Prevalence and correlates of hazardous, harmful, or dependent alcohol use and drug use among persons 15 years and older in South Africa: Results of a national survey in 2017

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Abstract:
The study aimed to assess the prevalence and correlates of hazardous, harmful or dependent alcohol use (HHDA) and drug use among persons 15 years and older in South Africa. In a national cross-sectional 2017 survey, 39,210 persons 15 years and older (Median=34 years) responded to a questionnaire on substance and health variables. Logistic regression was used to assess the determinants of HHDA and any drug use. Results indicate that (10.3%) engaged HHDA, 16.5% among males and 4.6% among females, and past 3-month drug use was 8.6%, 13.3% among males and 4.1% among females. In adjusted logistic regression analysis, among men, middle age (25-34 year olds), higher education, urban residence, drug use, and psychological distress were positively and Indian or Asian and White population groups were negatively associated with HHDA. Among women, middle age (25-34 year olds), Coloureds, residing on rural farms and urban areas, drug use and psychological distress were positively and older age (55 years and older), and Indians or Asians were negatively associated with HHDA. In adjusted logistic regression analysis, among men, having Grade 8-11 education, Coloureds, being unemployed, and HHDA were positively and middle and older age (25 years and older) and being a student or learner were negatively associated with past 3-month any drug use. Among women, Coloureds, Indians or Asians, and HHDA were positively and older age (45 years and older) was negatively associated with past 3-month and drug use. About one in ten participants engaged HHDA and any drug use, and several sociodemographic and health indicators were identified associated with HHDA and any drug use.

Keywords: alcohol use, drug use, adolescents, adults, health variables, South Africa
Introduction
Harmful alcohol and illicit drug use are significant contributors to the global burden of disease [1-3]. Globally, alcohol use contributed to 5.3% of all deaths and 5.0% of all disability-adjusted life-years (DALYs) in 2016 [1]. The corresponding figures for South Africa in 2000 were 7.1% and 7.0%, respectively [4]. Diverse alcohol use patterns have been observed in African countries [5-8]. In a 2015 national survey in Kenya, 6.7% of the adult population engaged in hazardous or harmful alcohol use [9]. In a 2008 national population-based survey of persons 15 years and older in South Africa, the prevalence of hazardous, harmful, or dependent alcohol (HHDA) use was 9.0%, 17.0% among men and 2.9% among women [10].

The estimated global past-year prevalence of illicit drug use was 5.3% in 2014 [2], and 3.8% for cannabis, 0.77% for amphetamines, 0.37% for opioid and 0.35% for cocaine use in 2015 [11]. In the 25 country World Mental Health Survey, “lifetime drug use disorders prevalence increased with country income: 0.9% in low/lower-middle income countries, 2.5% in upper-middle income countries, 4.8% in high-income countries.” [12]. In Nigeria, the past year prevalence of illicit drug use among adults was 14.4% [13]. In a 2012 national population-based survey in persons 15 years and older in South Africa, the prevalence of past 3-month drug use was 4.4% (4.0% for cannabis use, 0.4% sedatives, 0.3% opiates, 0.3% amphetamines, 0.2% inhalants, and 0.1% hallucinogens use in the past 3 months) [14]. There is a lack of more recent national population-based data on the prevalence and correlates of HHDA and drug use in South Africa.

As previously reviewed [14,15], factors associated with HHDA and/or drug use may include male sex, middle adulthood, specific ethnic groups, lower socioeconomic status, unemployed, urban residence, and other substance use. In addition, several studies have shown the comorbidity of HHDA with drug use and psychological distress [16,17], as well as the comorbidity of drug use with HHDA and psychological distress [6]. Epidemiological population-based surveys are needed to target interventions to prevent HHDA and drug use. The study aimed to assess the prevalence and correlates of hazardous, harmful, or dependent alcohol use (HHDA) and drug use among persons 15 years and older in South Africa.

Methods
Study design and participants
The data utilized in this study was obtained from a cross-sectional, nationally representative household-based survey conducted in 2017 in South Africa. The multistage stratified random cluster sampling approach of the survey is described elsewhere [18]. In summary, the mid-year population estimates [19] were utilized to select 1000 small area layers (SALs) that were stratified by province, locality type, and race groups. A maximum of 15 households were randomly selected from each of the 1000 SALs. In each household, all household members who resided in that household the previous night, were eligible to participate [18].

**Study procedure**

All eligible household members had to individually complete an informed consent form in private with the study fieldworker prior to being enrolled into the study. All questions that the respondent had during consent or interview were answered by the fieldworker or team supervisor. The respondent had the option to end the interview at any time without consequence. The household head or delegated household authority completed a household questionnaire which captured demographic and household situation information and each individual in the household completed an individual questionnaire [18]. The survey questionnaire was captured electronically by the fieldworker on a Mercer A105 tablet utilizing CSPro software. Data were collected from December 2016 to February 2018. For this paper, data from the household and individual questionnaires were used. We restricted the sample to those who were 15 years and older and who completed the alcohol use measurement.

**Measures**

**Substance use variables**

HHDA was assessed using the Alcohol Use Disorders Identification Test (AUDIT) [20] and was scored as in a previous survey in South Africa [10]. Among adults (20 years and above), a cut-off score of 8 or more [20] and among adolescents (15-19 years) 5 or more [21] for classifying HHDA use. Cronbach’s alpha for the AUDIT was 0.87 in this sample.

**Drug use** in the past three months was assessed with 7 items of the “Alcohol, Smoking and Substance Involvement Screening Test (ASSIST)”, e.g., “In the past three months, how often have you used cannabis (dagga, marijuana, pot, grass, hash, etc.)?” [22]. One item was added “Whoonga (mixture of heroin, dagga=cannabis and antiretrovirals)” and classified under opiates [14]. “Response options ranged from 1=never to 5=almost daily. Any drug used in the past three months was coded as 1 and never as 0.”[14]. “All items were added together to
indicate the prevalence of any drug use in the past three months” [14]. Cronbach alpha for the ASSIST in this sample was 0.91.

*Sociodemographic factors* included age, sex, highest educational level, population group (African Black, Coloured, Indian or Asian and White), employment status, province, and residence status [18].

*Psychological distress* was assessed with the Kessler Psychological Distress Scale (K10), with scores 20 or more indicating psychological distress [23]. Cronbach’s alpha for the K10 was 0.92 in this sample.

**Ethical consideration**

Approval for the survey was granted by the “Human Sciences Research Council (HSRC) Research Ethics Committee (REC: 4/18/11/15)”. Approval was also granted by the CDC’s Center for Global Health (CGH). Written informed consent was obtained from all participants.

**Data analysis**

All statistical analyses were conducted using STATA software version 14.0 (Stata Corporation, College Station, TX, USA). The data were weighted to make the sample representative of the target population in South Africa. Descriptive statistics were used to summarize the sample and substance use prevalence characteristics. Unadjusted and adjusted (including variables significant at p<0.05 in univariate analysis) logistic regression stratified by sex was used to predict HHDA and past 3-month drug use prevalence. Taylor linearization methods were applied to account for the complex study design and the sampling weight. Results from logistic regression analyses are reported as odds ratios (ORs) and 95% confidence intervals (Cis). Missing values were excluded and p<0.05 considered significant.

**Results**

*Characteristics of the sample and substance use*

The sample comprised 39,210 persons 15 years and older (Median=34 years, interquartile range= 25-48), 48.3% were men, and 51.7% were women, 36.1% had Grade 12 or more education education, and 79.3% were African Black by population group or ethnicity. More than one in three participants (36.0%) were employed or self-employed, 69.0% lived in urban areas, and 20.4% reported psychological distress. More than one in ten respondents (10.3%)
engaged in HHDA, 16.5% among males and 4.6% among females, and past 3-month drug use was 8.6%, 13.3% among males and 4.1% among females (see Table 1).

**Distribution of past 3-month drug use pattern**

The most common drug used was cannabis (7.8%). 12.4% among males and 3.5% among females. The prevalence of cocaine use was 1.8%, followed by sedatives 1.7%, amphetamine 1.5%, inhalents 1.3%, hallucinogens 1.2% and opiates 1.2% (see Table 2).

**Associations with hazardous, harmful, or dependent alcohol**

In adjusted logistic regression analysis, among men, middle age (25-34 year olds), higher education, urban residence, drug use, and psychological distress were positively, whereas Indian or Asian and White population groups were negatively associated with HHDA.

Among women, middle age (25-34 year olds), Coloureds, residing on rural farms and urban areas, drug use, and psychological distress were positively and older age (55 years and older), and Indians or Asians were negatively associated with with HHDA (see Tables 3 and 4).

**Associations with drug use**

In adjusted logistic regression analysis, among men, having Grade 8-11 education, Coloureds, being unemployed, and HHDA were positively and middle and older age (25 years and older) and being a student or learner were negatively associated with past 3-month drug use. Among women, Coloureds, Indians or Asians, and HHDA were positively and older age (45 years and older) was negatively associated with past 3-month drug use (see Tables 5 and 6).

**Discussion**

Compared to previous national population-based surveys in 2008 (9.0% HHDA; [10]) and 2012 (4.4% past 3-month drug use; [14]), this national survey in 2017 showed higher rates of HHDA (10.3%) and any past 3-month drug use (8.6%). Compared to the 2012 survey (4.0% past 3-month cannabis use) [14], cannabis use almost doubled in this 2017 survey (7.8%). Similar increases were observed for other drugs (0.4% sedatives in 2012 vs 1.7% in 2017), cocaine (0.3% vs 1.8%), amphetamine (0.3% vs 1.5%), opiates (0.3% vs 1.2%), inhalants (0.2% vs 1.3%) and hallucinogens (0.1% vs 1.2%) [14]. Similarly, Harker et al. [24] found an increase of opioid use disorder treatment admissions from 16.1% in 2012 to 20.0% in 2017. Although cannabis was still illegal during data collection, a number of respected authorities,
like the South African Medical Research Council, were publicly written about the possible medical benefits of cannabis [25], while the Central Drug Authority in South Africa was publicly recommending decriminalization of cannabis [26]. The considerable increase in cannabis usage could be due to the increased tolerance towards the end user by law enforcement as the focus shifted towards drug trafficking [27]. All these factors combined to increase the social acceptability of cannabis, thus either increasing usage or increasing self-report of cannabis usage. The overall slight increase of HHDA in South Africa from 2008 to 2017 may be related to a larger middle class and economic development in South Africa, as “alcohol consumption and resulting problems are likely to rise with increasing income” [28].

In agreement with previous studies [6-8,14,27,29], this study found that male sex increased the odds and older age decreased the odds of HHDA and drug use. Sex specific role expectations and norms, such as associating drinking alcohol and drug use with masculinity, may be related to the male preponderance of HHDA and drug use [7,30]. In older age, in this study among women, a reduction of HHDA may be expected since the tolerance towards alcohol reduces with ageing [31].

Among different population or ethnic groups in South Africa, Coloured women had significantly higher odds for HHDA and drug use. This result concurs with previous studies in South Africa for both Coloured women and men [10,14]. It is possible that people of mixed race (Coloured) are exposed to more stressors than other population groups contributing to higher rates of substance use. While previous research showed an association between lower education or lower socioeconomic status [10,32,33], this study did not find that educational level was associated with HHDA and drug use among women, while among men with higher education was positively associated with HHDA and drug use. The findings among women are interesting and warrants further investigation to fully understand the change. Among men with higher education, the positive association could be explained due to rapid modernization, which strongly correlates to drug use [34]. As South Africa progresses from apartheid, there are an increasing number of people entering the higher education, middle-upper income bracket. This rapid modernization, which brings about an increase in disposable income, coupled with its breakdown of traditional controls could be responsible for the positive associations between men with higher education and HHDA and drug use.

On the other hand, among men, unemployment increased the odds of drug use in this study, which is in line with a previous study in South Africa [27]. During the time of this survey data collection, the mean price of cannabis in South Africa was reported as low as
R11.17 per gram (~1 US$) [35]. This low price increases the affordability of cannabis to those unemployed. As stated by Peltzer et al. [34, p.2228], “use of drugs may be functional as it provides a form of release or escape not only for large numbers of unemployed (especially young men) who may also feel they are unemployable.”

Consistent with previous research findings [16,17,36], this study found strong associations between drug use, psychological distress and HHDA, and HHDA and drug use. This confirms the comorbidity between HHDA and drug use and psychological distress, but comorbidity between drug use and HHDA but not psychological distress. Reasons for the comorbidity between HHDA and drug use may lie in the codependence risk of the substances used. Public health interventions should be directed at integrating drug use and psychological distress prevention in persons with HHDA.

Study limitations
The study was limited by its cross-sectional design and self-report of data, including substance use. A further limitation was that in this household survey, heavy substance use populations, such as military personnel, homeless, or institutionalized persons, were not included [37].

Conclusions
In this large national population-based survey among persons 15 and older in 2017 in South Africa, about one in ten participants engaged in HHDA and drug use, and several sociodemographic (male sex, middle age, higher education, being unemployed, Coloureds, urban residence and health indicators (substance use and psychological distress) were identified associated with HHDA and/or any drug use.

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Table 1. Sample characteristics and distribution of substance use

| Variable                       | Sample | Hazardous, harmful or dependent alcohol use | Any drug use |
|-------------------------------|--------|--------------------------------------------|--------------|
|                               | N (%)  | Total | Male | Female | Total | Male | Female |
| All                           | 39210  | 10.3  | 16.5 | 4.6    | 8.6   | 13.3 | 4.1    |
| Sex                           |        |       |      |        |       |      |        |
| Female                        | 23112  | 51.7  |      |        |       |      |        |
| Male                          | 16098  | 48.3  |      |        |       |      |        |
| Age in years                  |        |       |      |        |       |      |        |
| 15-24                         | 10863  | 24.1  | 9.5  | 13.5   | 5.5   | 10.2 | 15.4   | 5.1    |
| 25-34                         | 8749   | 27.2  | 14.9 | 23.0   | 6.8   | 11.1 | 17.9   | 4.5    |
| 35-44                         | 6523   | 19.2  | 10.4 | 16.6   | 4.1   | 7.9  | 12.0   | 3.7    |
| 45-54                         | 5315   | 13.1  | 9.0  | 14.7   | 3.8   | 6.4  | 9.6    | 3.5    |
| 55 or more                    | 7760   | 16.5  | 5.1  | 10.2   | 1.6   | 4.4  | 6.2    | 3.1    |
| Education                     |        |       |      |        |       |      |        |
| Grade 0-7                     | 18901  | 37.3  | 7.8  | 11.8   | 4.2   | 7.0  | 10.5   | 4.0    |
| Grade 8-11                    | 9871   | 26.5  | 13.2 | 20.8   | 5.6   | 11.3 | 19.1   | 3.7    |
| Grade 12 or more              | 12362  | 36.1  | 11.0 | 17.9   | 4.3   | 8.1  | 12.0   | 4.4    |
| Population group              |        |       |      |        |       |      |        |
| African Black                 | 30675  | 79.3  | 10.4 | 17.2   | 4.2   | 8.4  | 13.7   | 3.6    |
| Coloured                      | 4303   | 8.8   | 13.5 | 19.4   | 10.9  | 10.8 | 17.2   | 6.4    |
| Indian or Asian               | 2310   | 2.9   | 5.5  | 5.7    | 1.1   | 8.9  | 8.9    | 4.5    |
| White                         | 1922   | 8.9   | 7.4  | 11.2   | 3.3   | 7.4  | 8.6    | 5.9    |
| Employment status             |        |       |      |        |       |      |        |
| Employed/self-employed        | 11931  | 36.0  | 12.2 | 17.4   | 4.8   | 8.9  | 12.3   | 4.1    |
| Unemployed                    | 20649  | 50.2  | 9.7  | 17.5   | 4.5   | 8.8  | 15.9   | 4.0    |
| Student/pupil/learner         | 5400   | 12.4  | 8.0  | 10.9   | 5.1   | 6.7  | 8.9    | 4.6    |
| Sick/disabled/unable/other    | 748    | 1.4   | 8.7  | 14.6   | 2.6   | 6.7  | 9.7    | 3.7    |
| Residence                     |        |       |      |        |       |      |        |
| Rural informal                | 13675  | 26.0  | 6.2  | 11.6   | 1.9   | 7.1  | 11.7   | 3.6    |
| Rural farms                   | 4263   | 5.0   | 9.6  | 12.3   | 5.8   | 8.8  | 12.2   | 4.2    |
| Urban                         | 21372  | 69.0  | 12.0 | 18.5   | 5.7   | 9.1  | 14.0   | 4.3    |
| Province                      |        |       |      |        |       |      |        |
| Western Cape                  | 2860   | 12.2  | 14.4 | 19.7   | 9.2   | 9.9  | 14.9   | 5.1    |
| Eastern Cape                  | 2970   | 10.7  | 8.0  | 12.6   | 4.0   | 4.8  | 8.3    | 1.7    |
| Northern Cape                 | 2030   | 2.0   | 15.3 | 22.7   | 7.9   | 11.3 | 16.5   | 6.0    |
| Free State                    | 1753   | 5.1   | 15.2 | 23.6   | 7.2   | 10.3 | 17.0   | 4.1    |
| KwaZulu-Natal                 | 13512  | 18.6  | 4.5  | 7.8    | 1.9   | 8.9  | 14.9   | 4.0    |
| North-West                    | 2498   | 6.8   | 13.0 | 22.3   | 4.5   | 8.3  | 11.3   | 5.6    |
| Gauteng                       | 6183   | 27.2  | 13.0 | 20.3   | 5.3   | 9.3  | 14.4   | 4.0    |
| Mpumalanga                    | 5054   | 7.9   | 7.8  | 11.7   | 3.7   | 7.0  | 8.7    | 5.4    |
| Limpopo                       | 2350   | 9.5   | 8.3  | 15.3   | 2.3   | 8.3  | 13.9   | 3.5    |
| Psychological distress        |        |       |      |        |       |      |        |
| No                            | 31307  | 79.6  | 9.8  | 15.6   | 4.1   | 8.3  | 12.8   | 3.8    |
| Yes                           | 7750   | 20.4  | 12.2 | 20.6   | 6.3   | 9.5  | 16.0   | 5.0    |

Table 2: Demogragphic distribution of the prevalence of past three month drugs
| Variable       | Cannabis | Cocaine | Amphetamine | Inhalants | Sedatives | Hallucinogens | Opiates |
|----------------|----------|---------|-------------|-----------|-----------|---------------|---------|
| All            | 7.8      | 1.8     | 1.5         | 1.3       | 1.7       | 1.2           | 1.2     |
| Sex            |          |         |             |           |           |               |         |
| Female         | 3.5      | 1.5     | 1.4         | 1.4       | 1.7       | 1.3           | 1.5     |
| Male           | 12.4     | 2.1     | 1.5         | 1.2       | 1.7       | 1.2           | 2.0     |
| Age in years   |          |         |             |           |           |               |         |
| 15-24          | 9.5      | 2.1     | 1.8         | 1.6       | 1.7       | 1.6           | 2.2     |
| 25-34          | 10.0     | 1.9     | 1.6         | 1.3       | 2.0       | 1.2           | 1.7     |
| 35-44          | 7.0      | 1.6     | 1.2         | 1.1       | 1.5       | 1.0           | 1.6     |
| 45-54          | 5.8      | 1.5     | 1.3         | 1.4       | 1.8       | 1.3           | 1.6     |
| 55 or more     | 4.1      | 1.3     | 1.1         | 1.1       | 1.5       | 1.0           | 1.2     |
| Population group |        |         |             |           |           |               |         |
| African Black  | 7.8      | 1.8     | 1.5         | 1.4       | 1.7       | 1.3           | 1.9     |
| Coloured       | 10.3     | 1.1     | 1.6         | 0.7       | 1.9       | 0.4           | 0.7     |
| Indian or Asian| 6.1      | 2.5     | 1.5         | 1.4       | 2.1       | 1.6           | 1.7     |
| White          | 6.3      | 1.5     | 1.2         | 1.1       | 1.8       | 1.2           | 1.0     |
| Residence      |          |         |             |           |           |               |         |
| Rural informal | 6.6      | 2.2     | 1.7         | 1.6       | 1.6       | 1.5           | 1.9     |
| Rural farms    | 7.7      | 1.4     | 1.2         | 1.4       | 1.6       | 1.2           | 1.6     |
| Urban          | 8.3      | 1.6     | 1.4         | 1.2       | 1.8       | 1.2           | 1.6     |
| Province       |          |         |             |           |           |               |         |
| Western Cape   | 8.9      | 1.5     | 1.4         | 0.6       | 1.6       | 0.7           | 1.1     |
| Eastern Cape   | 4.4      | 0.6     | 0.7         | 0.4       | 0.6       | 0.4           | 0.9     |
| Northern Cape  | 10.8     | 2.4     | 1.9         | 1.6       | 2.3       | 1.6           | 2.4     |
| Free State     | 9.6      | 1.1     | 0.9         | 1.0       | 1.9       | 1.0           | 1.2     |
| KwaZulu-Natal  | 8.2      | 2.4     | 2.1         | 2.0       | 2.2       | 1.9           | 2.2     |
| North-West     | 7.3      | 2.6     | 2.7         | 2.8       | 3.1       | 2.5           | 3.4     |
| Gauteng        | 8.5      | 0.9     | 0.6         | 0.6       | 1.1       | 0.5           | 1.0     |
| Mpumalanga     | 6.4      | 3.3     | 3.0         | 3.2       | 2.9       | 2.9           | 3.3     |
| Limpopo        | 7.4      | 3.0     | 1.6         | 1.6       | 1.7       | 1.4           | 2.1     |

Table 3. Associations with hazardous, harmful or dependent alcohol consumption among men

| Variable       | Simple logistic regression | Multiple logistic regression |
|----------------|----------------------------|-----------------------------|

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### Table 4. Associations with hazardous, harmful or dependent alcohol consumption among women

| Category                          | Crude OR (95% CI)       | p-value | Adjusted OR (95% CI)     | p-value |
|-----------------------------------|-------------------------|---------|--------------------------|---------|
| **Age in years**                  |                          |         |                          |         |
| 15-24                             | 1 (Reference)           |         | 1 (Reference)            |         |
| 25-34                             | 2.33 (1.91, 2.85)       | <0.001  | 1.82 (1.42, 2.32)        | <0.001  |
| 35-44                             | 1.55 (1.22, 1.97)       | <0.001  | 1.29 (0.96, 1.74)        | 0.092   |
| 45-54                             | 1.34 (1.03, 1.75)       | 0.030   | 1.23 (0.87, 1.74)        | 0.233   |
| 55 or more                        | 0.88 (0.68, 1.15)       | 0.345   | 0.89 (0.65, 1.22)        | 0.468   |
| **Education**                     |                          |         |                          |         |
| Grade 0-7                         | 1 (Reference)           |         | 1 (Reference)            |         |
| Grade 8-11                        | 2.18 (1.75, 2.71)       | <0.001  | 1.52 (1.18, 1.97)        | <0.001  |
| Grade 12 or more                  | 1.79 (1.44, 2.33)       | <0.001  | 1.40 (1.05, 1.87)        | 0.024   |
| **Population group**              |                          |         |                          |         |
| African Black                     | 1 (Reference)           |         | 1 (Reference)            |         |
| Coloured                          | 1.04 (0.83, 1.30)       | 0.747   | 0.97 (0.77, 1.21)        | 0.823   |
| Indian or Asian                   | 0.50 (0.37, 0.69)       | <0.000  | 0.40 (0.28, 0.57)        | <0.001  |
| White                             | 0.62 (0.46, 0.83)       | <0.001  | 0.52 (0.35, 0.78)        | <0.001  |
| **Employment status**             |                          |         |                          |         |
| Employed/self-employed            | 1 (Reference)           |         | 1 (Reference)            |         |
| Unemployed                        | 1.00 (0.83, 1.19)       | 0.960   | 1.14 (0.92, 1.42)        | 0.230   |
| Student/pupil/learner             | 0.41 (0.30, 0.54)       | <0.001  | 1.93 (0.82, 4.53)        | 0.133   |
| Sick/disabled/unable to work/other| 0.82 (0.47, 1.43)       | 0.476   | 1.24 (0.63, 2.42)        | 0.530   |
| **Residence**                     |                          |         |                          |         |
| Rural informal                    | 1 (Reference)           |         | 1 (Reference)            |         |
| Rural farms                       | 1.18 (0.83, 1.67)       | 0.360   | 1.03 (0.70, 1.51)        | 0.889   |
| Urban                             | 1.84 (1.44, 2.34)       | <0.001  | 1.70 (1.29, 2.23)        | <0.001  |
| **Drug use (past 3 months)**      |                          |         |                          |         |
| No                                | 1 (Reference)           |         | 1 (Reference)            |         |
| Yes                               | 3.11 (2.54, 3.80)       | <0.001  | 2.79 (2.25, 3.46)        | <0.001  |
| **Psychological distress**        |                          |         |                          |         |
| No                                | 1 (Reference)           | <0.001  | 1.42 (1.16, 1.75)        | <0.001  |
| Yes                               |                         |         |                         |         |

OR=Odds Ratio; CI=Confidence Interval.
| Variable                        | Simple logistic regression | Multiple logistic regression |
|--------------------------------|----------------------------|----------------------------|
|                                | Crude OR (95% CI)          | Adjusted OR (95% CI)       |
|                                | p-value                    | p-value                    |
| Age in years                   |                            |                            |
| 15-24                          | 1 (Reference)              | 1 (Reference)              |
| 25-34                          | 1.72 (1.24, 2.36)          | 1.72 (1.25, 2.36)          |
| 35-44                          | 1.00 (0.69, 1.47)          | 1.01 (0.69, 1.47)          |
| 45-54                          | 0.93 (0.64, 1.34)          | 0.88 (0.61, 1.27)          |
| 55 or more                     | 0.38 (0.24, 0.59)          | 0.40 (0.25, 0.63)          |
| Education                      |                            |                            |
| Grade 0-7                      | 1 (Reference)              | 1 (Reference)              |
| Grade 8-11                     | 1.54 (1.17, 2.02)          | 1.13 (0.83, 1.53)          |
| Grade 12 or more               | 1.15 (0.89, 1.48)          | 0.82 (0.62, 1.09)          |
| Population group               |                            |                            |
| African Black                  | 1 (Reference)              | 1 (Reference)              |
| Coloured                       | 2.32 (1.77, 3.02)          | 1.98 (1.49, 2.63)          |
| Indian or Asian                | 0.31 (0.15, 0.61)          | 0.27 (0.14, 0.55)          |
| White                          | 0.90 (0.56, 1.44)          | 0.95 (0.58, 1.56)          |
| Employment status              |                            |                            |
| Employed/self-employed         | 1 (Reference)              | 1 (Reference)              |
| Unemployed                     | 0.90 (0.68, 1.19)          | 0.460                      |
| Student/pupil/learner          | 0.71 (0.43, 1.18)          | 0.189                      |
| Sick/disabled/unable to work/other | 0.54 (0.18, 1.65) | 0.280                      |
| Residence                      |                            |                            |
| Rural informal                 | 1 (Reference)              | 1 (Reference)              |
| Rural farms                    | 3.52 (2.13, 5.82)          | 2.57 (1.51, 4.38)          |
| Urban                          | 3.28 (2.35, 4.57)          | 2.87 (1.99, 4.14)          |
| Drug use (past 3 months)       |                            |                            |
| No                             | 1 (Reference)              | 1 (Reference)              |
| Yes                            | 3.18 (2.15, 4.69)          | 2.91 (1.94, 4.36)          |
| Psychological distress         |                            |                            |
| No                             | 1 (Reference)              | 1 (Reference)              |
| Yes                            | 1.69 (1.29, 2.20)          | 1.68 (1.27, 2.22)          |

OR=Odds Ratio; CI=Confidence Interval.

Table 5. Associations with drug use among men
| Variable                        | Simple logistic regression | Multiple logistic regression |
|--------------------------------|---------------------------|-----------------------------|
|                                | Crude OR (95% CI)         | Adjusted OR (95% CI)        |
|                                | p-value                   | p-value                     |
| Age in years                   |                           |                             |
| 15-24                          | 1 (Reference)             | 1 (Reference)               |
|                                | 1.19 (0.95, 1.50)         | 0.81 (0.62, 1.04)           |
|                                | 0.126                     | 0.102                       |
| 25-34                          | 0.75 (0.59, 0.95)         | 0.53 (0.41, 0.70)           |
|                                | <0.001                    | <0.001                      |
| 35-44                          | 0.58 (0.43, 0.78)         | 0.40 (0.29, 0.56)           |
|                                | <0.001                    | <0.001                      |
| 45-54                          | 0.36 (0.27, 0.48)         | 0.26 (0.19, 0.35)           |
|                                | <0.001                    | <0.001                      |
| 55 or more                     |                           |                             |
| Education                      |                           |                             |
| Grade 0-7                      | 1 (Reference)             | 1 (Reference)               |
|                                | 2.01 (1.64, 2.47)         | 1.52 (1.20, 1.92)           |
|                                | <0.001                    | <0.001                      |
| Grade 8-11                     | 1.16 (0.95, 1.42)         | 0.93 (0.74, 1.19)           |
|                                | 0.141                     | 0.581                       |
| Grade 12 or more               |                           |                             |
| Population group               |                           |                             |
| African Black                  | 1 (Reference)             | 1 (Reference)               |
|                                | 1.31 (1.03, 1.67)         | 1.32 (1.03, 1.69)           |
|                                | 0.027                     | 0.029                       |
| Coloured                       | 0.63 (0.43, 0.93)         | 0.79 (0.52, 1.18)           |
|                                | 0.019                     | 0.242                       |
| Indian or Asian                | 0.59 (0.41, 0.85)         | 0.83 (0.56, 1.24)           |
|                                | 0.005                     | 0.362                       |
| White                          |                           |                             |
| Employement status             |                           |                             |
| Employed/self-employed         | 1 (Reference)             | 1 (Reference)               |
|                                | 1.34 (1.11, 1.62)         | 1.27 (1.02, 1.58)           |
|                                | 0.002                     | 0.034                       |
| Unemployed                     | 0.70 (0.52, 0.93)         | 0.52 (0.35, 0.76)           |
|                                | 0.015                     | <0.001                      |
| Student/pupil/learner          | 0.77 (0.43, 1.36)         | 0.99 (0.51, 1.90)           |
|                                | 0.363                     | 0.965                       |
| Sick/disabled/unable to work/other | 1 (Reference)             | ---                         |
| Residence                      |                           |                             |
| Rural informal                 | 1 (Reference)             | 1 (Reference)               |
|                                | 1.05 (0.75, 1.46)         | 2.81 (2.29, 3.46)           |
|                                | 0.778                     | <0.001                      |
| Rural farms                    | 1.24 (0.98, 1.55)         |                             |
|                                | 0.072                     |                             |
| Urban                          |                           |                             |
| Hazardous/harmful/dependent alcohol use | 1 (Reference)             | 1 (Reference)               |
| No                             | 3.12 (2.57, 3.78)         | 2.81 (2.29, 3.46)           |
|                                | <0.001                    | <0.001                      |
| Yes                            |                           |                             |
| Psychological distress         | 1 (Reference)             | 1 (Reference)               |
| No                             | 1.29 (1.02, 1.62)         | 1.22 (0.96, 1.53)           |
|                                | 0.031                     | 0.098                       |
| Yes                            |                           |                             |

OR=Odds Ratio; CI=Confidence Interval.
| Variable                        | Simple logistic regression | Multiple logistic regression |
|--------------------------------|---------------------------|----------------------------|
|                                | Crude OR (95% CI)         | Adjusted OR (95% CI)       |
|                                | p-value                   | p-value                   |
| Age in years                   |                           |                            |
| 15-24                          | 1 (Reference)             | 1 (Reference)              |
| 25-34                          | 0.87 (0.64, 1.18)         | 0.85 (0.63, 1.16)          |
| 35-44                          | 0.72 (0.50, 1.03)         | 0.71 (0.50, 1.01)          |
| 45-54                          | 0.68 (0.45, 1.02)         | 0.64 (0.43, 0.96)          |
| 55 or more                     | 0.60 (0.43, 0.84)         | 0.57 (0.40, 0.80)          |
|                                | 0.367                     | 0.067                     |
|                                | 0.069                     | 0.054                     |
|                                | 0.061                     | 0.032                     |
|                                | 0.003                     | <0.001                    |
| Education                      |                           |                            |
| Grade 0-7                      | 1 (Reference)             | 1 (Reference)              |
| 1.94 (0.68, 1.26)              | 0.624                     | <0.001                    |
| Grade 8-11                     | 1.09 (0.83, 1.44)         | 1.08 (0.61, 2.57)          |
|                                | 0.523                     | 0.548                     |
| Population group               |                           |                            |
| African Black                  | 1 (Reference)             | 1 (Reference)              |
| 1.84 (1.36, 2.62)              | <0.001                    | 1.70 (1.25, 2.30)          |
| Coloured                       | 1.25 (0.61, 2.57)         | 1.41 (0.68, 2.91)          |
| Indian or Asian                | 1.68 (1.08, 1.62)         | 1.94 (1.22, 3.07)          |
| White                          |                           | 0.355                     |
|                                | 0.615                     | 0.022                     |
|                                | 0.077                     | 0.005                     |
| Employment status              |                           |                            |
| Employed/self-employed        | 1 (Reference)             | 1 (Reference)              |
| 0.99 (0.74, 1.31)              | 0.922                     | <0.001                    |
| Unemployed                     | 1.14 (0.79, 1.63)         | 1.41 (0.68, 2.91)          |
| Student/pupil/learner          | 0.89 (0.41, 1.95)         | 1.94 (1.22, 3.07)          |
| Sick/disabled/unable to work/other |                           |                            |
| Residence                      |                           |                            |
| Rural informal                 | 1 (Reference)             | 1 (Reference)              |
| 1.17 (0.63, 2.19)              | 0.615                     | <0.001                    |
| Rural farms                    | 1.20 (0.85, 1.71)         | 0.301                     |
| Urban                          |                           |                            |
| Hazardous/harmful/dependent alcohol use | 1 (Reference)             | 1 (Reference)              |
| No                             | 3.43 (2.37, 4.95)         | 3.08 (2.11, 4.49)          |
| Yes                            |                           | <0.001                    |
| Psychological distress         |                           |                            |
| No                             | 1 (Reference)             | 1 (Reference)              |
| 1.33 (0.98, 1.81)              | 0.071                     | <0.001                    |
| Yes                            |                           |                            |

OR=Odds Ratio; CI=Confidence Interval.