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Depression Among HIV-Positive Individuals in Botswana: A Behavioral Surveillance

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Abstract

This study examined incidence of depression in HIV-positive individuals in Botswana. One hundred and twenty HIV-positive individuals were administered a measure of daily activities and two measures of depression. Twenty four to 38% were diagnosed with depression, suicidal ideation ranged from 9 to 12%, with a positive correlation between scores on the two depression measures. Depression was associated with greater impairment in activities of daily living, especially the ability to take medication. These instruments can diagnose depression in persons living with HIV in developing countries, which will help to target those at risk for poor adherence, and will enable better allocation of limited resources.

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Competing Interests The authors report no conflicts of interest.

Keywords

HIV; AIDS; Depression; Botswana; Activities; Daily living

Introduction

Persons living with HIV infection and AIDS are at increased risk for developing affective disorders, particularly depression [1]. Recent studies have also shown that depression impacts the course of HIV disease in Botswana and other sub-Saharan African countries [2]. Most depression inventories used in research are too lengthy to be practical in the clinical setting, requiring extensive staff training to administer, score, and interpret. Alternatively, depression studies in developing countries have tended to use a variety of questionnaires that include an item or two focused on depression, but do not adhere to DSM-IV criteria [3].

The World Health Organization rates depression as one of the most burdensome diseases in the world [4]. HIV associated depression has multiple causes, some of which may be components of the neurotropic disease process itself. The virus can cause damage to subcortical regions of the brain that are directly involved in the regulation of affect and mood. In addition, HIV-positive (HIV+) individuals often experience increased psychosocial stress associated with chronic illness and negative stigma [5].

It is important to identify depression because it can lead to poor adherence to highly active antiretroviral treatment (HAART) regimens. Inadequate levels of antiretroviral (ARV) medications contribute to the development of resistance, which compromises control of HIV disease. However, this destructive cycle can be averted in that poor adherence due to depression may be amenable to therapy, such as anti-depressant medications [6].

Despite the fact that depression may hasten the course of HIV and contribute to the development of ARV resistance, diagnosis of depression in HIV-endemic areas of Africa has not been a priority. This lack of attention to depression and other affective disorders is in part due to the scarcity of trained personnel and medical resources. In addition, diagnosis of depression in HIV-infected patients is complicated by somatic symptoms that may include fatigue, weight loss, and insomnia. Diagnosis is further complicated because some HIV+ individuals develop neurocognitive impairment including slowed thinking, poor concentration, forgetfulness, and executive dysfunction. HIV+ individuals with executive dysfunction may develop a flat affect and apathy due to damage to the fronto-striatal regions of the brain, thus they are often misdiagnosed as depressed and treated with anti-depressants. This may seem a minor problem, since anti-depressants are usually not harmful from a medical perspective; however, from a resource perspective this can be wasteful, and can translate into a large number of HIV+ individuals being prescribed expensive medications, with no benefit. Differentiation of affective changes due to executive dysfunction from depression is of great importance, not only clinically, but also to ensure judicious allocation of scarce medical resources in the regions worst affected by the HIV epidemic. Following from this, the aims of the present study were twofold: (1) To determine the incidence of depression in an HIV-positive population in Botswana, a country with one of the highest HIV rates in the world, and (2) To assess the utility of easily administered, brief clinical

measures to accurately diagnose depression in HIV-positive patients in a resource-limited setting.

Methods

Participants

One hundred twenty randomly selected HIV+ subjects, 60 men and 60 women, were asked to participate in this study during routine follow-up visits from March through May 2008, at the Infectious Disease Care Clinic (IDCC) at Princess Marina Hospital (PMH) in Gaborone, Botswana (Table 1). No reimbursement for participation was offered. Inclusion criteria were men and women with: (1) documented HIV-positive status; (2) ages 21–50; (3) ambulatory status; and (4) the ability to comprehend study procedures and provide informed consent. Consistent with current treatment practices in Botswana, most patients (97.5%) were prescribed highly active antiretroviral therapy (HAART). Exclusion criteria eliminated individuals with cognitive impairment unrelated to HIV, such as: (1) neurological conditions (e.g., head injury, seizure disorder); (2) medical illness unrelated to HIV (e.g., chronic hepatic or renal failure, malignancy) or severe HIV-related disease (current opportunistic infection); (3) current fever; (4) severe psychiatric disorder (e.g., schizophrenia); (5) a history of substance abuse; or (6) inability to function independently.

Procedure

Participants underwent a standardized neuropsychological examination, an assessment of depression, and an assessment of daily functioning. The neurocognitive findings will be reported elsewhere. Assessments were carried out by Botswana nursing staff (R.N.) and neuropsychology researchers from the University of Pennsylvania (K.L., K.S.). Testing procedures were standardized across examiners; and the neuropsychology expert (K.L.) observed all examiners in training prior to test administration to subjects. Structured interviews and chart reviews were performed to obtain information about medical and psychiatric history, pattern of substance use, marital status, education, current medications, recent CD4 lymphocyte counts and viral loads.

This research study was approved by the Institutional Review Boards (IRBs) from the Botswana Ministry of Health, PMH, and the University of Pennsylvania. All consent forms, questionnaires, and tests were translated into Setswana and back translated. For patients with limited reading ability, the BDI-FS and ADL scale were administered orally by the examiners.

Measures

Beck Depression Inventory-Fast Screen for Medical Patients (BDI-FS) [7]—The BDI-FS is a seven-item multiple-choice measure of current depression, developed to evaluate depression in patients with behavioral and somatic symptoms attributable to medical problems that may confound diagnosis. It uses a Likert scale (0–3) to measure the severity of depressive symptoms corresponding to psychological, nonsomatic criteria for diagnosing MDD in DSM-IV. Standard screening includes either self-administration or oral administration to accommodate illiterate subjects. A prior study demonstrated strong

psychometric properties for this instrument with HIV subjects, with good internal consistency (*coefficient alpha* = .84). A cut-off score of 4 and above identified patients with depression with an 81% correct classification rate, 90% sensitivity, and 74% specificity [8].

Mood Module (MM) of the Primary Care Evaluation of Mental Disorders (Prime-MD) [9]—The MM is a focused interviewing guide, that follows DSM-IV criteria, for screening medical patients for current depression, composed of simple ‘yes’ and ‘no’ questions. If five or more of the nine symptoms are present and one of these symptoms is sadness/hopeless or anhedonia, then a diagnosis of MDD is supported. The MM has previously been successfully used to diagnose depression in patients with HIV and was found to have a sensitivity of 77% and specificity of 84% [10].

The BDI-FS and MM have been extensively studied together and have consistently demonstrated strong correlations for diagnosing depression in patients with a wide range of medical conditions [7].

Activities of Daily Living Scale (ADL) [11]—This questionnaire was adapted from the original measure, and selected for its wide use and demonstrated validity in studies of medically ill and dementia populations, including HIV [1]. It is a 14-item scale measuring physical self-maintenance (e.g., dressing, bathing) and instrumental activities of daily living (e.g., preparing meals, taking medications). Each item is rated on a four-point scale: (1) no difficulty at all; (2) has some difficulty; (3) needs some assistance; (4) can’t do at all. Thus, higher scores indicate more impairment in daily functioning.

Data Analysis

We performed descriptive analyses and comparisons to examine the demographic and clinical characteristics of patients. All analyses were conducted using StataMP 10.0. Correlation coefficients were used to assess relationships between continuous variables. Student’s t test and analysis of variance (ANOVA) were used for comparisons of normally distributed variables. Kruskal–Wallis rank was used for non-normal variables, and Fisher’s exact tests were used for categorical variables. As this was an exploratory study, alpha was set at 0.05 to determine statistical significance.

Results

Beck Depression Inventory-Fast Screen (BDI-FS) and Prime-MD Mood Module (MM)

Using a cut-off score of 4 or higher on the BDI-FS, 38% of the patients met criteria for depression. Slightly over 24% of patients met criteria for MDD with the MM. According to the ranges in the BDI-FS manual, 59% were mildly depressed, 27% moderately depressed, and 14% severely depressed. There was a positive correlation ($r = 0.634$, $P < 0.001$) between the two measures; those classified as depressed on one scale were 13 times more likely to be classified as depressed on the other scale ($P < 0.001$). This is consistent with prior research that compared the diagnostic discrimination of these two instruments [7]. Suicidal ideation was endorsed on the MM (item 9) by 12% of subjects and on the BDI-FS (item 7) by 9% of subjects.

CD4 count was not significantly related to depression with either measure (MM $P=0.239$; BDI-FS $P=0.425$). No significant association emerged between depression, as measured by either depression inventory, and substance abuse (BDI-FS $P=0.606$; MM $P=0.201$) or employment status (BDI-FS $P=0.720$; MM $P=0.720$). In addition, nationality of the examiner (MM $P=0.263$; BDI-FS $P=0.092$) was not significantly associated with depression scores on either measure. Neither a history of prior opportunistic infections (MM $P=0.511$; BDI-FS $P=0.281$) or length of time since HIV diagnosis (MM $P=0.865$; BDI-FS $P=0.472$), were risk factors for depression. Similarly, there was no significant relationship between depression and time since beginning treatment with HAART (MM $P=0.619$).

Women had higher scores than men on the BDI-FS ($P=0.009$), but not on the MM ($P=0.120$). Significant associations did not emerge between MM scores and years of education ($P=0.098$), language of test administration ($P=0.128$) or age ($P=0.200$). A regression analysis to determine the importance of these same three variables on the BDI-FS total score was only significant for language of test administration, with lower scores for subjects tested in Setswana ($P_{\text{adj}}=0.011$), the primary language for 39% of the subjects.

Activities of Daily Living (ADL)

On the ADL scale, individuals meeting criteria for MDD on the MM reported significantly greater levels of impairment ($P=0.044$). Similarly, there was a significant positive association between depression on the BDI-FS and impairment on the ADL scale ($P=0.032$). There was no significant relationship between the ADL score and CD4 level ($P=0.949$).

Viral Load

The lower limit of viral load detection in the laboratory at PMH was 400 copies/ml. The majority of subjects had undetectable viral loads (<400 copies/ml; Table 1), so meaningful analyses were unable to be performed with these data.

Discussion

Consistent with prior studies of HIV-associated depression in Africa [2, 5], the present study, which utilized two widely validated depression measures, found a high rate of depression in an HIV-positive population in Botswana. The positive relationship between scores on the two depression measures is consistent with prior studies comparing scores on these measures with subjects in the United States [7], and suggests reasonable cross-cultural equivalence. In addition, the results obtained with both depression measures was consistent with the examiners' behavioral observations and clinical impressions of subjects' affect and behavior. We were concerned that the nationality of the examiner might affect subject's willingness to report symptoms of depression, but this was not significant with either depression measure. Level of education was not associated with scores on either depression measure, despite the fact that the education of our subjects ranged widely, from no formal education to completion of postgraduate study. However, it was our impression that the multiple-choice format of the BDI-FS was less familiar to some individuals, and thus

initially more difficult for them to understand. This may partly explain why patients assessed in Setswana had lower scores on the BDI-FS. The lower scores in this group may also be related to socioeconomic issues, such as malnutrition and lower income, or related to cultural differences in rural/urban populations, which should be explored in future research. Consistent with previous African studies [12] showing that HIV+ women are at higher risk for depression, women had higher rates of depression on the BDI-FS.

The majority of individuals reported few problems on the ADL measure, consistent with our observation that most subjects appeared self-sufficient. However, the item on the ADL scale that subjects reported having most difficulty with was the ability to take medications. This clearly has important implications for HIV+ individuals, and requires further investigation. Our finding that depression was significantly related to difficulties with daily activities is consistent with a recent study of depression in HIV+ subjects in China, using this same ADL measure [1]. However, the subjects in the China study reported much higher incidence of both depression and impairment in daily activities. One important difference between the two studies was that our subjects were randomly chosen, compared to the smaller convenience sample used in the Chinese study.

The two depression measures show promise for use in resource-limited regions to identify HIV+ individuals with MDD according to DSM-IV criteria. Both inventories are designed to be used by healthcare personnel without training in psychiatry, and take only 3–5 minutes to administer/score. They are appropriate for use in busy, understaffed clinics to target persons most in need of antidepressant medication and/or counseling. In addition, the high incidence of HIV-associated depression documented in this and other studies within Africa suggests a need to provide strategies and interventions to help HIV+ individuals manage psychological symptoms. At the time of the study, only one subject was being prescribed antidepressant medication and one other subject was receiving counseling. Depression can be successfully treated with inexpensive and technically simple interventions by grassroots organizations. Early recognition and proper management of depression will not only improve quality of life for individuals with HIV, but may also be an effective intervention strategy to improve adherence and slow the spread of HIV.

This pilot study clearly has limitations. First, our sample did not include a matched HIV-negative (HIV-) group for comparison. Second, very few subjects reported any substance use, which may have been due to a reluctance of subjects to report substance use in our structured interview format carried out within the clinic. Alternate forms of data collection for substance use should be explored in future studies. Third, rural populations should be included to investigate cultural issues that may affect subject's willingness to report symptoms of depression. And fourth, to place our findings in context, additional research is needed to determine the lifetime prevalence of depression in the general population in Botswana.

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References

1. Hua J, Atkinson JH, HNRC China collaboration group. Depression and suicidality in HIV/AIDS in China. *J Affect Disord.* 2006;94:269–75. [PubMed: 16764941]
2. Makoae LN, Seboni NM, Molosiwa K, et al. The symptom experience of people living with HIV/AIDS in Southern Africa. *J Assoc Nurses AIDS Care.* 2005;16(3):22–32. [PubMed: 16433114]
3. American Psychiatric Association Diagnostic and statistical manual for mental disorders fourth edition (DSM-IV). Washington, DC: American Psychiatric Association; 1994.
4. World Health Organization The world health report 22: reducing risks, promoting healthy life. Geneva: World Health Organization; 2000.
5. Simbayl L, Kalichman S, Stebel A, Cloete A, Henda N, Mqeketo A. Internalization, stigma, discrimination, and depression among men and women living with HIV/AIDS in Cape Town, South Africa. *Soc Sci Med.* 2007;64(9):1823–31. [PubMed: 17337318]
6. Dalessandro M, Conti C, Ganbi F, et al. Antidepressant therapy can improve adherence to antiretroviral regimens among HIV-infected and depressed patients. *J Clin Psychopharmacol.* 2007;27(1):58–61. [PubMed: 17224714]
7. Beck AT, Steer R, Brown G. Manual for the Beck depression inventory-fast screen (BDI-FS) for medical patients. San Antonio: Psychological Corporation; 2000.
8. Krefetz DG, Steer RA, Jermyn RT, Condoluci DV. Screening HIV-infected patients with chronic pain for anxiety and mood disorders with the Beck anxiety and depression inventories-fast screens for medical settings. *J Clin Psychol Med Settings.* 2004;11(4):283–9.
9. Spitzer R, Williams J, Kroenke D, et al. Utility of a new procedure for diagnosing mental disorders in primary care. The PRIME-MD study. *JAMA.* 1994;272:1749–56. [PubMed: 7966923]
10. Tommasello AC, Gills LM, Lawler JT, Bujak GJ. Characteristics of homeless HIV-positive outreach responders in urban US and their success in primary care treatment. *AIDS Care.* 2006;18(8): 911–7. [PubMed: 17012080]
11. Lawton M, Brody E. Assessment of older people: self-maintaining and instrumental activities of daily living. *Gerontologist.* 1969;9:179–86. [PubMed: 5349366]
12. Olley BO, Seedat S, Nei DG, Stein D. Predictors of major depression in recently diagnosed patients with HIV/AIDS in South Africa. *AIDS Patient Care STDS.* 2004;18(8):481–7. [PubMed: 15321019]

Table 1

Demographic and clinical characteristics of subjects

Characteristics	Percent (%)	Mean	SD	Range
Age (years)		37.5	6.5	23–50
Education (years)		8.9	4.1	0–18
Gender (female)	50			
CD4 count		360.4	181.4	42–881.8
Viral load				
<400	80			490–270,000
>400	17	37,181.0	92,828.2	
Unknown	3			
Time since				
HIV+ diagnosis (years)		3.9	2.4	<1–14
On ARV drugs	97.5			
Time since beginning ARV drugs (years)		2.8	2.0	1–7
Marital status	75			
Single	75			
Married	23			
Widowed	2			
Employment status				
Employed	68			
Unemployed	32			
Language of test administration				
Setswana	39			
English	52			
Both	9			