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Screening of Mental Disorders Related CD4 Count of People Living with HIV/AIDS with Anti-Retroviral Treatment in Medan, Indonesia

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Abstract

BACKGROUND: Mental disorders are the most common problems in the life of People Living with HIV/AIDS (PLWHA). The frequency in which HIV/AIDS and mental health problems co-exist, and the complex bi-directional relationship between them. Several biological, distress psychological and social dysfunction factors are associated with mental disorders in PLWHA.

AIM: To analyse the relationship between the screening of mental disorders using General Health Questionnaire-12 scores and CD4 counts of People Living with HIV/AIDS with Anti-Retroviral Treatment.

METHODS: This was a correlative analytical study with a cross-sectional approach using the General Health Questionnaire-12 (GHQ-12) instrument to assess screening mental disorders and the CD4 count. This research was conducted in February 2019 – April 2019 at an HIV/AIDS outpatient clinic. As many 33 subjects were divided into inclusion criteria; participant confirmed HIV seropositivity in stage II or III were undergoing ARV treatment, ranged in age between 25-49 years. The duration of HIV disease was ≤ four years, and the duration of ARV treatment was ≥ six months and informed consent to participate in the study. The patient who had mental disorders and currently drugs user was excluded from this study.

RESULTS: There was an association found between change in CD4 and screening mental disorders at univariate analysis among the study participants, whether on antiretroviral treatment. The correlation between the total GHQ-12 scores as a screening of mental disorders and CD4 counts indicated to result in a significant negative correlation, r = -0.670 with p = 0.001.

CONCLUSION: Screening mental disorders using General Health Questionnaire-12 from the results of this study shows that it is important to do for PLWHA because with low CD4 levels as biomarkers the progression of HIV infection affects psychological distress and social dysfunction in people living with HIV who have the potential for symptoms of mental disorders.

Introduction

Acquired Immune Deficiency Syndrome (AIDS) is a collection of symptoms or diseases caused by decreased immunity due to infection with the HIV which belongs to the retroviridae family. AIDS is the final stage of HIV infection. People with HIV and AIDS abbreviated as PLWHA are people who have been infected with the HIV virus [1].

People living with HIV/AIDS (PLWHA) will be vulnerable to the emergence of psychological problems and social problems, then it will have an impact on the emergence of mental disorders that arise not only when knowing HIV-infected status, but also changes in clinical conditions or clinical deterioration, namely the progression of HIV infection to AIDS. Quite several studies have examined the relationship between clinical development of HIV infection as measured by biomarkers of Cluster of Differences 4 (CD4) count, viral load count and psychological distress in people living with HIV [2].

A study conducted by Andrew in 2012 at Lagos University Teaching Hospital (LUTH) in West Africa of 300 people living with HIV in the age range of 18-60 years using the General Health Questionnaire (GHQ-12) instrument. It was found that the mean score of psychological distress was 4.6 (± 1.58). In the study also found a positive correlation between GHQ-12 scores and socio-demographic (unemployment, unmarried status and lack of family support) in PLWHA who were significantly related ($p < 0.05$) [3].

A descriptive cross-sectional study by Ezeh and friends in 2017 at Shika Hospital, Nigeria analysed the socio-demographics of people with HIV/AIDS with psychological distress who received antiretroviral therapy. Appraisal of psychological distress using GHQ-12 obtained total results that experienced psychological distress as much as 78%, with details of 16.2% with severe distress, 25.1% with moderate distress and 36.7% with severe distress. Women (65%) were more likely to experience psychological distress than men (35%) OR = 3.5 CI 95 per cent. The high level of psychological distress found is related to many factors related to problems in the family, bad culture, stigma, isolation from society and poverty to PLWHA [4].

In a different study by Farah M and friends conducted in Bandar Abbas Behavioral Diseases Counseling Center in 2012 using the General Health Questionnaire-28 (GHQ-28) as a measure of risk screening for mental disorders in PLWHA, with a sample of 95 ODHA. In the study, it was found that there was no significant relationship between mental disorders in PLWHA with the clinical stage of HIV/AIDS, gender, area of residence, marital status, education status, employment status, and history of drug use [5].

Based on this background, through a literature review, no similar research has ever been carried out in Indonesia. So, through this study, the researchers wanted to find out whether there was a correlation between psychological distress scores, social dysfunction scores, total General Health Questionnaire-12 (GHQ-12) scores and CD4 levels in people with HIV/AIDS who were undergoing Anti-Retroviral treatment in Indonesia.

Methods

This cross-sectional study was conducted in HIV/AIDS outpatient clinic, Haji Hospital, Medan, Indonesia, from February to April 2019 among 33 people living with HIV/AIDS (PLWHA) collected using the consecutive sampling method.

The inclusion criteria for the study were participant confirmed HIV seropositivity in stage II or III undergoing ARV treatment, ranged in age between 25-49 years. The duration of HIV disease was ≤ four years, and the duration of ARV treatment was ≥ six months and informed consent to participate in the study. A patient who had mental disorders and currently drugs user was excluded in this study.

Participation in this study was voluntary and written informed consent was obtained from each study participant after a detailed description of study objectives and procedures was provided. Privacy and confidentiality of the respondent were strictly protected. Health Research Ethical Committee approved this study, Faculty of Medicine of Universitas Sumatera Utara, Medan, Indonesia (No:245/TGL/KEPK FK USU-RSUP HAM/2019).

The GHQ-12 is a self-administered screening test, which is sensitive to the presence of psychiatric disorders in individuals presenting in primary care settings and non-psychiatric clinical settings. The GHQ is not designed to detect symptoms that occur with specific psychiatric diagnose; rather; it provides a measure of overall psychological health or wellness. The GHQ has reasonable test-retest reliability and both content validity and constructs validity. In the present study, the shorter version containing 12 items – the GHQ-12 – was used. The GHQ-12 has a sensitivity of 89% and specificity of 80% [6].

Statistic analysis

Sapphiro- Wilk test was performed to determine the normality distribution of the data. Furthermore, Pearson test was conducted for analysis. Both of these tests were carried out via SPSS 24 program.

Results

Socio-demographic characteristics of 33 study participants at the HIV clinic in Haji Hospital, Medan, Indonesia, between February – April 2019.

Table1: Socio-demographic characteristics

Characteristics mean ± SD		N (%)
Age in years	35.06 ± 6.55*	
Gender		
Male		18 (54.50%)
Female		15 (45.50%)
Stage of HIV		
Stage II		17 (51.50%)
Stage III		16 (48.50%)
Marital status		
Single		15 (45.50%)
Married		18 (54.50%)
Educational level		
Elementarry		3 (9.10%)
Junior High		4 (12.10%)
Senior High		13 (39.40%)
Graduation ect.		13 (39.40%)
Occupational status		
Work		18 (54.50%)
Jobless		15 (45.50%)
Duration of infection in a month	27.15 ± 10.54*	
Duration of ARV in months	25.67 ± 10.27*	
Psychological distress score	13.06 ± 1.95*	
Social dysfunction score	13.06 ± 1.75*	
Total GHQ-12 score	26.12 ± 3.16*	
CD4 count	281.91 ± 87.80*	

**Shapiro-Wilk* test p > 0,05.

The mean age of the subjects was found out to be 35.06 and standard deviation of 6.55 years. 17 subject (54.50%) cases were males, and 16 subjects (45.50%) cases were females. The most common marital status is single to many as 18 subjects (54.50%). The subject in stage II was the most

subjects who participated in this study (51.50%). The most education level recorded is in senior high school and Graduation with 13 subjects (39.40%). Moreover, most occupational status is working for 18 subjects (54.50%). The mean time diagnosed with HIV is 27.15, with a standard deviation of 10.54 months. The mean for obtaining ARV therapy is 25.67, with a standard deviation of 10.27 months. These data were normally distributed, referred to the results of the Shapiro-Wilk test with p > 0.05.

The mean psychological distress scores obtained 13.06 and a standard deviation of 1.95. Based on the results of the data normality test using Shapiro-Wilk, the data were normally distributed with p = 0.12 (p > 0.05). The mean social dysfunction scores obtained 13.06 and a standard deviation of 1.75. From the results of the normality test using Shapiro-Wilk, it was found that the value of p = 0.25 (p > 0.05), so it can be concluded that the data is normally distributed.

The overall mean of total General Health Questionnaire-12 (GHQ-12) score was 26.12 and standard deviation of 3.16. The data were normally distributed with p = 0.90 (p > 0.05). The overall mean of CD4 count was 281.97 and standard deviation of 87.80. The data were normally distributed with p = 0.26 (p > 0.05). The mean of CD4 count in this study was obtained 281.97 with a standard deviation of 87.80. Based on the results of the data normality test using Shapiro-Wilk, the data were normally distributed with p = 0.26 (p > 0.05).

The Correlation between Psychological Distress Score and CD4 Count

Table 2 in this study obtained the results of the Pearson correlation test between psychological distress scores using GHQ-12 and CD4 count in people living with HIV/AIDS who were undergoing ARV treatment statistically significantly showed a negative correlation of 0.576 with moderate correlation strength (r = 0.4 - <0.6), p = 0.001. With interpretation, the lower CD4 count means higher psychological distress in people living with HIV/AIDS.

Table 2: The correlation between psychological distress score and CD4 count

CD4 count
Psychological distress r = - 0.576 score *p* = 0.001* n = 33

**Pearson Correlation Test*.

The Correlation between Social Dysfunction Score and CD4 Count.

Based on the Table 3, it can be seen that the correlation between the Social Dysfunction Score and CD4 Count of PLWHA who are undergoing ARV therapy is statistically significant showing a negative correlation of 0.568 with moderate correlation strength (r = 0.4 - <0.6), p = 0.001 With interpretation, the lower of CD4 count means a higher incidence of social dysfunction in people living with HIV/AIDS.

Table 3: The Correlation between Social Dysfunction Score and CD4 Count

CD4 count
Social dysfunction r = - 0.568 score *p* = 0,001 n = 33

**Pearson Correlation Test.*

The Correlation between Total GHQ-12 Score and CD4 Count.

Based on table 4 in this study obtained Pearson correlation between the total score of the General Health Questionnaire-12 (GHQ-12) and CD4 count in people living with HIV/AIDS who were undergoing ARV therapy statistically significantly showed a negative correlation of 0.670 with strong correlation strength (r = 0.4 - < 0.6), p = 0.001.

Table 4: The Correlation between Total GHQ-12 Score and CD4 Count

CD4 count
Total GHQ-12 score r = -0.670 p = 0,001 n = 33

**Pearson Correlation Test.*

Discussion

Socio-demographic characteristics obtained by the mean age in this study were 35.06 years and standard deviation of 6.55 years. Based on data from the Indonesian Ministry of Health's Directorate General, it was found that the highest prevalence for people with HIV/AIDS and those at risk of acquiring HIV infection was in productive age, 25-49 years. The most common marital status is married as many as 18 subjects (54.50%) [7].

The mean duration of infection HIV was 27.15 (SD = 10.54) months. The duration of diagnosed affects psychological distress and social dysfunction and also on decreased CD4 levels in people living with HIV/AIDS.

The study conducted by Rachel Ramovha said that people who had just learned that they were infected with HIV would have various responses such as feeling unsure, denial, anger, anxiety, depression and to think of suicide [8].

The mean duration of ARV therapy was 25.67 (SD = 10.27) months. The study of Andrew found that the duration of ARV therapy showed a negative correlation with the GHQ-12 score (p < 0.05). Based on the guidelines for ARV treatment by the Indonesian Ministry of Health in 2014, it was stated that PLWHA who had started ARV treatment desperately needed control and regular follow-up. In the first six months,

there will be concerns about the possibility of the risk of unexpected side effects or Immune Reconstitution Inflammatory Syndrome (IRIS) [9].

The study by G. Ironson et al for 4-years longitudinal prospective design of 177 PLWHA with ARV therapy showed that psychosocial factors with high BDI scores, high neurohormone factors such as cortisol and Norepinephrine (NE) will significantly influence the progression of HIV infection to AIDS, a significant decrease in CD4 levels and an increase in the number of viruses (viral load). With these considerations, this study needs to control the duration of antiretroviral therapy for more than six months and limited to less than four years [10].

The study by Jenifer Attonito in 2014 concluded that PLWHA who adhered to ARV therapy could significantly mediate the psychosocial incidence and progression of HIV infection as measured by CD4 levels and viral load ($p = 0.001$) [11].

In another study by Pleasure Atok Ngum et al. of 300 PLWHA in Cameroon, the prevalence of PLWHA with symptoms of mental disorders was 26.7% with mean duration ARV therapy 47.6 ± 36.8 months. The results showed that there was no significant relationship between the duration of diagnosis of HIV infection and symptoms of mental disorders ($p = 0.65$) and there was no significant relationship between the duration of getting ARV therapy and symptoms of mental disorders ($p = 0.71$) in PLWHA [12].

The mean of psychological distress obtained 13.06 (SD = 1.95). In another study conducted by Andrew at Lagos University Teaching Hospital (LUTH), West Africa of 300 PLHIV who was on ARV therapy in the age range of 18-60 years using the General Health Questionnaire (GHQ-12) instrument with bimodal scale (0, 0, 1, 1) and cut off value 0/1. It was found that the mean of psychological distress was 4.60 (SD = 1.58) [3]. Both studies showed the same thing as psychological distress in PLWHA who were on ARV treatment. The mean score of social dysfunctions with the GHQ-12 instrument in this study was 13.06 (SD = 1.75). The same mean value between psychological distress scores and social dysfunction score indicates that both psychological distress and social dysfunction in this study equally affect PLWHA. The mean of the total GHQ-12 score in this study was 26.12 (SD = 3.16), which indicates the high score of GHQ-12. Based on the study of Ira in the validity and reliability of the GHQ-12 at the University of Indonesia found the cutoff value of 7/8 has identified a symptom of mental disorder in the subject [6]. The mean of CD4 levels in this study was obtained at 281.97, with a standard deviation of 87.80. The decrease in CD4 counts is related to psychological distress and social dysfunction. CD4 levels, as biological parameters, will affect the process of HIV infection along with clinical assessment. CD4 monitoring can be used to initiate ARV therapy or drug replacement for PLWHA.

This study obtained the results of the Pearson correlation test between psychological distress scores using GHQ-12 and CD4 count in people living with HIV/AIDS who were undergoing ARV treatment statistically significantly showed a negative correlation of 0.576 with moderate correlation strength ($r = 0.4 - < 0.6$), $p = 0.001$. With interpretation, the lower CD4 count means higher psychological distress in people living with HIV/AIDS.

A study by Weinstein and Li 2016 in the United States by analysing 23 studies on psychological distress relationships with the progression of HIV infection in people living with HIV who were on ARV treatment. The results show that high stress is linked to the clinical deterioration conditions of HIV infection associated with hypothalamic-pituitary-adrenal (HPA) axis activation and sympathetic adrenal-medullary (SAM) systems [2].

Based on the result on this study, the correlation between the social dysfunction score and a CD4 count of PLWHA who is undergoing ARV therapy is statistically significant showing a negative correlation of 0.568 with moderate correlation strength ($r = 0.4 - < 0.6$), $p = 0.001$. With interpretation, the lower CD4 count means a higher incidence of social dysfunction in people living with HIV/AIDS. A study by Prison showed that psychosocial factors using the Beck Depression Inventory (BDI) measurement instrument and neurohormonal factors affected the progression of HIV infection based on biological parameters using CD4 count and viral load. Psychosocial factors with high BDI scores were obtained, high neurohormone factors such as cortisol and Norepinephrine (NE) will significantly affect the progression of HIV infection to AIDS, a significant decrease in CD4 levels and an increase in viral load [10].

This study obtained Pearson correlation between the total score of the General Health Questionnaire-12 (GHQ-12) and CD4 count in people living with HIV/AIDS who were undergoing ARV therapy statistically significantly showed a negative correlation of 0.670 with strong correlation strength ($r = 0.4 - < 0.6$), $p = 0.001$. Both constructs in GHQ-12, psychological distress and social dysfunction constructs can be interpreted as screening for mental disorders that are significantly affected by CD4 count as biomarkers of the progression of HIV infection in PLWHA.

People living with HIV/AIDS are associated with psychological and social problems. These individuals are faced with various stigmas to show changes in psychosocial character. PLWHA will feel uncomfortable feelings because of the fear of the future, the next life which is full of uncertainty, to the quality of life and hopes of the future that are considered destroyed [13].

Physiological mechanisms that regulate stress can explain how stress in the immune function in HIV infection is interconnected and inseparable. First is through the mechanism of HPA (hypothalamic-pituitary-adrenal) activity through corticotropin-releasing factors (CRF). HIV infection affects the work of astrocytes and microglia to more actively produce and secrete pro-inflammatory interleukin-1 beta cytokines (IL-1β, interleukin-6 (IL-6) and tumour necrosis factor (TNF-α), production of reactive oxygen species (ROS) The proinflammatory cytokine together with serotonin, norepinephrine and acetylcholine which is a stress mechanism in the second pathway will affect the paraventricular nucleus (PVN) in the hypothalamus, then produce signaling molecules in the form of corticotropin-releasing factors (CRF) finally released at the end of the capillary arteries in the portal pituitary venous plexus which becomes the estuary of the anterior pituitary gland CRF then activates the basophil receptor in the anterior pituitary, induces postopias proopiomelanocortin polyprotein (POMC) to produce ACTH (adrenocorticotropic hormone), α, β, an melanocytes stimulating hormone (MSH), and β endorphins. ACTH will increase cortisol production as a stress hormone through its stimulation in the adrenal cortex. Cortisol is a glucocorticoid, a 21-carbon steroid produced in the fasciculation zone of the adrenal cortex. CRF also induces somatostatin and dopamine secretion by the hypothalamus. The immunosuppressive effect on the lymphoreticular system on distress will subsequently cause PLWHA to fall into mental disorders [14], [15]. Screening mental disorders using General Health Questionnaire-12 from the results of this study shows that it is important to do for PLWHA because with low CD4 levels as biomarkers the progression of HIV infection affects psychological distress and social dysfunction in people living with HIV who have the potential to get mental disturbances.

In conclusion, this study indicated a significant correlation between screening mental disorders using GHQ-12 and a CD4 count of people living with HIV/AIDS with antiretroviral treatment in HIV/AIDS outpatient clinic, Haji Hospital, Medan. The results showed strong correlation strength (r = 0.670), with negative direction (r = 0.6 - <0.8), p = 0.001. It indicates that the decrease in CD4 count will increase the risk of symptoms of mental disorders for PLWHA. Screening for mental disorders needs to be done in HIV/AIDS outpatient clinic quickly detect symptoms of mental disorders of PLWHA.

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