ORIGINAL ARTICLE

CD4 Association with Mortality in HIV Patients with Dyspnea in Dr Seotomo General Academic Hospital Surabaya

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ABSTRACT

Introduction: HIV AIDS patients who have a CD4 count < 200 cells/uL often complain of respiratory symptoms (Wallace, 1993). The complaint was shortness of breath (62%). Opportunistic infections (IO) in HIV patients are also brought on by a decreased CD4 count of 200 cells/uL (Peters, 2007). HIV/AIDS patients with CD4 < 200 cells/uL have a risk of death of 10.399 (Kusumaadhi, 2021). This study aims to determine the association between CD4 cell count with mortality in HIV patients with shortness of breath at Cendana, Dr. Soetomo General Academic Hospital Surabaya, during the period of January–December 2020.
Methods: This study used a cross-sectional retrospective design. The population in this study were patients diagnosed with HIV at Cendana, Dr. Soetomo General Academic Hospital, using a total sampling technique. The variables studied were the CD4 counts as the independent variable, and the mortality of HIV patients with dyspnea as the dependent variable. The sample in this study must meet the inclusion criteria, namely, the sample must have a history of CD4 counts in their medical record in the last 2 to 3 months while in Cendana, Dr. Soetomo General Academic Hospital. Secondary data from medical record data in Cendana, Dr. Soetomo General Academic Hospital, was used for the research from January to December 2020.
Results: A total of 128 HIV patients with dyspnea and a history of CD4 counts in the previous 3 to 4 months were included in the study: 79 (61.7%) males and 49 (38.3%) females. The most common age groups were 31–40 years (33.6%), 20–30 years (32.0%), 41–50 years (23.4%), and > 60 years (2.4%), with no patients under the age of 20. The distribution of the most opportunistic infections were: pneumocystis pneumonia (n = 62), tuberculosis (n = 49), and bacterial pneumonia (n = 17). Patients lived (n = 79) and died (n = 49) in total.
Conclusion: There was no significant association between CD4 count and mortality in HIV patients with dyspnea (p-value 0.084 > 0.05).

Keywords: CD4 count, HIV, Mortalilty, Shortness of breath, Opportunistic infection

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INTRODUCTION

HIV patients who have a CD4 count < 200 cells/μL show the most frequent respiratory symptoms (Wallace, 1993). Peters (2007) argued that the complaints were chronic productive cough (89%), chest pain (74%) and shortness of breath (62%). Then if traced based on a clinical approach to HIV patients with symptoms of chronic productive cough and shortness of breath, tuberculosis (40%) will be found as the highest infection. Examination of CD4 in patient samples found an average of 174.8 cells/uL. This is responsible for the occurrence of opportunistic infections in patients with CD4 < 200 cells/uL (Peters, 2007).

Kusumaadhi (2021) argued that most HIV AIDS patients who died were patients with a history of CD4 < 200 cells/uL (78.09%), while HIV AIDS patients died with a history of CD4 > 200 cells/uL (3.8%). This makes the risk of death of HIV/AIDS patients with a history of CD4 <200 cells/uL 10,399 more at risk. So, this study was conducted to determine the relationship between CD4 cell history and death in HIV patients with shortness of breath at Cendana Dr. Soetomo General Academic Hospital Surabaya for the period January - December 2020.

METHODS

This study was a cross-sectional retrospective study. The independent variable was CD4 cell history, while the dependent variable was the mortality of HIV patients with dyspnea. The ethics committee of Dr. Soetomo General Academic Hospital, Faculty of Medicine, Universitas Airlangga, Surabaya, approved this research for ethical clearance.

Secondary data from medical record patients in Cendana, Dr. Soetomo General Academic Hospital Surabaya, were used as the research instrument from January to December 2020. The population in this study were patients diagnosed with HIV in Cendana, Dr. Soetomo General Academic Hospital with a total sampling technique. The sample in this study must meet with inclusion criteria, namely, the sample must have a history of CD4 counts in their medical record in the last 2 to 3 months while in Cendana, Dr. Soetomo General Academic Hospital Surabaya during January – December 2020

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RESULTS

This study included 128 HIV patients with dyspnea who had a history of CD4 counts in the last 3 to 4 months. Total 79 males (61.7%) and 49 females (38.3%). The age categorized into six age groups (Table 1). The most age groups were 31 – 40 years (33.6%), 20 – 30 years (32.0%), 41 – 50 years (23.4%), > 60 years (2.4%) and there was no patients on <20 years.

Table 1 Age Groups Categorizes

Age	N	%
<20 y.o	0	0
20 – 30 y.o	41	32.0
31 – 40 y.o	43	33.6
41 – 50 y.o	30	23.4
51 – 60 y.o	11	8.6
>60 y.o	3	2.4
Total	128	100

The distribution of the most opportunistic infections was pneumocystis pneumonia (PCP) (n = 62), tuberculosis (TB) (n = 49), and bacterial pneumonia (n = 17) (Table 2). PCP patients were divided into 2 categories, CD4 <200 cells/uL in 51 patients (39.8%) and CD ≥200 cells/uL in 11 patients (8.6%). TB patients were divided into 2 categories: CD4 < 200 cells/uL in 41 patients (32.0%) and CD4 ≥ 200 cells/uL in 8 patients (6.3%). Bacterial pneumonia was classified into 2 categories, CD4<200 cells/uL in 15 patients (11.7%) and CD4 ≥ 200 cells in 2 patients (1.6%).

Table 2 Distribution Opportunistic Infections

Opportunistik Infection	CD4 count		Total
	<200	≥200	
Bacterial Pneumonia	15 (11.7%)	2 (1.6%)	17
PCP	51 (39.8%)	11 (8.6%)	62
TB	41 (32.0%)	8 (6.3%)	49
Total			128

The total number of patients who lived (n = 79) consisted of 2 categories (Table 3), CD4 < 200 cells/uL in 65 patients (50.8%), and CD4 ≥ 200 cells/uL in 14 patients (10.9%). The total number of patients who died (n = 49) consisted of 2 categories, CD4 < 200 cells/uL in 41 patients (32.0%) and CD4 ≥ 200 cells/uL in 8 patients (6.3%).

CD4 counts	Outcomes		Total
	Live	Dead	
<200	65 (50.8%)	41 (32.0%)	106
≥200	14 (10.9%)	8 (6.3%)	22
Total	79	49	128

DISCUSSION

HIV patients experience several levels of infection in the form of level 1 (HIV infection) with a history of CD4 > 500, level 2 (HIV infection) with a history of CD4 200–499 cells/uL, and level 3 (AIDS) with a history of CD4 count < 200 cells/uL. HIV patients with CD4 < 500 cells/uL will be susceptible to opportunistic infections (Afione, 2011). In this study, the CD4 history variable in the patient's medical record data were categorized into 2, CD4 < 200 cells/uL and CD4 ≥ 200 cells/uL. This relates to patients at high risk of opportunistic infection (CD4<200) and patients at lower risk of opportunistic infection (CD>200).

In this study of a total of 128 HIV patients with dyspnea, most patients are male (61.7%). In the US 2018, the number of new cases of HIV patients was 37,698 male (81%). The cause of the high rate of HIV in male is homosexuality in 24,933 cases (81%), heterosexuality in 2,916 cases (10%), injection drug use in 1,434 cases (5%), and the rest of the other cases (CDC, 2020). The mean age of patients diagnosed with HIV with PCP is 40.4 years (Fei, 2009). Amelia (2016) argues that the age group of 28–44 years has a 5.40 times higher risk of HIV/AIDS in male. In this study, the majority of HIV patients with shortness of breath were in the age group of 31–40 years, a total of 43 (33.6%) patients.

In this study, the distribution of the most opportunistic infections was PCP (n = 62), TB (n=49), and bacterial pneumonia (n=17). PCP was highest in the categories of history of CD4 count < 200 cells/uL (39.8%) and history of CD4 count > 200 cells/uL (8.6%). However, this is not in line with research in China, which stated that bacterial pneumonia was the highest opportunistic infection in HIV/AIDS patients in the categories of history of CD4 <200 cells/ul (17.3%) and history of CD4 200 cells/Ul (7.9%) (Pang, 2018). But in Pimpri, India, there are 20 HIV AIDS patients with TB (51.3%) (Tiwari, 2020).

There are regional demographic factors against opportunistic infections. Research by Gangcuangco (2017) examined opportunistic infections in different areas, namely Nagoya Medical Center (NMC, Nagoya, Japan), Lampang Hospital (LPH, Lampang, northern Thailand), Bach Mai Hospital (BMH, Hanoi, Vietnam), and the Philippine General Hospital (PGH, Manila, Philippines). TB was found in PGH (n = 75) but was low in NMC (n = 4). Then PCP was obtained at NMC (n = 75) but was low at BMH (n = 13). This proves that there are differences in the prevalence of opportunistic infections in different regions (Gangcuangco, 2017).

CONCLUSION

There was no significant association between CD4 count and mortality in HIV patients with dyspnea (p-value 0.084 > 0.05).

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CONFLICT OF INTEREST

The authors declare there is no conflict of interest.

ETHICS CONSIDERATION

This research was ethically cleared and approved by Ethical

Committee for Health research of Dr Soetomo General Academic Hospital certificate number 1112/101/4/XI/2021.

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AUTHOR CONTRIBUTION
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