Original Article

Distribution and Prevalence of Opportunistic Infections Among People Living with HIV/AIDS at Gambiran Hospital, Kediri, East Java

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Abstract

Introduction: *HIV/AIDS remains a global health problem with opportunistic infections (OIs) contributing to increased mortality. As a referral center for HIV/AIDS services in Kediri City, Gambiran Hospital has reported a rising prevalence of HIV/AIDS and associated OIs. This study aimed to determine the prevalence and distribution of OIs among HIV/AIDS patients at Gambiran Hospital, Kediri, East Java.*
Method*: This study involved adult patients diagnosed with HIV/AIDS and OIs during the period 2019–2021. Sampling from medical records was performed using a proportional random sampling method. Data were analyzed descriptively.*
Results*: Of the total subjects (n = 59), the highest proportion of HIV/AIDS patients with OIs was found in group age of 26–45 years (62.7%). Most were male (66.1%), married (71.2%), actively employed (66.1%), and had completed high school (45.8%). The majority of subjects had a single OI (61%), with tuberculosis being the most common (34.9%).*
Conclusion*: HIV/AIDS patients with OIs at Gambiran Hospital were predominantly aged 26–45 years, male, married, actively employed, and had completed high school, with tuberculosis being the most common OI.*

Keywords: *HIV/AIDS, opportunistic infection.*

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Distribusi dan Prevalensi Infeksi Oportunistik pada Orang dengan HIV/AIDS di RSUD Gambiran, Kediri, Jawa Timur

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Abstrak

Pendahuluan: *HIV/AIDS merupakan masalah kesehatan global hingga saat ini dengan risiko infeksi oportunistik (IO) yang dapat meningkatkan angka kematian. Sebagai pusat layanan HIV/AIDS di Kota Kediri, prevalensi kasus HIV/AIDS serta IO di RS Gambiran, Kediri, dilaporkan semakin meningkat. Studi ini bertujuan untuk mengetahui prevalensi dan distribusi IO pada pasien HIV/AIDS di RS Gambiran, Kediri, Jawa Timur.*
Metode*: Penelitian ini melibatkan pasien dewasa yang terdiagnosis dengan HIV/AIDS dan memiliki IO selama periode tahun 2019-2021. Pengambilan sampel dari rekam medik dilakukan dengan metode sampling acak proporsional. Data dioleh secara deskriptif.*
Hasil*: Dari total subyek (n=59), proporsi HIV/AIDS dengan IO tertinggi ditemukan pada kelompok usia 26-45 tahun (62,7%), jenis kelamin terbanyak adalah laki-laki (66,1%), mayoritas telah menikah (71,2%) aktif bekerja (66,1%), dan pendidikan terakhir menengah atas (45,8%). Mayoritas subyek memiliki satu IO (61%), yaitu tuberkulosis (34,9%).*
Kesimpulan*: Pasien HIV/AIDS dengan IO di RS Gambiran mayoritas berusia 26-45 tahun, jenis kelamin laki-laki, sudah menikah, aktif bekerja, dan dan pendidikan terakhir menengah atas, sementara IO yang paling banyak berupa tuberkulosis.*

Kata Kunci*: HIV/AIDS, Infeksi oportunistik.*

Introduction

Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS) is the most prevalent acquired immune deficiency disease worldwide and remains a major global public health problem due to its persistently increasing incidence.[1] In Indonesia, the cumulative number of reported HIV cases in 2021 reached 456,453 with 135,490 individuals diagnosed with AIDS. The AIDS-related mortality rate in 2021 was 0.59%, consistent with the rates reported in 2019 and 2020.[2]

Opportunistic infections (OIs) have a substantial impact on mortality and contribute to the increasing number of HIV/AIDS cases worldwide.[3] According to the World Health Organization (WHO), the prevalence of OIs varies across countries. In the United States, the most common OIs are Kaposi's sarcoma (21%), oral candidiasis (13%), cryptococcosis (7%), cryptosporidiosis-isosporiasis (6.2%), cytomegalovirus (5%), and toxoplasmosis and lung tuberculosis (3% each).[4] In Indonesia, the most frequently reported OIs include oral candidiasis (80.8%), tuberculosis (40.1%), cytomegalovirus infection (28.8%), toxoplasma encephalitis (17.3%) and *Pneumocystis carinii* pneumonia (13.35 %).[5]

As a public hospital serving as the referral center for HIV/AIDS care in Kediri City, East Java Province, Gambiran Hospital plays an important role in providing diagnosis, treatment, and monitoring services for people living with HIV/AIDS (PLWHA). In 2019, 36 new HIV/AIDS cases were recorded at Gambiran Hospital, of which 27 patients (75%) presented with OIs. In 2020, the number of new cases increased (117%) to 78, with 61 patients (78%) affected by OIs. In 2021, the number of new cases rose again by 25% to 97, with 61 patients (63%) presenting with OIs. These data indicate a persistently high proportion of HIV/AIDS patients with OIs at Gambiran Hospital. However, the prevalence

and distribution of OIs at this facility have not been comprehensively characterized, limiting the effectiveness of prevention and early detection efforts. If not effectively managed, OIs can promote viral shedding, increasing transmission risk, accelerating disease progression and AIDS-related mortality.[6,7]

This study aims to determine the distribution and prevalence of OIs among HIV patients at Gambiran Hospital, Kediri City, East Java Province. This information is essential for providing an initial framework for appropriate treatment strategies within HIV/AIDS control programs to support achievement of the "triple zero" targets.[8]

Methods

This study employed a descriptive design to characterize HIV/AIDS patients with OIs. The research was conducted at Gambiran Hospital, Kediri City, East Java Province, from November 2022 to March 2023. The study population compromised HIV/AIDS patients with OIs recorded at Gambiran Hospital between 2019 and 2021, based on medical records. Proportional random sampling was applied, yielding sample sizes in 2019, 2020, and 2021. Data were collected using observation sheets. This study was approved by the Ethics Committee of the Faculty of Health Technology and Management, Institut Ilmu Kesehatan Bhakti Wiyata Kediri (ethical approval no. 390/FTMK/EP/II/2023).

Result

Among the 59 participants enrolled in this study, most HIV/AIDS patients with OIs were aged 26-45 years (62.7%), followed by 45-65 years (25.4%) and 12-25 years (11.9%). The majority were male (66.1%) and married (71.2%). Employed respondents accounted for 66.1%, compared with 33.9% who were unemployed. Regarding educational attainment, most had completed high school (45.8%) (see Table 1).

As shown in Table 2, most HIV/AIDS patients had a single opportunistic infection (61%), followed by two concurrent infections (32.2%) and three infections (6.8%). The most common opportunistic infection was tuberculosis (34.9%), followed by oral candidiasis (24.1%), *Pneumocystis carinii* pneumonia (21.7%), chronic diarrhea (12.0%), toxoplasmosis cerebri (4.8%), lymphadenopathy (1.2%), and dermatitis (1.2%) (Table 3).

Discussion

Based on the characteristics of HIV/AIDS patients with OIs, the most common age group was 26-45 years (adults), consistent with data from the East Java Health Office reporting that most HIV/AIDS cases, with/without OIs, occur in individuals aged 25-49 years.[9] However, previous studies have found no significant association between age and the incidence or number of OIs.[10] The predomi-

Table 1. Distribution of Characteristics of HIV/AIDS Patients with Opportunistic Infections at Gambiran Hospital, Kediri City, 2019-2021

No.	Criteria	Items	N (%)
1.	Age group	12-25 years (teenagers)	7 (11.9)
		26-45 years (adult)	37 (62.7)
		46-65 years (elderly)	15 (25.4)
2.	Gender	Man	39 (66.1)
		Woman	20 (33.9)
3.	Marital status	Marry	42 (71.2)
		Not married yet	17 (28.8)
4.	Job status	Work	39 (66.1)
		Doesn't work	20 (33.9)
5.	Level of education	Elementary School	11 (18.6)
		Junior High School	17 (28.8)
		Senior High School	27 (45.8)
		College	4 (6.8)

Table 2. Distribution of the Number of Opportunistic Infections in HIV/AIDS Patients at Gambiran Hospital, Kediri City, 2019-2021

No	Opportunistic Infections	N=59
1.	**There is 1 type of opportunistic infection**	**36 (61%)**
	Tuberculosis	15
	Oral candidiasis	7
	Pneumocystis carinii pneumonia	7
	Chronic diarrhea	3
	Cerebral toxoplasmosis	2
	Lymphadenopathy	1
	Dermatitis	1
2.	**There are 2 types of opportunistic infections**	**19 (32.2%)**
	Tuberculosis, *Pneumocystis carinii* pneumonia	4
	Oral candidiasis, *Pneumocystis carinii* pneumonia	5
	Oral candidiasis, Chronic diarrhea	3
	Tuberculosis, Oral candidiasis	3
	Tuberculosis, Chronic diarrhea	3
	Pneumocystis carinii pneumonia, Toxoplasmosis cerebri	1
3.	**There are 3 types of opportunistic infections**	**4 (6.8%)**
	Tuberculosis, *Pneumocystis carinii* pneumonia, Toxoplasmosis cerebri	1
	Tuberculosis, *Pneumocystis carinii* pneumonia, Oral candidiasis	2
	Tuberculosis, Oral candidiasis, Chronic diarrhea	1

Table 3. Distribution of the Types of Opportunistic Infections in HIV/AIDS Patients at Gambiran Hospital, Kediri City in 2019-2021

No	Types of Opportunistic Infections	N=83
1.	*Tuberculosis*	**29 (34.9)**
2.	*Oral candidiasis*	20 (24.1)
3.	*Pneumocystis carinii pneumonia*	18 (21.7)
4.	Chronic diarrhea	10 (12)
5.	*Cerebral toxoplasmosis*	4 (4.8)
6.	*Lymphadenopathy*	1 (1.2)
7.	Dermatitis	1 (1.2)

nance of cases in adults likely reflects transmission patterns, such as high-risk sexual behavior, with AIDS manifestations appearing within the same age range.[11]

Similar to age distribution, the East Java Health Office reported that men have the highest prevalence of HIV/AIDS, with/without OIs.[9] Previous study have shown a significant association between gender and the incidence or number of OIs.[10] Men with HIV/AIDS are more likely to develop OIs because they tend to pay less attention to maintaining health and adhering to treatment compared with women.[12] They are also more frequently exposed to HIV through injecting drug use, homosexual contact, and heterosexual intercouse.[13] In our study, most respondents with HIV/AIDS and OIs were married, consistent with previous findings showing that the highest proportion of HIV cases occurs among married individuals.[14] The high number of married PLWHA and OIs may reflect sexual transmission from partners and limited knowledge about prevention HIV transmission in partners of PLWHA.[15] Over time, these partners may experience progressive immune decline due to CD4 T-cell damage, predisposing them to bacterial, fungal, viral infections and the emergence of new OIs.[15]

We obtained similar findings to previous study, which reported that 72.6% of PLWHA were employed compared with those unemployed.[10] There was no significant association between employment status and the occurrence of OIs.[16] Employment itself is not a direct factor for OIs, but it is closely linked to HIV transmission; previous research has shown that higher income may increase engagement in high-risk behaviors such as unprotected sexual intercourse and injecting

drug use.[17]

In this study, most respondents had a high school education, consistent with previous findings showing that the largest proportion of HIV/AIDS patients had attained high school education.[18] However, no significant association was observed between education level and the incidence of OIs among HIV/AIDS patients.[19] This lack of association may reflect similar levels of knowledge between individuals with lower and higher education, resulting incomparable awareness, attitudes, and preventive behaviors regarding OIs.[20]

OIs are the leading cause of hospitalization and death among patients with HIV/AIDS and must therefore be carefully considered during patients evaluation.[7] In our study, tuberculosis was the most common OI. TB and HIV are closely interconnected: HIV promotes the progression of latent TB infection to active disease, while TB facilities HIV replication and dissemination and may activate latent HIV infection.[21] Most individuals infected with *Mycobacterium tuberculosis* remain asymptomatic with latent TB due to intact immunity; however, latent TB readily progresses to active disease in immunocompromised individuals such as PLWHA.[22] At Gambiran Hospital, cases of TB-HIV co-infection included patients who discontinued TB treatment. Treatment interruption among TB-HIV coinfected patients may be due to various factors, particularly intolerable side effects, which discourage adherence to antituberculosis therapy.[23] The most frequently reported side effect in TB-HIV patients at Gambiran Hospital was anemia, often associated with the use of rifampicin and isonazid.[23]

Oral candidiasis was the second most common OIs in this study. It is the most freuent oral manifestation in AIDS patients, arising from disruption of the normal *Candida* flora in the oral cavity.[24] Contributing factors include suppression of cellular immunity and phagocytosis, the use of broad-spectrum antibiotics, and host immunodeficiency, which together facilitate *Candida* adhesion to epithelial cell walls.[24,25] In HIV/AIDS patients, oral candidiasis may progress to secondary complications such as esophageal candidiasis, underscoring the need for appropriate antifungal therapy.[26] At Gambiran Hospital, Kediri City, fluconazole is used as the first-line treatment for oral candidiasis because of its good safety profile, efficacy in immunocompromised patients, and ability to provide a prolonged disease-free interval.[26]

Pneumocystis carinii pneumonia was the third most common OI in this study. *Pneumocystis* are normally present in the lungs of healthy individuals but can cause life-threatening pneumonia in immunocompromised patients such as those with HIV/AIDS.[27] Most PCP cases occur in individuals unaware of their HIV status or those not receiving antiretroviral (ARV) therapy.[28] At Gambiran Hospital, HIV/AIDS patients with PCP are treated with cotrimoxazole, a combination of trimethoprim and sulfamethoxazole. Cotrimoxazole is used both prophylaxis, reducing the risk of PCP and other OIs, and as the first-line therapy for PCP treatment.[27]

This study has several limitations. First, it was conducted at a single regional hospital, which may limit the generalizability of the findings to PLWHA outside this setting. Second, the use of secondary data restricted access to some information on therapy programs, such as treatment adherence.

Conslusion

Most HIV/AIDS patients with OIs in this study were adults aged 26-45 years, male, married, employed, and had completed high school. Tuberculosis was the most common OI. These findings highlight the need to design targeted intervention programs for these subgroups, including monitoring adherence to ARV and OI treatment through reminders (eg., mobile check-ups, telephone, or social media) and providing patient education on the importance of ARV therapy to reduce the risk of OIs.

Conflicts of Interest

The authors declare that they have no competing interests.

Acknowledgment

All of the authors equally contributed to the study.

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