

## ORIGINAL ARTICLE

# Factors Associated with Adherence to Antiretroviral Therapy among People Living with HIV Infection in West Java Province, Indonesia

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## ABSTRACT

**Introduction:** Antiretroviral therapy (ART) has proved beneficial by decreasing mortality and increasing the quality of life of people living with HIV infection (PLWH). However, long time medication requires good adherence and strong commitment from the patients so that they take ART medication on time to achieve long-term viral suppression. This study aims to examine the level of adherence to ART and its associated factors among PLWH. **Methods:** A cross-sectional design was conducted at three HIV clinics in West Java Province, Indonesia. People diagnosed with HIV, aged over 18 years old, who had undertaken antiretroviral treatment for at least six months were recruited for this study. Adherence to ART was measured using self-reported measurement and a visual analogue scale (VAS). Data were analysed using descriptive statistics and logistic regression analyses. **Results:** There were 122 PLWH purposively recruited from three HIV- Clinics in West Java Province, Indonesia. The results showed that above half of the respondents showed good adherence to ART. Adherence was significantly associated with depression and perceived stigma. Stigma was found to be an independent predictor of adherence to ART. **Conclusions:** Routine assessment of adherence in clinical practice is essential to identify people at risk of treatment failure. This is crucial to an effective strategy aimed at promoting zero stigma in Indonesia.

**Keywords:** Adherence, Antiretroviral treatment, HIV, Indonesia

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## INTRODUCTION

HIV is an epidemic in Indonesia: the estimated number of people living with HIV infection (PLWH) is increasing unlike in other countries in the South and South East Asian region (SEAR). The prevalence was 0.4%, and the estimated total number of PLWH was 620,000 in 2016 (1). In 2005, the Indonesian government initiated efforts to provide Antiretroviral Therapy (ART) free of charge for PLWH at 25 referral hospitals, and about 2,381 PLWH gained access to ART. In 2011, an increasing number of PLWH gained access to ART. The number was 21,347 and about 70% of them gained free access to treatment subsidized by government funding (2). Although the mortality declined from 18.16% in 2000 to 3.12% in 2012, many of PLWH had delayed access to ART or has dropped out. According to the available data from the Ministry of Health of the Republic of Indonesia (MoH

RI), of the 21,347 PLWH receiving ART, only 55.7% were reported as showing good adherence to ART.

ART has played a significant impact on increasing life expectancy and the quality of life of PLWH (3,4), resulting in viral suppression, increased CD4 cell count, and decreased mortality rates (5). Poor ART adherence also leads to increasing hospitalization rates, increased health care costs, reduced productivity, and morbidity and mortality in low- and middle-income countries (6). Adherence to ART is a crucial element for the successful treatment of HIV infection (7). Adequate adherence was generally required to achieve viral suppression, to delay the progression of the disease and prevent early death (5,7). Many of the PLWH have difficulty in maintaining or achieving an adequate level of adherence to ART (8). Adherence to ART on the part of PLWH is a complex behaviour affected by many factors. Previous meta-analysis has found that symptoms of depression, social support, and HIV-stigma were strongly associated with adherence to ART (9). Despite the high number of PLWH in Indonesia, information on ART adherence and its associated factors among PLWH was limited. Understanding the factors associated with adherence

to ART may help health care professionals to develop effective intervention to enhance or maintains adherence to ART. This study aims to determine the level of adherence to ART and to examine the factors associated with ART adherence among PLWH in Indonesia.

## MATERIALS AND METHODS

### Study Design and Subjects

This study was conducted using a cross-sectional design at three HIV clinics affiliated with hospitals in West Java Province, Indonesia. The clinics are located in three major cities in West Java, namely Bekasi, Bandung, and Cirebon which had the highest prevalence of PLWH. The sample size was determined by Thorndike's formula for multiple regression sample size. Purposive sampling was applied to recruit the subjects of this study. The inclusion criteria for the subjects were those who diagnosed with HIV, aged over 18 years old, undergoing antiretroviral treatment for at least six months, and able to communicate and write in Bahasa Indonesia. Subjects who experienced severe illness or co-morbidities were excluded from this study. Variable dependent in this study was adherence level, whereas independent variables consist of stigma, depression, coping, and social support.

### Data Collection

The demographic data were collected on enrolment: this included age, gender, education level, marital status, employment status, monthly income, years living with HIV, duration of taking ART, joining a social group or not, and receiving adherence counselling prior to the initiation of antiretroviral treatment.

### Adherence to ART

Adherence to ART was measured using two methods that were developed initially in South Africa (6). The two methods were used to assure the consistency of the results for measuring adherence. The method used to assess adherence was self-reported assessment, which consists of four yes or no questions: 1) difficulty in remembering to take medication; 2) stopped taking medication because of feeling better; 3) missed doses; and 4) stopped taking medication because of adverse effects. If the respondents said "no" to all questions, it was categorized as high level adherence. If they said "yes" to one question, it was considered as moderate level of adherence. If they said "yes" to two or more questions, it was considered as a lower level of adherence.

We also measured the adherence to ART based on a Visual Analogue Scale (VAS). Every subject was asked to identify the time they missed doses or took them at the wrong time in the past four days. First, the researcher used a scale 0 to 10 and asked the subjects whether they took all the medicine. If the subjects missed all doses every time, the score is 0. If they never missed a dose, the score is 10. Second, the subject was asked to point

out their adherence level in the visual analogue scale. If the subjects pointed to the score 7, then the adherence level would be 70 percent (6). The adherence level was high if the score reaches  $\geq 95\%$ , moderate for the score of 75% - 94%, and lower when less than 75%.

### HIV Stigma Scale

The HIV stigma scale consists of 40 items with a four-point scale range from strongly disagree, disagree, agree and strongly agree. The minimum total score was 40 and the maximum total score was 160. The instrument was divided into four subscales; personalized, disclosure concerns, negative self-image, and public attitudes stigma. The HIV stigma scale was translated into an Indonesian version and validated by Nurdin (11). The Cronbach's Alpha for the subscales and total scores the Indonesian version range from 0.90 to 0.93. The test-retest reliability for the 2 to 3 weeks between test ranged from 0.89 to 0.92.

### The Beck Depression Inventory

The Beck Depression Inventory (BDI) was used to measure depressive symptoms (12). The BDI includes 21 questions, and symptoms are scored from 0 to 3, based on the severity of each item. A higher score reflects greater depression with a maximum total score of 63. The BDI has a cut-off point, as follows: minimal depression 0 - 9; mild depression 10-18; moderate depression 19-29; and severe depression 30-63. The BDI's internal consistency was .81 for nonpsychiatric subjects, and the concurrent validity with respect to the Hamilton Psychiatric Rating Scale for Depression (HRSD) was .74 (high) (13).

### Ways of Coping

The Ways of Coping (Revised) is a 66-item questionnaire consists of the ways of thought of people dealing with stressful events both internally and externally (14). The ways of coping consist of eight scales: problem-focused coping; wishful thinking; detachment; seeking social support; focusing on the positive; self-blame; tension reduction; and keeping to oneself. The response consists of a 4-point Likert scale (does not apply or not used (0) to use a great deal (3)). The Cronbach's alpha ranged from .59 to .88.

### The MOS Social Support Survey

The MOS Social Support Survey was used to measure social support (15). This has a 19-item scale on a 5-Likert scale from 1 to 5; 1 means none of the time and 5 is all the time. The MOS social survey covers four dimensions of support, including emotional support, tangible support, social interaction, and affection. The maximum score is 95 and higher score indicates higher social support. The reliability for each dimension ranged from .91 to .97.

### Procedure

Approval for data collection was obtained from the director of each of the hospitals involved in this study.

Ethical approval was obtained from the Health Research Ethics Committee Faculty of Medicine, Universitas Padjadjaran (Letter No. 531/UN6.C2.1.2/KEPK/PN/2013). Eligible subjects who had a diagnosis of HIV infection (referred via physicians in clinics) were invited to participate in the study. After obtaining written informed consent, the enumerator conducted interviews in a private room, free of distractions, at the three HIV clinics in West Java, Indonesia. Each subject had the right to reject or withdraw from this study at any time. Subjects were provided information regarding adherence to ART, stigma, social support, coping, and depression. Each interview required approximately 60-90 minutes.

### Data Analysis

Descriptive statistics were applied to describe the demographic characteristics, adherence to ART, stigma, social support, coping, and depression. We also compared the demographic characteristics between the high-adherence and low to moderate adherence groups based on the VAS measurement of adherence using independent t-tests and Chi-square tests. VAS score was selected after comparing with self-reported assessment used Cohen's Kappa test, and the results showed a fair agreement. A Pearson product moment correlation was used to determine the association between stigma, social support, coping, and depression in relation to adherence to antiretroviral treatment. Simple logistic regression was used to evaluate the dominant factors (among independent variables; stigma, depression, coping, and social support) associated with adherence to ART, as the dependent variable. Data were analysed using the Statistical Package for the Social Sciences (SPSS) version 21.00 for Windows.

## RESULTS

### Participant Characteristics

A total of 122 PLWH agreed to participate in this study. The mean age was 32 years old (SD = 4.9, range 21 to 54) (Table I). The proportion of females that took part in this study was higher compared to the males (58.2% vs. 41%, respectively). The majority of subjects were married (60.7%), Muslim (92.6%), educated to senior high school (63.1%), and housewives (23.8%). The mean monthly income was 61.5 USD (range 0 - 444.4 USD), and the majority of them (87.7%) had lower income ( $\leq$  148 USD per month). On average, the current CD4 cell count was 324.5 (SD=224.2), the mean of duration of living with HIV was 4.6 years (SD=2.7, range 1-13 years), and the mean of duration of receiving ART was 3.9 years (SD=2.4, range 1-13 years). More than 95% had previously participated in counselling concerning the adherence to antiretroviral therapy. There was no significant difference in the demographic and clinical information in terms of age, sex, education, employment, monthly income, current CD4 cell counts, years living with HIV and the duration of taking ART on the part of PLWH who showed adherence and non-

**Table I: Comparison of demographic and clinical characteristic among two groups (N=122)**

	Total (N=122)	High Adherence (n=75)	Low-Moderate Adherence (n=47)	p-value
Age, Mean $\pm$ SD (years)	32.04 $\pm$ 4.93	31.9 $\pm$ 5.21	32.3 $\pm$ 4.49	.647*
Male	41.8%	56.3%	43.7%	.314#
Muslim	92.6%	61.1%	38.9%	.519#
Married	60.7%	58.1%	41.9%	.883#
Education level				
Under senior high school	15.6%	13.7%	19.2%	.080#
Senior high school	63.1%	72%	48.9%	
College/university	21.3%	14.7%	31.9%	
Employee	75.4%	60%	51%	.117#
Income per month $\leq$ 148 USD	87.7%	90.3%	78.7%	.174#
Current CD4 cell counts (cell/ml <sup>3</sup> )	324.5 $\pm$ 224.2	321.9 $\pm$ 234.5	377.6 $\pm$ 203.6	.226*
Years living with HIV, Mean $\pm$ SD	4.56 $\pm$ 2.79	4.87 $\pm$ 3.11	4.33 $\pm$ 3.26	.120*
Duration of taking ART, Mean $\pm$ SD	3.82 $\pm$ 2.79	3.99 $\pm$ 2.80	3.53 $\pm$ 2.06	.340*
Receiving ART adherence consultation	96.7%	96%	97.9%	.500#

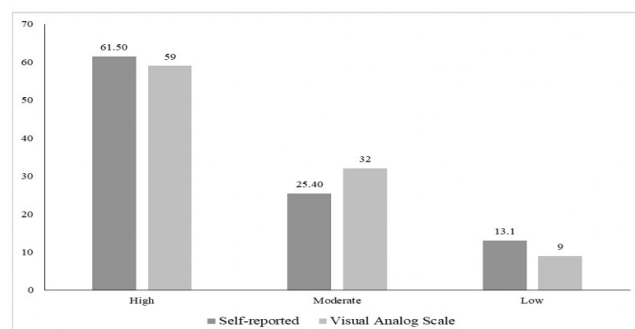
\*independent t-test

# Chi square test

adherence to ART.

### Adherence to ART, social support, coping, stigma, and depression

The mean of total score for adherence to ART as measured by self-reports was 9.03 (SD=1.94), with 61.5% of the subjects showing a higher level of adherence (Figure 1). The results of the visual analogue scale (VAS) showed that PLWH who had a high level of adherence (Score  $\geq$  95%) was 59%, lower than the self-reported measurement (the Kappa agreement test was 0.028 ( $p < .005$ ), indicating fair agreement).



**Figure 1: Level of adherence to ART among PLWH in Indonesia (N=122, Kappa test: 0.028,  $p < .005$ )**

The mean of the total score for depression was 16.5 (SD=12.5) with most of them (51.6%) showing mild depression (Table II). The mean score for the way of coping was 165.9 (SD=18.1, range 112 to 217), social support was 62.6 (SD=15.1, range 28 to 94), and the perceived stigma was 93.7 (SD=15.3, range 59 to 141). The PLWH who showed adherence to ART tend to show a significantly higher score for coping and social support, a lower score for stigma, particularly for personalized stigma and concern for the domain of public health attitude ( $p < .005$ ) (Table II).

**Table II: The differences in coping, depression, social support, and stigma between PLWH who high adherence and low-moderate adherence (N=122)**

	Total (N=122)	High Adherence (n=75)	Low-Moderate Adherence (n=47)	p-value
<b>Coping</b>	165.9 ±18.1	163.4 ±17.9	170.0 ±17.82	.049*
<b>Depression</b>	16.5 ±12.5	15.40 ±13.05	18.29 ±11.43	.213*
Mild	63 (51.6%)	45 (60.0%)	18 (38.3)	.045*
Moderate	40 (32.8%)	20 (26.7%)	20 (42.6)	
Severe	19 (15.6%)	10 (13.3%)	9 (19.1)	
<b>Social support</b>	62.6 ±15.1	61.96 ±15.40	63.51 ±14.61	.584*
<b>Stigma</b>	93.7 ±15.3	95.85 ±16.21	90.25 ±13.09	.049*
Personalized stigma	40.77 ±2.0	41.96 ±7.55	38.87 ±6.23	.020*
Disclosure concerns	27.71 ±4.03	27.95 ±4.44	27.35 ±3.28	.428*
Negative self-image	28.79 ±4.99	29.41 ±5.13	27.81 ±4.65	.084*
Concerns with public attitudes	45.54 ±8.83	46.82 ±9.19	43.50 ±7.89	.043*

\*independent t-test

\*chi square test

**Factors associated with adherence to ART**

From bivariate analysis we found a negative association between stigma ( $r = -.26, p < .001$ ) and depression ( $r = -.22, p < .001$ ) in relation to adherence to ART (Table III). No significant association was found between coping and social support with ART adherence. The results of logistic regression found that only stigma was associated with adherence to ART, and higher perceptions of the stigma were associated with non-adherence (crude OR = .96, 95% CI= .93 -.99). Stigma explained 13% of the variance in the adherence to ART (Table IV).

**Table III: Correlation between perceived stigma, social support, depression, coping, and adherence to ART as measured by VAS**

	Adherence	Coping	Depression	Social support	Stigma
Adherence	1	.031	-.258**	.017	-.222*
Coping		1	.115	.587**	.113
Depression			1	.066	.385**
Social support				1	-.237**
Stigma					1

Pearson product moment correlation

**Table IV: Factors associated with ART adherence among PLWH in Indonesia**

	B (SE)	Crude OR (95% CI)	p value
Coping	.025 (.014)	1.02 (.99 – 1.05)	.076
Depression	.033 (.018)	1.03 (.99 – 1.07)	.066
Social Support	-.019 (.017)	.98 (.95 – 1.01)	.272
Stigma	-.039 (.016)	.96 (.93 -.99)	.014
R <sup>2</sup>			.130

Note: CI: confidence interval

**DISCUSSION**

The results of this study revealed that about 60% of the subjects reported a high adherence to ART as measured by the VAS and self-reporting. Previous studies have highlighted so many factors were required to achieve the required 95% adherence rate for an indefinite period of time (16). Our results were similar to the national data reported by the Ministry of Health in 2011, of the 21,347 PLWH on ART, only 57.7% continued the treatment. The problems of low adherence to the treatment were also found in the majority of the chronic disease studied, mainly in developing countries (6). Thus, non-adherence is a global problem that can have a negative impact on the successful curing of diseases, resulting in treatment failure and increased mortality.

We found that depression was associated with adherence to ART. This outcome was consistent with a previous study (9). Peltzer, Preez, Ramlagan, and Anderson (17) found that adherence was associated with lower depression, and poor adherence was associated with poor environmental factors including stigma and discrimination. In another study, it was reported that patients who were not depressed were twice as likely to adhere than depressed patients (18). In this study it was found that nearly half (48.4%, n = 122) of the subjects reported symptoms of depression from moderate to severe. Depression is generally a decrease in feelings and motivation about living and this affects how patients keep up following their treatment.

We found no significant association between coping and adherence to ART. This was inconsistent with previous studies that found that coping strategies and social support play a role in improving adherence (19). Lazarus and Folkman (20) divided coping into two groups; focus on emotions and problem-solving. If coping is used to focus more on problem-solving, then the problem will be resolved. Conversely, if coping is used to focus on emotions, then the effect is only to relieve the tension, but the problem still persists. This study did not investigate the details of coping strategies which might be one of the reasons for the non-significance of findings.

This study did not show a significant relationship between social support and adherence. This was different from a previous study that noted social support as a factor related to adherence (19). The non-significant findings

might be due to the disclosure of HIV, although above 90% of PLWH had been disclosed concerning their HIV status, the majority only moved to closer relationships as a requirement to start taking ART (4). The support provided by the family or community will help alleviate the burden of disease. Social support, including family support, is needed by the patient or anyone who is experiencing health problems that require long-term treatment. This is especially so in societies that embrace a collectivistic culture or close kinship between family members and the community. Therefore, building a friendly social environment for PLWH is necessary to help them to achieve better health and well-being.

Stigma was the only factors associated with non-adherence to ART. Public attitudes and personalized stigma were rated as the two highest mean scores by the subjects. Stigmatization has brought many effects on the live of PLWH including adherence to ART. In a meta-analysis it was reported that HIV stigma is associated with lower levels of adherence (9). Feeling embarrassed as result of stigma was documented in a previous study as a barrier to access health care services (21). PLWH with less or little experience of stigmatization and discrimination are more likely to adhere to ART (22). According to a previous study conducted in Indonesia it was reported that PLWH suffer from low self-esteem and public-stigma which affected their quality of life (4). Therefore, it is essential to ensure there is no stigma for PLWH as stigma has a negative impact on the health and well-being of PLWH.

## CONCLUSION

In conclusion, only half of the people living with HIV reported that they adhered to ART. Depression and stigma were negatively associated with adherence to ART. From the simple logistic regression, stigma was the most important factor that influence the adherence to ART. Healthcare professionals need to assess the adherence to ART in clinical practice routinely to monitor the success of ART. Furthermore, early assessment and intervention to reduce depression and stigma are essential. Future studies exploring more detailed analysis of factors associated with adherence to ART using objective measures are warranted.

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