 doi:10.20944/preprints202011.0431.v1

Running title: Substance use

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

Supa Pengpid,[1,2] Shandir Ramlagan,[3] and Karl Peltzer[2,3*]

[1]ASEAN Institute for Health Development, Mahidol University, Salaya, Phutthamonthon, Nakhon Pathom 73170 Thailand

[2]Department of Research Administration and Development, University of Limpopo, Sovenga 0727, South Africa

[3]Department of Human and Social Capabilities, Human Sciences Research Council, Private Bag X41, Pretoria 0001, South Africa.

* Correspondence: kfpeltzer@gmail.com

 doi:10.20944/preprints202011.0431.v1

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

 doi:10.20944/preprints202011.0431.v1

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

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 16 November 2020 doi:10.20944/preprints202011.0431.v1

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 sedeatives 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,

 doi:10.20944/preprints202011.0431.v1

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 publically 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 possitive 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

 doi:10.20944/preprints202011.0431.v1

R11.17 per gram (~1 US$) [35]. This low price increases the affordablity 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 comorbity 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.

Author Contributions: "All authors fulfil the criteria for authorship. S.P., S.R. and K.P. conceived and designed the research, performed the statistical analysis, drafted the manuscript and made critical revision of the manuscript for key intellectual content. All authors have read and agreed to the published version of the manuscript."

Funding: Bill and Melinda Gates Foundation, Centers for Disease Control and Prevention Human Sciences Research Council, President's Emergency Plan for AIDS Relief (Emergency Plan), South African National AIDS Council, United Nations Children's Fund

Acknowledgments:

Human Sciences Research Council. *South African National HIV Prevalence, HIV Incidence, Behaviour and Communication Survey (SABSSM) 2017: Combined - All provinces*. [Data set]. SABSSM 2017 Combined. Version 1.0. Pretoria South Africa: Human Sciences Research Council [producer] 2017, Human Sciences Research Council [distributor] 2020. http://dx.doi.org/doi:10.14749/1585345902.

Conflicts of Interest: "The authors declare no conflict of interest."

References

1. Shield K, Manthey J, Rylett M, Probst C, Wettlaufer A, Parry CDH, Rehm J. National, regional, and global burdens of disease from 2000 to 2016 attributable to alcohol use: a comparative risk assessment study. Lancet Public Health. 2020 Jan;5(1):e51-e61. doi: 10.1016/S2468-2667(19)30231-2.
2. United Nations Office on Drugs and Crime. World Drug Report 2016, 2016. New Work: United Nations publication, Sales No. E.16.XI.7.
3. Degenhardt L, Whiteford HA, Ferrari AJ, Baxter AJ, Charlson FJ, Hall WD, Freedman G, Burstein R, Johns N, Engell RE, Flaxman A, Murray CJ, Vos T. Global burden of disease attributable to illicit drug use and dependence: findings from the Global Burden of Disease Study 2010. Lancet. 2013 Nov 9;382(9904):1564-74. doi: 10.1016/S0140-6736(13)61530-5.
4. Schneider, M , Norman, R , Parry, C , Bradshaw, D , & Plüddemann, A , & the South African Comparative Risk Assessment Collaborating Group (2007) Estimating the burden of disease attributable to alcohol use in South Africa in 2000 South African Medical Journal, 7, 664–672.
5. Clausen T, Rossow I, Naidoo N, Kowal P. Diverse alcohol drinking patterns in 20 African countries. Addiction. 2009 Jul;104(7):1147-54. doi: 10.1111/j.1360-0443.2009.02559.x.
6. Agoudavi, K., Dalmay, F., Legleyle, S., Kumako, K., Preux, P. M., Clément, J. P., … Nubukpo, P. (2015). Epidemiology of alcohol use in the general population of Togo. Addictive Behaviors Reports, 2, 1-5. doi: 10.1016/j.abrep.2015.03.004. eCollection 2015 Dec.
7. Kabwama, S. N., Ndyanabangi, S., Mutungi, G., Wesonga, R., Bahendeka, S. K., & Guwatudde, D. (2016). Alcohol use among adults in Uganda: findings from the

countrywide non-communicable diseases risk factor cross-sectional survey. Global Health Action, 9, 31302. doi: 10.3402/gha.v9.31302. eCollection 2016.

8. Pires, J., Padrão, P., Damasceno, A., Silva-Matos, C., & Lunet, N. (2012). Impact of different reference period definitions in the quantification of alcohol consumption: results from a nationwide STEPS survey in Mozambique. Alcohol and Alcoholism, 47(3), 328-33. doi: 10.1093/alcalc/ags003.
9. Pengpid, S., & Peltzer, K. (2019). Alcohol use among adults in Kenya: results from the national non-communicable diseases risk factor survey, 2015. Journal of Psychology in Africa, 29(1), 49-53, DOI: 10.1080/14330237.2019.1568728
10. Peltzer K, Davids A, Njuho P. Alcohol use and problem drinking in South Africa: findings from a national population-based survey. Afr J Psychiatry. 2011 Mar;14(1):30-7. doi: 10.4314/ajpsy.v14i1.65466.
11. Peacock A, Leung J, Larney S, Colledge S, Hickman M, Rehm J, Giovino GA, West R, Hall W, Griffiths P, Ali R, Gowing L, Marsden J, Ferrari AJ, Grebely J, Farrell M, Degenhardt L. Global statistics on alcohol, tobacco and illicit drug use: 2017 status report. Addiction. 2018 Oct;113(10):1905-1926. doi: 10.1111/add.14234.
12. Degenhardt L, Bharat C, Glantz MD, Sampson NA, Scott K, Lim CCW, Aguilar-Gaxiola S, Al-Hamzawi A, Alonso J, Andrade LH, Bromet EJ, Bruffaerts R, Bunting B, de Girolamo G, Gureje O, Haro JM, Harris MG, He Y, de Jonge P, Karam EG, Karam GE, Kiejna A, Lee S, Lepine JP, Levinson D, Makanjuola V, Medina-Mora ME, Mneimneh Z, Navarro-Mateu F, Posada-Villa J, Stein DJ, Tachimori H, Torres Y, Zarkov Z, Chatterji S, Kessler RC; WHO World Mental Health Survey Collaborators. The epidemiology of drug use disorders cross-nationally: Findings from the WHO's World Mental Health Surveys. Int J Drug Policy. 2019 Sep;71:103-112. doi: 10.1016/j.drugpo.2019.03.002. Epub 2019 Jun 28. PMID: 31255918; PMCID: PMC7370948.
13. Obot IS. Drugs in the Nigerian population: availability, use, consequences and policy implications. Bulletin on Narcotics, vol. LXII, 2019. 1-9. https://www.crisaafrica.org/wp-content/uploads/2020/08/Bulletin-19-11671_ebook.pdf#page=13
14. Peltzer, K., Phaswana-Mafuya, N. (2018) Drug use among youth and adults in a population-based survey in South Africa. South African Journal of Psychiatry, 24(0), a1139. https://doi.org/10.4102/sajpsychiatry.v24i0.1139

15. Peltzer K, Pengpid, S. Alcohol use and problem drinking in South Africa: Results from a national-population-based survey 2014-2015, Journal of Psychology in Africa. 2018;28:2, 147-151, DOI: 10.1080/14330237.2017.1375230
16. Lai HM, Cleary M, Sitharthan T, Hunt GE. Prevalence of comorbid substance use, anxiety and mood disorders in epidemiological surveys, 1990-2014: A systematic review and meta-analysis. Drug Alcohol Depend. 2015 Sep 1;154:1-13. doi: 10.1016/j.drugalcdep.2015.05.031.
17. Jané-Llopis E, Matytsina I. Mental health and alcohol, drugs and tobacco: a review of the comorbidity between mental disorders and the use of alcohol, tobacco and illicit drugs. Drug Alcohol Rev. 2006 Nov;25(6):515-36.
18. Simbayi, L.C., Zuma, K., Zungu, N., Moyo, S., Marinda, E., Jooste, S., Mabaso, M., Ramlagan, S., North, A., van Zyl, J., Mohlabane, N., Dietrich, C., Naidoo, I., and the SABSSM V Team. (2019). South African National HIV Prevalence, Incidence, Behaviour and Communication Survey, 2017. HSRC Press: Cape Town, South Africa.
19. Statistics South Africa. Mid-year population estimates 2017. Pretoria: Stats SA; 2017.
20. Babor TF, Higgens-Biddle JC, Saunders JB, Monteiro MG. AUDIT: The Alcohol Use Disorders Identification Test. Guidelines for use in primary care. World Health Organization, Geneva, Department of Mental Health and Substance Dependence, 2001.
21. Liskola, J., Haravuori, H., Lindberg, N., Niemelä, S., Karlsson, L., Kiviruusu, O., & Marttunen, M. (2018). AUDIT and AUDIT-C as screening instruments for alcohol problem use in adolescents. Drug and alcohol dependence, 188, 266–273. https://doi.org/10.1016/j.drugalcdep.2018.04.015
22. Humeniuk RE, Henry-Edwards S, Ali RL, Poznyak V, Monteiro M. The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST): manual for use in primary care. Geneva: World Health Organization; 2010.
23. Kessler RC, Andrews G, Colpe LJ, Hiripi E, Mroczek DK, Normand SL, Walters EE, Zaslavsky AM. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. Psychol Med. 2002 Aug;32(6):959-76. doi: 10.1017/s0033291702006074. PMID: 12214795.
24. Harker N, Lucas WC, Laubscher R, Dada S, Myers B, Parry CD. Is South Africa being spared the global opioid crisis? A review of trends in drug treatment demand for heroin, nyaope and codeine-related medicines in South Africa (2012-2017). Int J Drug Policy. 2020 Jul 7;83:102839. doi: 10.1016/j.drugpo.2020.102839.

25. Whiting, P.F., Wolff, R.F., Deshpande, S., Di Nisio, M., Duffy, S., Hernandez, A.V., Keurentjes, J.C., Lang, S., Misso, K., Ryder, S., Schmidlkofer, S., Westwood, M., and Kleijnen, J. (2015). Cannabinoids for Medical Use: A Systematic Review and Meta-analysis. Journal of the American Medical Association. 313(24): p. 2456-73. DOI: 10.1001/jama.2015.6358

26. Stein D. J. (2016). Position statement on cannabis. South African Medical Journal, 106(6), 45–46. https://doi.org/10.7196/SAMJ.2016.v106i6.10863

27. Peltzer K, Ramlagan S. Illicit drug use in South Africa: Findings from a 2008 national population-based survey. SAJP. 2010;16(1):8-15.

28. World Health Organization (WHO) (2002). Alcohol in developing societies : a public health approach. Summary. Available at http://www.who.int/substance_abuse/publications/en/APDSSummary.pdf (accessed 10 September 2018)

29. Phillips MR, Cheng HG, Li X, Zhang J, Shi Q, Xu G, Song Z, Ding Z, Pang S. Prevalence, correlates, comorbidity, and age of onset of alcohol use disorders in adult males from five provinces in China. Drug Alcohol Depend. 2017;173:170-177. doi: 10.1016/j.drugalcdep.2016.12.026.

30. Kassa A, Taddesse F, Yilma A. Prevalence and factors determining psychoactive substance (PAS) use among Hawassa University (HU) undergraduate students, Hawassa Ethiopia. BMC Public Health. 2014 Oct 7;14:1044. doi: 10.1186/1471-2458-14-1044.

31. Institute of Alcohol Studies (2017). Older people's drinking habits. Available at http://www.ias.org.uk/Alcohol-knowledge-centre/Alcohol-and-older-people/Factsheets/Older-peoples-drinking-habits-Very-little-very-often.aspx (accessed 30 August 2020).

32. Allen, L., Williams, J., Townsend, N., Mikkelsen, B., Roberts, N., Foster, C., & Wickramasinghe, K. (2017). Socioeconomic status and non-communicable disease behavioural risk factors in low-income and lower-middle-income countries: a systematic review. Lancet Global Health, 5(3):e277-e289. doi: 10.1016/S2214-109X(17)30058-X.

33. Assari S, Farokhnia M, Mistry R. Education Attainment and Alcohol Binge Drinking: Diminished Returns of Hispanics in Los Angeles. Behav Sci. 2019;9(1):9. doi: 10.3390/bs9010009.

34. Peltzer K, Ramlagan S, Johnson BD, Phaswana-Mafuya N. Illicit drug use and treatment in South Africa: a review. Subst Use Misuse. 2010 Nov;45(13):2221-43. doi: 10.3109/10826084.2010.481594.

35. Riley, S., Vellios, N., and van Walbeek, C. (2020) An economic analysis of the demand for cannabis: some results from South Africa, Drugs: Education, Prevention and Policy, 27:2, 123-130, DOI: 10.1080/09687637.2019.1581139

36. Peltzer K, Chao LW, Ramlagan S, Szrek H. Daily tobacco use and problem drinking among urban adults in South Africa: a longitudinal study. Pan Afr Med J. 2019 Jan 29;32:51. doi: 10.11604/pamj.2019.32.51.17256.

37. Rehm J, Crépault JF, Wettlaufer A, Manthey J, Shield K. What is the best indicator of the harmful use of alcohol? A narrative review. Drug Alcohol Rev. 2020. doi: 10.1111/dar.13053.

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 16 November 2020 doi:10.20944/preprints202011.0431.v1

Table 1. Sample characteristics and distribution of substance use

Variable	Sample	Hazardous, harmful or dependent alcohol use			Any drug use		
		Total	Male	Female	Total	Male	Female
	N (%)	%	%	%	%	%	%
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
Employement 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

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 16 November 2020 doi:10.20944/preprints202011.0431.v1

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

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 16 November 2020 doi:10.20944/preprints202011.0431.v1

	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, 1.51)	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
Employement 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 wotk/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)		1 (Reference)	
Yes	1.46 (1.20, 1.78)	<0.001	1.42 (1.16, 1.75)	<0.001

OR=Odds Ratio; CI=Confidence Interval.

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

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 16 November 2020 doi:10.20944/preprints202011.0431.v1

Variable	Simple logistic regression		Multiple logistic regression	
	Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Age in years				
15-24	1 (Reference)		1 (Reference)	
25-34	1.72 (1.24, 2.36)	<0.001	1.72 (1.25, 2.36)	<0.001
35-44	1.00 (0.69, 1.47)	0.982	1.01 (0.69, 1.47)	0.962
45-54	0.93 (0.64, 1.34)	0.680	0.88 (0.61, 1.27)	0.502
55 or more	0.38 (0.24, 0.59)	<0.001	0.40 (0.25, 0.63)	<0.001
Education				
Grade 0-7	1 (Reference)		1 (Reference)	
Grade 8-11	1.54 (1.17, 2.02)	0.002	1.13 (0.83, 1.53)	0.455
Grade 12 or more	1.15 (0.89, 1.48)	0.285	0.82 (0.62, 1.09)	0.174
Population group				
African Black	1 (Reference)		1 (Reference)	
Coloured	2.32 (1.77, 3.02)	<0.001	1.98 (1.49, 2.63)	<0.001
Indian or Asian	0.31 (0.15, 0.61)	<0.001	0.27 (0.14, 0.55)	<0.001
White	0.90 (0.56, 1.44)	0.668	0.95 (0.58, 1.56)	0.854
Employement status				
Employed/self-employed	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 wotk/other	0.54 (0.18, 1.65)	0.280		
Residence				
Rural informal	1 (Reference)		1 (Reference)	
Rural farms	3.52 (2.13, 5.82)	<0.001	2.57 (1.51, 4.38)	<0.001
Urban	3.28 (2.35, 4.57)	<0.001	2.87 (1.99, 4.14)	<0.001
Drug use (past 3 months)				
No	1 (Reference)		1 (Reference)	
Yes	3.18 (2.15, 4.69)	<0.001	2.91 (1.94, 4.36)	<0.001
Psychological distress				
No	1 (Reference)		1 (Reference)	
Yes	1.69 (1.29, 2.20)	<0.001	1.68 (1.27, 2.22)	<0.001

OR=Odds Ratio; CI=Confidence Interval.

Table 5. Associations with drug use among men

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 16 November 2020 doi:10.20944/preprints202011.0431.v1

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

OR=Odds Ratio; CI=Confidence Interval.

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 16 November 2020 doi:10.20944/preprints202011.0431.v1

Table 6. Associations with drug use among women

Variable	Simple logistic regression		Multiple logistic regression	
	Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Age in years				
15-24	1 (Reference)		1 (Reference)	
25-34	0.87 (0.64, 1.18)	0.367	0.85 (0.63, 1.16)	0.308
35-44	0.72 (0.50, 1.03)	0.069	0.71 (0.50, 1.01)	0.054
45-54	0.68 (0.45, 1.02)	0.061	0.64 (0.43, 0.96)	0.032
55 or more	0.60 (0.43, 0.84)	0.003	0.57 (0.40, 0.80)	<0.001
Education				
Grade 0-7	1 (Reference)		---	
Grade 8-11	0.94 (0.68, 1.26)	0.624		
Grade 12 or more	1.09 (0.83, 1.44)	0.523		
Population group				
African Black	1 (Reference)		1 (Reference)	
Coloured	1.84 (1.36, 2.62)	<0.001	1.70 (1.25, 2.30)	<0.001
Indian or Asian	1.25 (0.61, 2.57)	0.548	1.41 (0.68, 2.91)	0.355
White	1.68 (1.08, 1.62)	0.022	1.94 (1.22, 3.07)	0.005
Employement status				
Employed/self-employed	1 (Reference)		---	
Unemployed	0.99 (0.74, 1.31)	0.922		
Student/pupil/learner	1.14 (0.79, 1.63)	0.482		
Sick/disabled/unable to wotk/other	0.89 (0.41, 1.95)	0.775		
Residence				
Rural informal	1 (Reference)		---	
Rural farms	1.17 (0.63, 2.19)	0.615		
Urban	1.20 (0.85, 1.71)	0.301		
Hazardous/harmful/dependent alcohol use				
No	1 (Reference)		1 (Reference)	
Yes	3.43 (2.37, 4.95)	<0.001	3.08 (2.11, 4.49)	<0.001
Psychological distress				
No	1 (Reference)		---	
Yes	1.33 (0.98, 1.81)	0.071		

OR=Odds Ratio; CI=Confidence Interval.