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RESEARCH ARTICLE

Depressive symptoms and their sociodemographic determinants among people living with HIV/AIDS in Bangladesh: a cross-sectional study [version 1; peer review: 1 approved with reservations]

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Abstract

Background: This study aimed to determine the prevalence of depression and its associated factors among people living with HIV/AIDS in Bangladesh.

Methods: This cross-sectional study, which took place in Dhaka, Bangladesh, from July to December 2020, included 338 HIV-positive people. The method used was a simple random sampling technique. The Beck Depression Inventory assessed depression in HIV-positive people (BDI).

Results: More than 62 percent of the 338 people surveyed had severe depression, 30.5 percent had moderate depression, 5.6 percent had mild depression, and 1.8 percent had no depression at all. Age, being a man, being married, and having a low monthly income were all significant predictors of depression.

Conclusions: This study found that depressive symptoms are highly prevalent among HIV-positive patients in Bangladesh. The authors recommend that health care providers address depressive disorders for people with HIV/ AIDS comprehensively.

Keywords

HIV/AIDS, depression, depressive symptoms, acquired immune deficiency syndrome (AIDS), Bangladesh

Open Peer Review

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Introduction

Infection with the human immunodeficiency virus (HIV) causes acquired immune deficiency syndrome (AIDS) (Krämer, Kretzschmar, & Krickeberg, 2010). Around 38 million people worldwide are infected with HIV (Global Aids Update 2020, 2020). HIV is transmitted primarily through unprotected sex, contaminated blood transfusions, hypodermic needles, and mother-to-child transmission during pregnancy, delivery, or breastfeeding (Rom & Markowitz, 2007). Sharp and Hahn (2011) first recognized it as a new disease in 1981, when an increasing number of young homosexual men died of unusual opportunistic infections and rare cancers (Sharp & Hahn, 2011). According to the World Health Organization (WHO), 36.7 million people worldwide live with HIV and AIDS, with 1.1 million people dying from the disease in 2015 (World Health Organization, 2018). In Bangladesh, the first case of HIV was discovered in 1989 (Goldberg, 2010).

Depression is a mental illness marked by persistent sadness or despair that can alter a person's thoughts and feelings. It also has an impact on social behavior and physical well-being. It affects people of all ages, including children and teenagers (Deshmukh, Borkar, & Deshmukh, 2017). Depression is common among HIV-positive people. Depressed mood, loss of interest or pleasure, decreased energy, guilt or low self-worth, disturbed sleep or appetite, and poor concentration are all symptoms (World Health Organization, 2017). It obstructs daily life and lowers life quality. People living with HIV (PLHIV) had more mental health problems than people who were not infected with the virus, with those who had fewer problems being less likely to be poor and more likely to be employed, educated, and on antiretroviral therapy (ART). Being female, being in poor health, receiving poor-quality health care, and lacking material and emotional support from family and friends were all found to be more strongly linked to psychiatric morbidity (Brandt, 2009).

In PLWHA, depression is linked to increased morbidity and mortality, as well as poor adherence to antiretroviral therapy (ART), quality of life (QoL), and health-related quality of life (AQoL) (Abas, Ali, Nakimuli-Mpungu, & Chibanda, 2014). The financial cost of HIV treatment for the victim/patient is enormous, and it frequently leads to abject poverty for the sufferer and his or her family. Negative social consequences, such as stigma associated with being a PLWHA, are a problem that almost all PLWHAs face, limiting marriage and employment opportunities and possibly leading to divorce (Raguram, Weiss, Channabasavanna, & Devins, 1996). Even though depression among HIV patients is widespread in various countries, there is little evidence from Bangladesh. As a result, we conducted this research to fill a research gap that may provide evidence for future effective HIV/AIDS prevention and treatment.

Methods

From July to December 2020, an institution-based cross-sectional study among PLWHA in Bangladesh was conducted. Considering 67.3% population prevalence (Rai & Verma, 2015), 5% error, and 95% confidence interval, our sample size was 338. We conducted this study in all drop-in centers (DIC) of CARE Bangladesh located in Chankharpul, Swamibag, Dholpur, Hazaribagh, Noya Bajar, and Tongi of Dhaka city. We recruited adult males, females, and transgender who were advised for a routine checkup in those centers. HIV-positive patients who were not willing to participate in this study were excluded.

For this study, a purposive sampling technique was applied for selecting the HIV working organization, and after that, a simple random sampling technique was applied to recruit the study participants. A written, structured questionnaire based on the objectives and variables was used for data collection (see extended data). Only close-ended questionnaires were used to assemble data, and the interview was completed through the local language. Questionnaires were first prepared in English and then translated into the local language Bangla and again back translated into English to see the accuracy of Bangla translation.

The Statistical Package for Social Science (SPSS) version 25 was used to compile and analyze the data for this study. The questionnaire and data are available online (Rabeya *et al.*, 2021, 2022). A chi-square test or Fisher exact was used to determine the relationship between categorical variables. The presence and strength of association between independent variables and severe depression category were determined using crude and adjusted odds ratios with a 95 percent confidence interval (CI). Variables with a "p-value" of less than 0.05 were considered significant in the bivariate logistic model.

Primeasia University's Institutional Review Board (IRB) approved the study (in Dhaka, Bangladesh). Prior to data collection, we received approval from CARE Bangladesh addition to this approval. CARE Bangladesh is a humanitarian organization to improve the socioeconomic status of women and the marginalized population in Bangladesh. The purpose of the study was explained to each respondent (HIV-positive patient). Each respondent was given the option of declining to participate in the study, and the information gathered was kept private. Before providing information, each participant was informed about the study's purpose and signed a written consent form. This study was carried out in accordance with the Helsinki Declaration at every stage.

Ethics approval and consent to participate

The Institutional Review Board (IRB) of Primeasia University, Dhaka, Bangladesh, approved this study. The reference number is PAU/IEAC/22/103. Additionally, each participant was aware of the aim of the study, as well as they signed in the written informed consent form prior to providing information.

Results

Table 1 shows that a total of 338 male, female and transgender HIV positive respondents aged between 18 to more than 50 years were enrolled in the study. Demographic characteristics of the subject (n= 338) in this cross-sectional study shows that most of the participants (35.8%) belonged to age groups of 18 to 30 years, 31 to 40 years were 35.8%, 41 to 50 were 20.4%, and 50 and above were 8.0%. The mean age of the participants was 35.6 (± 9.9) years. The study revealed that 297 (87.95%) were male, whereas 20 (5.95%) were female, and 21 (6.2%) were transgender. Among 338 participants, 116 (34.3%) were illiterate, 173 (51.2%) were educated up to secondary school level (10th grade), 49 (14.5%) were Higher Secondary (12th grade) and above. Occupation revealed the following participants: 14.8% were unemployed/homemakers/others, 79.6% were employed, and 5.6% were students. In terms of religion, 93.5% were Muslims, and 6.5% were Hindu. Among the respondents, 57.7% were married, 34.4% were unmarried, and 7.4% were divorced or separated. The majority (76.3%) were from nuclear families, and 23.7% were from families with multiple members (spouses/parents). Most of the respondents (68.6%) came from a family consisting of two to five family members, followed by 24.6% of respondents who were single, and 6.8% were from more than six family members. The subjects'

Table 1. Demographic and socioeconomic features of the study subjects.

Independent variables	Categories	No. of respondents	Percent (%) of the respondents
Age	18-30 years	121	35.8
	31-40 years	121	35.8
	41-50 years	69	20.4
	Above 50 years	27	8.0
Mean age	35.6 (± 9.9)		
Sex	Male	297	87.9
	Female	20	5.9
	Transgender	21	6.2
Level of education	Illiterate	116	34.3
	Up to Secondary	173	51.2
	Higher Secondary and above	49	14.5
Occupation	Unemployed	50	14.8
	Employed	269	79.6
	Student	19	5.6
Religion	Muslim	316	93.5
	Hindu	22	6.5
Marital status	Married	195	57.7
	Unmarried	118	34.9
	Divorced or separated	25	7.4
Type of family	Nuclear	258	76.3
	Joint	80	23.7
Family size	Single	83	24.6
	2 to 5 members	232	68.6
	6 and above	23	6.8
Monthly income	Below 10000 taka	241	71.3
	11000 to 20000 taka	94	27.8
	21000 and above	3	0.9

Figure 1. Depression level of the HIV-positive respondents.

socioeconomic status showed that 71.3% of respondents' earnings were below 10000 TK per month based on their monthly income.

The Beck Depression Inventory (BDI) scale was used to determine depression, which was divided into four categories: no depression (0–9), mild depression (10–16), moderate depression (17–29), and severe depression (30–63) (Unnikrishnan, Jagannath, Ramapuram, Achappa, & Madi, 2012). We discovered that 62.1 percent had severe depression, 30.5 percent had moderate depression, 5.6 percent had mild depression, and only 1.8 percent had no depression at all (Figure 1).

Table 2 presents the results of the association between different categories of depression and various sociodemographic variables, where the significant association of depression was detected with age ($p=0.013$), religion ($p=0.038$), marital status ($p<0.002$), number of family members ($p=0.040$), and monthly income ($p<0.001$). Nevertheless, the variables like education, gender, occupation, family type did not exhibit any association with depression among HIV-positive respondents.

An adjusted multivariable model was created by forward stepwise logistic regression using the significant factors with the bivariate model. In our study, in the case of religion, Hindus were 4.9 times more prone to develop severe depression than their counterpart, Muslims (AOR=4.93; 95%CI: 1.09-22.24). Unmarried individuals had 1.9 times more chances to develop severe depression than married individuals (AOR=1.95; 95%CI: 1.00-3.80). Transgender people were more prone to develop severe depression than male and female respondents, but the association was not statistically significant in multivariable analysis. Similarly, students were more likely to develop severe depression than other occupations but did not find significant associations. Other variables such as education, family types, number of family members, and income were not significantly associated with depression of HIV patients (Table 3).

Discussion

The purpose of this study was to assess depression in PLWHA. This study included 338 HIV-positive respondents, ranging from 18 to more than 50 years old, with a mean age of 35.6 years. The average age of participants in a similar study conducted in Sub-Saharan Africa was 38.9 years, slightly higher than our study (van Copenhagen & Duvenage, 2019). Chikezie *et al.* in Nigeria found that the average age of participants was 35.57 years, which is similar to our study (Chikezie, Otakpor, Kuteyi, & James, 2013).

The Beck Depression Inventory was used in this study, and it was used to categorize depression into four categories: no depression, mild depression, moderate depression, and severe depression. We discovered that 62.1 percent of people had severe depression, 30.5 percent had moderate depression, 5.6 percent had mild depression, and 1.8 percent had no depression. A similar study conducted in Brazil found that the prevalence of no depression was 46.3 percent, mild depression was 17.7 percent, moderate depression was 22.7 percent, and severe depression was 13.3 percent, which was significantly lower than our study in terms of moderate and severe depression levels (Dal-Bó *et al.*, 2015). Another study in China found that 71.9 percent of people suffer from mild to severe depression (Su *et al.*, 2013). In the north, west, and

Table 2. Association between sociodemographic and socioeconomic factors with depression among people living with HIV.

	Depression level				Chi-square	p-value
	None	Mild	Moderate	Severe		
Age						
18-30 years	4 (3.3%)	4 (3.3%)	27 (22.3%)	86 (71.1%)	20.98	0.013
31-40 years	0 (0.0%)	9 (7.4%)	47 (38.8%)	65 (53.7%)		
41-50 years	0 (0.0%)	4 (5.8%)	23 (33.3%)	42 (60.9%)		
Above 50 years	2 (7.4%)	2 (7.4%)	6 (22.2%)	17 (63.0%)		
Sex						
Male	5 (1.7%)	16 (5.4%)	98 (33.0%)	178 (59.9%)	9.82	0.132
Female	1 (5.0%)	2 (10.0%)	3 (15.0%)	14 (70.0%)		
Transgender	0 (0.0%)	1 (4.8%)	2 (9.5%)	18 (85.7%)		
Level of education						
Illiterate	3 (2.6%)	12 (10.3%)	35 (30.2%)	66 (56.9%)	10.35	0.111
Up to Secondary	3 (1.7%)	7 (4.0%)	52 (30.1%)	111 (64.2%)		
Higher Secondary and above	0 (0.0%)	0 (0.0%)	16 (32.7%)	33 (67.3%)		
Occupation						
Unemployed	1 (2.0%)	2 (4.0%)	13 (26.0%)	34 (68.0%)	3.28	0.772
Employed	5 (1.9%)	17 (6.3%)	85 (31.6%)	162 (60.2%)		
Student	0 (0.0%)	0 (0.0%)	5 (26.3%)	14 (73.7%)		
Religion						
Muslim	6 (1.9%)	19 (6.0%)	101 (32.0%)	190 (60.1%)	8.40	0.038
Hindu	0 (0.0%)	0 (0.0%)	2 (9.1%)	20 (90.9%)		
Marital status						
Married	5 (2.6%)	16 (8.2%)	70 (35.9%)	104 (53.3%)	20.66	0.002
Unmarried	0 (0.0%)	3 (2.5%)	25 (21.2%)	90 (76.3%)		
Divorced or separated	1 (4.0%)	0 (0.0%)	8 (32.0%)	16 (64.0%)		

Table 2. *Continued*

	Depression level				Chi-square	p-value
	None	Mild	Moderate	Severe		
Types of family						
Nuclear	5 (1.9%)	12 (4.7%)	78 (30.2%)	163 (63.2%)	2.20	0.532
Multiple members (spouses/parents)	1 (1.2%)	7 (8.8%)	25 (31.2%)	47 (58.8%)		
Family size						
Single	0 (0.0%)	2 (2.4%)	18 (21.7%)	63 (75.9%)	13.21	0.040
2 to 5 members	6 (2.6%)	14 (6.0%)	79 (34.1%)	133 (57.3%)		
6 and above	0 (0.0%)	3 (13.0%)	6 (26.1%)	14 (60.9%)		
Monthly income						
Below 100000	5 (83.3%)	12 (63.2%)	66 (64.1%)	158 (75.2%)	28.89	<0.001
110000-200000	0 (0.0%)	6 (31.6%)	37 (35.9%)	51 (24.3%)		
210000 and above	1 (16.7%)	1 (5.3%)	0 (0.0%)	1 (0.5%)		

Table 3. Unadjusted and adjusted analysis of factors associated with severe depression among the participants.

Variables	Crude			Adjusted ¹		
	OR	95% CI	p value	OR	95% CI	p value
Age						
18-30 years	Ref.			Ref.		
31-40 years	0.47	0.27 – 0.80	0.006*	0.71	0.37 – 1.36	0.306
41-50 years	0.63	0.34 – 1.18	0.150	0.98	0.47 – 2.03	0.963
Above 50 years	0.69	0.28 – 1.65	0.409	1.26	0.48 – 3.29	0.627
Sex						
Male	Ref.			Ref.		
Female	1.56	0.58 – 4.17	0.376	1.64	0.57 – 4.73	0.354
Transgender	4.01	1.15 – 13.91	0.029*	1.59	0.38 – 6.60	0.518
Level of education						
Illiterate	Ref.			Ref.		
Up to Secondary	1.35	0.83 – 2.19	0.215	1.16	0.69 – 1.96	0.553
Higher Secondary and above	1.56	0.77 – 3.15	0.212	1.14	0.66 – 3.09	0.355
Occupation						
Unemployed	Ref.			Ref.		
Employed	0.71	0.37 – 1.35	0.301	0.95	0.46 – 1.95	0.892
Student	1.31	0.40 – 4.29	0.647	1.17	0.31 – 4.30	0.810
Religion						
Muslim	Ref.			Ref.		
Hindu	6.63	1.52 – 28.86	0.012*	4.93	1.09 – 22.24	0.038*
Marital status						
Married	Ref.			Ref.		
Unmarried	2.81	1.69 – 4.67	< 0.001*	1.95	1.00 – 3.80	0.049*
Divorced or separated	0.65	0.65 – 3.69	0.316	1.16	0.41 – 3.28	0.776
Types of family						
Nuclear	Ref.			Ref.		
Joint	0.83	0.49 – 1.38	0.476	0.77	0.42 – 1.43	0.420
Family size						
Single	Ref.			Ref.		
2 to 5 members	0.42	0.24 – 0.75	0.003*	0.69	0.33 – 1.45	0.331
6 and above	0.49	0.18 – 1.31	0.157	0.75	0.25 – 2.28	0.620
Monthly income						
<10,000	Ref.			Ref.		
10,001-20,000	0.62	0.38 – 1.01	0.056	0.65	0.38 – 1.14	0.120
>20,001	0.26	0.02 – 2.93	0.278	0.17	0.01 – 2.48	0.198

¹Adjusted with age, sex, religion, marital status, and family members.*Significant p-value at $p < 0.05$.

south of Iran, depression was found in 45 percent, 30 percent, and 56 percent of HIV patients, respectively. Furthermore, depression was prevalent in 25 percent of addicts and 58 percent of non-addicts, respectively (Doosti-Irani, Moameri, Ahmadi-Gharaei, & Holakouie-Naieni, 2017).

Some of the differences in depression prevalence could be due to those countries' socio-cultural and economic contexts, such as income, political and social stability, strong familial support, and healthy social environments. This cross-sectional study found that males were suffering more from depression than females. The possible reasons could be that men are more likely to smoke, drink alcohol, eat unhealthily, and are often less aware of medical conditions and confront unemployment, economic hardship, etc. (Alkazemi, 2019). A study conducted in Kalafong Provincial Tertiary Hospital is slightly different from our study, where they found that females were more depressive than males (55.70% vs. 50.66%) (van Coppenhagen & Duvenage, 2019). In addition, several studies also reported that women had more depression, anxiety, and stress, such as Gordillo *et al.* (Gordillo *et al.*, 2009) Wisniewski *et al.* (Wisniewski *et al.*, 2005) Rapaport *et al.* (Rapaport, Clary, Fayyad, & Endicott, 2005) and Othman *et al.* (Othman, Fadzil, Zakaria, Jaapar, & Husain, 2015).

This study revealed that participants whose monthly household income was less were at higher risk for depression; similar findings were reported by a study conducted at three hospitals in Ethiopia, which found that income less than 200 birr's was associated with depression (Gupta *et al.*, 2010). This could be because people in low-income countries are under pressure to rely on academics due to poverty-related factors, which leads to increased domestic work and a lack of access to health education and awareness (Al Jarad *et al.*, 2018). Deshmukh *et al.* conducted a study that backs up this claim (Deshmukh *et al.*, 2017).

Dorsisa *et al.* (2020) found that married people are more depressed than unmarried people in Ethiopia (Dorsisa, Ahimed, Anand, & Bekela, 2020), but we found that unmarried people are more likely to develop depression in our current study. Loneliness and a lack of mental support from partners to share the pain could be the cause, resulting in a variety of negative thoughts. Our research found a link between age and depressive symptoms in people aged 18 to 30, and Abebe *et al.* (2019) found a similar link. Understanding and conceptualizing that their HIV status increases with age and transitioning to adulthood may be fraught with developmental challenges (Abebe, Shumet, Nassir, Agidew, & Abebaw, 2019). In some studies, specific characteristics, such as age, employment status, and income level, have been linked to depression in PLWHA (Nanni, Caruso, Mitchell, Meggiolaro, & Grassi, 2014; Rabkin, 2008; Eller *et al.*, 2014; Do *et al.*, 2014).

Conclusions

The current study found a high prevalence of depressive symptoms among HIV-positive patients in Bangladesh. In order to improve patient care and clinical outcomes, routine screening is critical in addressing this common psychiatric condition among HIV-positive populations. Because depression is so common among HIV-positive people, policy-makers should include mental health programs in routine HIV care so that depression can be detected and treated early.

Data availability statement

Underlying data

Zenodo: Availability and use of technology for e-learning in Bangladesh <https://doi.org/10.5281/zenodo.5808314> (Rabeya, 2021)

This project contains the following underlying data:

- Data.xls (raw data from questionnaires)

Extended data

Zenodo: HIV/AIDS-Depression questionnaire. <https://doi.org/10.5281/zenodo.5904418> (Rabeya, 2022)

This project contains the following extended data:

- **Data file 1.** Copy of the survey administered to participants (in English).

Data are available under the terms of the [Creative Commons Attribution 4.0 International license](#) (CC-BY 4.0).

Author contributions

All of the authors greatly aided the manuscript's development.

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This is an important study documenting the burden of depressive symptoms among PLHIV, which can contribute to policy formulation, both locally and globally. The study has been conducted carefully and technically the study design is appropriate to respond to the study objectives. A review of the literature has been done optimally.

However, I have just two comments

Table 1 was not needed, it can be merged with table 2 as a composite table and that would reduce the article space in the journal.

Secondly, under the discussion section one or two articles relating to depression among people with other chronic diseases, might add value to the article.

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Depression, Reproductive health, Clinical trials, NCDs, Physical activity promotion, Oncology. etc.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 31 Aug 2022

Md. Kamrul Hasan

Comment-1: Table 1 was not needed, it can be merged with table 2 as a composite table and that would reduce the article space in the journal.

Author's Response: Thanks for the suggestion. As suggested the authors merged table 1 and table 2 and add a composite table in the revised (new version) manuscript.

Comment-2: Secondly, under the discussion section one or two articles relating to depression among people with other chronic diseases, might add value to the article.

Author's Response: Thanks. The authors added information relating to depression among people with other chronic diseases with appropriate citations in the revised (new version) manuscript.

Competing Interests: The authors declared no competing interests in this study.

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