23,5%
WPS	4	11,8%
Discordant Couples	3	8,8%
PLHIV children	1	2,9%
Total	34	100%

3.5 Distribution of HB levels in HIV-TB sufferers

The Table 5 reveals that 15 HIV-TB patients (61.7%) had a hemoglobin level of 11 g/dL, 16 patients (21.7%) had a hemoglobin level of 11 g/dL, and 3 patients (16.5%) had hemoglobin levels above 11 g/dL

3.6 Distribution of Clinical Stages of HIV-TB sufferers

The Table 6 indicates that all 34 HIV-TB patients (100%) were at Clinical Stage 3

3.7 Distribution of Key Populations with HIV-TB

The Table 7 shows that among HIV-TB patients, 14 individuals (41.2%) were homosexuals, 4 (11.8%) were FSW customers, 8 (23.5%) were

IDUs, 3 (8.8%) were discordant couples, and 1 (2.9%) was a couple of a PLHIV with children.

4. DISCUSSION

In discussing the results of this research, the findings obtained in the field will be reviewed, and complemented by discussions based on the findings obtained both from literature theories. This research is qualitative, and in analyzing this qualitative data, the researcher does not rule out the possibility of using quantitative data analysis, to develop and enrich the quantitative data analysis itself, based on the consideration that the existing sample size allows and fulfills the requirements for description and generalization of the population. Quantitative data is used only to a certain extent in analysis and is interpreted following quantitative principles. According to research conducted at the Bali Medika Clinic in Kuta, men make up 81.6% of those with HIV-TB,

while women make up 18.4% (Statistic on HIV/AIDS Cases in Indonesia, 2016). Meanwhile, research results for the city of Manado showed that there were 29 male respondents with a proportion of 54.7%, and 24 female respondents with a proportion of 45.3%. Men experienced 1.4 times more new cases of pulmonary tuberculosis in 2017 than women, according to gender (UNAIDS, 2016; Solomon et al. 2018). This may be because men are more exposed to risk factors such as smoking and non-compliance with taking medication. According to research findings, 68.5% of all participants were male smokers, and only 3.7% were female smokers (Ministry of Health of the Republic of Indonesia, 2018). The incidence and death rates from tuberculosis have been reduced by a number of symptom management measures (Wesnawa et al, 2016; Surjanto et al, 2012).

Research carried out at the Bali Medika Clinic in Kuta stated that 59.2% of cases of HIV-TB pulmonary patients mostly occurred in people aged 15-35 years, and for those over 35 years old it was 40.8 (Permitasari et al 2012; Pustil, 2003). If you look at the age distribution of the PLWHA group, the average age is the productive age that can transmit HIV to other people if they have sexual relations with other people, although they can accidentally infect other people with HIV through wounds and so on. Clinical provisions have been made for countries without adequate diagnostic resources (based on findings from a workshop held in Bangui, Central Africa, in October 1985) as follows:

1. Adults with at least two major symptoms, one mild, and suspected AIDS in the absence of other known immunosuppressive conditions, such as malignancy, severe malnutrition, or prolonged use of corticosteroids.

a. Major Symptoms:

Weight loss of more than 10%, chronic diarrhea for more than 1 month, fever for more than one month (continuous or intermittent).

b. Minor Symptoms:

- Cough for more than one month.
- Generalized pruritic dermatitis, Herpes zoster recurrens, Oro-pharyngeal candidiasis, Generalized lymphadenopathy, Chronic progressive disseminated herpes simplex.

2. If there are at least two major symptoms and two mild symptoms in children and there are

no other immunosuppressive conditions—such as cancer, severe malnutrition, long-term use of corticosteroids, or other causes—the condition is suspected to be “AIDS.”

a. Major Symptoms

- Weight loss or slow and abnormal growth.
- Chronic diarrhea for more than one month.
- Fever for more than one month.

b. Minor Symptoms

Recurrent generalized infections, oropharyngeal candidiasis, and generalized lymphadenopathy chronic cough, widespread dermatitis, HIV infection in the mother (Katiandagho, 2018).

The fact that young people are among the first to engage in sexual activity in many cities only highlights the need to provide reproductive health information as early as possible to young women and young men who may engage in commercial sex. The background to this type of work shows that various groups of men are at risk of contracting HIV(+)/AIDS due to working apart from the family, through frequent movement of commercial sex.

5. CONCLUSION

Several things can be concluded Including: 1) HIV-TB patients at the Kramat Jati District Health Center in the period January 2018 - January 2023, there were 34 patients aged 18-65 years, with the highest number being 94.1%, which is the age with the lowest number of sufferers; 2) Based on the gender of the most frequent HIV-TB patients in this study, 27 men were suffering from HIV-TB with a percentage of 79.9%; 3) Based on CD4, the most frequent HIV-TB patients were those with CD4 levels <200 cells/mm³, 20 people with a percentage of 58.8% 4) In this study it can be seen that the BTA and TMC results are the Gold Standard examination for HIV-TB sufferers with positive results in 34 people with a percentage of 100%; 5) Based on the lymphocytes of HIV-TB patients, the most numerous were 28 people with a lymphocyte level of 1000/mcL-1200/mcL with a percentage of 82.4%; 6) Based on the level of education, the majority of HIV-TB patients are at the high school education level, 20 people with a percentage of 58.8%; 7) Based on hemoglobin levels, the most frequent HIV-TB patients were those with hemoglobin levels <11 g/dL, 15 people with a percentage of 61.7%; 8) Based on the employment of most HIV-TB patients, there

are 27 private employees with a percentage of 79.4%' 9) Based on the Key Population, the majority of HIV-TB patients are Homosexual, 14 people with a percentage of 41.2%' 10) Based on the Clinical Stage, the most HIV-TB patients are Clinical Stage 3, 34 people with a percentage of 100%.

ETHICAL APPROVAL

As per international standards or university standards written ethical approval has been collected and preserved by the author(s).

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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