

2015

AIDS-Related Stigma and Mental Disorders among People Living with HIV: A Cross-Sectional Study in Cambodia

Siyan Yi

Touro University California, siyan@doctor.com

Pheak Chhoun

Samedy Suong

Carinne M. Brody

Touro University California, carinne.brody@tu.edu

Sovannary Tuot

Follow this and additional works at: http://touro scholar.touro.edu/cehs_pubs

 Part of the [Immune System Diseases Commons](#), [International Public Health Commons](#), and the [Psychiatric and Mental Health Commons](#)

Recommended Citation

Yi, S., Chhoun, P., Suong, S., Thin, K., Brody, C. M., & Tuot, S. (2015). AIDS-related stigma and mental disorders among people living with HIV: A cross-sectional study in Cambodia. *PLOS One*, 10(3) [Article e0121461].

This Article is brought to you for free and open access by the College of Education & Health Sciences at Touro Scholar. It has been accepted for inclusion in College of Education & Health Sciences (TUC) Publications and Research by an authorized administrator of Touro Scholar. For more information, please contact carrie.levinson2@touro.edu.

RESEARCH ARTICLE

AIDS-Related Stigma and Mental Disorders among People Living with HIV: A Cross-Sectional Study in Cambodia

Siyan Yi^{1,2*}, Pheak Chhoun¹, Samedy Suong¹, Kouland Thin¹, Carinne Brody², Sovannary Tuot¹

1 Research Department, KHANA, Phnom Penh, Cambodia, **2** Public Health Program, College of Education and Health Sciences, Touro University California, Vallejo, California, United States of America

* siyan@doctor.com



Abstract

Background

AIDS-related stigma and mental disorders are the most common conditions in people living with HIV (PLHIV). We therefore conducted this study to examine the association of AIDS-related stigma and discrimination with mental disorders among PLHIV in Cambodia.

Methods

A two-stage cluster sampling method was used to select 1,003 adult PLHIV from six provinces. The People Living with HIV Stigma Index was used to measure stigma and discrimination, and a short version of general health questionnaire (GHQ-12) was used to measure mental disorders. Multivariate logistic regression analysis was conducted.

Results

The reported experiences of discrimination in communities in the past 12 months ranged from 0.8% for reports of being denied health services to 42.3% for being aware of being gossiped about. Internal stigma was also common ranging from 2.8% for avoiding going to a local clinic and/or hospital to 59.6% for deciding not to have (more) children. The proportions of PLHIV who reported fear of stigma and discrimination ranged from 13.9% for fear of being physically assaulted to 34.5% for fear of being gossiped about. The mean score of GHQ-12 was 3.2 (SD = 2.4). After controlling for several potential confounders, higher levels of mental disorders (GHQ-12 \geq 4) remained significantly associated with higher levels of experiences of stigma and discrimination in family and communities (AOR = 1.9, 95% CI = 1.4–2.6), higher levels of internal stigma (AOR = 1.7, 95% CI = 1.2–2.3), and higher levels of fear of stigma and discrimination in family and communities (AOR = 1.5, 95% CI = 1.1–2.2).

OPEN ACCESS

Citation: Yi S, Chhoun P, Suong S, Thin K, Brody C, Tuot S (2015) AIDS-Related Stigma and Mental Disorders among People Living with HIV: A Cross-Sectional Study in Cambodia. PLoS ONE 10(3): e0121461. doi:10.1371/journal.pone.0121461

Academic Editor: Anil Kumar, University of Missouri-Kansas City, UNITED STATES

Received: November 27, 2014

Accepted: February 1, 2015

Published: March 25, 2015

Copyright: © 2015 Yi et al. This is an open access article distributed under the terms of the [Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Data Availability Statement: Data underlying the findings in this study are from an impact evaluation study of the Sustainable Action against HIV and AIDS in Communities. The data cannot be made available in the manuscript, the supplemental files, or a public repository due to the ethical restriction stated in the application for ethical approval from the National Ethics Committee for Health Research. However, all data are available upon request from Dr. Siyan Yi at siyan@doctor.com.

Funding: The authors received no specific funding for this work.

Competing Interests: The authors have declared that no competing interests exist.

Conclusions

AIDS-related stigma and discrimination among PLHIV in Cambodia are common and may have potential impacts on their mental health conditions. These findings indicate a need for community-based interventions to reduce stigma and discrimination in the general public and to help PLHIV to cope with this situation.

Introduction

Despite care and treatment advances that have turned HIV into a chronic and manageable condition, people living with HIV (PLHIV) continue to suffer from stigma and discrimination from their family and communities. AIDS-related stigma and discrimination impede millions of PLHIV from accessing and benefiting from effective prevention and treatment services [1]. As a result, approximately 50–60% of HIV-infected people are unaware of their sero-status, and many choose to hide it [2]. Furthermore, AIDS-related stigma and discrimination have been found to be associated with delays in seeking care [3] and potential barriers to HIV counseling and testing [4], disclosure of HIV sero-status [5,6], retention in care and treatment [7], and uptake of and adherence to antiretroviral therapy (ART) [8,9]. There is also mounting evidence that AIDS-related stigma and discrimination are associated with other social outcomes such as racism, poverty, and heterosexism [10–12].

Mental disorders are also among the most common problems in the life of PLHIV regardless of gender or race/ethnicity and can impact their health status, healthcare seeking behaviors, and quality of life. Depression, alcohol use disorders, and neurocognitive disorders are the most prevalent mental problems in this vulnerable population [13]. Studies in different countries have reported point prevalence rates of major depressive disorder among PLHIV from 3% to 54% [14–21]. Using the Composite International Diagnostic Inventory, a national survey in South Africa found that 44% of PLHIV had a diagnosable mental disorder [22]. Of these, major depression accounted for 11%, mild depression for 30%, and alcohol abuse for 12%. Furthermore, compared to HIV-negative individuals, PLHIV are two to three times more likely to develop mental disorders [23,24]. Mental disorders are also associated with several health and healthcare seeking behaviors such as poor adherence to medications [25–27], low rates of retention in ART care [28], and poor ART-related clinical outcomes [29]. PLHIV suffering from depression progress faster from HIV to AIDS compared to non-depressed PLHIV [30,31].

Several biological and socioeconomic factors have been found to be associated with mental disorders in PLHIV such as depression and anxiety. These factors include compromised immune system and increased opportunistic infections [32], absence of ART [33], perceived social support [34], and death of significant other due to AIDS [35]. Similar to general population, several socio-demographic variables such as older age, female gender, low education, and unemployment have also been found to be related to mental disorders among PLHIV [36,37].

The double burden of AIDS-related stigma and mental disorders could result in a number of problems in health and quality of life for PLHIV. Previous studies have also linked AIDS-related stigma and discrimination to mental wellbeing of PLHIV. Steward and colleagues found that all forms of stigma and discrimination are ultimately associated with depressive symptoms among PLHIV in India [38]. Several more recent studies have confirmed these findings and included other mental health outcomes such as anxiety, stress, or posttraumatic stress disorders (PTSD) in different populations of PLHIV in different countries around the world including

mainland China [33,34], India [39], South Africa [40], the United States [41–42], and several other countries [5].

Despite this alarming situation, AIDS-related stigma and discrimination as well as mental health issues among PLHIV in many developing countries have received only limited attention, and the linkage between these two common conditions has not been well addressed. To the best of our knowledge, no study of the relationship between AIDS-related stigma and mental health conditions has been conducted in Cambodia, where success stories have been touted in HIV prevention, care, and treatment programs with more than 95% of PLHIV in need of ART currently on the treatment [43]. We therefore conducted this study to examine the prevalence of AIDS-related stigma and discrimination and its relationship to mental disorders among PLHIV in Cambodia. We hypothesized that PLHIV who have experienced higher levels of stigma and discrimination in family and communities would express higher levels of mental disorders after controlling for the effects of potential confounding factors explored in previous studies.

Materials and Methods

Ethical statement

Participation in this study was voluntary, and a written informed consent was obtained from each study participant after a detailed description of study objectives and procedures was provided. Moreover, the study participants had an opportunity to refuse or to discontinue participation at any time. Privacy was strictly protected by conducting the interviews at a private place, and we ensured confidentiality of the respondents by removing all personal identifiers from the survey questionnaires. This study was approved by the National Ethics Committee for Health Research, the Ministry of Health, Cambodia (No. 082NECHR).

Study sites and sampling

Data used in this study were collected in May 2014 as part of an impact evaluation study for the Sustainable Action against HIV and AIDS in Communities (SAHACOM) Project. Participants included 1,005 PLHIV living in six provinces including Battambang, Kampong Cham, Pailin, Pursat, Siem Reap, and Takeo. Coordination and administration of the survey were facilitated by community-based organizations with support from provincial health departments and local authorities to ensure the effectiveness and quality of the data collection.

A two-stage cluster sampling method was utilized to select the study samples. The sample size was proportionally allocated to the size of PLHIV in each province. The number of health centers in each selected province to be included in the study was decided based upon the number of PLHIV registered in each health center. In order to be included in the study, a health center must have at least 20 PLHIV registered. In addition, other factors were assessed when deciding whether to include a health center in the study such as convenience for data collection and duration of the project implementation in the health center coverage. We then used the probability proportional-to-size sampling to select the required number of PLHIV from each province. The inclusion criteria for the study participants were: (1) men or women aged 18 years or older; (2) having been registered as a PLHIV within the network of a community-based implementing partner; (3) being able to provide consent to participate in the study; and (4) being able present themselves on the day of the data collection. PLHIV were excluded if they were mentally and/or physically too sick to participate in the study.

Data collection training and procedures

Prior to the data collection, all research team members were trained for three days on data collection methods including tool pretesting and reflection. The main objective of the training was to ensure that all interviewers and field supervisors understood the procedures and followed the standardized guidelines in the same manner to guarantee quality of the data. The training covered necessary skills including interview techniques, confidentiality, and practices of the questionnaire administration. We also reviewed the study protocol during the training sessions in order for the team members to be thoroughly familiar with it. Quality control skills such as rechecking and reviewing the questionnaires after administration as well as resolving issues that might arise during the fieldwork were included in the training. Regular review sessions with interviewers were conducted during the survey period to review progress and communicate any problems or issues occurring during the data collection.

Questionnaire development

The questionnaire was developed using standardized and validated tools adapted from previous studies. The questionnaire was initially developed in English and then translated into Khmer, the national language of Cambodia. Another translator back-translated it into English to ensure that the “content and spirit” of every original item would be maintained. Clear instructions and explanations were addressed to avoid any confusion during the interviews.

A pilot study was conducted before constructing the final questionnaire to ensure that the wording and contents were culturally suitable, acceptable, and clearly understandable for the study participants. In the pilot study, face-to-face interviews were conducted with 10 samples randomly selected from a pre-ART/ART site in Phnom Penh to assess the contents, format, length, language, and appropriateness of the questionnaire. Necessary modifications were made based upon feedbacks from the pilot study and comments from researchers and practitioners working on HIV in Cambodia.

Variables and measurements

Socio-economic characteristics of the participants and other variables such as social support and pre-ART/ART services received in the past 12 months were measured using existing tools adapted from our previous studies in the same population [44] and the most recent Cambodia Demographic and Health Survey [45].

Mental disorders were measured using a short version of the General Health Questionnaire (GHQ-12) developed by David Goldberg [46]. It is a screening tool used to screen mental health problems experienced by an individual in the past few weeks. GHQ-12 has also been validated in Asian populations [47,48]. Each item of the GHQ-12 were rated on a 4-point Likert scale, with the response options of “0 = less than usual,” “1 = no more than usual,” “2 = rather more than usual,” or “3 = much more than usual.” Goldberg & William suggested the use of scoring method ‘0-0-1-1’ as this particular method is believed to help eliminate biases resulted from respondents who tend to choose responses 0 and 3 or 1 and 2 [49]. The mean score for the whole population (3/4) was used as the cut-off for defining lower and higher levels of mental disorders as it provides a rough guide to the best threshold [50]. The Cronbach’s alpha for the scale among PLHIV in this study was 0.72.

Perceived AIDS-related stigma and discrimination were measured using the People Living with HIV Stigma Index that has been developed by and for PLHIV [51]. It is a result of a partnership between the International Planned Parenthood Federation, the International Community of Women Living with HIV, UNAIDS, and the Global Network of People Living with HIV. The questionnaire is divided into three main sections: (1) experiences of stigma and

discrimination in different settings such as home, community, workplace, religious settings, and healthcare facilities (18 items); (2) internal stigma (16 items); and (3) fear of stigma and discrimination in family and communities (5 items). The yes/no questions asked respondents to report their experiences, perception, and feeling related to stigma and discrimination in the past 12 months. The Cronbach's alpha for the sub-scales were 0.78, 0.75, and 0.77, respectively.

Data analyses

Data were coded and entered into a computerized database using EpiData version 3 (Odense, Denmark). Double data entry was performed to minimize entry errors. Chi-square test was used to compare socio-demographic characteristics, experiences of AIDS-related stigma and discrimination, internal stigma, and fear of stigma and discrimination among respondents with lower ($\text{GHQ-12} \leq 3$) and higher ($\text{GHQ-12} \geq 4$) levels of mental disorders. Total scores were calculated for experiences of stigma and discrimination, internal stigma, and fear of stigma and discrimination, and then the mean score of each scale was used to divide respondents into two groups for comparisons. Bivariate logistic regression analysis was used to examine the relationship of levels of stigma and discrimination, internal stigma, and fear of stigma and discrimination with levels of GHQ-12. Multivariate logistic regression models were then constructed to examine the association between each stigma and discrimination sub-scale with levels of GHQ-12 controlling for the effects of potential confounders. All variables found to have significant association with GHQ-12 in bivariate analyses at a level of $p < 0.10$ were simultaneously included in the models. SPSS version 22 (IBM Corporation, New York, USA) was used for all data analyses.

Results

Socio-demographic characteristics

In total, 329 men (32.8%) and 674 women (67.2%) were included in this study, with a mean age of 42.8 years ($\text{SD} = 8.8$ years). Two respondents were excluded from the analyses because their responses to GHQ-12 questionnaire were not completed. The majority of the participants were married (62.8%); while 35.2% were divorced, separated, or widowed; and only 2.0% were never-married. Their main occupations included farmers (39.0%), self-employed (21.6%), laborers (17.7%), office workers (3.9%), or other (5.4%). Mean monthly income of the respondents was US\$75, and the majority of them (95.2%) have received some forms of social support in the past 12 months. On average, participants in this study have been living with HIV for 8.4 years ($\text{SD} = 4.5$ years). Regarding HIV status disclosure, 66.0% of the respondents reported that their spouse or partner was also HIV infected, and the majority of their spouse or partner (79.0%) and family members (97.7%) knew their HIV status. For HIV treatment and care, 96.4% of respondents reported being currently on ART with a mean CD4 count at the most recent blood test of 513 cells/ mm^3 ($\text{SD} = 302$ cells/ mm^3).

As shown in [Table 1](#), PLHIV with higher levels of mental disorders ($\text{GHQ-12} \geq 4$) were significantly more likely to be female ($\text{OR} = 2.2$, 95% $\text{CI} = 1.6\text{--}2.9$), to have completed <5 years of formal education ($\text{OR} = 1.4$, 95% $\text{CI} = 1.1\text{--}1.9$), to be currently unmarried ($\text{OR} = 1.4$, 95% $\text{CI} = 1.1\text{--}1.7$), to be currently unemployed ($\text{OR} = 1.9$, 95% $\text{CI} = 1.3\text{--}2.7$), to have lower income ($\text{OR} = 1.5$, 95% $\text{CI} = 1.1\text{--}1.5$), to live with an HIV-infected spouse or partner ($\text{OR} = 1.6$, 95% $\text{CI} = 1.1\text{--}2.3$), to report that their spouse or partner knew their HIV status ($\text{OR} = 1.5$, 95% $\text{CI} = 1.1\text{--}2.5$), and to have not received any social support in the past 12 months ($\text{OR} = 1.7$, 95% $\text{CI} = 1.1\text{--}3.0$).

Table 1. Comparisons of socio-demographic characteristics of PLHIV with lower and higher levels of mental disorders.

| Socio-demographic characteristics | Total | Total score of GHQ-12 | | OR (95% CI) |
|---|------------|-----------------------|--------------|---------------|
| | | ≤ 3 n (%) | ≥ 4 n (%) | |
| Gender | | | | |
| Male | 329 (32.8) | 242 (38.8) | 85 (22.5) | Ref |
| Female | 674 (67.2) | 381 (61.2) | 292 (77.5) | 2.2 (1.6–2.9) |
| Age group | | | | |
| ≤ 43 years | 510 (50.7) | 320 (51.3) | 190 (50.3) | Ref |
| > 43 years | 495 (49.3) | 304 (48.7) | 188 (49.7) | 1.1 (0.8–1.3) |
| Formal education completed | | | | |
| ≥ 5 years | 567 (56.4) | 293 (47.0) | 144 (38.1) | Ref |
| < 5 years | 438 (43.6) | 331 (53.0) | 234 (61.9) | 1.4 (1.1–1.9) |
| Marital status | | | | |
| Married | 630 (62.8) | 405 (65.1) | 223 (59.0) | Ref |
| Unmarried | 373 (37.2) | 217 (34.9) | 155 (41.0) | 1.4 (1.1–1.7) |
| Current employment status | | | | |
| Employed | 880 (87.6) | 563 (90.2) | 314 (83.3) | Ref |
| Unemployed | 124 (12.4) | 61 (9.8) | 63 (16.7) | 1.9 (1.3–2.7) |
| Average monthly income | | | | |
| > US\$75 | 565 (56.8) | 277 (44.8) | 152 (40.6) | Ref |
| ≤ US\$75 | 430 (43.2) | 341 (55.2) | 222 (59.4) | 1.5 (1.1–1.5) |
| Duration of living with HIV | | | | |
| ≤ 8 years | 520 (51.7) | 328 (52.6) | 891 (50.5) | Ref |
| > 8 years | 485 (48.3) | 296 (47.4) | 187 (49.5) | 1.1 (0.8–1.4) |
| Spouse/partner's HIV status (for married PLHIV) | | | | |
| Negative | 197 (22.9) | 141 (25.9) | 56 (15.9) | Ref |
| Positive | 663 (77.1) | 404 (74.1) | 256 (82.1) | 1.6 (1.1–2.3) |
| Spouse/partner knows your HIV status | | | | |
| No | 77 (8.8) | 54 (9.9) | 22 (6.9) | Ref |
| Yes | 794 (91.2) | 494 (90.1) | 298 (93.1) | 1.5 (1.1–2.5) |
| Currently on ART treatment | | | | |
| No | 36 (3.6) | 26 (4.2) | 10 (2.7) | Ref |
| Yes | 958 (96.4) | 589 (95.8) | 366 (97.3) | 1.6 (0.8–3.4) |
| CD4 count at the most recent blood test | | | | |
| > 500 | 512 (51.8) | 304 (49.4) | 170 (45.9) | Ref |
| ≤ 500 | 477 (48.2) | 312 (50.6) | 200 (54.1) | 1.1 (0.9–1.5) |
| Received social support in the past 12 months | | | | |
| Yes | 956 (95.2) | 599 (96.1) | 354 (93.7) | Ref |
| No | 48 (4.8) | 24 (3.9) | 24 (6.3) | 1.7 (1.1–3.0) |

Abbreviations: CI, confidence interval; GHQ, general health questionnaire; OR, odds ratio; PLHIV, people living with HIV.

*Chi-square test was used for the comparisons.

doi:10.1371/journal.pone.0121461.t001

Experiences of stigma and discrimination

Table 2 shows the prevalence rates of AIDS-related stigma and discrimination experienced in different settings including home, community, workplace, religious settings, and healthcare facilities in the past 12 months. The common stigma and discrimination experiences included

Table 2. Comparisons of stigma and discrimination experienced in communities in the past 12 months among PLHIV with lower and higher levels of mental disorders.

| <i>Stigma and discrimination experiences</i> | Total <i>n</i> (%) | Total score of GHQ-12 | | OR (95% CI) |
|--|-----------------------|-----------------------|---------------------|---------------|
| | | ≤ 3 <i>n</i> (%) | ≥ 4 <i>n</i> (%) | |
| Excluded from social gatherings or activities | | | | |
| No | 936 (93.1) | 592 (94.9) | 341 (90.2) | Ref |
| Yes | 69 (6.9) | 32 (5.1) | 37 (9.8) | 2.0 (1.2–3.3) |
| Excluded from religious activities | | | | |
| No | 982 (97.7) | 613 (98.2) | 366 (96.8) | Ref |
| Yes | 23 (2.3) | 11 (1.8) | 12 (3.2) | 1.8 (0.8–4.2) |
| Excluded from family activities (e.g. cooking, eating, sleeping together, etc.) | | | | |
| No | 957 (95.2) | 601 (96.3) | 353 (93.4) | Ref |
| Yes | 48 (4.8) | 23 (3.7) | 25 (6.6) | 1.9 (1.1–3.3) |
| Aware of being gossiped about | | | | |
| No | 580 (57.7) | 396 (63.5) | 183 (48.4) | Ref |
| Yes | 425 (42.3) | 228 (36.5) | 195 (51.6) | 1.9 (1.4–2.4) |
| Verbally insulted, harassed and/or threatened | | | | |
| No | 797 (79.3) | 520 (83.3) | 274 (72.5) | Ref |
| Yes | 208 (20.7) | 104 (16.7) | 104 (27.5) | 1.9 (1.4–2.6) |
| Physically harassed and/or threatened | | | | |
| No | 925 (92.0) | 595 (95.4) | 327 (86.5) | Ref |
| Yes | 80 (8.0) | 29 (4.6) | 51 (13.5) | 3.2 (2.0–5.1) |
| Physically assaulted | | | | |
| No | 984 (97.9) | 615 (98.6) | 366 (96.8) | Ref |
| Yes | 21 (2.1) | 9 (1.4) | 12 (3.2) | 2.2 (0.9–5.4) |
| Subjected to psychological pressure by your husband/wife or partner | | | | |
| No | 883 (87.9) | 578 (92.6) | 302 (79.9) | Ref |
| Yes | 122 (12.1) | 46 (7.4) | 76 (20.1) | 3.2 (2.1–4.7) |
| Experienced sexual rejection as a result of HIV positive status | | | | |
| No | 931 (92.6) | 593 (95.0) | 335 (88.6) | Ref |
| Yes | 74 (7.4) | 31 (5.0) | 43 (11.4) | 2.5 (4.5–4.0) |
| Discriminated against by other PLHIV | | | | |
| No | 922 (91.8) | 576 (92.3) | 343 (91.0) | Ref |
| Yes | 82 (8.2) | 48 (7.7) | 34 (9.0) | 1.2 (0.8–1.9) |
| Members of household experienced discrimination as a result of HIV status | | | | |
| No | 909 (90.6) | 575 (92.4) | 331 (87.6) | Ref |
| Yes | 94 (9.4) | 47 (7.6) | 47 (12.4) | 1.7 (1.1–2.7) |
| Forced to change your place of residence or unable to rent accommodation | | | | |
| No | 973 (96.8) | 610 (97.8) | 360 (95.2) | Ref |
| Yes | 32 (3.2) | 14 (2.2) | 18 (4.8) | 2.2 (1.1–4.4) |
| Lost a job or another source of income because of HIV status | | | | |
| No | 873 (87.0) | 560 (89.7) | 310 (82.2) | Ref |
| Yes | 131 (13.0) | 64 (10.3) | 67 (17.8) | 1.9 (1.3–2.7) |
| Refused employment or a work opportunity because of HIV status | | | | |
| No | 872 (86.8) | 569 (91.2) | 300 (79.4) | Ref |
| Yes | 133 (13.2) | 55 (8.8) | 78 (20.6) | 2.7 (1.9–3.9) |
| Nature of work been changed, or been refused promotion as a result of HIV status | | | | |
| No | 872 (86.8) | 564 (90.4) | 305 (80.7) | Ref |

(Continued)

Table 2. (Continued)

| Stigma and discrimination experiences | Total n (%) | Total score of GHQ-12 | | |
|---|----------------|-----------------------|--------------|----------------|
| | | ≤ 3 n (%) | ≥ 4 n (%) | OR (95% CI) |
| Yes | 133 (13.2) | 60 (9.6) | 73 (19.3) | 2.3 (1.6–3.3) |
| Dismissed or prevented from attending an educational institution because of HIV | | | | |
| No | 891 (88.7) | 576 (92.3) | 312 (82.5) | Ref |
| Yes | 114 (11.3) | 48 (7.7) | 66 (17.5) | 2.5 (1.7–3.8) |
| Your child had been prevented from attending school because of your HIV status | | | | |
| No | 954 (95.0) | 603 (96.6) | 348 (92.3) | Ref |
| Yes | 50 (5.0) | 21 (3.4) | 29 (7.7) | 2.4 (1.3–4.3) |
| Denied health services because of HIV status | | | | |
| No | 996 (99.2) | 622 (99.7) | 371 (98.4) | Ref |
| Yes | 8 (0.8) | 2 (0.3) | 6 (1.6) | 5.0 (1.1–25.0) |

Abbreviations: CI, confidence interval; GHQ, general health questionnaire; OR, odds ratio; PLHIV, people living with HIV.

*Chi-square test or Fisher’s Exact test was used as appropriate for the comparisons.

doi:10.1371/journal.pone.0121461.t002

being gossiped about (42.3%), being verbally harassed and/or threatened (20.7%), being refused employment or job description/the nature of their work has been changed (13.2%), being subjected to psychological pressure by their spouse (12.1%), and having lost a job or another source of income (12.1%) as a result of their HIV positive status.

Table 2 also shows that most of the AIDS-related stigma and discrimination experiences were significantly associated higher levels of mental disorders (GHQ-12 ≥ 4). For examples, PLHIV with a total GHQ-12 score of ≥ 4 were significantly more likely to report being physically harassed and/or threatened (OR = 3.2, 95% CI = 2.0–5.1), being subjected to psychological pressure by their spouse (OR = 3.2, 95% CI = 2.1–4.7), being forced to change place of resident or unable to rent accommodation (OR = 2.2, 95% CI = 1.1–4.4), being refused employment (OR = 2.7, 95% CI = 1.9–3.9), having nature of work changed or being refused promotion (OR = 2.3, 95% CI = 1.6–3.3), or being prevented from attending an educational institution (OR = 2.5, 95% CI = 1.7–3.8) in the past 12 months as a result of their HIV positive status.

Internal stigma

Internal stigma experienced in the past 12 months and its bivariate relationship with levels of mental disorders are shown in Table 3. The most common internal stigma included feeling guilty (53.1%), feeling self-blamed (46.3%), feeling ashamed (45.9%), and feeling that they should be punished (25.6%). Most of the internal stigma variables were positively associated with levels of mental disorders (GHQ-12 ≥ 4). For examples, PLHIV with a total GHQ-12 score of ≥ 4 were significantly more likely to report feeling ashamed (OR = 2.1, 95% CI = 1.6–2.8), having low self-esteem (OR = 2.4, 95% CI = 1.8–3.2), or feeling suicidal (OR = 4.5, 95% CI = 2.4 = 8.4) compared to those with a total GHQ-12 score of ≤ 3. They were also significantly more likely to report isolating themselves from family and/or friends (OR = 3.2, 95% CI = 1.7–5.8), or making a decision to stop working (OR = 3.2, 95% CI = 1.7–5.8).

Fear of stigma and discrimination

Table 4 presents the prevalence rates of fear of AIDS-related stigma and discrimination and their association with levels of mental disorders. PLHIV in this study experienced several

Table 3. Comparisons of internal stigma experienced in the past 12 months among PLHIV with lower and higher levels of mental disorders.

| <i>Internal stigma</i> | Total <i>n</i> (%) | Total score of GHQ-12 | | OR (95% CI) |
|--|-------------------------------|------------------------------|-----------------------------|--------------------|
| | | ≤ 3 <i>n</i> (%) | ≥ 4 <i>n</i> (%) | |
| <i>I feel ashamed</i> | | | | |
| No | 543 (54.1) | 381 (61.1) | 160 (42.4) | Ref |
| Yes | 461 (45.9) | 243 (38.9) | 217 (57.6) | 2.1 (1.6–2.8) |
| <i>I feel guilty</i> | | | | |
| No | 471 (46.9) | 326 (52.2) | 143 (37.9) | Ref |
| Yes | 533 (53.1) | 298 (47.8) | 234 (62.1) | 1.8 (1.4–2.3) |
| <i>I blame myself</i> | | | | |
| No | 539 (53.7) | 370 (59.3) | 168 (44.6) | Ref |
| Yes | 465 (46.3) | 254 (40.7) | 209 (55.4) | 1.8 (1.4–2.3) |
| <i>I blame others</i> | | | | |
| No | 834 (83.2) | 531 (85.2) | 300 (79.6) | Ref |
| Yes | 169 (16.8) | 92 (14.8) | 77 (20.4) | 1.5 (1.1–2.1) |
| <i>I have low self-esteem</i> | | | | |
| No | 779 (77.7) | 520 (83.5) | 256 (67.9) | Ref |
| Yes | 224 (22.3) | 103 (16.5) | 121 (32.1) | 2.4 (1.8–3.2) |
| <i>I feel I should be punished</i> | | | | |
| No | 691 (68.8) | 464 (74.4) | 225 (59.7) | Ref |
| Yes | 313 (31.1) | 160 (25.6) | 152 (40.3) | 2.0 (1.5–2.6) |
| <i>I feel suicidal</i> | | | | |
| No | 955 (95.1) | 610 (97.8) | 342 (90.7) | Ref |
| Yes | 49 (4.9) | 14 (2.2) | 35 (9.3) | 4.5 (2.4–8.4) |
| <i>I chose not to attend social gathering</i> | | | | |
| No | 903 (89.9) | 566 (90.7) | 335 (88.6) | Ref |
| Yes | 102 (10.1) | 58 (9.3) | 43 (11.4) | 1.3 (0.8–1.9) |
| <i>I isolated myself from my family and/or friends</i> | | | | |
| No | 936 (93.1) | 599 (96.0) | 334 (88.4) | Ref |
| Yes | 69 (6.9) | 25 (4.0) | 44 (11.6) | 3.2 (1.9–5.3) |
| <i>I made the decision to stop working</i> | | | | |
| No | 956 (95.1) | 607 (97.3) | 347 (91.8) | Ref |
| Yes | 49 (4.9) | 17 (2.7) | 31 (8.2) | 3.2 (1.7–5.8) |
| <i>I decided not to apply for a job or a promotion</i> | | | | |
| No | 944 (93.9) | 588 (94.2) | 354 (93.7) | Ref |
| Yes | 61 (6.1) | 36 (5.8) | 24 (6.3) | 1.1 (0.7–1.9) |
| <i>I withdrew from education/training opportunity</i> | | | | |
| No | 959 (95.6) | 593 (95.2) | 364 (96.6) | Ref |
| Yes | 44 (4.4) | 30 (4.8) | 13 (3.4) | 1.4 (0.7–2.8) |
| <i>I decided not to get married</i> | | | | |
| No | 573 (57.1) | 339 (54.5) | 232 (61.4) | Ref |
| Yes | 430 (42.9) | 283 (45.5) | 146 (38.6) | 1.3 (1.1–1.7) |
| <i>I decided not to have sex</i> | | | | |
| No | 648 (64.5) | 403 (64.6) | 243 (64.3) | Ref |
| Yes | 357 (35.5) | 221 (35.4) | 135 (35.7) | 1.0 (0.8–1.3) |
| <i>I decided not to have (more) children</i> | | | | |
| No | 406 (40.4) | 263 (42.1) | 142 (37.6) | Ref |

(Continued)

Table 3. (Continued)

| <i>Internal stigma</i> | Total n (%) | Total score of GHQ-12 | | |
|---|------------------------|------------------------------|----------------------|--------------------|
| | | ≤ 3 n (%) | ≥ 4 n (%) | OR (95% CI) |
| Yes | 599 (59.6) | 361 (57.9) | 236 (62.4) | 1.2 (0.9–1.6) |
| I avoided going to a local clinic and/or hospital | | | | |
| No | 977 (97.2) | 608 (97.4) | 366 (96.8) | Ref |
| Yes | 28 (2.8) | 16 (2.6) | 12 (3.2) | 1.2 (0.6–2.7) |

Abbreviations: CI, confidence interval; GHQ, general health questionnaire; OR, odds ratio; PLHIV, people living with HIV.

*Chi-square test or Fisher’s Exact test was used as appropriate for the comparisons.

doi:10.1371/journal.pone.0121461.t003

forms of fear including fear of being gossiped about (34.5%), fear of being rejected for sexual intimacy (16.2%), fear of being verbally insulted (15.5%), and fear of being physically assaulted (13.9%). PLHIV with higher levels of mental disorders (GHQ-12 ≥ 4) were significantly more likely to report having been fearful of being gossiped about (OR = 2.2, 95% CI = 1.7–2.9), being verbally insulted (OR = 2.5, 1.9–3.3), being physically harassed (OR = 2.6, 95% CI = 1.8–3.6), and being physically assaulted (OR = 2.6, 95% CI = 1.8–3.8).

Results of bivariate and multivariate logistic regression analyses

As shown in [Table 5](#), in bivariate logistic regression analyses, PLHIV with higher levels of mental disorders (GHQ-12 ≥ 4) were significantly more likely to have higher levels of all forms of AIDS-related stigma and discrimination with all *p*-values < 0.001. After controlling for other co-variables in the multivariate logistic regression models, PLHIV with a total GHQ-12 score of ≥ 4 remained significantly more likely to have experienced higher levels of AIDS-related stigma and discrimination (AOR = 1.9, 95% CI = 1.4–2.6), higher levels of internal stigma (AOR = 1.7, 95% CI = 1.2–2.3), and higher levels of fear of AIDS-related stigma and discrimination (AOR = 1.5, 95% CI = 1.1–2.2) in the past 12 months.

Discussion

This study examined the prevalence rates of different forms of AIDS-related stigma and discrimination and their relationship with mental disorders among PLHIV in Cambodia. Consistent with previous studies, this study demonstrates that PLHIV continue to experience significant levels of various forms of stigma and discrimination in familial and community interactions that impact a broad range of aspects in their daily lives [52–54], although they manifest differently and in varying degrees in different settings and countries [55].

The People Living with HIV Stigma Index has been used to measure AIDS-related stigma and discrimination in different countries and regions enabling international comparisons of the prevalence rates of stigma and discrimination across the world. Using this stigma index, the Asia-Pacific regional analysis found that Cambodia is among the countries in the region with relatively lower proportions of PLHIV who reported experiencing AIDS-related stigma and discrimination than many other countries in the region, and the proportions were similar to findings in this study [55]. For examples, reports of experiences of physical harassment and threats ranged from 4% in Cambodia to 22% in Pakistan; this prevalence was 8% among Cambodian PLHIV in this study. The proportion of PLHIV who reported having been forced to move or had been unable to rent accommodation during the past 12 months as a result of their HIV-positive status ranged

Table 4. Comparisons of fear of stigma and discrimination experienced in the past 12 months among PLHIV lower and higher levels of mental disorders.

| Fears of stigma and discrimination | Total n (%) | Total score of GHQ-12 | | OR (95% CI) |
|--|----------------|-----------------------|--------------|---------------|
| | | ≤ 3 n (%) | ≥ 4 n (%) | |
| <i>Having been fearful of the following things happening to you:</i> | | | | |
| Being gossiped about | | | | |
| No | 658 (65.5) | 451 (72.3) | 204 (54.0) | Ref |
| Yes | 347 (34.5) | 173 (27.7) | 174 (46.0) | 2.2 (1.7–2.9) |
| Being verbally insulted, harassed, or threatened | | | | |
| No | 758 (75.4) | 511 (81.9) | 244 (64.6) | Ref |
| Yes | 247 (24.6) | 113 (18.1) | 134 (35.4) | 2.5 (1.9–3.3) |
| Being physically harassed and/or threatened | | | | |
| No | 849 (84.5) | 557 (89.3) | 289 (76.5) | Ref |
| Yes | 156 (15.5) | 67 (10.7) | 89 (23.5) | 2.6 (1.8–3.6) |
| Being physically assaulted | | | | |
| No | 865 (86.1) | 565 (90.5) | 297 (78.6) | Ref |
| Yes | 140 (13.9) | 59 (9.5) | 81 (21.4) | 2.6 (1.8–3.8) |
| Being rejected to have sexually intimate with | | | | |
| No | 837 (83.8) | 527 (84.7) | 307 (82.1) | Ref |
| Yes | 162 (16.2) | 95 (15.3) | 67 (17.9) | 1.2 (0.9–1.7) |

Abbreviations: CI, confidence interval; GHQ, general health questionnaire; OR, odds ratio; PLHIV, people living with HIV.

*Chi-square test was used for the comparisons.

doi:10.1371/journal.pone.0121461.t004

from 5% in Sri Lanka to 20% in Pakistan; in the regional study, this prevalence was 12% among Cambodian PLHIV compared to only 3% among Cambodian PLHIV in this study.

Table 5. Results of bivariate and multivariate logistic regression analyses of the association between stigma and discrimination with levels of mental disorders among PLHIV.

| Stigma and discrimination scales | Total score of GHQ-12 | | OR (95% CI) | AOR (95% CI) [†] |
|---|-----------------------|--------------|------------------|---------------------------|
| | ≤ 3 n (%) | ≥ 4 n (%) | | |
| Total score of stigma and discrimination experience | | | | |
| ≤ 2 | 468 (75.2) | 210 (56.1) | Ref | Ref |
| ≥ 3 | 154 (24.8) | 164 (43.9) | 2.4 (1.8–3.1)*** | 1.9 (1.4–2.6)*** |
| Total score of internal stigma | | | | |
| ≤ 4 | 434 (70.1) | 196 (52.1) | Ref | Ref |
| ≥ 5 | 185 (29.9) | 180 (47.9) | 2.2 (1.7–2.8)*** | 1.7 (1.2–2.3)** |
| Total score of fear of stigma and discrimination | | | | |
| ≤ 1 | 492 (79.1) | 237 (63.4) | Ref | Ref |
| ≥ 2 | 130 (20.9) | 137 (36.6) | 2.2 (1.6–2.9)*** | 1.5 (1.1–2.2)* |

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; GHQ, general health questionnaire; OR, odds ratio; PLHIV, people living with HIV.

[†]Socio-demographic variables that were associated with GHQ-12 in bivariate analyses at a level of $p \leq 0.10$ (gender, education level, marital status, employment status, income, and spouse's HIV sero-status) were included in the multivariate logistic regression models.

* $p < 0.05$;

** $p < 0.01$;

*** $p < 0.001$.

doi:10.1371/journal.pone.0121461.t005

The prevalence of reported internal stigma among PLHIV in this study was common but relatively lower than the rates documented in other countries in the region, ranging from 3% to 60%. The Asia-Pacific regional analysis of People Living with HIV Stigma Index [55] demonstrated that the proportion of PLHIV who reported feeling ashamed ranged from 54% in Sri Lanka to 76% in Pakistan. This prevalence was 62% among Cambodian PLHIV in the regional report compared to 46% in this study. The proportion of PLHIV who reported feeling self-blamed was also high, ranging from 51% in Sri Lanka to 80% in Fiji. In the Asia-Pacific regional study, 16% of PLHIV in Cambodia reported feeling suicidal in the past 12 months compared to 48% in China. The most common internal stigma found in the Asia-Pacific regional study was feeling of low self-esteem which ranged from 22% in Sri Lanka to 81% in Myanmar compared to 45% in Cambodia.

Furthermore, remarkably lower proportions of PLHIV in this study reported experiences of several forms of AIDS-related stigma and discrimination in the past 12 months compared to findings from a recent study in South Africa [52]. For examples, the proportion of PLHIV who reported being excluded from social gathering or activities was 7% among Cambodian PLHIV in this study compared to 19% among PLHIV in South Africa. Similarly, the proportion of PLHIV who reported being verbally insulted, harassed, or threatened was 21% among Cambodian PLHIV in this study compared to 28% among PLHIV in South Africa. Regarding internal stigma, only 5% of Cambodian PLHIV in this study reported feeling suicidal in the past 12 months compared to 15% among PLHIV in South Africa. Moreover, only 22% of Cambodian PLHIV in this study reported having low self-esteem compared to 32% among PLHIV in South Africa [52].

Although PLHIV in Cambodia are likely to experience lower levels of AIDS-related stigma and discrimination than those living in other countries, these experiences seem to have significant impacts on their mental health status. This finding is in line with findings from several studies in different settings and populations. AIDS-related stigma and discrimination were found to be associated with major depressive disorders in studies in Uganda [15,17] and South Africa [40]. In a study among Black men living with HIV in the United States, several types of perceived AIDS-related discrimination was found to contribute to poor mental health including depression and posttraumatic stress disorder [41]. The relationship between AIDS-related stigma and discrimination and mental health problems has also been reported in several studies in China [33,34,56], India [39], Thailand [57], and many countries across Africa, Asia-Pacific, Europe, Latin America, and North America [5].

AIDS-related stigma and discrimination may be one explanation for the disparities in mental health conditions of PLHIV and general population. The relationship of levels of AIDS-related stigma and discrimination with mental disorders in this study is consistent with biopsychosocial models that conceptualize stigma and discrimination as a stressor [58,59]. A meta-analysis also concluded that individuals who experience chronic stigma and discrimination are vulnerable to poor mental health including anxiety, depression, and distress [60]. Chronic discrimination creates a hostile living environment that can lead to wear and tear of protective mechanisms and over time, a lower capacity for coping with new stressors [41]. A possible explanation for the relationship can also be drawn from socio-psychological studies on theories of minority stress [61]. PLHIV may experience excess stress from stigma and discrimination, which creates a hostile living environment and in turn, lead to mental disorders [41].

Findings from this study should be interpreted in light of some methodological limitations. The first limitation concerns the representativeness of the study population. The study samples were recruited from provinces where the SAHACOM, a comprehensive community-based project aiming to improve overall health and quality of life of PLHIV, has been implemented.

The levels of AIDS-related stigma and discrimination as well as mental wellbeing reported in this study may therefore represent a more optimistic view than in other areas of Cambodia. Secondly, our measure of mental disorders using GHQ-12 was not a diagnostic instrument and can only be interpreted as symptoms of negative affects or emotional distress not as specific mental illnesses per se. Thirdly, the cross-sectional design precludes causal interpretation of the findings. Longitudinal studies are needed to examine the causal relationship of the existence of AIDS-related stigma and discrimination with mental health of PLHIV. Finally, findings from this study may be limited by the questionnaire survey measures that can lead to social desirability biases.

Despite these limitations, we believe that findings from this study carry important implications for health policies and intervention services for improving health and quality of life of PLHIV in Cambodia. The significant relationship of AIDS-related stigma and discrimination with mental disorders indicates a need for community-based interventions to reduce stigma and discrimination in the general public and to help PLHIV to cope with these stressful situations. A review of strategies for stigma reduction suggest promising results of legal protection, provision of ART, and introduction of quality HIV care in reducing public fear of HIV [62].

Acknowledgments

The authors thank KHANA's senior management team for their guidance, support, and advice. We gratefully acknowledge the support extended by our research assistants, implementing partners and their staff members, local authorities, community support volunteers, outreach workers as well as all participants for their excellent contribution to the data collection. Without such extensive supports, this study would have been impossible.

Author Contributions

Conceived and designed the experiments: SY ST PC. Performed the experiments: SY ST PC SS KT. Analyzed the data: SY. Contributed reagents/materials/analysis tools: SY ST CB. Wrote the paper: SY ST PC SS KT CB.

References

1. Grossman CI, Stangl AL. Global action to reduce HIV stigma and discrimination. *J Int AIDS Soc.* 2013; 16 (Suppl. 2): 18881. doi: [10.7448/IAS.16.3.18881](https://doi.org/10.7448/IAS.16.3.18881) PMID: [24242269](https://pubmed.ncbi.nlm.nih.gov/24242269/)
2. Sidibé M, Goosby EP. Global action to reduce HIV stigma and discrimination. *J Int AIDS Soc.* 2013; 16 (Suppl. 2): 18893. doi: [10.7448/IAS.16.3.18893](https://doi.org/10.7448/IAS.16.3.18893) PMID: [24242270](https://pubmed.ncbi.nlm.nih.gov/24242270/)
3. Steward WT, Bharat S, Ramakrishna J, Heylen E, Ekstrand ML. Stigma is associated with delays in seeking care among HIV-infected people in India. *J Int Assoc Provid AIDS Care.* 2013; 12: 103–109. doi: [10.1177/1545109711432315](https://doi.org/10.1177/1545109711432315) PMID: [22282878](https://pubmed.ncbi.nlm.nih.gov/22282878/)
4. Turan JM, Bukusi EA, Onono M, Holzemer WL, Miller S. HIV/AIDS stigma and refusal of HIV testing among pregnant women in rural Kenya: results from the MAMAS study. *AIDS Behav.* 2011; 15: 1111–1120. doi: [10.1007/s10461-010-9798-5](https://doi.org/10.1007/s10461-010-9798-5) PMID: [20827573](https://pubmed.ncbi.nlm.nih.gov/20827573/)
5. Nachegea JB, Morroni C, Zuniga JM, Sherer R, Beyrer C. HIV-related stigma, isolation, discrimination, and serostatus disclosure: a global survey of 2035 HIV-infected adults. *J Int Assoc Physicians AIDS Care.* 2012; 11: 172–178. doi: [10.1177/1545109712436723](https://doi.org/10.1177/1545109712436723) PMID: [22431893](https://pubmed.ncbi.nlm.nih.gov/22431893/)
6. Tsai AC, Bangsberg DR, Kegeles SM, Katz IT, Haberer JE, Muzoora C et al. Internalized stigma, social distance, and disclosure of HIV sero-positivity in rural Uganda. *Ann Behav Med.* 2013; 46: 285–294. doi: [10.1007/s12160-013-9514-6](https://doi.org/10.1007/s12160-013-9514-6) PMID: [23690283](https://pubmed.ncbi.nlm.nih.gov/23690283/)
7. Naar-King S, Bradford J, Coleman S, Green-Jones M, Cabral H. Retention in care of persons newly diagnosed with HIV: outcomes of the outreach initiative. *AIDS Patient Care STDS.* 2007; 21 (Suppl. 1): S40–48. PMID: [17563289](https://pubmed.ncbi.nlm.nih.gov/17563289/)
8. Katz IT, Ryu AE, Onuegbu AG, Psaros C, Weiser SD. Impact of HIV-related stigma on treatment adherence: systematic review and meta-synthesis. *J Int AIDS Soc.* 2013; 16 (Suppl. 2): 18640. doi: [10.7448/IAS.16.3.18640](https://doi.org/10.7448/IAS.16.3.18640) PMID: [24242258](https://pubmed.ncbi.nlm.nih.gov/24242258/)

9. Rao D, Kekwaletswe TC, Hosek S, Martinez J, Rodriguez F. Stigma and social barriers to medication adherence with urban youth living with HIV. *AIDS Care*. 2007; 19: 28–33. PMID: [17129855](#)
10. Earnshaw VA, Bogart LM, Dovidio JF, Williams DR. Stigma and racial/ethnic HIV disparities: moving toward resilience. *Am Psychol*. 2013; 68: 225–236. doi: [10.1037/a0032705](#) PMID: [23688090](#)
11. Logie C, James L, Tharao W, Loutfy M. Associations between HIV-related stigma, racial discrimination, gender discrimination, and depression among HIV-positive African, Caribbean, and Black women in Ontario, Canada. *AIDS Patient Care STDS*. 2013; 27: 114–122. doi: [10.1089/apc.2012.0296](#) PMID: [23373665](#)
12. Bogart LM, Wagner GJ, Galvan FH, Klein DJ. Longitudinal relationships between antiretroviral treatment adherence and discrimination due to HIV sero-status, race, and sexual orientation among African-American men with HIV. *Ann Behav Med*. 2010; 40: 184–190. doi: [10.1007/s12160-010-9200-x](#) PMID: [20552416](#)
13. Chibanda D, Benjamin L, Weiss HA, Abas M. Mental, neurological, and substance use disorders in people living with HIV/AIDS in low- and middle-income countries. *J Acquir Immune Defic Syndr*. 2014 67 (Suppl. 1): S54–67. doi: [10.1097/QAI.0000000000000258](#) PMID: [25117961](#)
14. Adewaya AO, Afolabi MO, Ola BA, Ogundele OA, Ajibare AO, Oladipo BF. Psychiatric disorders among the HIV-positive population in Nigeria: A control study. *J Psychosom Res*. 2007; 63: 203–206. PMID: [17662758](#)
15. Akena D, Musisi S, Joska J, Stein DJ. The association between aids related stigma and major depressive disorder among HIV-positive individuals in Uganda. *PLoS One*. 2012; 7: e48671. doi: [10.1371/journal.pone.0048671](#) PMID: [23209556](#)
16. Kaharuza FM, Bunnell R, Moss S, Purcell DW, Bikaako- Kafura W. Depression and CD4 cell count among person with HIV infection in Uganda. *AIDS Behav*. 2006; 10: S105–111. PMID: [16802195](#)
17. Kinyanda E, Hoskins S, Nakku J, Nawaz S, Patel V. Prevalence and risk factors of major depressive disorder in HIV/AIDS as seen in semi-urban Entebbe district, Uganda. *BMC Psychiatry*. 2011; 11: 205. doi: [10.1186/1471-244X-11-205](#) PMID: [22208452](#)
18. Myer L, Smit J, Roux LL, Parker S, Stein DJ. Common mental disorders among HIV- infected individuals in South Africa: Prevalence, predictors, and validation of brief psychiatric rating scales. *AIDS Patient Care STDs*. 2008; 22: 147–158. doi: [10.1089/apc.2007.0102](#) PMID: [18260806](#)
19. Nakasujja N, Skolasky RL, Musisi S, Allebeck P, Robertson K. Depression symptoms and cognitive function among individuals with advanced HIV infection initiating HAART in Uganda. *BMC Psychiatry*. 2010; 10: 44. doi: [10.1186/1471-244X-10-44](#) PMID: [20537129](#)
20. Olley BO, Seedat S, Stein DJ. Persistence of psychiatric disorders in a cohort of HIV/AIDS patients in South Africa. A 6-month follow- up study. *J Psychosom Res*. 2006; 61: 479–484. PMID: [17011355](#)
21. Petrushkin A, Boardman J, Ovuga E. Psychiatric disorders in HIV- positive individuals in urban Uganda. *Psychiatr Bull*. 2005; 29: 455–458.
22. Freeman M, Nkomo N, Kafaar Z, Kelley K. Mental disorder in people living with HIV/AIDS in South Africa. *S Afr J Psych*. 2008; 38: 480–500.
23. Mogga S, Prince M, Alem A, Kebede D, Stewart R, Glozier N, et al. Outcome of major depression in Ethiopia: Population-based study. *Br J Psychiatry*. 2006; 189: 241–246. PMID: [16946359](#)
24. Nakimuli-Mpungu E, Munyaneza G. Depression, alcohol abuse, and disclosure of HIV serostatus among rural HIV-positive individuals in western Uganda. *Neurobehav HIV Med*. 2011; 3: 19–25.
25. Horberg MA, Silverberg MJ, Hurley LB, Towner WJ, Klein DB, Bersoff-Matcha S, et al. Effects of depression and selective serotonin reuptake inhibitor use on adherence to highly active antiretroviral therapy and on clinical outcomes in HIV-infected patients. *J Acquir Immune Defic Syndr*. 2008; 47: 384–390. PMID: [18091609](#)
26. Springer SA, Dushaj A, Azar MM. The impact of DSM-IV mental disorders on adherence to combination antiretroviral therapy among adult persons living with HIV/AIDS: A system review. *AIDS Behav*. 2012; 16: 2119–2143. doi: [10.1007/s10461-012-0212-3](#) PMID: [22644066](#)
27. Treisman G, Angelino A. Interrelation between psychiatric disorders and the prevention and treatment of HIV infection. *Clin Infect Dis*. 2007; 45: S313–317. doi: [10.1086/522556](#) PMID: [18190305](#)
28. Joska JA, Obayemi A Jr., Cararra H, Sorsdahl K. Severe mental illness and retention in anti-retroviral care: A retrospective study. *AIDS Behav*. 2014; 18: 1492–1500. doi: [10.1007/s10461-014-0709-z](#) PMID: [24515624](#)
29. Pence BW. The impact of mental health and traumatic life experiences on antiretroviral treatment outcomes for people living with HIV/AIDS. *J Antimicrob Chemother*. 2009; 63: 636–640. doi: [10.1093/jac/dkp006](#) PMID: [19153077](#)

30. Bouhnik AD, Pre´au M, Vincent E, Carrieri MP, Gallais H, Lepeu G, et al. Depression and clinical progression in HIV-infected drug users treated with highly active antiretroviral therapy. *Antivir Ther.* 2005; 10: 53–61. PMID: [15751763](#)
31. Cruess DG, Douglas SD, Petitto JM, Have TT, Gettes D, Dubé B, et al. Association of Resolution of Major Depression With Increased Natural Killer Cell Activity Among HIV-Seropositive Women. *Am J Psychiatry.* 2005; 162: 2125–2130. PMID: [16263853](#)
32. Cook JA, Grey D, Burke J, Cohen MH, Gurtman AC. Depressive symptoms and AIDS-related mortality among a multisite cohort of HIV-positive women. *Am J Public Health.* 2004; 94: 1133–1140. PMID: [15226133](#)
33. Yu XN, Lau JT, Mak WW, Cheng YM, Lv YH. Risk and protective factors in association with mental health problems among people living with HIV who were former plasma/blood donors in rural China. *AIDS Care.* 2009; 21: 645–654. doi: [10.1080/09540120802459770](#) PMID: [19444674](#)
34. Su X, Lau JT, Mak WW, Chen L, Choi KC. Perceived discrimination, social support, and perceived stress among people living with HIV/AIDS in China. *AIDS Care.* 2013; 25: 239–248. doi: [10.1080/09540121.2012.701713](#) PMID: [22835331](#)
35. Freeman M, Nkomo N, Kafaar Z, Kelley K. Factors associated with prevalence of mental disorder in people living with HIV/AIDS in South Africa. *AIDS Care.* 2007; 19: 1201–1209. PMID: [18071963](#)
36. Olley BO, Seedat S, Nel DG, Stein DJ. Predictors of major depression in recently diagnosed patients with HIV/AIDS in South Africa. *AIDS Patient Care STDs.* 2004; 18: 481–487. PMID: [15321019](#)
37. Bjelland I, Krokstad S, Mykletun A, Dahl AA, Tell GS, Tambs K. Does a higher educational level protect against anxiety and depression? The HUNT study. *Soc Sci Med.* 2008; 66: 1334–1345. doi: [10.1016/j.socscimed.2007.12.019](#) PMID: [18234406](#)
38. Steward WT, Herek GM, Ramakrishna J, Bharat S, Chandy S. HIV-related stigma: adapting a theoretical framework for use in India. *Soc Sci Med.* 2008; 67: 1225–1235. doi: [10.1016/j.socscimed.2008.05.032](#) PMID: [18599171](#)
39. Steward WT, Chandy S, Singh G, Panicker ST, Osmand TA. Depression is not an inevitable outcome of disclosure avoidance: HIV stigma and mental health in a cohort of HIV-infected individuals from Southern India. *Psychol Health Med.* 2011; 16: 74–85. doi: [10.1080/13548506.2010.521568](#) PMID: [21218366](#)
40. Simbayi LC, Kalichman S, Strebel A, Cloete A, Henda N. Internalized stigma, discrimination, and depression among men and women living with HIV/AIDS in Cape Town, South Africa. *Soc Sci Med.* 2007; 64: 1823–1831. PMID: [17337318](#)
41. Bogart LM, Wagner GJ, Galvan FH, Landrine H, Klein DJ. Perceived discrimination and mental health symptoms among black men with HIV. *Cultur Divers Ethnic Minor Psychol.* 2011; 1: 295–302. doi: [10.1037/a0024056](#) PMID: [21787061](#)
42. Fields EL, Bogart LM, Galvan FH, Wagner GJ, Klein DJ. Association of discrimination-related trauma with sexual risk among HIV-positive African American men who have sex with men. *Am J Public Health.* 2013; 103: 875–880. doi: [10.2105/AJPH.2012.300951](#) PMID: [23488499](#)
43. Yi S, Chhoun P, Brant S, Kita K, Tuot S. The Sustainable Action against HIV and AIDS in Communities (SAHACOM): End-of-project evaluation. Phnom Penh, Cambodia: KHANA; 2014.
44. Sopheab H, Tuot S. Mid-term review of the Sustainable Action against HIV and AIDS in Communities (SAHACOM) program. Phnom Penh, Cambodia: KHANA; 2013.
45. National Institute of Public Health, National Institute of Statistics, and ORC Macro. Cambodia Demographic and Health Survey 2010. Phnom Penh, Cambodia and Calverton, Maryland, USA; 2010.
46. Goldberg DP. The detection of psychiatric illness by questionnaire: A technique for identification and assessment of non-psychotic psychiatric illness. London, New York: Oxford University Press; 1972.
47. Kim YJ, Cho MJ, Park S, Hong JP, Sohn JH. The 12-item general health questionnaire as an effective mental health screening tool for general Korean adult population. *Psychiatry Investig.* 2013; 10: 352–358. doi: [10.4306/pi.2013.10.4.352](#) PMID: [24474983](#)
48. Zulkefly NS, Baharudin R. Using the 12-item General Health Questionnaire (GHQ-12) to assess the psychological health of Malaysian college students. *Glob J Health Sci.* 2010; 2: 73–80.
49. Goldberg DP, Williams P. A user’s guide to the General Health Questionnaire. Winsor UK: NFER-Nelson; 1988.
50. Goldberg DP, Oldehinkel T, Ormel J. Why GHQ threshold varies from one place to another. *Psychol Med.* 1998; 28: 915–921. PMID: [9723146](#)
51. International Parenthood Federation (IPF), Global Network of People Living with HIV (GNP+), International Community of Women Living with HIV (ICW), UNAIDS. The People Living with HIV Stigma Index: an index to measure the stigma and discrimination experienced by people living with HIV. London: International Parenthood Federation.; 2008.

52. dos Santos MML, Kruger P, Mellors SE, Wolvaardt G, van der Ryst E. An exploratory survey measuring stigma and discrimination experienced by people living with HIV/AIDS in South Africa: the People Living with HIV Stigma Index. *BMC Public Health*. 2014; 14: 80. doi: [10.1186/1471-2458-14-80](https://doi.org/10.1186/1471-2458-14-80) PMID: [24461042](https://pubmed.ncbi.nlm.nih.gov/24461042/)
53. Stangl AL, Grossman CI. Global action to reduce HIV stigma and discrimination. *J Int AIDS Soc*. 2012; 16: 2.
54. Valdiserri RO. HIV/AIDS stigma: an impediment to public health. *Am J Public Health*. 2012; 92: 341–342.
55. UNAIDS–Joint United Nations Programme on HIV/AIDS. *People Living with HIV Stigma Index: Asia Pacific Regional Analysis*. Geneva, Switzerland: UNAIDS; 2011.
56. Wang B, Li X, Barnett D, Zhao G, Zhao J. Risk and protective factors for depression symptoms among children affected by HIV/AIDS in rural China: A structural equation modeling analysis. *Soc Sci Med*. 2012; 74: 1435–1443. doi: [10.1016/j.socscimed.2012.01.007](https://doi.org/10.1016/j.socscimed.2012.01.007) PMID: [22405505](https://pubmed.ncbi.nlm.nih.gov/22405505/)
57. Lia L, Leea SJ, Thammawijay P, Jiraphongs C, Rotheram-Borusa MJ. Stigma, social support, and depression among people living with HIV in Thailand. *AIDS Care*. 2009; 21: 1007–1013. doi: [10.1080/09540120802614358](https://doi.org/10.1080/09540120802614358) PMID: [20024757](https://pubmed.ncbi.nlm.nih.gov/20024757/)
58. Jackson JS, Knight KM. Race and self-regulatory health behaviors: The role of the stress response and the HPA axis in physical and mental health disparities. In: Schaie KW, Carstensen LL, editors. *Social structure, aging and self-regulation in the elderly*. Springer; New York; 2006.
59. Williams DR, Mohammed SA. Discrimination and racial disparities in health: Evidence and needed research. *J Behav Med*. 2009; 32: 20–47. doi: [10.1007/s10865-008-9185-0](https://doi.org/10.1007/s10865-008-9185-0) PMID: [19030981](https://pubmed.ncbi.nlm.nih.gov/19030981/)
60. Pascoe EA, Smart Richman L. Perceived discrimination and health: A meta-analytic review. *Psychol Bull*. 2009; 135: 531–554. doi: [10.1037/a0016059](https://doi.org/10.1037/a0016059) PMID: [19586161](https://pubmed.ncbi.nlm.nih.gov/19586161/)
61. Hatzenbuehler ML, Nolen-Hoeksema S, Dovidio J. How does stigma “get under the skin”? The mediating role of emotion regulation. *Psychol Sci*. 2009; 20: 1282–1289. doi: [10.1111/j.1467-9280.2009.02441.x](https://doi.org/10.1111/j.1467-9280.2009.02441.x) PMID: [19765237](https://pubmed.ncbi.nlm.nih.gov/19765237/)
62. Stangl A, Lloyd JK, Brady LM, Holland CE, Baral S. A systematic review of interventions to reduce HIV-related stigma and discrimination from 2002–2013: How far have we come? *J Int AIDS Soc*. 2013; 16 (suppl. 2): 18734. doi: [10.7448/IAS.16.3.18734](https://doi.org/10.7448/IAS.16.3.18734) PMID: [24242268](https://pubmed.ncbi.nlm.nih.gov/24242268/)