



Nutritional Status and Health Characteristics of People Living with HIV/AIDS

Siti Ulfah Rifa'atul Fitri¹, Kusman Ibrahim^{1*}, Siti Sandra Liani¹, Laili Rahayuwati², Yussy Kurnia Herliani¹

¹Department of Medical Surgical Nursing, Faculty of Nursing, Universitas Padjadjaran, Bandung, Indonesia; ²Department of Community Health Nursing, Faculty of Nursing, Universitas Padjadjaran, Bandung, Indonesia

Abstract

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***Correspondence:** Kusman Ibrahim, Department of Medical Surgical Nursing, Faculty of Nursing, Universitas Padjadjaran, Jl. Bandung Sumedang Km. 21, Jatinangor, Sumedang, Jawa Barat, Indonesia. E-mail: k.ibrahim@unpad.ac.id
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BACKGROUND: Diagnosis and treatment of HIV infection may impact on the individual's life, including the physical aspect such as the length of HIV diagnosed, WHO stage, the antiretroviral therapy (ART), and the psychological aspect such as the level of stress. People living with HIV/AIDS (PLWHA) have an increased need of energy but they have symptom of lack of nutrition intake. Therefore, PLWHA have a risk of low nutrition status.

AIM: The aims of this study were to examine the relationship between nutritional status and health characteristics among HIV/AIDS patients.

METHODS: A cross-sectional analytical design was conducted among PLWHA in outpatients' hospital. A purposive sampling method was used and the sample size was 78 respondents. Data relating to socio-demographic and health characteristics, and nutritional status were collected using questionnaires. The cross-tabulation calculations used Chi-square were presented to identify the relationship between nutritional status and health characteristics.

RESULTS: The majority of respondent had the good health characteristic which includes the length of HIV diagnosed more than 6 months (79.5%), clinical WHO Stage I (61.5%), no stress level (94.9%), and first choice of ART (83.3%). The nutritional status reported that majority of the respondents had normal body mass index (61.5%), mid-upper arms circumstances not at risk (>23.5 cm) (71.8%), and moderate level of energy intake (37.2%). There was no significant associated between the nutritional status and health characteristics ($p > 0.05$).

CONCLUSION: The good condition of health characteristic among PLWHA in this study impacted on level the nutritional status.

Introduction

The development of the HIV-AIDS epidemic is still a global problem, including in Indonesia. According to the database of the World Health Organization [1], in December 2016, there were 36.7 million people living with HIV of which 1.8 million were new cases. Southeast Asia was the second largest region after Africa by 3.5 million people. Whereas in Indonesia, the total number people living with HIV/AIDS (PLWHA) reported from October 1, 2016, until December 31, 2016, were 41,250 people, including 7491 people in phase of AIDS and 806 people died [2].

Diagnosis and treatment of HIV infection may impact on the individual's life, including physical, psychological, and social impacts. The physical impacts among PLWHA can occur for the rest of their lives [3]. The trajectory illness of HIV was different for each individual. The time period between seroconversion (negative antibody status to positive) and the appearance of symptoms can occur around ± 10 years which is called asymptomatic period. Then, it will continue into symptomatic phase when the level of CD4 decreased

gradually until <300 cells/ μ l. The patient will experience symptoms that show immunosuppression and continue until the AIDS phase. Regarding psychological and social impacts, stigma and discrimination in the community are particularly relevant for PLWHA [3], [4], [5].

PLWHA shows different state of health condition, including physical and psychological condition. The physical condition such as the length of HIV diagnosed, the stage of HIV, type of anti-retroviral therapy (ART), as well as the psychological condition such as the level of stress. The immune system, HIV, and nutrition having many parts were usually interrelated. PLWHA have an increased need of energy, whereas the symptoms of HIV infection and opportunistic infections can reduce nutrient intake, whether caused by decreased appetite or difficulty swallowing, or the presence of malabsorption. These condition can cause malnutrition among PLWHA [6].

There are four causes of malnutrition among PLWHA: (1) Inadequate nutrient intake; (2) nutrient loss; (3) metabolic changes; and (4) increasing body needs. Even in the AIDS stage, patients can experience wasting syndrome, which is undesirable weight loss

(more than 10% of basic body weight) and diarrhea or chronic weakness within 30 days, accompanied by persistent fever without any other disease [7], [8].

The Regional General Hospital (RSUD) of Bandung City is one of the government referral hospitals that provide services for HIV/AIDS patients. A total of 350 PLWHA were recorded as outpatients undergoing ART in November 2017. Based on a preliminary study, there are no objective data related to nutritional status and how patients' efforts in fulfilling nutritional needs. Measurement of nutritional status was done by weighing the patient's body weight when controlling once a month. The nutrition installation staff also explained that there was no nutrition consultation proposed by the Kemuning Poli (HIV Clinic) in the past 1 year.

Monitoring the nutritional status is part of nursing intervention, so nurses as health workers have a responsibility in helping patients to monitor, maintain, and/or improve the nutritional status. PLWHA who have a risk of experiencing nutritional disorders throughout the period of illness were very significant to their health conditions. Some previous studies revealed that attention to nutrition in PLWHA still lack whereas the urgency and positive impact of nutrition interventions for PLWHA have been demonstrated [6]. The nutritional conditions of PLWHA who are vulnerable and fluctuate require a nutritional assessment more comprehensive so that PLWHA have a preventive effect that will improve their health conditions. Hence, this study intended to assess the nutritional status among PLWHA and understanding the relationship between nutritional status and health characteristics among HIV/AIDS patients.

Methods

Study design

A cross-sectional analytical design was used to undertake the study.

Sample and settings

The target population was all the outpatient recorded in Kemuning Poly, Bandung General Hospital since November 2017 by 350 of PLWHA. A purposive sampling method was used using the following inclusion criteria: (1) Age >18 years, (2) not currently pregnant, and (3) undergoing ART. The number of samples needed after being calculated using the *Slovin* formula was 78 respondents.

Instrument

The instruments of this study divided into three parts were the sociodemographic, health characteristic, and nutritional status. The sociodemographic characteristics included age, gender, marital status, education level, occupation, and household income. The health characteristic questionnaire included length of HIV diagnosed, staging of HIV, level of stress, and type of ART. The nutritional status of this study was measures using weight scales (kg) and tape to measure upper arm circumference (cm). The classified of nutritional status divided into three categories: (1) Body mass index (BMI) which consists into three levels was underweight (≤ 18.4), normal (18.5–25.0), and obese (≥ 25.0); (2) Mid-upper arms circumferences (MUACs) consist into two levels which were at risk (< 23.5), not risk (≥ 23.5 cm); and (3) energy intake which consists into three levels was high intake ($> 80\%$), moderate intake (51–79%), and low intake ($< 51\%$).

Data analysis

Descriptive statistics (frequency and percentage) were used to analyze and describe sociodemographic, health characteristic, and nutritional status. The cross-tabulation calculations used Chi-square (χ^2) were presented to identify the relationship between nutritional status and health characteristics.

Table 1: Sociodemographic characteristics of HIV/AIDS patients in Bandung general hospital (n = 78)

Sociodemographic characteristics	f	%
Age		
19–39	49	62.8
40–49	29	37.2
Gender		
Male	66	84.6
Female	12	15.4
Marital status		
Married	12	15.4
Single	60	76.9
Widowed	6	7.7
Education level		
Primary school	3	3.8
Junior high school	11	14.1
Senior high school	34	43.6
College/university	30	38.5
Occupation		
Unemployed	16	20.5
Students	11	14.1
Employed	51	65.4
Household income		
\leq IDR 2,500,000	41	52.6
$>$ IDR 2,500,000	37	47.4

Ethical consideration

This study was approved by the Ethics Commission of the Health Faculty of Medical Faculty of Padjadjaran University, number: 94/UN6.KEP/EC/2018 and a research permit from the Bandung City

General Hospital number: 070/1168.C-RSUD/18 and was conducted retrieval of data in the Bandung City Regional General Hospital, Bandung City in January–February 2018.

Results

The sociodemographic characteristics and health characteristics of PLWHA

Data were collected in total of 78 PLWHA with majority of the respondents ranging from 19 to 39 years old

Table 2: Health characteristics of HIV/AIDS patients in Bandung general hospital (n = 78)

Health characteristics	f	%
Length of HIV (+) diagnoses		
≤6 months	16	20.5
>6 months	62	79.5
WHO clinical stage		
Stage I	48	61.5
Stage II	9	11.5
Stage III	9	11.5
Stage IV	12	15.5
Stress/Trauma		
No stress	74	94.9
Mild (gastrointestinal inflammation, cancer)	4	5.1
ART		
First choice (combination of tenofovir, lamivudine/emtricitabine, and efavirenz)	65	83.3
Alternative choice	13	16.7

(62.8%). Majority of respondents were male (84.6%) and single (76.9%). Regarding education was senior high school level (43.6%). Most of the respondents were employed (65.4%) and more than half of them had household income less than ≤IDR 2,500,000 (52.6%) (Table 1).

In terms of health characteristics, majority of respondent had the length of HIV diagnosed more than 6 months (79.5%), clinical WHO Stage I (61.5%), no stress level (94.9%), and first choice of ART (83.3%) (Table 2).

The nutritional statuses of PLWHA

Concerning nutritional status of PLWHA, majority of the respondents had normal BMI (18.5–25) (61.5%) and MUAC not at risk (>23.5 cm) (71.8%), and most of the respondents had moderate level of energy intake (37.2%) (Table 3).

Table 3: Nutritional status of HIV/AIDS patients in Bandung general hospital (n = 78)

Nutritional status	f	%
BMI		
Underweight (≤18.4)	24	30.8
Normal (18.5–25.0)	48	61.5
Obese (≥25.0)	6	7.7
MUAC		
At risk (<23.5)	22	28.2
Not risk (≥23.5 cm)	56	71.8
Energy intake		
High intake (>80%)	26	33.3
Moderate intake (51–79%)	29	37.2
Low intake (<51%)	23	29.5

BMI: Body mass index, MUAC: Mid-upper arm circumference.

The nutritional statuses based on the health characteristic among PLWHA

BMI based on the health characteristic among PLWHA

The health characteristics based on nutritional status of BMI, are shown in Table 4. The majority of respondents who had length of HIV diagnose less than 6 months had normal BMI (68.8%). Normal BMI was higher among respondents who had the WHO clinical stage stadium I (68.8%) compare to Stage II (55.6%), Stage III (44.4%), and Stage IV (58.3%). Respondents with normal BMI also higher among respondents had no level stress (63.5%) and ART was alternative choice (76.9%). All health characteristics (time since HIV diagnosis, clinical WHO stage, stress level, and ART) had no significant (p -value = 0.431; 0.131; 0.596; 0.122) relationship with nutritional status (Body Mass Index-BMI) (Table 4).

MUAC based on the health characteristic among PLWHA

The nutritional status of MUAC did not have significant impacts on the health characteristics of respondents. with Respondents with category of MUAC were not significant among health characteristic of respondents with had length of HIV diagnose.

The majority of respondents with category of MUAC not at risk had length of HIV diagnose less than 6 months (75%) compared with respondents who had length of HIV diagnose more than 6 months (71%) and there was not significant relationship (p = 0.749). Respondents with category of MUAC not at risk were higher among respondents who had the WHO clinical stage stadium II (77.8%) compared with stadium I (75%), stadium III (55.6%), stadium IV (66.7%) and there was not significant associated (p = 0.630). Similarly, respondents with no stress had higher MUAC not at risk category (63.5%) compared with respondents with mild stress (50%) revealed not significant relationship (p = 0.320). Likewise, respondents who had ART in alternative choice of ART category had higher not at risk in nutritional status MUAC (84.6%) compared to respondents who had ART in first choice category (69.2%) and there was not significant relationship (p = 0.260) (Table 5).

Energy intake based on the health characteristic among PLWHA

No significant relationship was found between the health characteristics of respondents (time since HIV diagnosis, clinical WHO stage, stress level, and ART treatment) and energy intake. The results showed that half of the respondents were moderate energy intake (50%) based on their health characteristic who had length of HIV diagnose less than 6 months compared with respondents who had length of HIV diagnose more than 6 months (33.9%) (p = 0.485). More than half of

Table 4: Status of nutrition BMI based on the health characteristic of HIV/AIDS patients in Bandung general hospital (n = 78)

Health characteristic	BMI			χ^2 -value	p-value
	Underweight f (%)	Normal f (%)	Obese f (%)		
Length of HIV (+) diagnoses					
≤6 months	5 (31.3)	11 (68.8)	0 (0)	1.682	0.431
>6 months	18 (29.0)	38 (61.3)	6 (9.7)		
Stadium					
Stage I	9 (18.8)	33 (68.8)	6 (12.5)	9.854	0.131
Stage II	4 (44.4)	5 (55.6)	0 (0)		
Stage III	5 (55.6)	4 (44.4)	0 (0)		
Stage IV	5 (41.7)	7 (58.3)	0 (0)		
Stress					
No stress	21 (28.4)	47 (63.5)	6 (8.1)	1.036	0.596
Mild (gastrointestinal inflammation, cancer)	2 (50)	2 (50)	0 (0)		
ART					
First choice	22 (33.8)	39 (60)	4 (6.2)	4.207	0.122
Alternative choice	1 (7.7)	10 (76.9)	2 (15.4)		
Total	23 (29.5)	49 (62.8)	6 (7.7)		

BMI: Body mass index.

the respondents were moderate energy intake (55.6%) based on the WHO clinical stage stadium III (55.6%) compared with stadium I (37.5%), stadium II (22.2%), and stadium IV (33.3%) ($p = 0.597$). The level of moderate energy intake of respondents between no stress (37.8%) compared to mild stress respondents (25%) (p -value = 0,651). Similarly, majority of respondents were moderate energy intake based on first choice ART (41.5%) compared with respondents who had alternative choice in ART category (15.4%) ($p = 0,051$) (Table 6).

Discussion

The regulation of Minister of Health No. 87 in 2014 concerning guidelines for ART states that nutrition services are part of a treatment support package for PLWHA. Monitoring and evaluating the nutritional status of PLWHA must be carried out regularly and promptly given appropriate nutritional interventions if there is a risk or sign of a decrease in nutritional status. Good nutritional status has a positive effect on increasing CD4 levels in the blood, this can be explained by the protective effect of fat cells or adipose which is a source of the leptin hormone. The leptin hormone is known to inhibit the detrimental/damaging effects of cytokines whose levels are increased in HIV patients [9].

The findings of this study showed that the majority of respondents were male, range at young age between 19 and 39 years, single, employed status with

more than half of them had household income less than ≤IDR 2,500,000. Under the Indonesian characteristic, these characteristics were congruent with a previous study that the major of PLWHA are male, level of education was senior high school, and employed status [10], [11].

Table 3 shows that the majority of respondents were normal BMI (61.5%) and they were not at risk of MUAC (71.8%). However, there were still respondents who had BMI below normal (30.8%). Similarly, the results of MUAC measurements revealed the risk of chronic energy shortages in 28.2% of respondents. These results were not much different from the study conducted by NLP *et al.* (2016) at Cipto Mangunkusumo Hospital (n = 444); the percentage of patients with BMI <18.5 kg/m² was 32.4%. In addition, research conducted by Iskandar *et al.* [13] at Hasan Sadikin General Hospital, Bandung (n = 281), showed similar results with the percentage of HIV patients having a BMI <18.5 kg/m² (25.7%).

Decreased nutritional status among PLWHA can be caused by several factors, including: Poor food security; drug-nutrition interactions; diarrhea and vomiting; decreased metabolism and nutrient absorption; and increasing energy needs. The diagnosed of HIV can cause damage to the intestine by making the intestinal villi thinner and decreasing D-xylose absorption. This condition causes disruption of absorption of carbohydrates and fats. Thus reducing the effectiveness of fat-soluble vitamins, such as vitamins A and E, which are important in the formation of body immunity [14], [15].

Table 5: Status of nutrition (MUAC) based on the health characteristic of HIV/AIDS patients in Bandung general hospital (n = 78)

Health characteristic	MUAC		χ^2 -value	p-value
	At risk f (%)	Not risk f (%)		
Length of HIV (+) diagnoses				
≤6 months	4 (25)	12 (75)	0.102	0.749
>6 months	18 (29)	44 (71)		
Stadium				
Stage I	12 (25)	36 (75)	1.731	0.630
Stage II	2 (22.2)	7 (77.8)		
Stage III	4 (44.4)	5 (55.6)		
Stage IV	4 (33.3)	8 (66.7)		
Stress				
No stress	20 (27)	54 (63.5)	0.989	0.320
Mild (gastrointestinal inflammation, cancer)	2 (50)	2 (50)		
ART				
First choice	20 (30.8)	45 (69.2)	1.266	0.260
Alternative choice	2 (15.4)	11 (84.6)		
Total	22 (28.2)	56 (71.8)		

MUAC: Mid-upper arm circumference.

Table 6: Status of nutrition (energy intake) based on the health characteristic of HIV/AIDS patients in Bandung general hospital (n = 78)

Health characteristic	Energy intake			χ^2 -value	p-value
	High f (%)	Moderate f (%)	Low f (%)		
Length of HIV (+) diagnoses					
≤6 months	4 (25)	8 (50)	4 (25)	1.447	0.485
>6 months	22 (35.5)	21 (33.9)	19 (30.6)		
Stadium					
Stage I	18 (37.5)	18 (37.5)	12 (25)	4.596	0.597
Stage II	4 (44.4)	2 (22.2)	3 (33.3)		
Stage III	1 (11.1)	5 (55.6)	3 (33.3)		
Stage IV	3 (25)	4 (33.3)	5 (41.7)		
Stress					
No stress	25 (33.8)	28 (37.8)	21 (28.4)	0.858	0.651
Mild (gastrointestinal inflammation, cancer)	1 (25)	1 (25)	2 (50)		
ART					
First choice	18 (27.7)	27 (41.5)	20 (30.8)	5.934	0.051
Alternative choice	8 (61.5)	2 (15.4)	3 (23.1)		
Total	26 (33.3)	29 (37.2)	23 (29.5)		

The higher of clinical stage, the greater the proportion of respondents who were in the underweight nutrition status and at risk of UMAC. Increasing the body's needs related to the disease burden lead to inadequate nutrient intake at the WHO Stages III and IV will cause a more progressive decrease in nutritional status. Research conducted by Tesfamariam *et al.* (2016), showed similar results, patients in Stages III and IV were found to be twice as likely to experience undernutrition [16].

This study revealed that the majority of PLWHA were WHO clinical Stage I (61.5%), no stress level (94.9%), and the nutritional status was normal of BMI (63.5%). A study conducted by Thapa *et al.* (2015), reported that the WHO clinical staging has significant effect on nutrition status [17]. This finding also supported by a study done in Ethiopia that reported that the malnutrition was usually met with at the advanced staging of HIV infection [6]. In addition, the level of psychological status was significantly associated with the nutritional status among PLWHA. The increase of depression among PLWHA can affect their appetite, intake of nutrition, and exacerbate the status of nutrition [18], [19].

The respondents in this study showed that the most widely used combination of ART was the first choice combination consisting of tenofovir, lamivudine/emtricitabine, and efavirenz. Based on the research of Hussen *et al.* (2017), the provision of ART in patients with BMI <18.5 kg/m² increases the risk of opportunistic infections and the administration of combination ART on a zidovudine basis increases the risk of opportunistic infections which also decreases nutritional status [20].

In accordance with [21], the poor treatment outcomes can be predicted by assessing nutrient intake. Failure to increase nutrient intake will result in increased disease severity in the presence of immunosuppression. Another result of study from Utarini *et al.* [22] also explained that there were several predictors in nutritional status fluctuations in health characteristic of PLWHA, including BMI, CD4 count, clinical stage, status of diarrhea, and nutrient intake. It is known that nutrient intake was the strongest predictor

to be able to improve nutritional status in PLWHA. The low nutritional status cannot be underestimated, PLWHA with IMT values ≤18.5 kg/m², MUAC ≤25 cm, CD4 count ≤350 cells/μl, and suPAR levels plasma >5.3 ng/ml are more rapid to experience death [23]. Similarly, all the variables of the status of nutrition in this study were no significant effect on all variables of health characteristics among PLWHA. Here, the majority of respondent has not severe health condition include WHO staging I, no stress level, and first choice of ART. Thus, the nutritional status in this study reported the normal of BMI, not risk of MUAC, and moderate level of energy intake.

Conclusion

The study of health characteristic and nutritional status of PLWHA revealed that the high prevalence of health characteristics was the length of HIV diagnosed more than 6 months, clinical WHO Stage I, no stress level, and first choice of ART. Regarding to nutritional status of PLWHA, majority of the respondents had normal BMI, MUAC not at risk, and moderate level of energy intake. There was not significant associated between all the variables of nutrition status and health condition among PLWHA. The good condition of health characteristic among PLWHA in this study impacted on level the nutritional status.

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