

Understanding the Health-related Quality of Life of People Living with HIV Based on Sexual Orientation

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Abstract

Human immunodeficiency virus (HIV) infection has detrimental impacts on the lives of different population groups living with HIV, including men who have sex with men (MSM). Using the World Health Organization Quality of Life questionnaire, this study aimed to assess the health-related quality of life of men living with HIV with different sexual orientations and to determine the dominant influential factors. This cross-sectional study involved 206 men living with HIV. They were recruited from the Sriwijaya Plus Foundation and a medical facility that provided antiretroviral therapy. The data were analyzed using Chi-square and binomial logistic regression. The analysis showed that the percentage of MSM patients was greater than that of non-MSM patients, accounting for 68.9% of the total population. The multivariate logistic regression revealed that the most dominant influential factor was depression status (PR = 6.268; 95% CI = 2.811–13.975), with the majority of the depressed patients being 6.268 times more at risk of a lower quality of life compared to others. These findings suggest that depression can lead to a low quality of life among HIV patients.

Keywords: depression, HIV, men who have sex with men, sexual orientation

Introduction

Human immunodeficiency virus (HIV) infection is a global public health issue with high morbidity and mortality rates.^{1,2} The UNAIDS data reported an estimated 37.7 million people living with HIV (PLHIV) globally in 2020, with Eastern and Southern Africa, Asia, and the Pacific at the top position, accounting for 20.6 million and 5.8 million PLHIV, respectively.³ In Indonesia, the AIDS national report shows an estimation of more than five thousand PLHIV in 2021, with less than 50% (144,632) actively on antiretroviral therapy (ART).⁴

HIV infection has been reported to cause PLHIV with various detrimental impacts, including psychological, social (stigma and discrimination), and economic impacts.^{5,6} These impacts, compounded with many other factors, can also lead to further negative impacts and result in reduced or poor quality of life (QoL) of PLHIV. Studies investigating the QoL of PLHIV have reported that PLHIV experienced poor QoL in several domains, such as physical health, psychological health, level of independence, social relationships, and environmental and spirituality domains.^{7,8}

Studies have also suggested several factors associated with poor QoL of PLHIV in general, including a low level of educational attainment, unemployment status, perception of being ill, and dissatisfaction with sexual activity.^{7,9–11} The experiences of family food insecurity, polypharmacy use, the advanced state of HIV infection, and psychiatric comorbidities are also factors associated with poor QoL among PLHIV.^{10–12} The use of illicit drugs, which negatively influence the physical and mental well-being of PLHIV, was also found to cause poor QoL among them.¹³ Stigma, perceived discrimination, adverse effects of ART, non-adherence to ART, and low family income are factors associated with poor QoL among men who have sex with men (MSM) living with HIV.^{14,15}

Previous studies have also reported factors associated with good QoL of PLHIV to include being employed, having no financial concerns, not having mental health issues (e.g., stress, depression, anxiety) and other medical comorbidities, higher education level, and undergoing ART.^{8,9,13,16,17} Other supporting factors for good QoL of PLHIV include the availability of social support, such

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as emotional, tangible, and informational support, and having good coping strategies toward HIV-related difficult life situations. Similarly, studies on MSM living with HIV have reported that their better acceptance of the illness, family acceptance, and peer support are positively associated with their better QoL.¹⁸⁻²¹

Despite a range of factors associated with poor or good QoL of PLHIV, as reported in the previous studies, none of these studies reported a global comparison of QoL of MSM living with HIV and non-MSM living with HIV or heterosexual men. In Indonesia, there is limited evidence and studies exploring the QoL of different population groups living with HIV.^{18,20,21} Therefore, this study aimed to compare the QoL of men living with HIV with different sexual orientations and determine the dominant factors affecting their QoL.

Method

This study used a quantitative approach with a cross-sectional design, and the sample population consisted of 1,180 HIV patients. The sample was calculated using a two-proportion hypothesis test formula from Lemeshow, *et al.*²² Subsequently, a total of 206 respondents (MSM = 142; non-MSM = 64) were recruited using purposive sampling. They were registered with the Care Support and Treatment (CST) service and the Sriwijaya Plus Community in Palembang City.

The respondents' QoL was measured using the World Health Organization Quality of Life-HIV BREF (WHO-QOL-HIV BREF) instrument, consisting of six domains: physical, psychological, level of independence, social relationships, environment, and spirituality. Each domain was rated on a 5-point Likert scale, where 1 indicates low and negative perceptions, and 5 shows high positive perceptions. The validity and reliability tests of the instrument were carried out in Indonesia. The validity test revealed a strong correlation coefficient ($r = 0.60-0.79$); while the Cronbach's alpha value obtained from the reliability test was in the medium and good categories ($0.513-0.798$).²³

Depressive symptoms: The symptoms evaluated included the psychological state of the respondents within the last two weeks before the survey. Furthermore, their depression status was measured using the Patient Health Questionnaire-9 (PHQ-9), and the answers were assigned different scores: never (0), several days (1), more than a week (2), and almost every day (3). The PHQ was a self-administered version of the Primary Care Evaluation of Mental Disorder diagnostic instrument for common mental disorders. Depression status was grouped into two categories, where scores of 5-27 indicated a depressed state, while 0-4 were categorized as not depressed.²⁴

Social stigma: This is a negative mark or view received

by people living with HIV/AIDS, and it was assessed using the Berger HIV Stigma Scale instrument, in which the total score ranged from 25 to 125. The categorization was carried out using a cut-off point formula of 75% of the total score (125), in which values ≥ 93.75 indicated high stigma, while values < 93.75 were in a low category. The validity and reliability test of the Indonesian version of the Berger HIV Stigma Scale questionnaire (40 items) conducted by Nurdin obtained a Cronbach's alpha value of 0.94. In contrast, a value of 0.93 was recorded on the short version, consisting of 25 items.²⁵

Family support: This includes the support received by PLHIV from family members, such as husband, wife, and children, as well as biological relatives (father, mother, brother, and sister) caring for them during illness. This support could take various forms, including informational, emotional, instrumental, and appreciative support. It was measured using an instrument developed by Arikunto, in which the total score ranged from 18 to 90. The categorization was carried out using a cut-off point formula of 75% of the total score, in which values < 67.5 indicated low support, while others ≥ 67.5 were in the high category. A Cronbach's alpha value of 0.6 was obtained from the reliability results.²⁶

Occupation: Information on the respondent's occupation was obtained through interviews with the available questions in a structured questionnaire. Their occupations were then categorized into "unemployed" or "employed" for further analysis.

Duration of ART: Information on the respondent's duration of ART was obtained through interviews using the available questions in a structured questionnaire. The durations were categorized into "<1 year" or " ≥ 1 year" for further analysis.

Duration of living with HIV: Information on the respondent's duration of HIV infection was collected through interviews with the available questions in a structured questionnaire. The durations were then categorized into "<5 years" or " ≥ 5 years" for further analysis.

The data were analyzed statistically in three stages. The analysis began with data completion by editing, coding, and entering. The refined data were further analyzed using univariate, bivariate, and multivariate methods. Furthermore, univariate analysis was conducted to describe the characteristics and distribution of each variable: sex, occupation, marital status, income, age, degree, QoL, social stigma, duration of ART (years), duration of living with HIV (years), family support, and depression symptoms. Bivariate statistical analysis was applied to the Chi-square test to explore the relationship between the independent variables and QoL. To determine the dominant factors, a multivariate analysis was performed using a multiple logistic regression test. The significance of the

Multivariate analysis was 5% alpha. If the p-value <0.05, it means that the independent variables significantly could predict QoL.

Results

Based on descriptive analysis, the demographic characteristics of the respondents showed that there were more MSM patients than non-MSM/heterosexual men, accounting for 68.9% of the study sample. Table 1 re-

veals that within the MSM group, 68.1% have a job, 71.2% have incomes below the minimum wage, 71.2% are not married, and 76.9% are below the age of 30 years. Furthermore, 64.8% have an undergraduate degree, 68.8% are undergoing ART, and 70.2% are not depressed. The analysis also showed that 63.9% of the MSM participants experienced stigma, 72% had been diagnosed with HIV for less than five years, 80.6% received low family support, and 71% had a low QoL.

Table 1. Demographic Characteristics of People Living with Human Immunodeficiency Virus Based on Sexual Orientation

Variable	Category	Sexual Orientation			
		MSM (n = 142)		Non-MSM (n = 64)	
		n	%	n	%
Sex	Male	142	68.9	64	31.1
Occupation	Unemployed	18	75.0	6	25.0
	Employed	124	68.1	58	31.9
Marital status	Single	126	82.9	26	17.1
	Married	12	27.3	32	72.7
	Widower	4	40.0	6	60.0
Income	<regional minimum wage	94	71.2	38	28.8
	≥regional minimum wage	48	64.9	26	35.1
Age (years)	<30	80	76.9	24	23.1
	≥30	62	60.8	40	39.2
Education	Elementary school	2	28.6	5	71.4
	Junior high school	7	70.0	3	30.0
	Senior high school	81	72.3	31	27.7
	Diploma	15	75.0	5	25.0
	Undergraduate	35	64.8	19	35.2
Quality of Life	Graduate	2	66.7	1	33.3
	Low	76	71.0	31	29.0
Social stigma	High	66	66.7	33	33.3
	Low	43	84.3	8	15.7
Duration of ART (years)	High	99	63.9	56	36.1
	<1	23	69.7	10	30.3
	≥1	119	68.8	54	31.2
Duration of living with HIV (years)	<5	118	72.0	46	28.0
	≥5	24	57.1	18	42.9
Family support	Low	108	80.6	26	19.4
	High	34	47.2	38	52.8
Depression symptoms	Depressed	36	65.5	19	34.5
	Not depressed	106	70.2	45	29.8

Notes: MSM = Men who have Sex with Men, HIV = Human Immunodeficiency Virus, ART = Antiretroviral Therapy.

Table 2. Descriptive Analysis of the Health-related Quality of Life of People Living with Human Immunodeficiency Virus Based on Sexual Orientation

Quality of Life Domain	MSM (n = 142)		Non MSM (n = 64)	
	Mean±SD	Min–Max	Mean±SD	Min–Max
Physical	13.75±2.98	6–19	14.58±2.88	5–20
Psychological	14.33±2.63	5.6–20	14.01±2.10	8–18.4
Level of independencies	14.52±2.39	7–19	13.77±2.01	7–18
Social relationship	13.65±2.61	8–20	13.48±2.89	8–20
Environment	13.81±2.15	8.5–20	13.58±2.29	9–20
Spiritual	13.08±3.76	4–20	14.23±3.54	6–19
Individual perception of QoL	3.84±0.89	1–5	3.65±0.81	1–5
Individual perception of health	3.76±0.86	2–5	3.58±0.89	2–5

Notes: MSM = Men who have Sex with Men, SD = Standard Deviation, Min = Minimum, Max = Maximum, QoL = Quality of Life.

Table 3. Predictors of Health-related Quality of Life

Variable	Category	Quality of Life				p-value	PR (95% CI)
		Low		High			
		n	%	n	%		
Depression status	Depressed	45	81.8	10	18.2	<0.001	1.993 (1.586–2.505)
	Not depressed	62	41.1	89	58.9		
Social stigma	High	36	70.6	15	29.4	0.004	1.541 (1.204–1.972)
	Low	71	45.8	84	54.2		
Family support	Low	80	59.7	54	40.3	0.004	1.592 (1.146–2.212)
	High	27	37.5	45	62.5		
Occupation	Unemployed	16	66.7	8	33.3	0.187	1.333 (0.970–1.835)
	Employed	91	50.0	91	50.0		
Duration of ART	<1 year	23	69.7	10	30.3	0.042	1.435 (1.093–1.885)
	1 year	84	48.6	89	51.4		
Duration of living with HIV	<5 years	91	55.5	73	44.5	0.066	1.457 (0.967–2.195)
	5 years	16	38.1	26	61.9		

Notes: PR = Prevalence Ratio, CI = Confidence Interval, HIV = Human Immunodeficiency Virus, ART = Antiretroviral Therapy.

Table 4. Multivariate Analysis of Health-related Quality of Life

Risk Factor	Category	β	p-value	Adjusted PR (95% CI)
Depression status	Depressed	1.690	<0.001	6.268 (2.811–13.975)
	Not depressed	Reff		
Duration of ART	<1 year	0.493	0,002	2.723 (1.426–5.198)
	≥1 year	Reff		
Social stigma	High	0.919	0.013	2.506 (1.213–5.176)
	Low			

Notes: PR = Prevalence Ratio, CI = Confidence Interval, ART = Antiretroviral Therapy.

The evaluation of the participants’ QoL showed that non-MSM/heterosexual men had a better QoL in the physical domain. However, the MSM group was better in terms of psychological aspects, independencies, social interaction, environmental domain, and perception of health, as shown in Table 2. The bivariate analysis showed that depression status, social stigma, family support, and the duration of ART and HIV infection were significantly correlated with the QoL of MSM and non-MSM with a p-value = <0.001, as shown in Table 3.

The multivariate analysis using logistic regression revealed that the most influential factor was depression status (p-value = <0.001, prevalence ratio (PR)Adj = 6.268; 95% confidence interval (CI) = 2.811–13.975) in both the MSM and non-MSM groups. The findings indicated that depressed HIV patients were 6.268 times more at risk than others, as shown in Table 4.

Discussion

The study suggested that the MSM group had lower QoL compared to the non-MSM/ heterosexual men. The higher prevalence of depression among the MSM group compared to the non-MSM group was a possible expla-

nation for their experience of low QoL. The findings of this study confirmed previous findings indicating that depression was common among PLHIV due to their experience of health status deterioration, negative side effects of ARV therapy, and apathy following their HIV diagnosis.^{27,28}

A previous study suggested that depression, consisting of a series of disorders, could negatively affect sleep, weight loss, appetite, health-seeking behaviors, and motivation of the PLHIV, which in turn could further deteriorate their health and psychological well-being.²⁹ Depression is one of the most common psychiatric disorders, negatively impacting the adherence and outcomes of ARV therapy among PLHIV.^{30,31} The QoL of the MSM population found in this study was negatively influenced by several factors, including social inequalities, lack of health programs prioritizing their needs, and social rejection by family members, communities, and various institutions in Indonesia. Such rejection toward the MSM populations was mainly due to the unacceptance of same-sex relationships, which are considered taboo and sinful.

The findings of this study showed that such perceived

and internalized stigma led to an increase in the intensity of depression among MSM and non-MSM. They also influenced both groups of patients' health behaviors and led to non-disclosure of HIV status to partners, poor adherence to ARV therapy, increased risk of developing drug resistance, restricted access to health services, and reduced health-related QoL. These findings were in line with the results of previous studies suggesting the association of stigma with poor physical life quality among PLHIV.^{32,33}

Despite numerous efforts to reduce the negative impact of HIV-related stigma, patients or PLHIV are still stigmatized in various contexts, including within families, communities, workplaces, and health care settings.^{32,34-36} This study also suggested that there was a significant relationship between QoL and family support among both MSM and non-MSM with HIV. This finding was consistent with previous reports that family support was associated with encouragement and the absence of stigma and discrimination against PLHIV.³⁷ This study found that negative treatment and stigma toward PLHIV also negatively impact their daily activities and influence their access to health care services or willingness to undergo health care and treatment. This, in turn, will exacerbate their health condition and result in negative health outcomes.

Strategies to improve the QoL of PLHIV included strengthening support and family care for them and promoting HIV screening among high-risk populations. Family supports include encouraging medication adherence, overcoming discrimination, encouraging early ARV therapy initiation, and supporting regular attendance of therapy, which can reduce loss to follow-up.³⁸ Adherence to therapy strongly supports the QoL of PLHIV. This study indicated that the length of treatment is significantly related to improving the QoL of PLHIV. This finding was consistent with previous studies that associated being on ARV therapy with good QoL of PLHIV.^{8,9}

The intake of ARV therapy helps lower viral load, improve physical immune function, and reduce opportunistic infections and comorbidities. It also increases the patient's productivity, social inclination, and QoL. ARV therapy is a key component of increasing longevity and controlling other infectious diseases, and it has a significant long-term contribution to improving health-related QoL.³⁹ Ideally, PLHIV are suggested to adhere to ARV therapy to suppress viral load or to achieve viral load suppression in their body. Viral suppression will not only contribute to better health outcomes, but also enable their body to function properly in any activities they engage in, and it will positively contribute to improving their QoL.

The findings of this study provided valid and complete information on the QoL of PLHIV. Such informa-

tion is the main contribution to the body of knowledge, as it fills in the gap in the paucity of information and understanding about the association between sexual orientation and the QoL of PLHIV who do not disclose their sexual orientations and are under-researched.

There is a possibility of information bias in this study, as the participants were not open or reluctant to talk about their sexual orientation at the beginning of the interviews. This problem was solved through discussion and coordination with Sriwijaya Plus Community, which supported the respondents in their daily activities. This solution resulted in the participants being open and encouraged to actively participate in the study and respond to the study questions without any hesitation. However, for generalizability purposes, further studies with a larger sample size and intervention studies involving both MSM and non-MSM populations are recommended.

Conclusion

The results of this study show that the average physical and spiritual life quality of HIV patients with MSM sexual orientation was higher than that of others in the non-MSM category. They also have better psychological well-being, independence level, social relationships, environment, and perceptions of health. The QoL of this population can be improved by providing vital support, reducing stigma, and paying attention to stress levels and therapy adherence.

Abbreviations

HIV: Human Immunodeficiency Virus; PLHIV: People Living with HIV; ART: Antiretroviral Therapy; QOL: Quality of Life; MSM: Men Having Sex with Men; CST: Care Support and Treatment; WHOQOL-HIV BREF: World Health Organization Quality of Life-HIV BREF; PHQ-9: Patient Health Questionnaire-9; PR: Prevalence Ratio; CI: Confidence Interval; SD: Standard Deviation.

Ethics Approval and Consent to Participate

This study was approved by the Ethical Review Committee of the Faculty of Public Health Sriwijaya University, with reference number 149/UN9.FKM/TU.KKE/2021.

Competing Interest

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

Availability of Data and Materials

All data and related materials from this study are available and can be provided by the first author

Authors' Contribution

RJS designed the study, developed a data instrument for data collection analysis and drafted the manuscript. NKF contributed to drafting and

proofreading the e-manuscript. NYA contributed to the interpretation of the results, as well as the reviewing and editing of the article. Furthermore, RVS contributed to the proofreading and editing of the article, while MNP assisted in the literature review and editing. All coauthors reviewed and approved the final manuscript before submission.

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References

1. Local Burden of Disease HIV Collaborators. Mapping subnational HIV mortality in six Latin American countries with incomplete vital registration systems. *BMC Med.* 2021; 19: 4
2. Local Burden of Disease HIV Collaborators. Subnational mapping of HIV incidence and mortality among individuals aged 15-49 years in sub-Saharan Africa, 2000-18: A modeling study. *The Lancet HIV.* 2021; 8 (6): e363–e375.
3. United Nations Programme on HIV/AIDS. Global HIV statistics. Geneva: United Nations Programme on HIV/AIDS; 2021.
4. Kementerian Kesehatan Republik Indonesia. Laporan Perkembangan HIV AIDS dan Penyakit Infeksi Menular Seksual (PIMS) Triwulan I Tahun 2021. Jakarta: Kementerian Kesehatan Republik Indonesia; 2022.
5. Fauk NK, Mwanri L, Hawke K, Mohammadi L, Ward PR. Psychological and social impact of HIV on women living with HIV and their families in low- and middle-income Asian countries: A systematic search and critical review. *Int J Environ Res Public Health.* 2022; 19 (11): 6668.
6. Fauk NK. Risk factors and the impact of HIV among women living with HIV and their families in Yogyakarta and Belu district, Indonesia [Dissertation]. Australia: Flinders University; 2022.
7. Akinboro AO, Akinyemi SO, Olaitan PB, Raji AA, Popoola AA, Awoyemi OR, et al. Quality of life of Nigerians living with human immunodeficiency virus. *The Pan African Med J.* 2014; 18: 234.
8. Monteiro F, Canavarro M, Pereira M. Factors associated with quality of life in middle-aged and older patients living with HIV. *AIDS Care.* 2016; 28 Suppl 1 (sup1): 92-8.
9. Karkashadze E, Gates MA, Chkhartishvili N, DeHovitz J, Tsertsvadze T. Assessment of quality of life in people living with HIV in Georgia. *Int J STD AIDS.* 2017; 28 (7): 672–8.
10. Osei-Yeboah J, Owiredu WKBA, Norgbe GK, Lokpo SY, Obirikorang C, Alote Allotey E, et al. Quality of life of people living with HIV/AIDS in the Ho municipality, Ghana: A cross-sectional study. *AIDS Res Treat.* 2017; 6806951.
11. Nigusso FT, Mavhandu-Mudzusi AH. Health-related quality of life of people living with HIV/AIDS: The role of social inequalities and disease-related factors. *Health Qual Life Outcomes.* 2021; 19: 63.
12. Seguiti C, Salvo PF, Di Stasio E, Lamonica S, Fedele AL, Manfrida S, et al. Health-related quality of life (HRQoL) from HIV patients' perspective: Comparison of patient-reported outcome (PRO) measures among people living with hiv (PLWH) and other chronic clinical conditions. *J Patient Rep Outcomes.* 2022; 6: 27.
13. Khademi N, Zanganeh A, Saeidi S, Teimouri R, Khezeli M, Jamshidi B, et al. Quality of life of HIV-infected individuals: Insights from a study of patients in Kermanshah, Iran. *BMC Infect Dis.* 2021; 21: 205.
14. Hidru TH, Wang F, Lolokote S, Jia Y, Chen M, Tong W, et al. Associated factors of self-reported psychopathology and health related quality of life among men who have sex with men (MSM) with HIV/AIDS in Dalian, China: A pilot study. *Infect Dis Poverty.* 2016; 5: 108.
15. Song B, Yan C, Lin Y, Wang F, Wang L. Health-related quality of life in HIV-infected men who have sex with men in China: a cross-sectional study. *Med Sci Monit.* 2016; 22: 2859-70.
16. Nobre N, Pereira M, Roine RP, Sintonen H, Sutinen J. Factors associated with the quality of life of people living with HIV in Finland. *AIDS Care.* 2017; 29 (8): 1074–8.
17. Popping S, Kall M, Nichols BE, Stempher E, Versteegh L, van de Vijver DAMC, et al. Quality of life among people living with HIV in England and the Netherlands: A population-based study. *Lancet Reg Heal - Eur.* 2021; 8: 100177.
18. Desyani NLJ, Waluyo A, Yona S. The relationship between stigma, religiosity, and the quality of life of HIV-positive MSM in Medan, Indonesia. *Enfermería Clínica.* 2019; 29 (Suppl. 2): 510–4.
19. Gao C, Xiao X, Zhang L, Xu H, Wang M, Wang H. The relationship between acceptance of illness and quality of life among men who have sex with men living with human immunodeficiency virus: A cross-sectional study. *Int J Nurs Sci.* 2022; 9 (3): 313–20.
20. Martiana I, Waluyo A, Yona S, Edianto. Dukungan Sebaya dan Penerimaan Keluarga terhadap Kualitas Hidup Homoseksual dengan HIV dan Terapi Antiretroviral. *J Kep Indones.* 2021; 24 (1).
21. Putra INAM, Waluyo A, Yona S. The relationship between family acceptance and quality of life and self esteem of PLWH MSM in Medan, North Sumatera, Indonesia. *Enfermería Clínica.* 2019; 29 (Suppl. 2): 291-4.
22. Lwanga SK, Lemeshow S, & World Health Organization. Sample size determination in health studies : a practical manual / S. K. Lwanga and S. Lemeshow. Geneva: World Health Organization; 1991.
23. Muhammad NM, Shatri H, Djoerban Z, Abdullah M. Validity and readability test of Indonesian version of World Health Organization Quality of Life-HIV BREF Questionnaire to measure the quality of life patients with HIV/AIDS. *J Penyakit Dalam Indonesia.* 4 (3): 112-122.
24. Dar P, Kachroo V, Qureshi S. Prevalence of depression in HIV patients on antiretroviral therapy (ART). *Int J Res Rev.* 2020; 7 (4): 13-21.
25. Nurdin HC. Uji Validitas dan Reliabilitas Berger HIV Stigma Scale versi Bahasa Indonesia dalam menilai Perceived Stigma pada Orang dengan HIV/AIDS (ODHA). *AIDS.* 2013.
26. Arikunto S. Prosedur penelitian: suatu pendekatan praktik. Jakarta: Rineka Cipta; 2010.
27. Bhatia MS, Munjal S. Prevalence of depression in people living with HIV/AIDS undergoing art and factors associated with it. *J Clin Diagn*

- Res. 2014; 8 (10): WC01-4.
28. Rivera-Rivera Y, Vázquez-Santiago FJ, Albino E, Sánchez MDC, Rivera-Amill V. Impact of depression and inflammation on the progression of HIV disease. *J Clin Cell Immunol.* 2016; 7 (3): 425.
29. Lopresti AL, Hood SD, Drummond PD. A review of lifestyle factors that contribute to important pathways associated with major depression: diet, sleep and exercise. *J Affect Disord.* 2015; 148 (1): 12–27.
30. Mohammed M, Mengistie B, Dessie Y, Godana W. Prevalence of depression and associated factors among HIV patients seeking treatments in ART clinics at Harar Town, Eastern Ethiopia. *J AIDS Clin Res.* 2015; 6 (6): 474.
31. Fauk NK, Merry MS, Ambarwati A, Sigilipoe MA, Ernawati, Mwanri L. A qualitative inquiry of adherence to antiretroviral therapy and its associated factors: A study with transgender women living with HIV in Indonesia. *Indian J Public Health.* 2020; 64 (2): 116–25.
32. Bello SI, Bello IK. Quality of life of HIV/AIDS patients in a secondary health care facility, Ilorin, Nigeria. *Proc (Bayl Univ Med Cent).* 2013; 26 (2): 116–9.
33. Achappa B, Madi D, Bhaskaran U, Ramapuram JT, Rao S, Mahalingam S. Adherence to antiretroviral therapy among people living with HIV. *N Am J Med Sci.* 2013; 5 (3): 220-3.
34. Fauk NK, Hawke K, Mwanri L, Ward PR. Stigma and discrimination towards people living with HIV in the context of families, communities, and healthcare settings: A qualitative study in Indonesia. *Int J Environ Res Public Health.* 2021; 18 (10): 5424.
35. Fauk NK, Ward PR, Hawke K, Mwanri L. HIV stigma and discrimination: perspectives and personal experiences of healthcare providers in Yogyakarta and Belu, Indonesia. *Front Med.* 2021; 8.
36. Mahamboro DB, Fauk NK, Ward PR, Merry MS, Siri TA, Mwanri L. HIV stigma and moral judgement: Qualitative exploration of the experiences of hiv stigma and discrimination among married men living with HIV in Yogyakarta. *Int J Environ Res Public Health.* 2020; 17 (2): 636.
37. Xu JF, Ming ZQ, Zhang YQ, Wang PC, Jing J, Cheng F. Family support, discrimination, and quality of life among ART-treated HIV-infected patients: A two-year study in China. *Infect Dis Poverty.* 2017; 6 (1): 152.
38. Kebede MA, Haidar J. Factors influencing adherence to the food by prescription program among adult HIV positive patients in Addis Ababa, Ethiopia: A facility-based, cross-sectional study. *Infect Dis poverty.* 2014; 3: 20.
39. Mugavero MJ, Amico KR, Horn T, Thompson MA. The state of engagement in HIV care in the United States: From cascade to continuum to control. *Clin Infect Dis.* 2013; 57 (8): 1164–71.