



## Article

# Prevalence of psychological distress and its association with socio-demographic and HIV-risk factors in South Africa: Findings of the 2012 HIV prevalence, incidence and behaviour survey



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## ABSTRACT

**Background:** In South Africa, there are limited nationally representative data on the prevalence and factors associated with psychological distress. This study used a 2012 nationally representative population-based household survey to investigate factors associated with psychological distress in South Africa.

**Methods:** The survey is based on a multistage stratified cross-sectional design. Univariate and multivariate logistic regression models were fitted to identify factors associated with psychological distress.

**Results:** Out of a total 25860 participants, 23.9% reported psychological distress. Higher likelihood of reporting psychological distress was significantly associated with being female [OR = 1.68 (95% CI: 1.34–2.10),  $p < 0.001$ ], aged 25 to 49 years [OR = 1.35 (95% CI: 1.08–1.70),  $p = 0.010$ ] and 50 years and older [OR = 1.44 (95% CI: 1.06–1.97),  $p = 0.023$ ], Black Africans [OR = 1.61 (95% CI: 1.24–2.10),  $p < 0.001$ ], a high risk drinker [OR = 1.37 (95% CI: 1.02–1.83),  $p = 0.037$ ], a hazardous drinker [OR = 4.76 (95% CI: 2.69–8.42),  $p < 0.001$ ] and HIV positive, [OR = 1.79 (95% CI: 1.55–2.08)  $p < 0.001$ ], while lower likelihood of reporting psychological distress was significantly associated with being married [OR = 0.78 (95% CI: 0.62–0.98),  $p = 0.031$ ], employed [OR = 0.71 (95% CI: 0.57–0.88),  $p = 0.002$ ], and living in a rural formal area [OR = 0.73 (95% CI: 0.55–0.97),  $p = 0.033$ ].

**Conclusion:** There is a need to develop strategies to alleviate psychological distress in the general population, with a particular focus on those who may be more vulnerable to distress such as females, the aged, excessive alcohol users, the unemployed, people living with HIV and those residing in urban areas as identified in the current findings.

## Introduction

Mental health is a public health priority globally; however, in low and middle-income countries mental health remains a low priority for health practitioners, as a concerted focus is on the prevention and control of infectious diseases (Prince et al., 2007; Sipsma et al., 2013). Poor mental health includes psychological distress, which refers to a perceived or actual threat experienced by an individual, that may be physiological or psychological (Andreou et al., 2011). Psychological distress, is widely used in public health research as an indicator of population mental health, and is viewed as a multifaceted phenomenon, a product of synergies between biological, structural, psychosocial, and behavioural factors (Caron et al., 2012). Globally, psychological

distress is a major contributor to the burden of disease, and the burden of disease is higher in low and middle-income countries including South Africa (SA) (Murray, Vos, Lozano, Naghavi & Flaxman, 2012; Prince et al., 2007).

Among South African adults, in 2012, the prevalence of psychological distress constituted 28.4%, with varying proportions of the intensity of distress such as 10.3% prevalence of moderate levels of distress, 4.2% prevalence of high levels of distress and 2.2% prevalence of very high levels of distress (Shisana & Labadarios, et al., 2014). Psychological distress has been shown to vary by socio-demographic factors which include age, gender, race, culture, ethnicity, religious contexts, household roles, educational achievement and socio-economic status (Canavan et al., 2013; Flisher & Gevers, 2010; Jackson et al.,

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2010; Nduna & Jewkes, 2012; Sipsma et al., 2013). In the general population, stressful life events have also been shown to be a significant risk factors for psychological distress (Tomlinson, Grimsrud, Stein, Williams, & Myer, 2009). There is a complex interplay of socio-demographic and stress-related factors that increase vulnerability to psychological distress.

In addition, various HIV risk-related factors (i.e. risky sexual behaviours and alcohol use) have been found to be associated with psychological distress. A growing body of literature highlights associations between psychological distress and sexual risk behaviours such as multiple sexual partners, inconsistent condom use and transactional sex (Brody et al., 2016; Elkington, Bauermeister, & Zimmerman, 2010; Lundberg, 2014; Pengpid, Peltzer, & Skaal, 2013). Psychological distress is also documented to be significantly higher among individuals who use alcohol (Balogun, Koyanagi, Stickley, Gilmour, & Shibuya, 2014; Foulds et al., 2013). Risky sexual behaviours and alcohol use have also been found to be positively associated with each other. (Choudhry, Agardh, Stafström, & Östergren, 2014; Indig, Eyeson-Annan, Copeland, & Conigrave, 2007) Moreover, risky sexual behaviours and alcohol use are both inversely associated with mental health (Ramrakha et al., 2013).

Empirical evidence concerning the numerous risk and protective factors associated with distress is vital for informing existing interventions and designing new ones. However, there is limited nationally representative data on the prevalence and factors associated with psychological distress in South Africa (Tomlinson et al., 2009). This study, therefore, used a 2012 South African national population-based household survey to investigate socio-demographic factors and HIV risk-related behaviours factors associated with psychological distress.

## Methods

### Study design and sample

The study used data from the National HIV Prevalence, Incidence and Behaviour Survey, conducted in SA in 2012, which was based on a multistage stratified cross-sectional design described in detail elsewhere (Shisana & Rehle, et al., 2014). Briefly, 1000 enumeration areas (EAs) were selected from the 2001 population census areas and mapped by aerial photography to create the master samples that informed the sampling of households. A systematic probability sample of 15 households was drawn from each of the 1000 randomly selected EAs. The selection of EAs was stratified by province and four locality types were defined, namely urban formal (formal settlements - with official governmental approval), urban informal (Informal settlements - without official governmental approval), rural formal (including commercial farms) and rural informal localities (including tribal authority areas).

Persons of all ages living in the selected households were eligible to participate in the survey. Household and age-appropriate individual questionnaires were administered to consenting eligible individuals to solicit information on demographic characteristics, HIV-related knowledge, attitudes, and behaviours and health issues (Shisana & Rehle, et al., 2014). Dried blood spots (DBS) specimens collected by nurses were tested anonymously for HIV antibodies using a testing algorithm with three different immunoassays (Vironostika HIV Uni-Form II plus O, Biomeriux, Boxtel, The Netherlands; Advia Centaur XP, Siemens Medical Solutions Diagnostics, Tarrytown, NJ, USA; (Roche Elecsys 2010 HIV Combi, Roche Diagnostics, Mannheim, Germany). A total of 42 950 individuals in the valid households were eligible to be interviewed, and 38 431 agreed to be interviewed. Of these, 25,860 responded to the 10-item scale used as a brief screening tool to identify the person's level of psychological distress.

Ethical approval for the study was obtained from the Research Ethics Committee of the Human Sciences Research Council, South Africa (REC: 5/17/11/10) as well as by the Associate Director of Science of the National Center for HIV and AIDS, Viral Hepatitis, STD

and TB Prevention at the USA's Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia, USA.

### Measures

Psychological distress was based on the 10-item scale used as a brief screening tool to identify the person's level of psychological distress (Kessler et al., 2002). The Kessler Psychological Distress Scale (K10) was used to measure psychological distress (Kessler et al., 2001). The K10 scale appraises items on how respondents felt during the previous 30 days on a 5-point Likert scale (1 = never, 2 = rarely, 3 = some of the time, 4 = most of the time, 5 = all of the time). In the original measure, raw scores are summed, and a total score indicates that respondents are likely to be well (score below 20), experiencing mild (score 20–24), moderate (score 25–29) or severe (score 30 and above) psychological distress (Andrews & Slade, 2001). For this analysis, due to the small number in each of the categories, the scores were dichotomized into those who scored < 20 (absence of psychological distress = 0) and those who scored  $\leq$  20 (presence of psychological distress = 1). Socio-demographic characteristics included sex, age, race, marital status, education level, employment status, and locality type. Information on HIV risk-related behaviours was collected among those who reported having ever had sexual intercourse, and included sexual partners in last 12 months, concurrent sexual partnerships, age disparate partnerships of 5 years or more, condom use at last sex, and consistent condom use. Risky alcohol use was also measured using the AUDIT risk score (0 = abstainers; 1–7 = low-risk drinkers; 8–19 = high-risk drinkers; 20+ = hazardous drinking) (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993).

### Statistical analysis

Descriptive statistics (frequency distribution and percentages) were used to characterize the prevalence of psychological distress by socio-demographic and HIV risk-related factors. Bivariate logistic regression models were used to identify potential factors associated with psychological distress. Statistically significant covariates from the bivariate analysis were entered into a multivariate logistic regression model to examine the independent effects of covariates associated with psychological distress. For all the analysis unadjusted and adjusted odds ratios (ORs) with 95% confidence intervals (CI) were used to measure the strength and direction of the association, and the level of significance at  $p \leq 0.05$ . The “svy” command was used to introduce weights which take into account the complex design of the survey. All data were analysed using statistical software STATA version 13.0 (Stata Corp, College Station, Texas, USA).

## Results

### Prevalence of mental distress

Out of a total 25,860 participants 23.9% reported psychological distress. A significant proportion of females reported higher psychological distress than males. Reported psychological distress was also significantly higher among those 50 years and older, Black Africans, those not married, those with no education or with primary educational qualifications, the unemployed, and those living in urban informal areas (Table 1).

Psychological distress was also significantly higher among those who reported sexual partners at least 5 years older than them, condom use at last sex, consistent condom use, risky/hazardous and high risk/harmful alcohol users, and those whose serostatus was positive (Table 1).

**Table 1**  
Reported psychological distress by socio-demographic characteristics and HIV risk-related factors among participants 15 years and older.

SOCIO-DEMOGRAPHIC VARIABLES	n = 25,860	%	95% CI	p-value
<b>Sex</b>				
Male	11,185	19.6	17.8–21.5	< 0.001
Female	14,675	27.8	25.8–29.9	
<b>Age group in years</b>				
15–24	6972	20.1	18.2–22.1	< 0.001
25–49	11,341	24.9	22.9–27.0	
50+	7547	26.1	23.6–28.8	
<b>Race groups</b>				
Black African	14,770	26.4	24.4–28.6	< 0.001
Other <sup>a</sup>	11,029	14.9	13.2–16.8	
<b>Marital status</b>				
Not Married	16,367	25.2	23.2–27.3	< 0.001
Married	9119	20.8	18.8–22.9	
<b>Education level</b>				
No education/Primary	4183	28.2	24.8–31.9	< 0.001
Secondary	15,590	23.3	21.5–25.3	
Tertiary	2215	15.9	12.8–19.6	
<b>Employment status</b>				
No	14,003	26.9	24.7–29.2	< 0.001
Yes	9497	19.3	17.6–21.2	
<b>Locality type</b>				
Urban formal	15,339	23.3	21.1–25.7	0.03
Urban informal	2591	30.3	25.7–35.3	
Rural informal	5453	24.2	20.9–27.8	
Rural formal	2477	17.7	14.1–21.9	
<b>HIV RISK-RELATED VARIABLES</b>	n = 25,860	%	95% CI	p-value
<b>Sexual partners in last 12 months</b>				
One partner	13,888	22.8	21.0–24.7	0.604
More than two partner	1435	21.8	18.4–25.7	
<b>Concurrent partnership</b>				
No	463	24.9	19.5–31.2	0.997
Yes	305	24.9	17.1–34.6	
<b>Age disparate partnerships</b>				
5+ older	3154	26.9	24.1–29.9	< 0.001
5+ younger	2604	20.3	17.6–23.2	
Within 5 years older or younger	9535	21.9	19.9–24.0	
<b>Condom use last sex</b>				
No	10,447	21.4	19.6–23.4	0.004
Yes	4583	25	22.6–27.6	
<b>Consistent condom use</b>				
No	11,608	22	20.2–23.8	0.032
Yes	3596	24.8	22.1–27.7	
<b>Alcohol use risk score (AUDIT)<sup>b</sup></b>				
Abstainers (0)	14,344	25.1	22.9–27.5	< 0.001
Low risk (1–7)	6219	17.7	15.9–19.7	
High risk drinkers (8–19)	2141	30.7	27.1–43.5	
hazardous (20+)	285	58.9	49.8–67.4	
<b>Ever tested for HIV</b>				
No	9531	22.7	20.7–24.8	0.065
Yes	16,208	24.5	22.6–26.5	
<b>Awareness of HIV status</b>				
No	15,662	23.5	21.7–25.4	0.227
Yes	9816	24.6	22.5–26.8	
<b>HIV serostatus</b>				
Negative	17,531	22.7	20.9–24.7	< 0.001
Positive	2533	34.5	30.9–38.4	

<sup>a</sup> For other races the sample was too small hence they were grouped. Subtotals do not total (n) due to non-response and / or missing data.

<sup>b</sup> Alcohol risk score based on a questionnaire for Alcohol Use Disorder Identification Test (AUDIT) and scores used for categorisation within parentheses. Subtotals do not total (n) due to non-response and / or missing data.

*Factors associated with psychological distress*

Table 2 shows unadjusted odds ratios for socio-demographic and HIV risk-related factors associated with psychological distress. The higher likelihood of reporting psychological distress was significantly associated with being female [OR = 1.57 (95% CI: 1.43–1.73), p < 0.001], age 25 to 49 years [OR = 1.32 (95% 1.17–1.48), p < 0.001] and 50 years and older [OR = 1.41 (95%: 1.23–1.61),

**Table 2**  
Socio-demographic and HIV-related factors associated with psychological distress among participants 15 years and older (n = 25,860).

SOCIO-DEMOGRAPHIC VARIABLES	OR	95% CI	p-value
<b>Sex</b>			
Male	1		
Female	1.57	1.43–1.73	< 0.001
<b>Age group in years</b>			
15–24	1		
25–49	1.32	1.17–1.48	< 0.001
50+	1.41	1.23–1.61	< 0.001
<b>Race groups</b>			
Other	1		
Black African	2.05	1.71–2.44	< 0.001
<b>Marital status</b>			
Not Married	1		
Married	0.78	0.69–0.89	< 0.001
<b>Education level</b>			
No education/Primary	1		
Secondary	0.78	0.66–0.91	0.002
Tertiary	0.48	0.36–0.65	< 0.001
<b>Employment status</b>			
No	1		
Yes	0.65	0.58–0.74	< 0.001
<b>Locality type</b>			
Urban formal	1		
Urban informal	1.43	1.10–1.86	0.008
Rural informal	1.05	0.84–1.32	0.67
Rural formal	0.71	0.52–0.95	0.023
<b>HIV RISK-RELATED VARIABLES</b>	OR	95% CI	p-value
<b>Sexual partners in last 12 months</b>			
One partner	1		
More than two partner	0.95	0.76–1.17	0.604
<b>Concurrent partnership</b>			
No	1		
Yes	1	0.58–1.72	0.997
<b>Age disparate partnerships</b>			
Partner 5 years and older	1		
Partner 5 years younger	0.69	0.57–0.83	< 0.001
Partner within 5 years older or younger	0.76	0.65–0.90	< 0.001
<b>Condom use last sex</b>			
No	1		
Yes	1.22	1.07–1.40	0.004
<b>Consistent condom use</b>			
No	1		
Yes	1.17	1.01–1.35	0.032
<b>Alcohol use risk score (AUDIT)<sup>a</sup></b>			
Abstainers (0)	1		
Low risk (1–7)	0.64	0.55–0.75	< 0.001
High risk drinkers (8–19)	1.32	1.09–1.59	0.004
Hazardous drinkers (20+)	4.27	2.95–6.18	< 0.001
<b>Ever tested for HIV</b>			
No	1		
Yes	1.11	0.99–1.23	0.065
<b>Awareness of HIV status</b>			
No	1		
Yes	1.06	0.96–1.18	0.227
<b>HIV serostatus</b>			
Negative	1		
Positive	1.79	1.55–2.08	< 0.001

<sup>a</sup> Alcohol risk score based on a questionnaire for Alcohol Use Disorder Identification Test (AUDIT)

p < 0.001], Black African [OR = 2.05 (95%: 1.71–2.44), p < 0.001], and residing in urban informal areas [OR = 1.43 (95%: 1.10–1.86), p < 0.001]. On the other hand, the lower likelihood of reporting psychological distress was significantly associated with being married [OR = 0.78 (95%: 0.69–0.89), p < 0.001], having secondary [OR = 0.78 (95%: 0.66–0.91), p = 0.002] and tertiary education [OR = 0.48 (95%: 0.36–0.65), p < 0.001], being employed [OR = 0.65 (95%: 0.58–0.74), p < 0.001], and living in rural formal areas [OR = 0.71 (95%: 0.52–0.95), p = 0.023].

The lower likelihood of reporting psychological distress was significantly associated with those who reported younger sexual partners

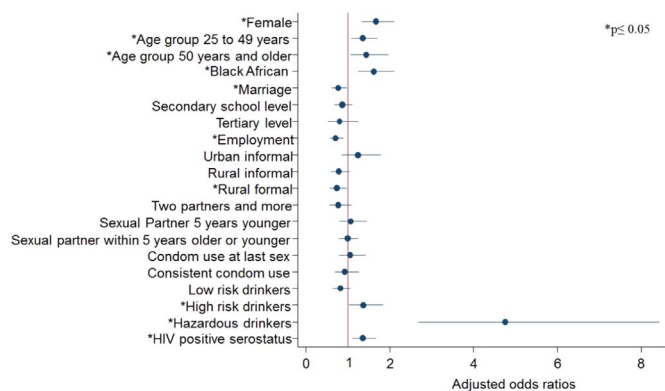


Fig. 1. Multivariate model of factors associated with psychological distress among participants 15 years and older (n = 8414).

[OR = 0.69 (95% CI: 0.57–0.83),  $p < 0.001$ ] and partners within 5 years older or younger [OR = 0.76 (95% CI: 0.65–0.90),  $p = 0.001$ ], and low risk alcohol use [OR = 0.64 (95% CI: 0.65–0.90),  $p < 0.001$ ]. Conversely, higher likelihood of reporting psychological distress was significantly associated with those who reported condom use at last sex [OR = 1.22 (95% CI: 1.07–1.40),  $p = 0.004$ ], consistent condoms use [OR = 1.17 (95% CI: 1.01–1.35),  $p = 0.032$ ], high risk drinkers [OR = 1.32 (95% CI: 1.09–1.59),  $p = 0.004$ ] and hazardous drinkers [OR = 4.27 (95% CI: 2.95–6.18),  $p < 0.001$ ] and those whose HIV serostatus was positive [OR = 1.79 (95% CI: 1.55–2.08),  $p < 0.001$ ].

Fig. 1 report the final multivariate model with adjusted ratios (aOR) of factors that remained significantly associated with a higher likelihood of reporting psychological distress. These included being a female [aOR = 1.68 (95% CI: 1.34–2.10),  $p < 0.001$ ], ages 25 to 49 years [aOR = 1.35 (95% CI: 1.08–1.70),  $p = 0.009$ ] and 50 years and older [OR = 1.44 (95% CI: 1.06–1.97),  $p = 0.023$ ], Black African [aOR = 1.62 (95% CI: 1.24–2.10),  $p < 0.001$ ], and those who reported high risk drinking [aOR = 1.37 (95% CI: 1.02–1.83),  $p = 0.037$ ] and hazardous drinking [aOR = 4.76 (95% CI: 2.69–8.42),  $p < 0.001$ ] as well as those reporting an HIV positive serostatus. Conversely, lower likelihood of reporting psychological distress remained significantly associated with marriage [aOR = 0.78 (95% CI: 0.62–0.98),  $p = 0.031$ ], employment [aOR = 0.71 (95% CI: 0.57–0.88),  $p = 0.002$ ], and residing in rural formal areas [aOR = 0.73 (95% CI: 0.55–0.97),  $p = 0.033$ ].

## Discussion

In this nationally representative sample, the overall prevalence of reported psychological distress was 23.9%. In the final multivariate model higher likelihood of reporting psychological distress was significantly associated with being female, aged 25 and older, Black African, and being a hazardous or high risk drinker. The South African National Health and Nutrition Examination Survey (Shisana & Labadarios, et al., 2014), similarly reported a high prevalence of distress among females, Black Africans and older people. The prevalence of psychological distress was significantly higher among those who had seroconverted. HIV-related risk behaviours (i.e. condom use) did not yield significance in the final model. These results are contrary to previous literature that found a higher level of psychological distress among people who reported inconsistent condom use or no condom use (Lundberg, 2014; Smith, 2015). This finding may suggest that the unadjusted or crude relationship between risky sexual behaviour and psychological distress was distorted by confounding variables (gender and alcohol use) that were accounted for in the adjusted analysis (Elkington et al., 2010; Smith, 2015). Lower likelihood of reporting psychological distress was significantly associated with being married, employed and residing in rural formal areas.

In line with current findings, others studies have consistently

identified socio-demographic characteristics such as being female, aged, not being married, belonging to a particular race group, and lower socioeconomic status as predisposing factors for psychological distress.

(Drapeau, Marchand, & Forest, 2014; Jackson et al., 2010; Mandemakers & Monden, 2010; Sipsma et al., 2013; Walters, McDonough, & Strohschein, 2002). These findings suggest that inequalities associated with gender, race, education, employment and poverty may have an impact on mental health and wellbeing. Regarding the higher likelihood of psychological distress with increasing age, there is varying observations about how age affects psychological distress, with a lack of consistent results across studies (Drapeau et al., 2014; Jorm et al., 2005). This has been largely attributed to different patterns of exposure to risk factors across age groups in various studies (Drapeau et al., 2014; Jorm et al., 2005).

The current study also appears to be in agreement with literature that found marriage to have protective effects against psychological stress. This finding may be explained by the fact that the marital relationship is a primary source of social and emotional support for many adults (Mandemakers & Monden, 2010; Walters et al., 2002). Moreover, this finding may suggest that within the South African context, marriage is protective against psychological distress. However, Sipsma and colleagues (2013) studying psychological distress in the Ghanaian context, suggests that the patriarchal ideology of female disempowerment in African countries, may contribute to a higher likelihood for women to experience psychological distress in the marital space. Further research should explore this association.

Furthermore, consistent with current findings research demonstrates that individuals who experience mental distress may be vulnerable to situations that expose them to sexual risk behaviours (Brody et al., 2016; Elkington et al. 2010). Psychological distress and risk behaviours may interact to increase exposure to HIV infection. There is also evidence that people living with HIV are more likely to report poor mental health, for instance depression, stress or distress (Gonzalez, Batchelder, Psaros, & Safren, 2011; Gupta et al., 2010; Kalichman et al., 2009; Nakasujja et al., 2010; South African National Aids Council, 2015).

These findings may speak to the need for implementing routine mental health screening, with particular attention to people living with HIV, the aged, women, and other high-risk groups. It is also imperative to develop new and evaluate existing psychosocial interventions that can be integrated into general health and well-being as well as HIV management. Consequently, the health care system should strengthen access and delivery of mental health care by expanding existing programmes and activities to community levels (Prince et al., 2007).

The study relies on data that are self-reported and is therefore limited by recall and social desirability bias. Since the cross-sectional study design does not allow us to infer causality, we could not analyse the cause of psychological distress. Nevertheless, the study adds value to the growing evidence of factors associated with psychological distress in the context of the HIV/AIDS epidemic and psycho-social and economic climate in South Africa. Furthermore, the use of a nationally representative sample allows for the results to be generalised to the youth and adult population in the country.

## Conclusion

This study has identified risk and protective factors associated with psychological distress based on nationally representative data. While there is a need to develop strategies that mitigate psychological distress in the general population, a special focus should be given to females, older age groups, people living with HIV and risky alcohol users, while simultaneously addressing gender, racial and employment inequalities in order to lessen related stressors in the country.

Ethical Statement.

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## References

- Andreou, E., Alexopoulos, E. C., Lionis, C., Varvogli, L., Gnardellis, C., Chrousos, G. P., & Darviri, C. (2011). Perceived stress scale: Reliability and validity study in Greece. *International Journal of Environmental Research and Public Health*, 8(12), 3287–3298. <http://dx.doi.org/10.3390/ijerph8083287>.
- Andrews, G., & Slade, T. (2001). Interpreting scores on the Kessler psychological distress scale (K10). *Australian and New Zealand Journal of Public Health*, 25(6), 494–497. <http://dx.doi.org/10.1111/j.1467-842X.2001.tb00310.x>.
- Balogun, O., Koyanagi, A., Stickley, A., Gilmour, S., & Shibuya, K. (2014). Alcohol consumption and psychological distress in adolescents: A multi-country study. *Journal of Adolescent Health*, 54(2), 228–234. <http://dx.doi.org/10.1016/j.jadohealth.2013.07.034>.
- Brody, C., Chhoun, P., Tuot, S., Pal, K., Chhim, K., & Yi, S. (2016). HIV risk and psychological distress among female entertainment workers in Cambodia: A cross-sectional study. *BMC Public Health*, 33, 1–10. <http://dx.doi.org/10.1186/s12889-016-2814-6>.
- Canavan, M. E., Sipsma, H. L., Adhvaryu, A., Ofori-atta, A., Jack, H., Udry, C., ... Bradley, E. H. (2013). Psychological distress in Ghana: Associations with employment and lost productivity. *International Journal of Mental Health Systems*, 7(9), 1–9.
- Caron, J., Fleury, M., Perreault, M., Crocker, A., Tremblay, J., Tousignant, M., ... Daniel, M. (2012). Prevalence of psychological distress and mental disorders, and use of mental health services in the epidemiological catchment area of Montreal South-West. *BMC Psychiatry*, 12, 183. <http://dx.doi.org/10.1186/1471-244X-12-183>.
- Choudhry, V., Agardh, A., Stafström, M., & Östergren, P.-O. (2014). Patterns of alcohol consumption and risky sexual behavior: A cross-sectional study among Ugandan university students. *BMC Public Health*, 14(1), 128. <http://dx.doi.org/10.1186/1471-2458-14-128>.
- Drapeau, A., Marchand, A., & Forest, C. (2014). Gender differences in the age-cohort distribution of psychological distress in Canadian adults: Findings from a national longitudinal survey. *BMC Psychology*, 2(25), 1–13.
- Elkington, K. S., Bauermeister, J. A., & Zimmerman, M. A. (2010). Psychological distress, substance use, and HIV / STI risk behaviors among youth. *Journal of Youth and Adolescence*, 39, 514–527. <http://dx.doi.org/10.1007/s10964-010-9524-7>.
- Flisher, A. J., Gevers, A. (2010). Mental health and risk behaviour (pp. 53–57).
- Foulds, J. A., Wells, J. E., Lacey, C. J., Adamson, S. J., Sellman, J. D., & Mulder, R. T. (2013). A comparison of alcohol measures as predictors of psychological distress in the New Zealand population. *The International Journal of Alcohol and Drug Research*, 2(1), 59–67. <http://dx.doi.org/10.7895/ijadr.v2i1.73>.
- Gonzalez, J. S., Batchelder, A. W., Psaros, C., & Safren, S. A. (2011). Depression and HIV/AIDS treatment nonadherence: a review and meta-analysis. *Journal of Acquired Immune Deficiency Syndromes (1999)*, 58(2), 181–187. <http://dx.doi.org/10.1097/QAI.0b013e31822d490a>.
- Gupta, R., Dandu, M., Packer, L., Rutherford, G., Leiter, K., Phaladze, N., ... Weiser, S. D. (2010). Depression and HIV in Botswana: A population-based study on gender-specific socioeconomic and behavioral correlates. *PLoS ONE*, 5(12), <http://dx.doi.org/10.1371/journal.pone.0014252>.
- Indig, D., Eyeson-Annan, M., Copeland, J., & Conigrave, K. M. (2007). The effects of alcohol consumption, psychological distress and smoking status on emergency department presentations in New South Wales, Australia. *BMC Public Health*, 7(46), 1–10. <http://dx.doi.org/10.1186/1471-2458-7-46>.
- Jackson, P. B., Williams, D. R., Stein, D. J., Herman, A., Williams, S. L., & Redmond, Deidre L. (2010). Race and psychological distress: The South African stress and health study. *Journal of Health Sociology Behavior*, 51(4), 458–477.
- Jorm, A., Windsor, T., Dear, K., Anstey, K., Christensen, H., & Rodgers, B. (2005). Age group differences in psychological distress: The role of psychosocial risk factors that vary with age. *Psychological Medicine*, 35(9), 1253–1263. <http://dx.doi.org/10.1017/S0033291705004976>.
- Kalichman, S. C., Simbayi, L. C., Cloete, A., Clayford, M., Arnolds, W., Mxoli, M., ... Kalichman, M. O. (2009). Integrated gender-based violence and HIV risk reduction intervention for South African men: Results of a quasi-experimental field trial. *Prevention Science*, 10(3), 260–269.
- Kessler, R. C., Andrews, G., Colpe, L. J., Hiripi, E., Mroczek, D. K., Normand, S. L. T., ... Zaslavsky, A. M. (2002). Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine*, 32(6), 959–976. <http://dx.doi.org/10.1017/S0033291702006074>.
- Lundberg, P. (2014). *Mental disorder, sexual risk behaviour, sexual violence and HIV in Uganda*. Solna, Sweden: Karolinska Institutet.
- Mandemakers, J. J., & Monden, C. W. S. (2010). Social science & medicine does education buffer the impact of disability on psychological distress? *Social Science Medicine*, 71(2), 288–297. <http://dx.doi.org/10.1016/j.socscimed.2010.04.004>.
- Murray, C., Vos, T., Lozano, R., Naghavi, M., Flaxman, A., et al. (2012). Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: A systematic analysis for the global burden of disease study. *Lancet*, 380(9859), 2197–2223.
- Nakasujja, N., Skolasky, R. L., Musisi, S., Allebeck, P., Robertson, K., Ronald, A., ... Sacktor, N. (2010). Depression symptoms and cognitive function among individuals with advanced HIV infection initiating HAART in Uganda. *BMC Psychiatry*, 10(44), 1–7.
- Nduna, M., & Jewkes, R. (2012). Disempowerment and psychological distress in the lives of young people in Eastern Cape, South Africa. *Journal of Child and Family Studies*, 21(6), 1018–1027. <http://dx.doi.org/10.1007/s10826-011-9564-y>.
- Pengpid, S., Peltzer, K., & Skaal, L. (2013). Mental health and HIV sexual risk behaviour among University of Limpopo students. *South African Journal of Psychology*, 19(2), 25–31. <http://dx.doi.org/10.7196/SAJP415>.
- Prince, M., Patel, V., Saxena, S., Maj, M., Maselko, J., Phillips, M. R., & Rahman, A. (2007). No health without mental health. *Lancet*, 370(9590), 859–877. [http://dx.doi.org/10.1016/S0140-6736\(07\)61238-0](http://dx.doi.org/10.1016/S0140-6736(07)61238-0).
- Ramrakha, S., Paul, C., Bell, M. L., Dickson, N., Moffitt, T. E., & Caspi, A. (2013). The relationship between multiple sex partners and anxiety, depression, and substance dependence disorders: A cohort study. *Archives of Sexual Behavior*, 42(5), 863–872. <http://dx.doi.org/10.1007/s10508-012-0053-1>.
- Saunders, J., Aasland, O., Babor, T., de la Fuente, J., & Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption—II. *Addiction*, 88(6), 791–804.
- Shisana, O., Labadarios, D., Rehle, T., Simbayi, L., Zuma, K., Dhansay, A., ... the SANHANES-1 Team (2014). *South African National Health and Nutrition Examination Survey (SANHANES-1)*. Cape Town: HSRC Press. (Retrieved from <<http://www.hsrc.ac.za/en/research-outputs/ktree-doc/13850>>).
- Shisana, O., Rehle, T.M., Simbayi, L., Zuma, K., Jooste, S., Zungu, N., ... Al, E. (2014). South African National HIV prevalence, incidence and behaviour survey, 2012. Cape Town.
- Sipsma, H., Ofori-Atta, A., Canavan, M., Osei-Akoto, I., Udry, C., & Bradley, E. H. (2013). Poor mental health in Ghana: Who is at risk? *BMC Public Health*, 13(1), 288. <http://dx.doi.org/10.1186/1471-2458-13-288>.
- Smith, H. (2015). *An Examination of the Relationship between Psychological Distress and Risky Sexual Behaviors among a Treatment-Seeking Opioid-Dependent Population*. University of South Carolina <http://dx.doi.org/10.1177/0022466916683171>.
- South African National Aids Council (2015). *The People Living With HIV Stigma Index: South Africa 2014 (Summary Report)*. Retrieved from <<http://www.stigmaindex.org/sites/default/files/reports/Summary-Booklet-on-Stigma-Index-Survey>> South Africa. pdf.
- Tomlinson, M., Grimsrud, A. T., Stein, D. J., Williams, D. R., & Myer, L. (2009). The epidemiology of major depression in South Africa: Results from the South African stress and health study. *South African Medical Journal*, 99(5), 367–373. <http://dx.doi.org/10.1016/j.biotechadv.2011.08.021>. Secreted.
- Walters, V., McDonough, P., & Strohschein, L. (2002). The influence of work, household structure, and social, personal and material resources on gender differences in health: An analysis of the 1994 Canadian national population health survey. *Social Science Medicine*, 54, 677–692.