



Published in final edited form as:

*AIDS Behav.* 2018 July ; 22(Suppl 1): 76–84. doi:10.1007/s10461-017-1946-8.

## Symptoms of depression in people living with HIV in Ho Chi Minh City, Vietnam: prevalence and associated factors

Truc Thanh Thai<sup>1,2</sup>, Mairwen K. Jones<sup>2</sup>, Lynne M. Harris<sup>3</sup>, Robert C. Heard<sup>2</sup>, Nancy K. Hills<sup>4</sup>, and Christina P. Lindan<sup>4</sup>

<sup>1</sup>Faculty of Public Health, Ho Chi Minh City University of Medicine and Pharmacy, 159 Hung Phu Street, Ward 8, District 8, Ho Chi Minh City, Vietnam

<sup>2</sup>Faculty of Health Sciences, University of Sydney, 75 East Street Lidcombe, Sydney NSW 2141, Australia

<sup>3</sup>Discipline of Psychological Sciences, Australian College of Applied Psychology, Level 11, 255 Elizabeth Street, Sydney NSW 2000, Australia

<sup>4</sup>Global Health Sciences & Department of Epidemiology and Biostatistics, University of California, San Francisco. 550 16<sup>th</sup> Street, Mission Hall, San Francisco, CA 94105, US

### Abstract

This cross-sectional study investigated the prevalence and correlates of symptoms of depression among 400 people living with HIV/AIDS (PLHIV) from two HIV clinics in Ho Chi Minh City, Vietnam. Based on the Center for Epidemiologic Studies – Depression scale, 36.5% of participants were classified as likely to be clinically depressed. Factors independently associated with symptoms of depression included self-report of poor or fair health (aOR=2.16, 95% CI 1.33-3.51), having a low body mass index (aOR=1.85, 95% CI 1.13-3.04), reporting recent problems with family (aOR=1.97, 95% CI 1.21-3.19), feeling shame about being HIV-infected (aOR=1.90, 95% CI 1.20-3.00), and reporting conflict with a partner (aOR=2.21, 95% CI 1.14-4.26). Participants who lived with family (aOR=0.48, 95% CI 0.25-0.90) or who received emotional support from their families or supportive HIV networks (aOR=0.45, 95% CI 0.25-0.80) were less likely to experience symptoms of depression. Screening for and treatment of depression among Vietnamese PLHIV are needed.

### Keywords

CES-D; depression; HIV/AIDS; outpatient; Vietnam

---

Corresponding author: Truc Thanh Thai, Faculty of Public Health, Ho Chi Minh City University of Medicine and Pharmacy, 159 Hung Phu Street, Ward 8, District 8, Ho Chi Minh City, Vietnam. Phone: +84, 908381266. Fax: +84 838597965. ThaiThanhTruc@fphhcm.edu.vn or ThaiThanhTruc@ump.edu.vn.

**Compliance with Ethical Standards: Conflict of Interest:** The authors declare that they have no conflict of interest.

**Ethics approval:** All procedures performed in studies involving human participants were in accordance with the ethical standards of the Human Ethics Committee at Ho Chi Minh City Provincial AIDS Committee, Vietnam (Approval number: IRB-03-2013, dated 17/10/2013) and the University of Sydney, Australia (Approval number: 2013/859, dated 15/11/2013) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed consent:** Informed consent was obtained from all individual participants included in the study.

## Introduction

Up to 350 million people worldwide are estimated to experience symptoms of depression [1]. People living with HIV/AIDS (PLHIV) are two to four times more likely to experience depression than the general population [2, 3]. A recent systematic review of PLHIV from multiple countries estimated that 42% were depressed [3], and other studies from China, India, Portugal, Brazil, Nigeria and the U.S. found that 34% to 67% of PLHIV experienced symptoms of clinical depression [4 - 9]. It is important to identify and treat depression among PLHIV because depression can reduce quality of life and complicate HIV treatment by reducing adherence to antiretroviral medication [2, 3]. Additionally, depression can affect cognitive functioning which in turn can impair judgment and reduce one's ability to accurately assess risk and negotiate safe behavior [2, 3]. For example, HIV-positive outpatients from the U.S. with severe depression were found to be less able to negotiate condom use [10]. Despite these findings, mental health problems among PLHIV are both underdiagnosed and undertreated, particularly in resource-constrained countries [2, 3, 11].

Since 2012, the rate of new HIV infections and the number of AIDS-related deaths in Vietnam have decreased but the total number of PLHIV has increased, likely due to reduced mortality from antiretroviral therapy (ART) [12]. Recent estimators indicate that the HIV prevalence in Vietnam is about 0.3% to 0.5% among the total population [12]. However, only a few studies have examined depression among Vietnamese PLHIV, and these have shown varying results, possibly due to the different measurement tools employed [13 - 15]. For example, a health-related quality of life survey conducted in Vietnam in 2008-2009 using the EuroQOL questionnaire among 400 PLHIV revealed that 32.5% had symptoms of depression [13]. In one evaluation, 18.7% of men living with HIV were identified as being depressed, based on a locally validated psychiatric scale [14]. Another evaluation of male and female clients attending two HIV clinics in the north of Vietnam estimated that 40% were depressed, although the measurement tool was not described [15].

Although the Ministry of Health in Vietnam has encouraged integration of mental health and HIV care under the Vietnamese National Palliative Care Program, practical guidelines for how to do so are limited [16]. There are few psychiatric resources in the country, particularly for outpatients and even more so for PLHIV [17]. As a result, assessment, treatment, and evidence-based interventions to improve PLHIV's mental health are lacking [17]. In addition, medical personnel caring for HIV-positive patients rarely receive any training in mental health, and usually are not alert to the possibility that some patients may be at particular risk for depression and that symptoms of depression are treatable.

Therefore, to add to an understanding of depression among PLHIV in Vietnam, we conducted a cross-sectional study among adult clients of HIV outpatient clinics in Ho Chi Minh City (HCMC) to examine the prevalence and predictors of depression. We also evaluated whether support systems, health status, and demographic factors were related to depression, based on other studies that have examined these relationships [2, 5, 11, 14, 18, 19].

## Methods

### Setting and participants

HCMC is the economic center of the country and has a population of close to 10 million, with at least 25,000 PLHIV [20]. In 2013, we randomly selected two clinics from among 30 public HIV clinics in HCMC by drawing names out of a box. The selected health centers were located in District 8 (420,000 people) and District 10 (235,000 people), and provide care to 1300-1400 HIV-positive clients each. All HIV clinics follow the national care and treatment guidelines.

We calculated a sample size based on a parallel evaluation designed to determine the proportion of PLHIV in these clinics who had mental health symptoms requiring referral for psychiatric services. Since prevalence of those who had symptoms of depression was estimated to range from 34% to 67% [4 - 9], we assumed a prevalence of mental health disorders of 0.50 (50%) and a 95% confidence interval width of 0.10, resulting in a required sample size of 385. Out of 410 clients who were invited to participate, 400 (97.6%) agreed to enroll, 200 from each clinic. Staff described the study in detail to potential participants and answered questions, indicated that declining enrolment would not impact their ability to receive care at the clinic; all participants provided signed informed consent.

### Procedures

HIV-positive male and female patients who were at least 18 years of age and who could read Vietnamese were systematically recruited by study staff on the day of their routine monthly visit by asking every fifth client who registered that day to participate. This method was chosen so that approximately 20 patients could be interviewed daily, which was the limit of the capacity of the research staff.

In a private room in the clinic, participants completed anonymous self-administered questionnaires that included the Center for Epidemiologic Studies – Depression scale (CES-D) [21]. Participants were independently assessed for symptoms of depression by one of four experienced psychiatrists from the Department of Psychiatry, HCMC University of Medicine and Pharmacy. Psychiatrists were present in the clinic for study purposes only and were not providing clinical care. The psychiatrists evaluated participants for symptoms of Major Depressive Disorder based on diagnostic criteria from the Diagnostic and Statistical Manual of Mental Disorders, fourth edition, text revision [22]. Those whom the psychiatrists considered to have symptoms of depression were referred to mental health services for further evaluation and treatment. The psychiatric evaluation and referral were provided free of charge. The findings from the psychiatrists' interview were used in a subsequent study to validate the CES-D as a method of screening PLHIV for symptoms of depression, the results of which are reported elsewhere [23]. Only data from the CES-D are reported here and were used in the analysis. Participants either first completed the questionnaire or were interviewed by a psychiatrist, depending on the availability of the psychiatrist. Completion of the survey and the psychiatric evaluation took 40 - 60 minutes. All procedures, including informed consent, were conducted in Vietnamese.

## Measurements

The questionnaire contained questions about demographic characteristics including sex; employment (unemployed, casual work [non-contract employment including self-employment], part or full-time employment, or other [including being a student or housewife]); highest level of education completed (primary school, secondary school and high school); marital status (single, married/cohabiting, divorced/separated/widowed); living with family (yes/no); self-reported economic status (poor/very poor, average, rich/very rich); religious affiliation (yes/no); self-reported general health status (“In general, would you say your health is poor, fair, good, very good?”); alcohol use at least monthly (yes/no); “Have you used illicit/illegal drugs during the last 12 months?” (yes/no). Questions also asked about the frequency of receiving practical, emotional, spiritual or financial support from family and from HIV networks (never, rarely, occasionally, frequently, very frequently) and occurrence of stressful life experiences during the last 30 days (never, rarely, occasionally, frequently, very frequently). Questions about types of support were asked in the following manners: “Do you receive any financial support from your family?” and “Do you receive emotional support from your family?”. Questions about stress were adapted from previously validated measures and included questions about problems or conflict with family and friends, difficulty finding work or accessing medical care, financial difficulties, discrimination and shame [5,14]. The following are examples of how these questions were asked: “Have you ever been discriminated against because of your HIV status?”, “Have you had serious financial problems or have you ever been without income?”.

The CES-D consists of 20 items measuring four domains of depression during the last 7 days: depressed affect, positive affect, somatic and decreased physical activity, and interpersonal relationships [21]. The CES-D is widely used and freely available for use. The CES-D is scored on a Likert scale from 0 (rarely or none of the time) to 3 (most or all of the time). CES-D scores can range from 0–60, and a score of  $\geq 16$  is used to indicate the need for further assessment of clinical depression [21, 24]. This scale has been shown to have internal reliability and construct and criterion validity when used among HIV-positive patients [25]. The CES-D has previously been translated into Vietnamese and has been used in several studies of adolescents and adults in the country [24]. For this study, we independently translated the CES-D into Vietnamese and compared it to the original translation; no significant differences were found.

We also abstracted health and treatment-related data from medical records including body mass index (BMI) using standards for Asia (low  $< 18.5$  kg/m<sup>2</sup>, normal 18.6-23.9 kg/m<sup>2</sup> and high  $\geq 24$  kg/m<sup>2</sup>) [26], years since HIV diagnosis, years on ART and most recent CD4 cell count. Adherence to ART was listed on medical records as good, average, or poor; levels of drug adherence were determined and recorded by the physician based on a combination of patient self-report and/or pill count. ‘Good’ adherence generally means that  $>95\%$  of ART doses have been taken in the previous month [27, 28].

## Ethical approval

All study procedures were reviewed and approved by the Human Research Ethics Committee of the University of Sydney, Australia and the Ho Chi Minh City Provincial AIDS Committee, Vietnam.

## Data analysis

We used proportions to summarize the data and Chi-square and Fisher's exact tests to evaluate the association between participants' characteristics and presence of depressive symptoms. We examined the association of factors with a positive screen for symptoms of depression (CES-D score  $\geq 16$ ) using univariate logistic regression; we then included factors with a p-value  $\leq 0.2$  in univariate analyses into multiple logistic regression models [29]. We initially retained variables in these models based on a  $p < 0.05$  level and then reintroduced non-significant variables one by one to assess their individual contributions to the model. We used likelihood ratio tests to compare the fitness of different models and checked assumptions by examining residuals plots and model fit indices including McFadden's R-square statistics, and Pearson and Hosmer-Lemeshow Chi-square statistics. Adjustment for age and sex in multiple logistic regression analyses with likelihood ratio testing indicated no significant difference when these variables were included compared to when they were not, and therefore they were dropped in the final model. We conducted all analyses using Stata v13 (StataCorp, College Station, TX).

## Results

Based on a CES-D score of  $\geq 16$ , 36.5% of participants in the survey were classified as likely to have symptoms of depression warranting further evaluation (Table 1). Less than half the participants were female (36.0%); 38.0% were unemployed or had a casual job; slightly more than half (54.8%) were married; and 86.3% were living with their families. Almost three-quarters of the sample reported having no religious affiliation (74.0%). More than half (56.7%) reported that they considered their overall health as being fair or poor, and 30.3% had a low BMI. Over half the participants (56.0%) reported having acquired HIV through sexual transmission and 29.8% by injecting drugs. Less than one-fifth of the sample (17.7%) reported drinking alcohol at least monthly, and less than 5% (3.2%) reported illicit/illegal drug use in the last year. Almost all of those sampled (91.0%) had disclosed their HIV status to others. The median time since HIV diagnosis was 5.7 (IQR 3.2–6.7) years. Almost all participants (99.0%) were on ART and the median number of years on treatment was 4.2 (IQR 1.8–5.9). For the vast majority (92.0%), levels of adherence to ART in the last month were recorded on charts as being 'good'.

The proportion of patients who reported occasionally or frequently receiving some kind of support from either their family or an HIV network was high; more than 80% reported that they received emotional or spiritual support, and almost two thirds (64.3%) reported that they had received financial support (Table 2). Many reported experiencing stressful life experiences in the last 30 days, most commonly related to serious financial difficulties (60.8%) or family-related problems (54.8%).

Table 3 shows unadjusted and adjusted analyses of the association of factors with having a CES-D score  $\geq 16$ . The unadjusted analyses are shown only for age and those variables which were associated with the CES-D at  $p < 0.20$  in Tables 1 and 2. Based on multiple logistic regression analyses, higher odds of having symptoms of depression were found among PLHIV who had poor or fair health status, low BMI, problems with family, conflict with a partner or family member or felt ashamed about being HIV-infected. Those who reported living with their family or receiving emotional support from their family and/or an HIV network were less than half as likely to have symptoms of depression than those who did not live with family or did not receive emotional support.

## Discussion

We found that more than one-third of adult PLHIV attending two outpatient clinics in HCMC could be classified as having symptoms of depression. These results are similar to findings from another study in which 40% of PLHIV from northern Vietnam were found to be depressed [15], as well as a pooled estimate (36.4%) from eight countries in the Asia Pacific region but that did not include Vietnam [30]. Other evaluations of PLHIV across a range of countries, including the U.S., India and Uganda, have found even higher levels of depression, from 54-73% [8, 9, 31]. The variation in estimates across countries is unlikely to be caused by differences in the measurement tool, since all the studies cited, with the exception of that performed by Green et al [15], used the CES-D. Regardless of these differences, our findings add to the body of literature demonstrating that many PLHIV have high levels of depression and therefore warrant screening for mental health issues and provision of appropriate support and treatment.

We found a number of factors to be independently associated with depressive symptoms, particularly relationships with and support from family, friends, and social networks. PLHIV who were living with their family or were receiving emotional support were less likely to be depressed; those who experienced family conflict or were ashamed of their HIV status were more likely to be so. In Vietnam, depression is usually thought to result from disrupted functioning of social groups [32]; therefore, a therapeutic approach that includes the family or close members of one's social network may be helpful for treating depression [32]. Lack of emotional support from family and/or society, having stressful life experiences, and experiencing stigma and discrimination have consistently been shown to contribute to depressive symptoms among PLHIV evaluated in multiple settings [2, 3, 14], including in Vietnam [13, 33]. Other studies have found that financial worries can contribute to both stress and depression [5, 11], although in our study we did not find that individuals who reported financial problems were more likely to be depressed. We also evaluated other factors that have previously been shown to be associated with depression among PLHIV, including gender, age, employment, and education [3, 5, 11, 14]. In contrast to the results of those studies, however, we did not find that women, those who were older, were unemployed or who had lower levels of education were more likely to score higher on the CES-D [3, 11].

Although poor self-reported health and low BMI score were associated with symptoms of depression in our study, HIV immunological status was not. Other studies of PLHIV have reported conflicting findings regarding the association of poor physical health and more

advanced HIV disease with being depressed [3, 4, 7]. Participants in our study had been on ART for an average of four years; however, 38.4% still had CD4 counts less than 350 cells/mm, 30.3% had a low BMI score, and 56.7% reported that their health status was fair or poor. This suggests that HIV treatment was sub-optimal, either due to clinical or patient-related factors, or both. If clinical care and interaction with health care workers were poor, this might also have contributed to depressive symptoms. Depression can also undermine medication and appointment adherence [2, 3, 6], so that early identification, and care and treatment of mental health issues could improve HIV-related outcomes [3]. In a randomized controlled trial among Chinese PLHIV, those who received an intervention targeting depression were found to have significantly higher levels of ART adherence six and 12 months later compared to those who did not [6]. It is also possible that PLHIV in our study started ART in advanced stages of HIV disease, so that even optimal treatment and adherence would not have significantly improved their CD4 cell counts [34]. Due to limited resources, less than half (42%) of PLHIV in Vietnam had access to ART in 2013 [20], and scaling up of treatment remains a major challenge. At the time this study was conducted, the CD4 cut-off for ART eligibility was 350 CD4 cells/mm, but was changed in 2015 to 500 cell/mm [3], except among those who are considered particularly high risk, such as injecting drug users, where cutoffs are not applied.

Various barriers to treatment of depression exist in Vietnam. Beliefs about the causes of depression and other mental health disorders vary widely among the population and are often not considered to be physiological. Instead, many Vietnamese believe that mental health problems result from evil events or one's behavior in a previous life [35]. For this and other reasons, people with mental health problems are often stigmatized [17, 35]. Coupled with a lack of awareness of mental health in the community and among health care providers, these beliefs prevent many with depression from seeking professional help [35]. In addition, mental health services are under-resourced, and psychiatry departments generally focus on treating severely ill and/or psychotic patients [17]. The World Health Organization has acknowledged the large gap in trained mental health professionals in Asia, which is compounded by the lack of treatment options and little training in how to address mental health issues [36]. In Vietnam, there is poor acceptance of and familiarity with behavioral therapy and counseling, and psychopharmacologic treatment options are limited [37]. This is despite the fact that the Vietnamese National Health Target Program in 2002 added depression to the list of conditions that should be treated free of charge [17]. In some cities and provinces, mental health departments are co-located with district preventative medicine centers that provide HIV/AIDS care; however, linkages between HIV and mental health clinics do not routinely occur [38, 39].

An effective method of screening for depression and providing treatment in the Vietnamese cultural context and with limited resources needs to be developed. Ngo et al. implemented and evaluated an intervention in Vietnam that employed task shifting, or using non-physician health care workers and counselors to assist with depression referral, evaluation and treatment [37]. Their intervention also included training to raise awareness about depression among both health workers and the community as a way of reducing stigma. Finally, they encouraged patients to participate in family activities that were considered fun or pleasurable. The intervention was reported to be acceptable, feasible and effective in

improving symptoms of depression [37]. This approach makes sense for the Vietnamese context and could be further evaluated among PLHIV. However, any intervention first requires that patients and health care providers understand that depression is a treatable condition from which people do not need to suffer.

This study was subject to several limitations. First, the cross-sectional design prevented us from identifying a causal relationship between measured variables and depression. For example, we were not able to determine whether being in poor health caused a patient to feel depressed, or whether depression contributed to poorer health by reducing a person's appetite. Second, we were only able to sample clients from a small number of clinics in HCMC. Even though sites were selected randomly, it is possible that socio-economic and/or other differences existed among clients across facilities. However, at least among clients at the two clinics sampled, our response rate was very high. This might have been due to the offer of a free psychiatric evaluation and referral if needed for anyone who participated. Given that mental health services are not usually available in HIV clinics, this might partly explain the low refusal rate. Third, we could not explore nuances around clients' perceptions of the causes of their depressive symptoms as this study did not include qualitative interviews. Fourth, those who were evaluated by a psychiatrist before they completed the questionnaire might have responded differently to the CES-D by being sensitized to particular items, in comparison to those who completed the questionnaire first. Unfortunately, we did not record when clients saw the psychiatrist and so could not evaluate whether this might have biased responses. Finally, PLHIV may not have been willing to reveal symptoms of depression on a self-report questionnaire because of the social stigma associated with mental health problems in Vietnam [32].

## Conclusions

Overall, we found that depression was common among adult HIV patients in HCMC. Further examination of the prevalence of symptoms of depression, factors associated with depression, and development and testing of treatment approaches for the outpatient setting that take into account the cultural environment of Vietnam are needed. Finding ways to include families and social networks in the treatment approach, or encouraging them to provide support, could be helpful to PLHIV who suffer from depression. We also suggest that efforts be made to improve knowledge about depression among clients and staff of HIV/AIDS clinics, and to provide training in how to detect symptoms. This could include the administration of standardized screening tests such as the CES-D along with referral to mental health services for those who require it.

## Acknowledgments

The authors would like to thank the people living with HIV who participated in this study, as well as the individuals and institutions that made this research possible: Dr Tran Thinh, Dr Nguyen Hoang Tam, Dr Van Hung from Ho Chi Minh city Provincial AIDS Committee; Dr Bui Thi Thu Phuong and Dr Pham Thanh Hieu from the HIV outpatient clinics; Associate Professor Do Van Dung, Mr Tran Nhat Quang, Mr Hua Thanh Liem, Ms Van Thi Thuy Duong, Ms Kim Xuan Loan from the Ho Chi Minh City University of Medicine and Pharmacy; Ms Bui Thi Hy Han from the Ho Chi Minh City Institute of Public Health; and Drs. John Nguyen and Jeffrey Mandel from the University of California, San Francisco. This work was supported by The Representative Office of Abbott Laboratories S.A. in Vietnam in collaboration with Ho Chi Minh City University of Medicine and Pharmacy HAND AWARENESS program. No Abbott products were used or were recommended to be used during the study and no



trademark of Abbott appeared in the study. Travel for field work was funded by the Australia Award Scholarship. Protocol development and manuscript writing was supported by CDC-PEPFAR Vietnam, the University of California, San Francisco's International Traineeships in AIDS Prevention Studies (ITAPS) program (U.S. NIMH, R25MH064712), and the Starr Foundation.

## References

1. World Health Organization. [Accessed May 2, 2016] Depression Fact Sheet Available at: <http://www.who.int/mediacentre/factsheets/fs369/en/>. Updated April, 2016
2. Benton TD. Depression and HIV/AIDS. *Curr Psychiatry Rep.* 2008; 10(3):280–5. [PubMed: 18652798]
3. Nanni MG, Caruso R, Mitchell AJ, et al. Depression in HIV infected patients: a review. *Curr Psychiatry Rep.* 2015; 17(1):530. [PubMed: 25413636]
4. Braganca M, Palha A. Depression and neurocognitive performance in Portuguese patients infected with HIV. *AIDS Behav.* 2011; 15(8):1879–87. [PubMed: 21598031]
5. Shittu RO, Issa BA, Olanrewaju GT, et al. Prevalence and Correlates of Depressive Disorders among People Living with HIV/AIDS, in North Central Nigeria. *J AIDS HIV Res.* 2013; 4(11)
6. Williams AB, Wang H, Li X, et al. Efficacy of an evidence-based ARV adherence intervention in China. *AIDS Patient Care STDS.* 2014; 28(8):411–7. [PubMed: 25046061]
7. Dal-Bo MJ, Manoel AL, Filho AO, et al. Depressive Symptoms and Associated Factors among People Living with HIV/AIDS. *J Int Assoc Provid AIDS Care.* 2015; 14(2):136–40. [PubMed: 23873218]
8. 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–WC04.
9. Springer SA, Chen S, Altice F. Depression and symptomatic response among HIV-infected drug users enrolled in a randomized controlled trial of directly administered antiretroviral therapy. *AIDS care.* 2009; 21(8):976–983. [PubMed: 20024753]
10. Reilly T, Woo G. Predictors of High-Risk Sexual Behavior Among People Living With HIV/AIDS. *AIDS Behav.* 2001; 5(3):205–17.
11. Asch SM, Kilbourne AM, Gifford AL, et al. Underdiagnosis of depression in HIV: Who are we missing? *J Gen Intern Med.* 2003; 18(6):450–460. [PubMed: 12823652]
12. Vietnam Administration of HIV/AIDS Control. A report on HIV/AIDS prevention in 2015 and priorities for 2016. Ministry of Health. 2016 Report No.: 145/BC-BYT.
13. Tran B, Ohinmaa A, Nguyen L, et al. Determinants of health-related quality of life in adults living with HIV in Vietnam. *AIDS Care.* 2011; 23(10):1236–45. [PubMed: 21711211]
14. Esposito CA, Steel Z, Gioi TM, et al. The prevalence of depression among men living with HIV infection in Vietnam. *Am J Public Health.* 2009; 99(Suppl 2):S439–44. [PubMed: 19797756]
15. Green K, Tuan T, Hoang TV, et al. Integrating palliative care into HIV outpatient clinical settings: preliminary findings from an intervention study in Vietnam. *J Pain Symptom Manage.* 2010; 40(1):31–4. [PubMed: 20619211]
16. Krakauer EL, Cham NT, Khue LN. Vietnam's palliative care initiative: successes and challenges in the first five years. *J Pain Symptom Manage.* 2010; 40(1):27–30. [PubMed: 20619210]
17. Vuong DA, Van Ginneken E, Morris J, et al. Mental health in Vietnam: Burden of disease and availability of services. *Asian J Psychiatr.* 2011; 4(1):65–70. [PubMed: 23050918]
18. Li L, Lee SJ, Thammawijaya P, Jiraphongsa C, et al. Stigma, social support, and depression among people living with HIV in Thailand. *AIDS care.* 2009; 21(8):1007–13. [PubMed: 20024757]
19. Reich WA, Lounsbury DW, Zaid-Muhammad S, et al. Forms of social support and their relationships to mental health in HIV-positive persons. *Psychol Health Med.* 2010; 15(2):135–45. [PubMed: 20391231]
20. Vietnam Administration of HIV/AIDS Control - Ministry of Health Vietnam HIV/AIDS estimates and Projections 2011 – 2015 Hanoi: Medical Publishing House; 2013
21. Radloff LS. The CES-D Scale: A Self-Report Depression Scale for Research in the General Population. *Appl Psychol Meas.* 1977; 1(3):385–401.

22. American Psychiatric Association. Diagnostic and statistical manual of mental disorders 4th. Washington, DC: 2013 text revised
23. Thai TT, Jones MK, Harris LM, Heard RC. Screening value of the Center for epidemiologic studies - depression scale among people living with HIV/AIDS in Ho Chi Minh City, Vietnam: a validation study. *BMC Psychiatry*. 2016; 16(1):145. [PubMed: 27178070]
24. Murphy J, Goldner EM, Goldsmith CH, et al. Selection of depression measures for use among Vietnamese populations in primary care settings: a scoping review. *Int J Ment Health Syst*. 2015; 9:31. [PubMed: 26300962]
25. Natamba BK, Achan J, Arbach A, et al. Reliability and validity of the center for epidemiologic studies-depression scale in screening for depression among HIV-infected and -uninfected pregnant women attending antenatal services in northern Uganda: a cross-sectional study. *BMC Psychiatry*. 2014; 14:303. [PubMed: 25416286]
26. World Health Organization. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *The Lancet*. 2004; 363(9403):157–63.
27. Paterson DL, Swindells S, Mohr J, Brester M, Vergis EN, Squier C, et al. Adherence to protease inhibitor therapy and outcomes in patients with HIV infection. *Ann Intern Med*. 2000; 133(1):21–30. [PubMed: 10877736]
28. Kobin AB, Sheth NU. Levels of Adherence Required for Virologic Suppression Among Newer Antiretroviral Medications. *Annals of Pharmacotherapy*. 2011; 45(3):372–9. [PubMed: 21386024]
29. Hosmer DW, Lemeshow S, Sturdivant RX. *Applied logistic regression 3rd*. Hoboken, New Jersey: Wiley; 2013
30. Wright E, Brew B, Arayawichanon A, et al. Neurologic disorders are prevalent in HIV-positive outpatients in the Asia-Pacific region. *Neurology*. 2008; 71(1):50–6. [PubMed: 18591505]
31. Nakasujja N, Skolasky RL, Musisi S, et al. Depression symptoms and cognitive function among individuals with advanced HIV infection initiating HAART in Uganda. *BMC Psychiatry*. 2010; 10:44–44. [PubMed: 20537129]
32. Fancher TL, Ton H, Le Meyer O, et al. Discussing depression with Vietnamese American patients. *J Immigr Minor Health*. 2010; 12(2):263–6. [PubMed: 19242803]
33. Thi MD, Brickley DB, Vinh DT, et al. A qualitative study of stigma and discrimination against people living with HIV in Ho Chi Minh City, Vietnam. *AIDS Behav*. 2008; 12(Suppl 4):S63–70. [PubMed: 18360743]
34. Rangarajan S, Tram HNB, Todd CS, Think T, Hung V, Hieu PT, et al. Risk Factors for Delayed Entrance into Care after Diagnosis among Patients with Late-Stage HIV Disease in Southern Vietnam. *PLOS ONE*. 2014; 9(10):e108939. [PubMed: 25330196]
35. van der Ham L, Wright P, Van TV, et al. Perceptions of mental health and help-seeking behavior in an urban community in Vietnam: an explorative study. *Community Ment Health J*. 2011; 47(5): 574–82. [PubMed: 21409418]
36. World Health Organization. *Mental Health Atlas: 2011* Geneva, Switzerland: 2011
37. Ngo VK, Weiss B, Lam T, et al. The Vietnam Multicomponent Collaborative Care for Depression Program: Development of Depression Care for Low- and Middle-Income Nations. *J Cogn Psychother*. 2014; 28(3):156–67. [PubMed: 25568593]
38. Ng CH, Than PT, La CD, et al. The national community mental health care project in Vietnam: a review for future guidance. *Australas Psychiatry*. 2011; 19(2):143–50. [PubMed: 21443393]
39. Niemi M, Thanh HT, Tuan T, et al. Mental health priorities in Vietnam: a mixed-methods analysis. *BMC Health Serv Res*. 2010; 10:257. [PubMed: 20813036]

**Table 1**  
**Association between demographic and health-related characteristics, and depressive symptoms (CES-D 16)<sup>a</sup> among 400 PLHIV in HCMC, Vietnam**

Demographic characteristics	All (N=400) n (%)	CES-D 16 (N=146, 36.5%) n (%)	p <sup>b</sup>	Health-related factors	All (N=400) n (%)	CES-D 16 (N=146, 36.5%) n (%)	p <sup>b</sup>
Sex							
Male	254 (63.5)	84 (33.1)	0.060	Good/very good	173 (43.3)	40 (23.1)	<0.001 <sup>c</sup>
Female	146 (36.5)	62 (42.5)		Fair	218 (54.5)	100 (45.9)	
Age, year							
20-30	100 (25.0)	40 (40.0)	0.384	Poor	9 (2.2)	6 (66.7)	
31-40	237 (59.3)	79 (33.3)		Body Mass Index, kg/m <sup>2</sup> <sup>d</sup>			
41-50	49 (12.3)	20 (40.8)		Low ( 18.5)	121 (30.3)	56 (46.3)	0.019
51	14 (3.4)	7 (50.0)		Normal (18.6-23.9)	243 (60.8)	76 (31.3)	
Work status							
Unemployed/Casual	152 (38.0)	63 (41.4)	0.198	High ( 24)	36 (8.9)	14 (38.9)	
Part-time	69 (17.3)	23 (33.3)		Source of HIV infection			
Full-time	126 (31.5)	38 (30.2)		Sexual transmission	224 (56.0)	86 (38.4)	0.588
Housewife, other	53 (13.2)	22 (41.5)		Injection drug use	119 (29.8)	39 (32.8)	
Highest level of education completed							
Primary school	139 (34.8)	56 (40.3)	0.376	Undisclosed	57 (14.2)	21 (36.8)	
Secondary school	151 (37.8)	49 (32.5)		Drink alcohol at least once/month			
High school	110 (27.4)	41 (37.3)		Yes	71 (17.7)	18 (25.4)	0.031
Marital status							
Single	124 (31.0)	44 (35.5)	0.784	No	329 (82.3)	128 (38.9)	
Married/Cohabiting	219 (54.8)	83 (37.9)		Used illicit drugs, last 12 months			
Divorced/Separated/Widowed	57 (14.2)	19 (33.3)		Yes	13 (3.2)	5 (38.5)	0.999 <sup>c</sup>
Live with family							
Yes	345 (86.3)	117 (33.9)	0.007	No	387 (96.8)	141 (36.4)	
No	55 (13.7)	29 (52.7)		Have disclosed HIV status			
Have children							
				Yes	364 (91.0)	131 (36.0)	0.500
				No	36 (9.0)	15 (41.7)	
				Years since HIV diagnosis <sup>d</sup>			
				< 1 year	22 (5.5)	13 (59.1)	0.057
				1 - 5 years	135 (33.7)	44 (32.5)	
				> 5 years	243 (60.8)	89 (36.6)	

Demographic characteristics	All (N=400) n (%)	CES-D 16 (N=146, 36.5%) n (%)	p <sup>b</sup>	Health-related factors	All (N=400) n (%)	CES-D 16 (N=146, 36.5%) n (%)	p <sup>b</sup>
Yes	219 (54.8)	84 (38.4)	0.396	On ART <sup>d</sup>			
No	181 (45.2)	62 (34.3)		Yes	396 (99.0)	144 (36.4)	0.625 <sup>c</sup>
Self-reported economic status				No	4 (1.0)	2 (50.0)	
Poor/very poor	174 (43.5)	75 (43.1)	0.015 <sup>c</sup>	Years on ART <sup>d</sup>			
Average	223 (55.8)	69 (30.9)		< 1 year	38 (9.6)	18 (47.4)	0.319
Rich/very rich	3 (0.7)	2 (66.7)		1 - 5 years	197 (49.7)	68 (34.5)	
Religious affiliation				> 5 years	161 (40.7)	58 (36.0)	
Yes	104 (26.0)	38 (36.5)	0.992	Adherence to HIV medications <sup>d</sup>			
No	296 (74.0)	108 (36.5)		Good	368 (92.0)	133 (36.1)	0.773
				Average	18 (4.5)	8 (44.4)	
				Poor	14 (3.5)	5 (35.7)	
				Most recent CD4 cell count, cell/mm <sup>3</sup> <sup>d</sup>			
				< 200	58 (14.4)	24 (41.4)	0.787
				200 -<350	96 (24.0)	36 (37.5)	
				350 -<500	93 (23.3)	31 (33.3)	
				500	153 (38.3)	55 (35.9)	

<sup>a</sup>CES-D: Center for Epidemiologic Studies – Depression scale;

<sup>b</sup>All p-values determined using Chi-square tests unless otherwise indicated;

<sup>c</sup>Fisher's exact tests;

<sup>d</sup>Extracted from clinical record.

**Table 2**  
**Association between support, stressful experiences and depressive symptoms (CES-D 16)<sup>a</sup> among 400 PLHIV in HCMC, Vietnam**

Factors	All (N=400) n (%)	CES-D 16 (N=146, 36.5%) n (%)	p <sup>b</sup>	Factors	All (N=400) n (%)	CES-D 16 (N=146, 36.5%) n (%)	p <sup>b</sup>
<b>Type of support received<sup>d</sup></b>							
<b>Stressful life experiences, last 30 days<sup>e</sup></b>							
Change in living accommodation							
Practical support				Yes	39 (9.7)	17 (43.6)	0.333
Yes	310 (77.5)	105 (33.9)	0.043	No	361 (90.3)	129 (35.7)	
No	90 (22.5)	41 (45.6)		Serious financial problems			
Emotional support							
Yes	330 (82.5)	106 (32.1)	<0.001	Yes	243 (60.8)	100 (41.2)	0.016
No	70 (17.5)	40 (57.1)		No	157 (39.2)	46 (29.3)	
Spiritual support							
Yes	346 (86.5)	116 (33.5)	0.002	Unable to find work			
No	54 (13.5)	30 (55.6)		Yes	91 (22.7)	32 (35.2)	0.763
Financial support							
Yes	257 (64.3)	84 (32.7)	0.034	No	309 (77.3)	114 (36.9)	
No	143 (35.7)	62 (43.4)		Trouble accessing medical care			
Stressful life experiences, last 30 days <sup>e</sup>							
Ashamed about HIV status							
Problems with family				Yes	169 (42.2)	80 (47.3)	<0.001
Yes	219 (54.8)	104 (47.5)	<0.001	No	231 (57.8)	66 (28.6)	
No	181 (45.2)	42 (23.2)		Discriminated against because of HIV status			
Conflict with partner/family member							
Yes	55 (13.7)	34 (61.8)	<0.001	Yes	73 (18.2)	37 (50.7)	0.005
No	345 (86.3)	112 (32.5)		No	327 (81.8)	109 (33.3)	
Change in marital status							
Yes	10 (2.5)	6 (60.0)	0.180 <sup>c</sup>	Know HIV+ person who died or who is ill			
No	390 (97.5)	140 (35.9)		Yes	133 (33.2)	55 (41.4)	0.155
Felt rejected by family or friends							
Yes	22 (5.5)	15 (68.2)	0.001	No	267 (66.8)	91 (34.1)	
No	378 (94.5)	131 (34.7)					

<sup>a</sup>CES-D: Center for Epidemiologic Studies – Depression scale;

All p-values determined using Chi-square tests unless otherwise indicated;  
Fisher's exact tests;  
Occasionally/frequently received from family or an HIV network;  
Occasionally/frequently occurred.

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

**Table 3**  
**Factors associated with depressive symptoms (CES-D 16)<sup>a</sup> among 400 PLHIV in HCMC, Vietnam: univariate and multiple logistic regression**

Factors	Univariate logistic regression			Multiple logistic regression <sup>b</sup>		
	OR	95% CI	p	aOR	95% CI	p
<b>Demographics</b>						
Female	1.49	0.98 – 2.27	0.061			
Age, year	Ref					
20-30	0.75	0.46 – 1.21	0.243			
31-40	1.03	0.52 – 2.08	0.924			
41-50	1.50	0.49 – 4.60	0.479			
51						
Work status						
Unemployed/Casual	1.64	1.00 – 2.70	0.052			
Part-time	1.16	0.62 – 2.17	0.648			
Full-time	Ref					
Housewife/ other	1.64	0.84 – 3.20	0.144			
Self-reported economic status						
Poor/very poor	1.69	1.12 – 2.56	0.013			
Average	Ref					
Rich/very rich	4.46	0.40 – 50.06	0.225			
Live with family	0.46	0.26 – 0.82	0.008	0.48	0.25 – 0.90	0.023
<b>Health-related factors</b>						
Self-reported health status						
Good/very good	Ref			Ref		
Poor/Fair	2.91	1.88 – 4.52	<0.001	2.16	1.33 – 3.51	0.002
Drink alcohol at least once/month	0.53	0.30 – 0.95	0.033			
Body Mass Index, kg/m <sup>2</sup> <sup>c</sup>						
Low ( 18.5)	1.89	1.21 – 2.96	0.005	1.85	1.13 – 3.04	0.015
Normal (18.6-23.9)	Ref			Ref		

Factors	Univariate logistic regression			Multiple logistic regression <sup>b</sup>		
	OR	95% CI	P	aOR	95% CI	P
<i>High ( 24)</i>	1.40	0.68 – 2.88	0.363	1.64	0.75 – 3.61	0.215
Years since HIV diagnosis <sup>c</sup>						
< 1 year	Ref					
1 – 5 years	0.33	0.13 – 0.84	0.020			
> 5 years	0.40	0.16 – 0.97	0.043			
<b>Type of support received<sup>d</sup></b>						
Practical	0.61	0.38 – 0.99	0.044			
Emotional	0.35	0.21 – 0.60	<0.001	0.45	0.25 – 0.80	0.007
Spiritual	0.40	0.23 – 0.72	0.002			
Financial	0.63	0.42 – 0.97	0.034			
<b>Stressful life experiences, last 30 days<sup>e</sup></b>						
Problems with family	2.99	1.94 – 4.63	<0.001	1.97	1.21 – 3.19	0.006
Conflict with partner/family member	3.37	1.87 – 6.07	<0.001	2.21	1.14 – 4.26	0.018
Change in marital status	2.68	0.74 – 9.65	0.132			
Felt rejected by family or friends	4.04	1.61 – 10.16	0.003			
Serious financial problems	1.69	1.10 – 2.59	0.017			
Ashamed about HIV status	2.25	1.48 – 3.40	<0.001	1.90	1.20 – 3.00	0.006
Discriminated against because of HIV status	2.06	1.23 – 3.43	0.006			
Know HIV+ person who died or is ill	1.36	0.89 – 2.09	0.155			

<sup>a</sup> CES-D: Center for Epidemiologic Studies – Depression scale;

<sup>b</sup> Only variables in the final multiple logistic regression model are presented.

<sup>c</sup> Extracted from clinical record;

<sup>d</sup> Occasionally/frequently received from family or an HIV network;

<sup>e</sup> Occasionally/frequently occurred.