

# COVID-19 Prevention in People Living with HIV/AIDS: Entering the Endemic Phase

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## Abstract

The mortality and severity risks due to COVID-19 infection are higher in people living with HIV/AIDS (PLWHA) than those with no such condition. This study aimed to analyze the relationship between health literacy, social support, and the health belief model in PLWHA in preventing COVID-19 from entering the endemic phase. An analytic observational study with a cross-sectional design was conducted in October 2021 among 94 PLWHA selected by purposive sampling in Kupang City, Indonesia. The bivariate data analysis used the Chi-square, and the multivariate data analysis used the binomial logistic regression test. The results showed that 88.3% of the participants had poor COVID-19 literacy, 67% had low emotional support, and 71.3% had poor COVID-19 prevention behavior. The results of the multivariate analysis showed that the factors with the strongest association, COVID-19 literacy (95% CI = 1.71–108.55; PR = 4.15) and emotional support (95% CI = 1.01–53.81; PR = 2.35), improve COVID-19 prevention behavior. Implementing communication, information, education, and policy strategies is important to improve literacy and emotional support to prevent COVID-19 from entering the endemic phase among PLWHA.

**Keywords:** COVID-19 prevention, literacy, people living with HIV/AIDS, social support

## Introduction

The first coronavirus disease 2019 (COVID-19) case was discovered in December 2019 in Wuhan City, China. The disease became a worldwide pandemic in March 2020.<sup>1</sup> The spread and prevalence of COVID-19 increased rapidly worldwide. A World Health Organization report as of 26 October 2021 stated that 243,561,596 people had been infected with COVID-19, and 4,947,777 had died due to COVID-19 infection (case fatality rate: 2.0%).<sup>2</sup> A total of 204 countries have been infected with coronavirus, and 151 countries have experienced community transmission.<sup>2</sup> Indonesia ranks 20<sup>th</sup> among the most cases worldwide, with 4,241,090 people infected and 143,270 total deaths.<sup>3</sup> Increased cases also occurred in the East Nusa Tenggara Province, with 63,508 cases and 1,323 total deaths.<sup>3</sup>

One high-risk group during the COVID-19 pandemic was people living with human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS) (PLWHA). A study of 144,795 hospitalized COVID-19 patients in North America, Europe, and Asia found that the prevalence of PLWHA among those infected with COVID-19 was 1.22%, twice as high as the overall local

HIV prevalence of 0.65%. These data indicate the possible susceptibility to COVID-19 infection of people with HIV.<sup>4</sup> The worrying case is the fact that the vast majority of PLWHA around the world live in a country with a poor health care infrastructure.<sup>5</sup>

By 2021, 38.4 million people worldwide were infected with HIV/AIDS.<sup>5</sup> Indonesia had reached 558,618 cases by March 2021.<sup>6</sup> Antiretroviral therapy (ART) is crucial for PLWHA. Therefore, the Indonesian Ministry of Health set a target that, by 2021, 45% of PLWHA in all regencies and cities of Indonesia would receive ART.<sup>6</sup> However, not all districts and cities have reached the target, including Kupang City, the capital city of the East Nusa Tenggara Province. The number of HIV/AIDS patients in this province is 8,666 cases, and Kupang has the highest number of PLWHA in this region, with a significantly increasing number of cases, from 1,026 in 2020 to 1,144 in 2021.<sup>7</sup>

The relationship between COVID-19 morbidity and mortality in PLWHA has been established in various studies. ART therapy is crucial for PLWHA, as it suppresses virus replication, strengthening the immune system, which enables them to fight the COVID-19 infec-

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Received : March 14, 2023  
Accepted : May 19, 2023  
Published : May 30, 2023

tion. A study in the UK found that COVID-19-infected PLWHA had a higher risk of death than those with no such infection.<sup>8</sup> PLWHA are at high risk of respiratory issues.<sup>9</sup> The weakening of the immune system among PLWHA is a severity risk for COVID-19 infection.<sup>10</sup>

Adherence to ART does not eliminate the risk of COVID-19 infection.<sup>11</sup> The clinical course of COVID-19 among PLWHA is similar to that in the general population. However, a concern is the high level of inflammation in the two conditions, which can lead to complications in PLWHA. Prevention as early as possible is essential so that PLWHA do not get infected with COVID-19. One of the COVID-19 prevention measures among PLWHA is to ensure that the cluster of differentiation 4 (CD4) remains high by regularly taking ART.<sup>12</sup>

The strategy to eradicate COVID-19 as it enters the endemic phase is to continue carrying out health protocols and conducting COVID-19 vaccination.<sup>13</sup> The transmission of COVID-19 can be prevented by implementing health protocols, such as washing hands, wearing masks, and maintaining social distancing.<sup>14</sup> In addition to preventing infection, the COVID-19 vaccine reduces severity and mortality risk.<sup>15</sup> However, many people still do not take the vaccine.<sup>16</sup> A previous study found that knowledge, attitudes, health belief, and media are factors related to COVID-19 prevention behavior.<sup>17</sup>

PLWHA, as a group vulnerable to COVID-19, should carry out health protocols and take the vaccine. Therefore, this study analyzed the relationship between health literacy, social support, and the health belief model in PLWHA in preventing COVID-19 from entering the endemic phase. This study's importance lies in identifying the factors that influence COVID-19 prevention in PLWHA as an effort to prevent PLWHA from experiencing a more severe impact of COVID-19.

## Method

This analytic observational study was conducted in October 2021 using a cross-sectional design. The study population was all individuals infected with HIV/AIDS in 2020, with a total of 1,026 people in Kupang City, Indonesia. The sample was determined using the hypothesis of sample size based on proportion with a 95% confidence level.<sup>18</sup> The number of the sample was 94 participants in Kupang City, including an additional 10% to account for drop-out during the data collection. The sample was recruited using purposive sampling among people registered with a care support group A in Kupang. The inclusion criteria were people aged at least 18 years and living with HIV/AIDS for more than six months.

The selected sample received a study explanation and an informed consent form. If the participants agreed, they were asked to sign the informed consent. The study instrument was a questionnaire comprising the partici-

pants' demographic characteristics and independent and dependent variables. The demographic characteristics data collected were age, sex, education, and occupation. The independent variables were COVID-19 literacy, social support (informational, instrumental, and emotional), and health belief (perceived susceptibility, severity, benefits, barriers, and cue to action).

For the variable COVID-19 literacy, the instrument was adapted from a questionnaire developed by Archila, *et al.* The consistency and internal reliability test yielded a Cronbach's alpha of >0.744.<sup>19</sup> The questionnaire for the COVID-19 literacy variable consisted of questions regarding prevention, early detection of COVID-19, risk factors for transmission, and the behavior of influencing others to prevent COVID-19. Each question had four answer choices. If the answer was correct, the score was 1; if the answer was wrong, the score was 0. The questionnaire consisted of seven questions. A participant with at least four correct answers was categorized as having "good" literacy.

The social support variable was measured using a questionnaire developed by Manurung.<sup>20</sup> Its validity and reliability were tested using corrected item-total correlation (<0.36) and Cronbach's alpha (<0.6). The statements for the social support variables had two answer choices: "yes" and "no." For favorable statements, "yes," scored 1, and "no" scored 0. There were five statements each for informational, instrumental, and emotional support. A total score of 3 the participant got was categorized "high". The statements for the perception variables consisted of five choices with a score of 1 to 5. "Strongly agree" on a favorable statement scored 5, and "Strongly agree" on an unfavorable statement scored 1.

To measure the variables of COVID 19 prevention behavior and the health belief model, this study adopted a questionnaire developed by Karimy, *et al.*<sup>21</sup> There were four statements each for the perceptions of susceptibility and severity and a total score of <12 was categorized as "low." There were eight statements for perceived benefit, for which a total score of <24 was categorized as "low." There were five statements for the perception of barriers, for which a total score of <15 were categorized as "low." There were 10 statements for COVID-19 prevention behavior. Each statement consisted of four answer choices: "never," "rarely," "often," and "always," with a score of 0–3. A total score of <19 was categorized as "low."

At the time of the interviews, the authors ensured that only the enumerators and PLWHA were there. This condition was necessary to avoid bias in the answers of PLWHA when asked about family support. The data obtained from univariate analysis were in the form of frequency and percentage of each variable. Bivariate analysis was conducted using a Chi-squared test to describe the relationship between the independent variable and

COVID-19 prevention behavior, with a p-value of <0.05.

The analysis examined the relationship of COVID-19 literacy, social support, and health belief to COVID-19 prevention. A multivariate analysis using a binomial logistic regression test was applied to examine the dominant factors. The significance of the variable was determined by a p-value of <0.05. The prevalence ratios (PRs) and 95% confidence intervals (CIs) were presented.

**Results**

The distribution of demographic characteristics in Table 1 shows that most participants were females (61.7%), aged 18–49 years (66.0%), had gone to high school (56.4%), and were self-employed (50%). The youngest respondent was 18 years old, and the oldest was 61 years old. Table 1 indicates that 88.3% of the participants had poor COVID-19 literacy. The lowest literacy value by respondents was 1, and the highest was 6. The highest percentage under social support was found in low instrumental support (86.2%). For the social support variable, the lowest score was 1, and the highest score was 5. The highest average in the social support variable was 2.8. The highest percentage in the variables for

health belief was for perceived benefits (70.2%), and most participants had poor COVID-19 prevention behavior (71.3%). The highest score under health belief was for the variable of perceived benefits, which has a maximum score of 36, a minimum score of 18, and an average of 26.4.

The results of the bivariate analysis in Table 2 show that COVID-19 literacy, instrumental support, emotional support, perceived susceptibility, perceived severity, perceived benefits, and perceived cue to action had a relationship with COVID-19 prevention behavior in PLWHA. The highest PR values were found in instrumental support and COVID-19 literacy. The provision of high instrumental support increased COVID-19 prevention behavior in PLWHA by 5.60 times, and good COVID-19 literacy increased COVID-19 prevention behavior in PLWHA by 8.743 times. The highest PR value under health belief was in the variable of perceived severity, and a higher perceived severity among PLWHA increases prevention efforts by 8.256 times. While, the variables of informational support and perceived barriers did not show a significant relationship.

Table 2 shows that the variable of perceived barriers

**Table 1. Distribution of Participants' Characteristics, COVID-19 Literacy, Social Support, Health Belief, and COVID-19 Prevention Behavior (n = 94)**

Variable	Category	Min–Max	Mean	n (%)
Sex	Male			36 (38.5)
	Female			58 (61.7)
Age (years)	18–49	18–61	46.2	62 (66.0)
	≥50			32 (34.0)
Education	<Junior high school			14 (14.9)
	Senior high school			53 (56.4)
	Higher education			27 (28.7)
Occupation	Civil servant/police			10 (10.6)
	Self-employed			47 (50.0)
	Housewife			37 (39.4)
COVID-19 literacy	Poor	1–6	2.8	83 (88.3)
	Good			11 (11.7)
Social support	Informational	Low	2.8	65 (69.1)
				High
Instrumental	Low	1–5	2.2	81 (86.2)
				High
Emotional	Low	1–5	2.6	63 (67.0)
				High
Health Belief	Perceived susceptibility	Low	14.6	40 (42.6)
				High
Perceived severity	Low	12–20	14.2	53 (56.4)
				High
Perceived benefits	Low	18–36	26.4	28 (29.8)
				High
Perceived barriers	Low	12–24	16.2	32 (34.0)
				High
Perceived cue to action	Low	10–24	15.8	31 (33.0)
				High
COVID-19 prevention behavior	Poor	8–26	14.8	67 (71.3)
				Good

Table 2. Analysis of the Relationships between COVID-19 Literacy, Social Support, and Health Belief to COVID-19 Prevention Behavior

Variable	Category	COVID-19 Prevention Behavior				Sig.	Crude PR	95% CI
		Poor		Good				
		n	%	n	%			
Sex	Male	29	30.8	7	7.5	0.282	0.815–5.852	
	Female	38	40.4	20	21.3			
Age (years)	18–49	9	9.6	3	3.1	0.981	0.302–4.981	
	≥50	58	61.7	24	25.6			
Education	<Junior high school	12	12.7	2	2.1	0.708	0.063–2.735	
	Senior high school	41	43.6	12	12.9			
	Higher education	14	14.9	13	13.8			
Occupation	Civil servant/police	7	7.1	3	2.9	0.518	0.512–0.526	
	Self-employed	36	33.5	11	13.5			
	Housewife	24	26.4	13	10.6			
COVID-19 literacy	Poor	66	70.2	17	18.1	0.001	8.743	4.642–324.613
	Good	1	1.1	10	10.6			
Social support Informational	Low	49	52.2	16	17.0	0.182	0.731–4.785	
	High	18	19.1	11	11.7			
Instrumental	Low	66	70.1	15	16.0	0.001	5.604	6.362–137.961
	High	1	1.1	12	12.8			
Emotional	Low	53	56.4	10	10.6	0.001	6.417	2.422–17.115
	High	14	14.9	17	18.1			
Health Belief Perceived susceptibility	Low	40	42.6	0	0	0.001	2.301	1.531–2.614
	High	27	28.7	27	28.7			
Perceived severity	Low	47	50.0	6	6.4	0.001	8.256	2.882–23.441
	High <sup>20</sup>	21.3	21	22.3				
Perceived benefits	Low	24	28.7	4	1.1	0.001	2.054	0.242–137.164
	High	31	42.6	35	27.6			
Perceived barriers	Low	23	24.5	9	9.6	0.925		0.406–2.691
	High	44	46.8	18	19.1			
Perceived cue to action	Low	27	28.7	4	4.4	0.31	3.801	1.205–12.483
	High	40	42.6	23	24.5			

Notes: Sig. = Significance (p-value of <0.05), PR = Prevalence Ratio, CI = Confidence Interval

does not meet the requirements of the multivariate analysis. The results of the multivariate analysis in Table 3 show that only COVID-19 literacy, emotional support, and perceived benefits influenced COVID-19 prevention behavior in PLWHA. Good COVID-19 literacy increased COVID-19 prevention behavior in PLWHA by 4.153 times over PLWHA with poor literacy, and high emotional support increased COVID-19 prevention behavior by 2.356 times over those with low emotional support.

**Discussion**

The findings of this study indicated that any increase in literacy increases COVID-19 prevention behavior in PLWHA. The better the COVID-19 literacy, the better the prevention behavior will be. However, most PLWHA in this study still had poor COVID-19 literacy. The low level of knowledge could be because the PLWHA had not been exposed to information on COVID-19. A study in Korea in 2020 found that misinformation about COVID-19 could affect public knowledge of preventing COVID-19.<sup>22</sup> In addition, there is a great deal of misin-

formation about COVID-19, such as the perceived existence of a political conspiracy, which may influence the views of PLWHA.<sup>23</sup> This condition will certainly increase the risk of COVID-19 infection in the endemic phase.

COVID-19 literacy is one's knowledge and skills to prevent COVID-19 in oneself and others.<sup>24</sup> COVID-19 prevention behavior includes wearing a mask in crowds and closed spaces, washing hands, not touching the nose and mouth with unwashed hands, maintaining social distancing, and getting vaccinated.<sup>25</sup> These behaviors are effective in preventing COVID-19 transmission.<sup>26</sup> Interventions to improve COVID-19 literacy in PLWHA are important so that PLWHA are more obedient in preventing COVID-19 in the endemic phase.<sup>27</sup>

Social support is a factor that may influence a person to stay strong in dealing with the threat of COVID-19.<sup>28</sup> This study found that social support in the form of high emotional and instrumental support increases COVID-19 prevention behavior in PLWHA. The results of this study were in line with a study in the UK, showing that social support was an important determinant of COVID-

**Table 3. Multivariate Analysis of the Relationships between COVID-19 Literacy, Social Support, and Health Belief to COVID-19 Prevention Behavior**

Variable	Category	Adjusted PR	Sig. (2-tailed)	95% CI		
				Lower	Upper	
COVID-19 literacy	Poor	4.153	0.023	1.714	108.552	
	Good	Ref				
Social support	Informational	Low	0.462	0.051	3.656	
		High				
	Instrumental	Low	0.877	0.999	0.013	23.564
		High				
Emotional	Low	2.356	0.042	1.012	53.811	
	High					Ref
Health belief	Perceived susceptibility	Low	0.971	0.999	0.022	34.261
		High				
	Perceived severity	Low	1.114	0.918	0.157	7.953
		High				
	Perceived benefits	Low	1.380	0.082	0.728	148.901
		High				
	Perceived cue to action	Low	0.891	0.915	0.119	7.072
		High				

Notes: PR = Prevalence Ratio, CI = Confidence Interval

19 prevention behavior.<sup>29</sup>

This study indicated that instrumental and emotional supports were more needed by PLWHA to prevent COVID-19. Instrumental support comes from family or friends through assistance such as providing masks and hand sanitizer.<sup>24</sup> In addition, family or friends can provide emotional support in the form of affection, attention, trust, and empathy.<sup>30</sup> Therefore, it is necessary to increase the role of the family in providing emotional assistance and support concerning the development and prevention of COVID-19 among PLWHA in the endemic phase.<sup>29</sup>

Everyone is influenced by different factors in determining COVID-19 prevention efforts.<sup>31</sup> Behavior is an individual's response to a stimulus that can be observed and has a specific frequency, duration, and purpose.<sup>32</sup> Perceived susceptibility, severity, cue to action, barriers, and benefits can bring about compliance in COVID-19 prevention.<sup>33</sup> The interactions among perceptions were so complex that it was difficult to identify the cause of a person's adopting a specific behavior. Therefore, examining the reasons behind individual behavior before changing it is important.<sup>34</sup>

An analysis of the health belief model can be used as a reference in conducting interventions to improve COVID-19 prevention behavior.<sup>35</sup> This study found that perceived susceptibility, severity, cue to action, and benefits were related to COVID-19 prevention behavior in PLWHA, whereas perceived barriers were not. The higher the perceived barrier, the lower PLWHA's COVID-19

prevention behavior.<sup>36</sup> This study's results aligned with a study conducted among health school students in Korea, finding that the higher the health belief model score, the stronger the COVID-19 prevention habit.<sup>22</sup>

The logistic regression analysis showed that COVID-19 literacy, emotional support, and perceived benefits influence PLWHA to prevent COVID-19. The greater the COVID-19 literacy, emotional support, and perceived benefits, the better the COVID-19 prevention behavior in PLWHA.<sup>20,36</sup> However, the results of this study revealed that most of the three variables were still low. As a result, the risk of PLWHA not making efforts to prevent COVID-19 would be higher. Therefore, it is important to make interventions to improve COVID-19 literacy, emotional support, and perceived benefits so that PLWHA will prevent COVID-19 during the endemic phase.

Interventions can be in the form of information, communication, and education that aims to increase the awareness of PLWHA about making efforts to prevent the transmission of COVID-19.<sup>37</sup> In addition, they make it easier for PLWHA to access vaccines and ARTs and to become more comfortable regarding health services. PLWHA are one of the vulnerable groups to COVID-19 transmission, then it is important to help them protect themselves in the endemic phase.

All instruments were tested for validity and reliability. However, this study has some limitations, first, in relation to the small cells found. This could be caused by almost all the respondents being interviewed by telephone, which may have influenced the respondents' answers.

Furthermore, the number of questions was too small for each variable. The authors suggested that future studies employ face-to-face interviews. Second, because this was a cross-sectional study, it examined only a limited time and determined the conditions obtained at the study's time. Changes in each variable that may have occurred or will occur could not be observed. Therefore, further study is needed on PLWHA families to support the prevention of COVID-19 in the endemic phase.

### Conclusion

COVID-19 literacy, social support in the form of instrumental and emotional support as well as health belief in the form of perceived susceptibility, severity, benefits, and action cues, are related to COVID-19 prevention behavior in PLWHA. In addition, the results of the multivariate analysis show that the better the COVID-19 literacy and emotional support, the better the COVID-19 prevention behavior will be. However, the results show that most PLWHA still had poor COVID-19 literacy, low emotional support from family and friends, and low perceived benefits of COVID-19 prevention. Therefore, it is necessary to improve COVID-19 literacy and emotional support for COVID-19 prevention in PLWHA. It is necessary to increase the quality of health services for PLWHA by supporting their peers to be health communicators, particularly concerning COVID-19 prevention behavior. Sustainable health education could increase social support for PLWHA in maintaining their preventive behavior in the endemic phase. It is expected that PLWHA, as a vulnerable group, will be increasingly obedient in carrying out prevention efforts and preventing the transmission of COVID-19 during the endemic phase.

### Abbreviations

COVID-19: coronavirus disease 2019; HIV: Human Immunodeficiency Virus; AIDS: Acquired Immunodeficiency Syndrome; PLWHA: People Living with HIV/AIDS; ART: Antiretroviral Therapy; CD4: Cluster of Differentiation 4; PR: Prevalence Ratio; CI: Confidence Interval.

### Ethics Approval and Consent to Participate

Research ethical clearance was obtained from the Health Research Ethics Commission of the Faculty of Public Health, Universitas Nusa Cendana Kupang (No. 2021087 – KEPK).

### Competing Interest

The authors declare that there are no significant competing financial, professional, or personal interests that might have affected the performance or presentation of the work described in this manuscript.

### Availability of Data and Materials

The data and materials in this study are available and may be requested

from the corresponding author.

### Authors' Contribution

IFEM developed ideas, methodology, instruments, and data analysis and drafted the manuscript. AELT developed instruments and collected, analyzed, and interpreted the data. JC developed instruments and provided administration and supervision.

### Acknowledgment

The authors thank the AIDS Commission of East Nusa Tenggara Province for the information and data required to support this study. The authors also thank PLWHA for helping during the data collection, both as key personnel and participants. This study was funded by Daftar Isian Pelaksanaan Anggaran Fakultas Kesehatan Masyarakat Universitas Cendana.

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