Prevalence and Correlates of Psychological Distress Among HIV Positive Individuals in South Africa: Findings from the 2012 HIV National Household Survey

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Abstract: Psychological distress symptoms like depression and anxiety are potentially dangerous conditions in HIV positive individuals influencing health-seeking behaviour, care and treatment leading to poor health outcomes. This study sought to determine the prevalence of psychological distress symptoms and associated socio-demographic and health-related factors amongst HIV positive individuals. The study used the 2012 data from a nationwide cross-sectional population-based household survey that was conducted using a multi-stage stratified cluster sampling design. Bivariate and multivariate logistic regression analysis were used to identify factors associated with psychological distress among HIV positive individuals. Of 2 536 HIV infected individuals found in the study, 34.5% reported psychological distress symptoms. The prevalence of reported psychological distress symptoms was significantly higher among females (38.2%) than males (28.5%). Increased likelihood of psychological distress among HIV positive males was significantly associated with residing in urban informal areas than urban formal areas [OR=2.5(95% CI: 1.2-5.6), p=0.021], not engaging in vigorous intensity sport [OR=2.1 (95% CI: 1.2-3.8), p=0.009]. The decreased likelihood was significantly associated with being employed [OR=0.6 (95% CI: 0.4-1.0), p=0.066], not having any chronic condition [OR=0.5(95% CI: (0.3-1.0), p=0.037], and low risk drinkers than hazardous drinkers [OR=0.3(95% CI: 0.1-0.9), p=0.036]. Among HIV positive females, increased likelihood of psychological distress was significantly associated with never seeing a health personnel [OR=2.8 (95% CI: 1.2-6.7), p=0.022]. The decreased likelihood was significantly associated with seeing a health personnel more than one year ago than in the past 6 months [OR=0.7 (95% CI: 0.4-1.0), p=0.051], and not having any chronic conditions [OR=0.6 (95% CI: 0.5-0.9), p=0.017]. The findings suggest a need for integrated interventions including those addressing mental health issues which target HIV positive individuals in urban informal areas, the unemployed, hazardous risk drinkers, and those with chronic medical conditions.

Keywords: Psychological distress, HIV positive individuals, HIV Prevalence, Correlates, Household survey, South Africa.

INTRODUCTION

HIV and mental health continue to be major public health issues globally [1]. South Africa carries the world's heaviest HIV burden with 7.9 million people (14.0 % of the population) living with HIV [2]. HIV can result in considerable psychological distress that manifest in depression and anxiety burden [3, 4]. Psychological distress symptoms of depression and anxiety are often common among HIV positive individuals [5, 6].

In the context of HIV, psychological distress symptoms like depression and anxiety can Influence health-seeking behaviour or uptake of diagnosis and treatment for HIV/AIDS, creating non-adherence to treatment, adding to the burden of HIV disease and increasing the risk of mortality and morbidity due to HIV [7-9]. However, psychological distress symptoms often remain undetected and untreated in HIV health-care settings [9, 10]. Therefore, improved understanding of the prevalence of psychological distress symptoms (*i.e*., depression and anxiety) and associated factors is important in the fight against HIV.

Research evidence shows that the prevalence of psychological distress varies according to socio-demographic factors such as younger or older age, female gender, lower education and lower socioeconomic status, urban or rural residence, lack of social support, and stressful life events, substance

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abuse, and poor health status [8, 11, 12]. In South Africa, while the rise in psychological distress symptoms (depression and anxiety) among HIV positive individuals has been observed [4, 13, 14], the prevalence of psychological distress and factors associated among HIV positive individuals nationally is poorly understood.

This paper investigates the prevalence of psychological distress symptoms and associated socio-demographic and health-related factors amongst HIV positive individuals in South Africa using the 2012 nationally representative population-based household survey. Previous studies have been small scale both in terms of national representativeness and also sample sizes [15-17].

METHODS

Study Design and Sample

This analysis is based on data from the 2012 South African National HIV Prevalence, Incidence, and Behaviour Survey, a cross-sectional population based survey described in detail elsewhere [18]. The survey used a multi-stage stratified cluster sampling design to draw a systematic probability sample of 15 households from a total of 1,000 enumeration areas (EAs) selected randomly from a database of 86,000 EAs developed Statistics South Africa (Stats SA). The selection of EAs were stratified by both province and locality type and race group. The selected EAs formed the primary sampling units, and the visiting points (VPs) or households within the EAs were used as secondary sampling units. A systematic random sample of 15 VPs was selected from each of the 1,000 EAs, yielding a total sample size of 15,000 VPs [18].

Three detailed age-appropriate questionnaires (*i.e.*, one for parent/guardian of children aged 0 to 11 years, one for children aged 12 to 14 years, and one for persons aged 15 years and older) were used to solicit information related to demographic characteristics, HIV-related knowledge, attitudes, and behaviours as well as health-related issues. In particular, the questionnaire for those 15 years and older also included a module with questions that assessed the participants' levels of psychological distress symptoms (presence or absence of depression and anxiety disorders) to all consenting individual using the Kessler 10 scale [19, 20].

Dried blood spots (DBS) specimens were also collected from participants who consented for HIV testing. Samples were tested for HIV using an enzyme immunoassay (EIA) (Vironostika HIV Uni-Form II plus O, Biomeriux, Boxtel, The Netherlands), and samples which tested positive were retested using a second EIA (Advia Centaur XP, Siemens Medical Solutions Diagnostics, Tarrytown, New York, USA). Any samples with discordant results on the first two EIAs were tested with a third EIA (Roche Elecys 2010 HIV Combi, Roche Diagnostics, Mannheim, Germany).

Measures

The primary outcome is based on respondent's experience of anxiety and depressive disorders based on how they felt during the previous 30 days. This was measured using the Kessler 10 scale [19, 20] which consists of 10 items. This scale has been has been validated among low- and middle-income countries including South Africa [21, 22]. This scale measures these symptoms by asking: 'In the past 30 days, how often did you feel: tired out for no good reason; so nervous that nothing could calm you down, hopeless; hopeless; restless or fidgety, so restless that you could not sit still; depressed; that everything was an effort; so sad that nothing could cheer you up; worthless?' The frequency with which each of these items was experienced was recorded using a 5-point Likert scale (1 = never, 2 = rarely, 3 = some of the time, 4 = most of the time, 5 = all of the time). Row scores were then summed to calculate a total score indicating whether the respondents were likely to be well (score below 20), experiencing mild (score 20–24), moderate (score 25–29) or severe (score 30 and above) psychological distress [21]. The scores were then dichotomized into those who scored <19 absence of psychological distress = 0) and those who scored ≤ 20 (presence of psychological distress =1). The internal reliability coefficient for the K-10 in this study was Cronbach alpha = 0.90.

Explanatory variables included socio-demographic factors such as sex (male and female), age (15-24, 25 to 34 years, 35 to 49 years, and 50 years and older), race (Black African and other races[1]), marital status (not married and married), education level (no education/primary, secondary and tertiary), employment status (employed, not employed), locality type (urban formal, urban informal, rural informal, and rural formal), and asset-based socio-economic status

[1] "Other races" includes Whites, Indians and Coloureds combined. Such racial classification is still used in South Africa as various kinds of inequalities persist among Black Africans in almost every sphere of life as a legacy of the apartheid past.

(SES) based on the availability/ownership and utility of a broad range of household assets such as water, electricity, television, computer, refrigerator, and washing machine [23]. Multiple correspondence analyses (MCA) was used to calculate a composite indicator score computed by adding up all weighted responses [24]. The predicted score for each household was used to compute five quintiles (1st lowest, 2nd lower, 3rd middle, 4th higher and 5th highest) representing a continuum of household SES from the most poor to the least poor.

Other explanatory variables included health-related variables such as the last time one saw a health personnel (within the past6 months/more than 6 months but not more than a year ago/more than one year ago/never), hospitalization within the past year (yes/no), physical activity (not active/moderate activity/vigorous activity), presence of a chronic condition (yes/no), HIV status (positive/negative), ever test for HIV (yes/no), and awareness of HIV status (yes/no), and alcohol use risk score (non-excessive/excessive) based on a questionnaire for Alcohol Use Disorder Identification Test (AUDIT) scale [25], The AUDIT is a10-item self-report instrument that includes quantity and frequency of alcohol use and was designed to identify individuals for whom alcohol use is a risk factor either for developing alcohol problems or who already experience alcohol-related problems [26]. AUDIT scores range from 0 to 40, and in South Africa scores of 8 or greater are used to identify individuals who may be at risk or who are experiencing alcohol problems (also referred to as hazardous or harmful drinking). Hazardous drinking is defined as a quantity or pattern of alcohol consumption that places patients at risk for adverse health events, while harmful drinking is defined as alcohol consumption that results in adverse events (*e.g.*, physical or psychological harm to themselves or others) [27].

Data Analysis

Data were analysed using STATA 12 software (Stata Corporation, College Station, Texas, USA). Descriptive statistics were used to summarize background characteristics of the study sample and the prevalence of psychological distress symptoms by sex. Bivariate logistic regression analysis were used to assess the relationship between psychological distress symptoms and each explanatory variable. Statistically significant variables were entered into a multivariate logistic regression analysis to identify factors independently associated psychological distress symptoms among HIV infected individuals. Crude Odds ratios (OR) and adjusted a OR for the bivariate and multivariate models respectively with 95% confidence intervals (CI) were used as a measure the effect of each variable on psychological distress. All statistical analysis was significant at a p-value ≤0.05. Weighting procedures were carried out before data analysis to account for the multi-level complex design of the survey. Sample weights were introduced to correct for potential bias at the EA, household, and individual levels and also to adjust for non-response. The analyses took into account the complex, multi-level, stratified design of the survey using the *svy command* to adjust for unequal sampling.

Table 1: Socio-Demographic Characteristics of the Study Sample, South Africa 2012

Variables	Total*	%
Sex		
Males	789	38.6
Females	1747	61.4
Age groups (years)		
15-24	387	11.9
25 to 34	896	40.1
35 to 49	884	38.6
50+	369	9.4
Race Group		
Black African	2307	97.2
Other Race Groups	229	2.8
Marital status		
Not married	2041	81.0
Married	458	19.0
Education Level		
No education/Primary	557	21.2
Secondary	1502	74.5
Tertiary	81	4.3
Employment status		
Unemployed	1521	62.9
Employed	889	37.1
Asset based SES**		
Low SES	1433	56.1
Middle SES	885	38.4
High SES	192	5.5
Locality type		
Urban formal	874	40.5
Urban informal	503	13.4
Rural informal	826	41.6
Rural formal	333	4.6

*Subtotals do not add up to the overall total due to non-response and / or missing data, SES-Socio-Economic Status.

RESULTS

Characteristics of the Study Sample

A sub-sample of 2 536 HIV positive participants aged 15 years and older was used in the analysis, 38.6% (789) males and 61.4% (1747) females. Table **1** shows that the majority of the participants were females (61.4%), and 40.1% were aged 25 to 34 years (40.1%). The majority were Black African (97.2%), not married (81.0%), had secondary level education (74.5%), were unemployed (62.9%), and were from low SES households (56.1%) and about 40.5 % were from urban formal areas and 41.6% from urban formal areas.

Prevalence of Psychological Distress

Of the 2 536 HIV positive participants that responded to the questions on psychological distress, 34.5% (95% CI: 30.7-38.6) reported psychological distress symptoms. The prevalence of reported psychological distress symptoms was significantly higher among HIV positive females than males (38.3%; vs 28.5%, p<0.001). Table **2** shows that the proportion of reported psychological distress among HIV positive

Table 2: Prevalence of Psychological Distress and Socio-Demographic Characteristics Among HIV Infected Individuals by Sex, South Africa 2012

Variables	Males				Females			
	n	%	95% CI	p-value	n	%	95% CI	p-value
Age groups (years)								
15-24	91	22.1	11.5-38.2	0.128	296	31.5	24.7-39.1	0.072
25 to 34	274	25.8	19.4-33.4		622	35.6	29.9-41.6	
35 to 49	280	34.0	25.7-43.4		604	42.8	36.2-49.8	
50+	144	23.2	14.4-35.3		225	42.3	32.3-53.0	
Race Group								
Black African	689	28.7	23.8-34.2	0.394	1618	38.4	34.3-42.6	0.442
Other Race Groups	100	22.6	12.5-37.3		129	31.7	17.8-49.9	
Marital status								
Not married	592	29.6	23.9-36.0	0.198	1449	38.9	34.5-43.5	0.141
Married	186	21.7	13.7-32.6		272	32.3	25.1-40.5	
Education Level								
No education/Primary	190	31.4	21.8-43.0	0.707	367	40.4	31.9-49.5	0.107
Secondary	434	26.5	20.9-32.9		1068	39.1	34.5-43.8	
Tertiary	27	28.8	10.5-58.1		54	20.8	10.0-38.4	
Employment status								
Unemployed	340	36.7	28.7-45.4	0.008	1181	38	33.5-42.8	0.959
Employed	410	22.6	17.0-29.3		479	37.8	30.5-45.7	
Asset based SES								
Low SES	444	30.1	23.6-37.5	0.502	989	37.8	32.2-43.8	0.767
Middle SES	269	24.4	17.3-33.3		616	37.3	32.1-42.9	
High SES	68	31.9	16.0-53.7		124	43.1	30.0-57.3	
Locality type								
Urban formal	304	22.6	16.2-30.5	0.046	570	39.9	33.5-46.7	0.856
Urban informal	147	40.7	30.1-52.1		356	37.3	29.4-45.9	
Rural informal	196	31.5	23.0-41.4		630	37.2	30.8-44.1	
Rural formal	142	24.9	17.5-34.1		191	37.8	28.9-47.6	

Subtotals do not add up to the overall total due to non-response and / or missing data, CI-Confidence Intervals. SES-Socio-Economic Status.

males was only significantly higher among the unemployed when compared to those who were employed (36.7 vs 22.6%, p=0.008) and those residing in urban informal areas compared to other locality types (40.7%; p=0.046).

Table **3** shows that with health-related variables the proportion of reported psychological distress among HIV positive males was significantly higher among individuals that reported fair/poor than excellent/good self-rated health (SRH) (47.8%; 95% CI: 38.1-57.7), p<0.001), those that did not engage in vigorous intensity sport than those who did (33.4% vs. 19.0%, p=0.004), had been hospitalised for any illness in the past 12 months than those who were not (48.6% vs 25.8%, p= 0.009) and chronic medical condition than those who did not (44.0% vs 23.3%, p<0.001). Similarly, the proportion of reported psychological distress among HIV positive females among individuals that reported fair/poor than excellent/good SRH (54.1% vs 32.2%, p<0.001), those that did not engage in vigorous intensity than did (39.8% vs. 27.7%, p=0.008) and moderate intensity sport than did (40.5% vs. 29.2%, p=0.006), never saw health personnel in the past 12 months than did do so more than one year ago, more than 6 months but not more than a year ago and within the past 6 months (56.7% vs. 28.8% vs. 43.6% vs. 39.2%, p=0.011), and had chronic medical condition than did not (47.4% vs. 34.7%, p=0.001).

Table 3: Prevalence of Psychological Distress and Health-Related Variables among HIV-Infected Individuals by Sex, South Africa 2012

Variables	Males				Females			
Self-rated health	**n**	**%**	**95% CI**	**p-value**	**n**	**%**	**95% CI**	**p-value**
Fair/poor	217	47.8	38.1-57.7	<0.001	486	54.1	46.8-61.2	<0.001
Excellent/good	570	20.6	16.1-26.0		1253	32.2	27.9-36.7	
Do you do vigorous intensity sport?								
Yes	264	19.0	13.2-26.6	0.004	222	27.7	20.7-35.8	0.008
No	521	33.4	27.2-40.2		1519	39.8	35.4-44.4	
Do you do moderate intensity sport?								
Yes	283	24.8	17.6-33.7	0.272	332	29.2	22.8-36.6	0.006
No	501	30.5	24.7-37.1		1410	40.5	36.0-45.2	
When was last time you saw a health personnel?								
Within the past six months	407	32.8	26.1-40.3	0.520	1025	39.2	34.4-44.3	0.011
More than six months but not more than a year	123	34.3	23.3-47.4		273	43.6	34.3-53.3	
More than one year ago	212	18.0	11.0-28.0		373	28.8	22.3-36.2	
Never	43	26.7	13.0-47.1		64	56.7	36.8-74.6	
Have you been hospitalised in the past 12 months?								
Yes	79	48.6	30.9-66.7	0.009	170	35.2	25.9-45.8	0.521
No	709	25.8	21.4-30.9		1571	38.7	34.4-43.1	
Do you have any chronic medical condition?								
Yes	196	44.0	33.5-55.1	<0.001	530	47.4	39.9-55.0	0.001
No	589	23.3	18.7-28.8		1209	34.7	30.4-39.2	
Alcohol use AUDIT score*								
Hazardous drinkers (20+)	321	32.1	24.4-40.9	0.104	1293	38.0	33.5-42.7	0.107
Abstainers	221	20.0	13.9-28.0		219	37.0	25.4-50.4	
Low drinkers (1-7)	124	29.1	17.7-44.0		62	41.9	27.7-57.5	
High risk drinkers (8-19)	25	45.0	22.9-69.2		9	100.0		

Subtotals do not add up to the overall total due to non-response and / or missing data, CI-Confidence Intervals, *Alcohol risk score based on a questionnaire for Alcohol Use Disorder Identification Test (AUDIT).

Factors Associated with Psychological Distress

Bivariate Models

Table **4** shows that in the bivariate logistic regression analysis with socio-demographic factors among HIV positive males, the increased likelihood of psychological distress was significantly associated with living in urban informal areas [OR=2.4 (95% CI: 1.2-4.5), p=0.010]. While the decreased likelihood was significantly associated with being employed than unemployed [OR=0.5 (95% CI: 0.3-0.8), p=0.005). Among HIV positive females, the increased likelihood of psychological distress was significantly associated with age among those aged 35 to 49 years [OR=1.6 (95% CI: 1.1-2.5), p=0. 0.023] than among those of other ages. While the decreased likelihood was significantly associated with having tertiary level education than having no education or primary level education [OR=0.4 (95% CI: 0.2-0.9), p=0.037].

Table **5** shows that in the bivariate logistic regression analysis with health-related factors among HIV positive males, the increased likelihood of psychological distress was significantly associated with not doing vigorous intensity sport [OR=1.3 (95% CI: 1.3-3.6), p=0.005]. While the decreased likelihood of psychological distress was significantly associated with reported excellent/good SRH than fair/poor SRH [OR=0.3 (95% CI: 0.2-0.5), p<0.001], visiting health personnel more than a year ago than in the past 6

Table 4: Bivariate Logistic Regression Models of Socio-Demographic Factors Associated with Psychological Distress among HIV Infected Individuals by Sex

	Male Model				Female Model			
Age group (in) years	**OR**	**95% CI**		**p-value**	**OR**	**95% CI**		**p-value**
15-24	1				1			
25 to 34	1.2	0.6	2.7	0.614	1.2	0.8	1.8	0.407
35 to 49	1.8	0.8	4.0	0.136	1.6	1.1	2.5	0.023
50+	1.1	0.5	2.5	0.881	1.6	1.0	2.7	0.073
Race Group								
Black African	1				1			
Other Race Groups	0.7	0.3	1.6	0.407	0.7	0.4	1.5	0.426
Marital status								
Not married	1.0				1			
Married	0.7	0.4	1.2	0.174	0.8	0.5	1.1	0.143
Education Level								
No education/Primary	1				1			
Secondary	0.8	0.4	1.4	0.418	0.9	0.7	1.3	0.765
Tertiary	0.9	0.2	3.3	0.852	0.4	0.2	0.9	0.037
Employment status								
Unemployed	1				1			
Employed	0.5	0.3	0.8	0.005	1.0	0.7	1.4	0.957
Asset based SES								
Low SES	1				1			
Middle SES	0.8	0.4	1.3	0.287	1.0	0.7	1.3	0.883
High SES	1.1	0.4	2.7	0.849	1.2	0.7	2.3	0.467
Locality type								
Urban formal	1				1			
Urban informal	2.4	1.2	4.5	0.010	0.9	0.6	1.4	0.609
Rural informal	1.6	0.9	2.8	0.110	0.9	0.6	1.3	0.521
Rural formal	1.1	0.6	2.1	0.690	0.9	0.6	1.5	0.716

SES-Socio-economic status, unadjusted OR-Odds ratio, CI-Confidence intervals, SES-socio-economic status, p-value ≤ 0.05 considered significant.

Table 5: Bivariate Logistic Regression Analysis of Health Related Factors Associated with Psychological Distress among HIV Infected Individuals by Sex

	Male Model				Female Model			
	OR	95% CI		p-value	OR	95% CI		p-value
Self-rated health (SRH)								
Fair/poor	1				1			
Excellent/good	0.3	0.2	0.5	<0.001	0.4	0.3	0.6	<0.001
Do you do vigorous intensity sport?								
Yes	1				1			
No	2.1	1.3	3.6	0.005	1.7	1.2	2.6	0.008
Do you do moderate intensity sport?								
Yes	1				1			
No	1.3	0.8	2.2	0.273	1.7	1.1	2.4	0.007
When was last time you saw a health personnel?								
Within the past six months	1				1			
More than six months but not more than a year	1.1	0.6	2.0	0.83	1.2	0.8	1.8	0.372
More than one year ago	0.4	0.2	0.9	0.015	0.6	0.4	0.9	0.014
Never	0.7	0.3	1.9	0.544	2.0	0.9	4.7	0.097
Have you been hospitalised for any illness in the past 12 months?								
Yes	1				1			
No	0.4	0.2	0.8	0.006	1.2	0.7	1.8	0.528
Do you have any chronic medical condition?								
Yes	1.0				1.0			
No	0.4	0.2	0.7	<0.001	0.6	0.4	0.8	0.001
Alcohol use AUDIT score*								
Hazardous drinkers (20+)	1				**	**	**	**
Abstainers	0.6	0.2	1.9	0.374	**	**	**	**
Low drinkers (1-7)	0.3	0.1	1.1	0.062	**	**	**	**
High risk drinkers (8-19)	0.5	0.1	1.9	0.308	**	**	**	**

Unadjusted OR-Odds ratio, CI-Confidence intervals, *Alcohol risk score based on a questionnaire for Alcohol Use Disorder Identification Test (AUDIT), **The variable was omitted by the model, p-value ≤ 0.05 considered significant.

months [OR=0.4 (95% CI: 0.2-0.9), p=0.015], not being hospitalized in the past 12 months [OR=0.4 (95% CI: 0.2-0.8), p=0.006], and not having any chronic medical condition [OR=0.4 (95% CI: 0.2-0.7), p<0.001].

Similarly, among HIV positive females, the increased likelihood of psychological distress was significantly associated with not doing vigorous intensity sport [OR=1.7 (95% CI: 11.2-2.6), p=0.008] and moderate intensity sport [OR=1.7 (95% CI: 1.1-2.4), p=0.007]. While the decreased likelihood was significantly associated with reported excellent/good SRH than fair/poor SRH [OR=0.4 (95% CI: 0.3-0.6), p <0.001], visiting health personnel more than a year ago than in the past six months [OR=0.6 (95% CI: 0.4-0.9), p=0.014], and not having any chronic medical condition [OR=0.6 (95% CI: 0.4-0.8), p=0.001].

Multivariate Model

Figure **1** shows final multivariate model for factors associated with reported psychological distress symptoms among HIV positive males and females. In the male model the increased likelihood of psychological distress was significantly associated with residing in urban informal areas than urban formal areas [aOR=2.5(95% CI: 1.2-5.6), p=0.021], and not engaging in vigorous intensity sport [aOR=2.1 (95% CI: 1.2-3.8), p=0.009]. The decreased likelihood of psychological distress was significantly associated with being employed [aOR=0.6 (95% CI: 0.4-1.0), p=0.066],

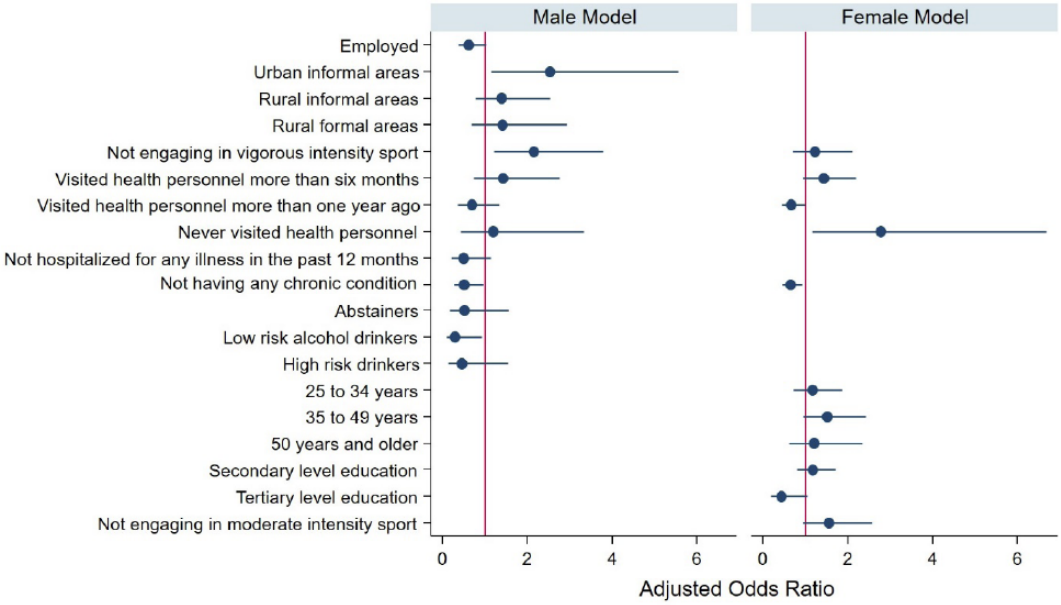

Figure 1: Coefficient plots of the multivariate logistic regression models of factors associated with psychological distress among HIV positive individual stratified by sex.

not having any chronic condition [aOR=0.5 (95% CI: (0.3-1.0), p=0.037], and low risk drinkers than hazardous drinkers [aOR=0.3 (95% CI: 0.1-0.9), p=0.036].

In the female model, the increased likelihood of psychological distress was significantly associated with never seeing a health personnel [aOR=2.8 (95% CI: 1.2-6.7), p=0.022]. The decreased likelihood of psychological distress was significantly associated with seeing a health personnel more than one year ago than in the past 6 months [aOR=0.7 (95% CI: 0.4-1.0), p=0.051], and not having any chronic conditions [aOR=0.6 (95% CI: 0.5-0.9), p=0.017].

DISCUSSION

This study sought to determine the prevalence of psychological distress symptoms and associated socio-demographic and health-related factors among HIV positive individuals in South Africa. The following results were found. Firstly, the prevalence of psychological distress symptoms among HIV positive individuals was 34.5%. Secondly, the prevalence of reported psychological distress symptoms was significantly higher among females (38.2%) than males (28.5%). Thirdly, increased likelihood of psychological distress among HIV positive males was significantly associated with residing in urban informal areas than urban formal areas, and not engaging in vigorous intensity sport while decreased likelihood was significantly associated with being employed, not having any chronic condition, and low risk drinkers than hazardous drinkers. Fourthly, among females, increased likelihood of psychological distress was significantly associated with never seeing a health personnel while decreased likelihood was significantly associated with seeing a health personnel more than one year ago than in the past 6 months, and not having any chronic conditions.

In this study, the prevalence of psychological distress was significantly higher among females compared to males. Similar findings were reported by the South African National Health and Nutrition Examination Survey (SANHANES) [28]. These findings are also in line with other studies that found high prevalence of psychological distress among females due to factors such as pregnancy, poverty, sexual harassment and abuse [29]. It's been argued that females are at a distinct disadvantage in most South African communities such as economic and gender inequality including sex roles, and such disparities make females more susceptible to psychological distress.

The findings of this study showed that contextual factors such as type of residence and employment contribute to the risk of psychological distress. Prevalence of psychological distress was found higher among males who resided in urban informal areas and those who were unemployed than their female counterparts. In support of these findings, evidence showed that contextual factors such as poor

socioeconomic status, are related to both HIV/AIDS and psychological distress symptoms such as depression and anxiety [30, 31]. In line with current findings, psychological distress symptoms such as depression were also found in males who resided in informal settlements and were associated with stealing because of hunger, being more controlling in relationships, and being more ashamed about lack of work [31]. Furthermore, consistent with current findings, research demonstrates that conditions such as poverty, poor housing and amenities, unemployment, and gender inequality may be additional stressors to one's wellbeing [7].

Among females, the findings showed that factors such as poor health, never seen a health personnel and presence of chronic medical conditions were found to be associated with psychological distress. In agreement with current findings, poor self-rated health and diagnoses with other chronic medical illnesses have been associated with psychological distress among HIV positive individuals [32]. Poor emotional and physical health often co-occur among HIV positive individuals, and it is therefore important to intervene in an integrated manner that address all of their health needs [33]. In addition, studies show that physical activity can change an individual's mental state and therefore help prevent and manage mental health problems [34, 35].

This study is not without limitations. The study relied on self-report for obtaining data on depression and anxiety diagnosis to assess psychological distress symptoms. The K10 scale used to measure psychological distress is also not a diagnostic tool but rather a screening tool. This study does not examine the aetiology of the psychological distress but only correlates thereof; we therefore could not determine the causes of psychological distress but instead made associations with mediating factors. The study may also be limited by other unmeasured important predictors of psychological distress that were not accounted for in the analysis. Nevertheless, this nationally representative population-based study adds to the growing literature on the prevalence of psychological distress and associated factors among HIV positive individuals both globally and in South Africa due to the large number of HIV positive individuals involved.

In conclusion, the reported co-occurrence of psychological distress symptoms and HIV suggest a need for integrated intervention strategies (prevention, treatment, and health promotion) for HIV and psychological distress especially among females. The findings also suggest a need for a targeted focus on HIV positive individuals in urban informal areas, the unemployed, hazardous risk drinkers, and those with chronic medical conditions. As there is big shortage of professional mental health practitioners in most countries in Sub-Saharan Africa including South Africa, there is need to consider expanding the role played by lay (non-specialist) health providers in local communities who have been successfully used to provide both pre-and post-counselling during testing for HIV infections to also provide for follow-up counselling [36, 37]. However, there is also a need for more studies that track changes and trends overtime on factors that underlie linkages between psychological distress symptoms and HIV in South Africa.

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