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To cite this article: Catherine Mawia Musyoka , Anne Mbwayo , Dennis M. Donovan & Muthoni Mathai (2020): mHealth-based peer mentoring for prevention of alcohol and substance abuse among first year university students: protocol for quasi-experimental intervention, Journal of Substance Use, DOI: [10.1080/14659891.2020.1766131](https://doi.org/10.1080/14659891.2020.1766131)

To link to this article: <https://doi.org/10.1080/14659891.2020.1766131>



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Published online: 19 May 2020.



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# mHealth-based peer mentoring for prevention of alcohol and substance abuse among first year university students: protocol for quasi-experimental intervention

Catherine Mawia Musyoka <sup>a</sup>, Anne Mbwya<sup>a</sup>, Dennis M. Donovan<sup>b</sup>, and Muthoni Mathai<sup>a</sup>

<sup>a</sup>Department of Psychiatry, College of Health Sciences, University of Nairobi, Nairobi, Kenya; <sup>b</sup>Department of Psychiatry & Behavioural Sciences and Alcohol & Drug Abuse Institute, University of Washington School of Medicine, Seattle, WA, USA

## ABSTRACT

**Objective:** The use of psychoactive substances increases university students' general morbidity and mortality. Universities run programs to prevent psychoactive substance use since they are associated with the risk of poor academic outcomes. The University of Nairobi (UoN) trains peer mentors who counsel students to prevent substance use. There is, however, inadequate feedback and no evaluation of the effectiveness of this method. This study will pilot mobile health (mHealth) based peer mentoring, evaluate and provide feedback about implementation. It will be based in two campuses of UoN, Nairobi, Kenya.

**Methods:** Three phases study. In the first phase, a baseline survey determines students' knowledge about, attitudes toward, and prevalence of substance use at baseline and the end of the intervention phase. Second phase, mHealth based intervention using a quasi-experimental design. Participants 100 mentors (50 intervention and 50 control groups). Intervention group using mHealth screens for substance use, provide structured brief intervention and treatment referral. A comparative control group, using a paper-based guide will deliver the same program. Phase three, mentors during focussed group discussions will share their experiences.

**Results:** Data will be collected on implementation, acceptability and substance use patterns. Data analysis using descriptive, inferential statistics and thematic content analysis for qualitative data.

**Conclusions:** The study will provide evidence on the implementation and acceptability of mHealth among university students. This will inform national and regional substance use prevention policy and practice.

**Abbreviations:** ASSIST: Assessment of Smoking and Substance Involvement Test; AUDIT: Alcohol Use Disorder Identification Tool; KAP: Knowledge, Attitude, and Prevalence; mHealth: Mobile Health; RDSDQ: Researcher Designed Socio-Demographic Questionnaire; UNODC: United Nations Office on Drugs and Crime; USA: United States of America; WHO: World Health Organization

## ARTICLE HISTORY

Received 5 March 2020

Revised 23 April 2020

Accepted 29 April 2020

## KEYWORDS

Alcohol and substance use; decisional support; mHealth; peer mentors; university students

## Background

Alcohol and substance use is a global public health concern, more so among young people between the ages of 18 to 25 years, which is reportedly the peak of substance use (World Drug Report, U., 2018). This is an age of important milestones in a person's life for various reasons:

(i) At this age adolescents transition to adulthood; bringing new challenges because, though there is an increase in body size, the adolescents' brains are yet to develop to adult maturity (Skidmore et al., 2016). (ii) Psychologically, adolescents are prone to thrill-seeking; they need to socialize, feel good, and engage in risky behaviors which lead to negative consequences (Dayan et al., 2010). (iii) This period marks the transition from high school to a college education; this exciting venture comes along with new pressures and uncertainties, which may be coupled with personal and social maladjustments (Ross et al., 2008; World Drug Report, U., 2018). All these are risk factors which make alcohol and substance use to be high among University students, making it a global public health problem.

Globally, there is reportedly increased use of psychoactive substances, in Africa and Asia there is a soaring use of tramadol while

North America is facing an opioid crisis (World Drug Report, U., 2018). In the United States of America (USA) substance use among those aged 18 to 25 years is in the increase (McCance-Katz, 2018), with females having increased use of cannabis, prescription drugs, and alcohol (Organization of American States, C 2019). In Europe an estimated 19.1 million young adults used substances in 2018 (European Drug Report, 2019); males used substances twice as much as females, while cannabis was the most used substance (European Drug Report, 2019; United Nations Office on Drugs and Crime [UNODC], 2018).

The prevalence of substance use among undergraduate students in one African university was reported at 27.5% with alcohol, codeine, tramadol and tobacco being the most used substances (Johnson et al., 2017). In Kenya, the prevalence of substance use among University students ranges from 25% to 67.9% (Atwoli et al., 2011). Alcohol, cannabis, and tobacco are the most used substances (Tumuti et al., 2014).

Prevention of substance use among university students is key to avert immediate and long term deleterious consequences. Universities go to great lengths to prevent and treat alcohol

and substance use among its students, to avert the associated negative consequences including, poor academic performance, prolonged stay in university, drop out and criminality (Mekonen et al., 2017). Universities and schools use varying strategies to prevent substance use and problem behaviors among their students (Botvin & Griffin, 2007). The National Registry of Evidence-based Programs and Practices (NREPP), reports that the median number of school-based drugs prevention activities in a typical school was fourteen, these included rules and policies to deter substance possession and use or other problem behaviors while others had curriculum instruction on drug use prevention (Bullock et al., 2015). Table 1 presents the summary of the methodology: the study objectives, data needed, study design, location, sources of data, sample size, data collection tools, and data analysis.

Despite the available intervention programs, substance use among university students continues to rise. The uptake of counseling services in universities by students is low. There is a need, therefore, to explore innovative ways and strategies which will aid to connect and effectively communicate substance use behavior change to this group of students (Skidmore et al., 2016). There are challenges faced by parents and other authority figures as they attempt to reach out to students at this age to make meaningful communication (Macarthur et al., 2016). Young adults resist authority figures and value their independence and freedom which is associated with this developmental stage (Botvin & Griffin, 2007).

To bridge this communion gap, the use of a peer-led approach is useful to influence behavior change among University students (Macarthur et al., 2016).

There is limited evidence for the use of peer-based interventions, yet at this time and age, young adults listen to each other more freely, they have shared interests and common beliefs (Macarthur et al., 2016). It is useful therefore to involve peers in programs related to youth health promotion. The use of peer mentors is a common practice in behavior change as well as substance use prevention programs. Peers have been used as mentors in HIV/AIDS programs (Brown et al., 2009), drugs and alcohol use prevention (Thomas & Spragins, 2011), as well as those which seek to encourage youth to remain in colleges and complete their studies (Andrews & Clark, 2011).

Evidence of the effectiveness of strategies used for psychoactive substance use among University students is limited and there is a gap in the evidence base. Consequently, there is a substantial need to develop novel interventions for the prevention of psychoactive substance use among University students. An example of such novel interventions is the use of technology. The use of technology such as the Internet and mobile phones offer promise for research (Hopson et al., 2015), prevention, management of and recovery from substance use disorders (Marsch, 2012).

## Objective

This study aims to evaluate and compare the implementation of a peer-mentoring intervention delivered via a mobile phone (mHealth) and a paper-based approach as a decision support

tool for the prevention of substance use among freshmen at the University of Nairobi.

## Methods/design

### Study design

This study is in three phases. The first phase is a cross-sectional baseline survey of university first-year students, to determine their knowledge about, attitudes toward and prevalence (KAP) of substance use at the entry to university; this survey will be repeated at the end of the intervention.

Phase two is the implementation of the intervention. The design will be a quasi-experimental mixed-methods study.

One hundred peer mentors will participate (50 in the intervention group and 50 in the control group). The intervention group will use an algorithm decision support tool programmed in a mHealth platform to screen fellow students for any substance use, provide a structured brief intervention, and refer cases who need professional care; the comparative control group will use paper-based (practice as usual) to deliver the same program. The two groups of peer mentors will be trained to identify and intervene with their peers who have psychological challenges and screen for alcohol and substance use. They will be instructed to refer difficult cases for professional attention by professional student counselors.

Phase Three is a sequential explanatory study (collection and analysis of quantitative data followed by a collection and analysis of qualitative data) that will explore the experiences of both groups of peer mentors. Sets of 8–12 peer mentors from the experimental and the control groups will be randomly selected to independently participate in focused group discussions to share in-depth their experiences with the approach they used for the intervention as a peer mentor.

### Sample size determination

In the Phase One KAP survey, the sample size will be calculated using the Cochran's formula (Daniel, 1999; Naing et al., 2006) using a power of 95% and a significance level of 5%, a sample size of 384 students will be used for the study, with each of the two study campuses contributing participants proportionate to their enrollment.

### Inclusion criteria for the KAP survey

In Phase One, first-year students in the study campuses aged 18 to 25 years will be included in the study.

### Exclusion criteria for KAP survey

- (1) First-year students who are repeating the academic year.
- (2) First-year students joining on transfer from other universities.

In Phase Two, the whole population of 100 student peer mentors who give consent, will be eligible to participate in

**Table 1.** Gives a summary of the methodology: the study objectives, data needed, study design, location, sources of data, sample size, data collection tools, and data analysis.

	Objective One	Objective Two	Objective Three	Objective Four	Objective Five	Objective Six
<b>Objectives</b>	To determine the knowledge, attitude and prevalence (KAP) of alcohol and substance use at the entry to university and a repeat survey 12 months later after the intervention	To determine the acceptability of a peer mentoring intervention program on alcohol and substance use prevention, delivered via a mHealth or paper-based approach by peer mentors	To determine the reach (number of contacts between peer mentors and students) in the mHealth technology group as compared to the paper-based approach group.	To determine the patterns of alcohol and substance use among the students' population as identified by peer mentors in the mHealth and paper-based intervention groups.	To evaluate the awareness and sensitization sessions on alcohol and substance use conducted by peer mentors in the mHealth group and the paper-based group	To explore qualitatively, the experiences of all peer mentors, whether they used the paper-based approach or mHealth for alcohol and drug abuse intervention
<b>Data collected</b>	KAP frequencies, lifetime substance use, current substance use, attitude measures toward drug use	Acceptability of intervention measures, perceived usefulness, perceived ease of use, behavior intention to use the intervention and actual use	Contacts between mentors and Mentees Frequency and duration of contacts	Substances consumed by the mentees, patterns of use, levels of use Other problem areas presented by the mentees	Enumerate the number of awareness sessions, how many mentees attend the sensitizations, Topics discussed during sensitization meetings	Lived experiences of the mentors while delivering the intervention
<b>Study design Location</b>	Cross-sectional survey Two separate University campuses	Pretest and posttest questionnaire Two separate University campuses	Quasi-experimental Two separate University campuses	Quasi-experimental Two separate University campuses	Quasi-experimental Two separate University campuses	Focused Group Discussions Two separate University campuses
<b>Source of data</b>	First-year university students	Student Peer Mentors	mHealth Application Paper-based intervention tool 100 student Peer Mentors	mHealth Application Paper-based intervention tool 100 Student Peer Mentors	mHealth Application Paper-based intervention tool 100 student Peer Mentors	mHealth Application Paper-based intervention tool Sets of 8 to 12 homogenous Student Peer Mentors
<b>Sample size</b>	384 students	100 Student Peer Mentors				
<b>Inclusion criteria</b>	All first-year university students who give written consent	All first-year student peer mentors who meet the inclusion criteria and as well give consent	All first-year student peer mentors who meet the inclusion criteria and as well give consent	All first-year student peer mentors who meet the inclusion criteria and as well give consent	All first-year student peer mentors who meet the inclusion criteria and as well give consent	All first-year student peer mentors who meet the inclusion criteria and as well give consent
<b>Data collection tools</b>	Questionnaire: (WHO- ASSIST) and a researcher designed Socio-demographic questionnaire	Technology Acceptability Measure(TAM) tool Acceptance of Intervention Measure (AIM), Appropriateness of Intervention Measure and Feasibility of Intervention Measure (FIM) tool	MHealth App data, Researcher designed peer mentoring guide tool	The researcher designed a peer mentoring guide tool Health App data and	ODK based mHealth data collection tool and The researcher designed a peer mentoring guide tool	Focused Group Discussion Interview Guide
<b>Data analysis</b>	Descriptive statistics Frequencies and percentages Logistic regression analysis	Descriptive statistics Frequencies and percentages Logistic regression analysis	Descriptive statistics Frequencies and percentages Logistic regression analysis	Descriptive statistics Frequencies and percentages Logistic regression analysis	Descriptive statistics Frequencies and percentages Logistic regression analysis	Thematic content Analysis

this study. This will be all the peer mentors in their 1<sup>st</sup> year of study at purposively selected university campuses.

### **Inclusion criteria for peer mentors**

- (1) First-year students who express interest to take part in the peer mentoring program
- (2) First-year students who have android based smartphone
- (3) First-year students who give written consent to participate

### **Exclusion criteria for peer mentors**

- (1) Students who are repeating their academic year of study
- (2) Students who have disciplinary cases in college

The protocol has been reviewed and approved by Kenyatta National Hospital and the University of Nairobi Ethical Committee (KNH-UoN ERC) P98/02/2018. Written informed consent will be obtained from all study participants.

## **Recruitment strategy**

### **Phase one of the study**

Data will be collected in lecture rooms, the principal investigator with permission from concerned lecturers will do to the classes and request the students for their time, she will address them and explain the nature of the study. All the students enrolled in a particular course are assigned a unique student number. These numbers are used to make a class list. The randomization program will be used to generate a list of those numbers to be selected. The students whose numbers are randomly selected will then be approached and requested consent to participate in the survey. If the student is not present in class on the data collection day or they decline to participate, the student whose number is next on the class list will be approached and requested to participate. The students will be requested to complete a WHO standardized questionnaire on their knowledge about, attitude toward and practice of alcohol and drugs use. There will be no interference from the PI or their research assistants. However, the PI or the research assistant will be available for any clarifications. This process will be repeated until the required sample size is achieved.

### **Phase two of the study**

All first-year students from the two study campuses will be informed about the study, they will be requested to apply for consideration as peer mentors. Advertisement for recruitment of peer mentors will be made through student forums, student internet portals, student leaders, notice boards and distribution of flyers in college. Interested first-year students will be requested to apply for training as peer mentors in their campuses. The criteria for inclusion will be: first-year students, had scored a B plus and above at Kenya certificate of secondary examination (this is the high school examination for qualification to University education), those who

demonstrate involvement in school clubs and have leadership skills. One hundred and twenty (a slightly higher number will be recruited to account for those who will drop out during the study period) students who meet the set criteria will be interviewed and recruited for training as peer mentors. The selected students will be explained to, about the study and requested their consent to participate in the same. These selected Peer mentors will be divided into two groups of sixty will be in each cohort depending on the campus they are registered in. Students from the College of Biological and Physical Sciences (experimental group) who give written consent to participate in the study will, also, be taken through further training on the use of the Open Data Kit (ODK) technology-based peer mentoring software. The program will be installed on their smartphones and they will be trained on how to use it. Peer mentors from the College of Education and External Studies (control group), will be trained on the use of a structured paper-based tool for peer mentoring.

Baseline survey using the Acceptability of Intervention Measure (AIM), will be used to document the acceptability of the peer mentoring process will be done after the initial training of all the peer mentors. This survey will be repeated at the end of the study intervention; the aim will be to document before and after the attitude of the mentors with the use of the intervention program they will have used. Furthermore, some peer mentors from both groups will be randomly selected to participate in focused group discussions. They will share their experiences with the use of either mHealth technology or the paper-based approach for peer mentoring.

## **Study procedure**

In phase one cross-sectional data will be collected using the World Health Organization (WHO) 'Assessment of Smoking and Substance Involvement Test' (ASSIST), the Alcohol Use Disorder Identification Tool (AUDIT) and a Researcher Designed Socio-Demographic Questionnaire (RDSDQ). The ASSIST identifies different types of psychoactive substances including Alcohol, Cannabis, and Tobacco, which are in common use (Humeniuk & Ali, 2006; WHO | The ASSIST project – Alcohol, Smoking and Substance Involvement Screening Test, 2018). While AUDIT gives the patterns of alcohol use which include hazardous or harmful and binge drinking (Babor et al., 2001). Alcohol is the most used/misused substance by university students.

In Phase Two, peer mentors in two different campuses will be compared, one group exposed to paper-based (current practice) peer mentoring and another group in a different campus exposed to mHealth based mentoring intervention program. The treatment as usual peer mentors will use paper-based assessment tools and will be instructed to document their activities. They will be requested to identify students on their campus who need mentorship and intervene accordingly. Any student with serious psychological problems should be referred to a qualified student counselor for professional care. The experimental group peer mentors will have the same instructions, but instead of paper-based assessment

tools, they will be trained to use an intervention program that is installed in their smartphones. This mHealth app is based on the open data technology.

In Phase three, sets of 8 to 12 peer mentors will participate in focused group discussions to give their experiences in the peer mentoring process. This will be repeated until saturation is achieved. They will be independently selected from both the experimental and the control groups. The interviews will be audio-recorded by the principal investigator and later transcribed verbatim by an independent research assistant.

### Data management and analysis

Data from the Phase One baseline survey will be coded and cleaned using Epi Data 3.1 software. Statistical analysis of cleaned data will be performed using Stata software version 14.2 Special Edition.

Prevalence of any substance used in a lifetime and the past 3 months will be determined. Summary of the lifetime and current use prevalence and social demographic variables will be done using descriptive statistics such as mean and mode. Associations between the outcome variables of a lifetime and current substance use and the independent variables such as sociodemographic characteristics will be examined by calculating odds ratios.

Statistically significant variables at the  $p < .05$  levels in bivariate analysis will be used to create multivariable models. Multivariable logistic regression will be used to assess the impact of explanatory variables for the outcome of a lifetime and current substance use prevalence, for women and men separately.

For the intervention phase (Phase Two), the Acceptability of Intervention Measure (AIM), Intervention Appropriateness Measure (IAM), and Feasibility of Intervention Measure (FIM) will be analyzed and presented as frequencies and proportions. The tools are used for assessment of implementation outcome measures, and are essential for monitoring and evaluating the success of implementation efforts. Higher scores denote higher acceptability, higher perceived appropriateness, and feasibility of the intervention.

To investigate the extent to which perceived resources, perceived usefulness, perceived ease of use which is hypothesized by the study to be fundamental determinants of user attitude to use, behavioral intention to use, and actual use of the mHealth based peer mentoring program will be analyzed by multiple regression analysis.

Correlation analysis will also be performed between perceived resources, perceived usefulness, and perceived ease of use, with predictors of user attitude to use, behavioral intention to use, and actual use.

For the qualitative data, the principal investigator and one other independent coder will separately do coding, the results will be compared. Themes in the transcribed data will be identified using thematic content analysis. Data coding will be categorized and sub-categorized according to similar foci to identify emerging themes. Nvivo 11 will be used for coding and data management.

### Discussion

The mHealth-based intervention for substance use prevention among university students seeks to provide evidence for

implementation outcomes of technology-based peer mentoring among University students. The study methodology integrates the use of peer mentors to interact with their mentees during their normal day to day University life and to ensure convenience for the participants. The goal is to demonstrate the feasibility and acceptability of the mHealth intervention as a decision support tool for mentorship activities among University students. Prevention of alcohol and substance use among the youth is integral in maintaining healthy communities as envisaged by the global sustainable development goals, especially goal number 3 on good health and well-being (Hambrey, 2017).

There is a widespread use of mobile technology among the youth (Poushter, 2016), and this provides an opportunity for mHealth based interventions that target this cohort, as it is suited for their lifestyle and preferences (Marsch & Borodovsky, 2017).

This study will generate useful evidence and build into the pool of growing knowledge on the use of technology in the prevention of substance use among the youth.

The findings of this study are useful to policymakers to inform health-promoting policies and for University management in designing preventive strategies for alcohol and substance use among University students.

### Strengths of the study

- (1) This is the first study done in Kenya to provide vital evidence on the use of mHealth for intervention in the prevention of substance misuse among university students which is a relatively novel practise with limited evidence
- (2) This study will provide epidemiological information about students' knowledge about, attitudes toward, and prevalence of substance use in Kenya
- (3) This study uses peer mentors who interact with their mentees at all spheres of their University life, including the hostels, lecture theaters and social activities

### Study limitations

- (1) Being a prospective study some study participants (peer mentors may lose interest) thus be lost to natural attrition.
- (2) Peer mentors who do not have android phones will not be recruited to participate in the study.
- (3) The KAP survey being a self-report the respondents may give socially desirable responses thus with a potential for over or under-reporting of the prevalence of alcohol and substance use.

To mitigate these limitations, the principal investigator will recruit a slightly larger sample size to accommodate the ones who may drop out of the study and study data will be backed up daily. Notwithstanding these limitations, the results of this study will have implications for interventions on substance use prevention among university students.

## Disclosure of potential conflict of interest

All the authors declare that they have no competing interests.

## Funding

This research was supported by the Consortium for Advanced Research Training in Africa (CARTA). CARTA is jointly led by the African Population and Health Research Center and the University of the Witwatersrand and funded by the Carnegie Corporation of New York (Grant No-B 8606.R02), Sida (Grant No:54100113), the DELTAS Africa Initiative (Grant No: 107768/Z/15/Z) and Deutscher Akademischer Austauschdienst (DAAD). The DELTAS Africa Initiative is an independent funding scheme of the African Academy of Sciences (AAS)'s Alliance for Accelerating Excellence in Science in Africa (AESA) and supported by the New Partnership for Africa's Development Planning and Coordinating Agency (NEPAD Agency) with funding from the Wellcome Trust (UK) and the UK government. The statements made and views expressed are solely the responsibility of the Fellow.

## Data availability

This article is a research proposal. The dataset generated will be made available from the corresponding author on a reasonable request.

## Ethics approval and consent to participate

The protocol has been reviewed and approved by Kenyatta National Hospital and the University of Nairobi Ethical Committee (KNH-UoN ERC) P98/02/2018. Written informed consent will be obtained from all study participants. Participants will be informed about the voluntary nature of the study and that they are free to opt-out of the study without any consequences to them.

## Current status

Phase one of this study started in November 2018 with a baseline survey. It is currently in phase two of implementing the interventions.

## ORCID

Catherine Mawia Musyoka  <http://orcid.org/0000-0001-6669-9860>

## References

- Andrews, J., & Clark, R. (2011, November). *Peer mentoring works! November*. Aston University. ISBN: 978 1 85449 417 7.
- Atwoli, L., Mungla, P. A., Ndung'u, M. N., Kinoti, K. C., & Ogot, E. M. (2011). Prevalence of substance use among college students in Eldoret, western Kenya. *BMC Psychiatry*, 11(1), 34. <https://doi.org/10.1186/1471-244X-11-34>
- Babor, T. F., Higgins-biddle, J. C., Saunders, J. B., Monteiro, M. G., Higgins-biddle, J. C., Saunders, J. B., & Monteiro, M. G. (2001). *The alcohol use disorders identification test*. World Health Organization. [http://whqlibdoc.who.int/hq/2001/who\\_msd\\_msb\\_01.6a.pdf](http://whqlibdoc.who.int/hq/2001/who_msd_msb_01.6a.pdf)
- Botvin, G. J., & Griffin, K. W. (2007). School-based programmes to prevent alcohol, tobacco and other drug use. *International Review of Psychiatry*, 19(6), 607–615. <https://doi.org/10.1080/09540260701797753>
- Brown, L., Thurman, T. R., Rice, J., Boris, N. W., Ntaganira, J., Nyirazinyoye, L., de Dieu, J., & Snider, L. (2009). Impact of a mentoring program on psychosocial wellbeing of youth in Rwanda: Results of a quasi-experimental study. *Vulnerable Children and Youth Studies*, 4(4), 288–299. <https://doi.org/10.1080/17450120903193915>
- Bullock, L. M., Zolkoski, S. M., & Estes, M. B. (2015). Meeting the mental health needs of children and youth: Using evidence-based education worldwide. *Emotional and Behavioural Difficulties*, 20(4), 398–414. <https://doi.org/10.1080/13632752.2015.1027631>
- Daniel, W. W. (1999). BIostatistics. *Journal of Chemical Information and Modeling*, 53(9), 1689–1699. <https://doi.org/10.1017/CBO9781107415324.004>
- Dayan, J., Bernard, A., Olliac, B., Mailhes, A. S., & Kermarrec, S. (2010). Adolescent brain development, risk-taking and vulnerability to addiction. *Journal of Physiology, Paris*, 104(5–6), 279–286. <https://doi.org/10.1016/j.jphysparis.2010.08.007>
- European Drug Report. (2019). Publications Office of the European Union. <https://doi.org/10.2810/191370TD-AT-19-001-EN-C>
- Hambrey, J. (2017). The 2030 agenda and the sustainable development goals: The challenge for aquaculture development and management. *FAO Fisheries & Aquaculture Circular*, 1141(1141), 62–70. ISBN-9789251099285.
- Hopson, L., Wodarski, J., & Tang, N. (2015). The effectiveness of electronic approaches to substance abuse prevention for adolescents. *Journal of Evidence-Informed Social Work*, 12(3), 310–322. <https://doi.org/10.1080/15433714.2013.857178>
- Humeniuk, R., & Ali, R. (2006). *Validation of the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) and pilot brief intervention: A technical report of phase II findings of the WHO ASSIST Project*. [inclusive pages]. WHO Press, World Health Organization.
- Johnson, O. E., Akpanekpo, E. I., Okonna, E. M., Adeboye, S. E., & Udoh, A. J. (2017). The prevalence and factors affecting psychoactive substance use among undergraduate students in University of Uyo, Nigeria. *Journal of Community Medicine and Primary Health Care*, 29(2), 11–22. ISSN 0794-7410.
- Macarthur, G. J., Sean, H., Deborah, M., . C., Matthew, H., & Rona, C. (2016). Peer-led interventions to prevent tobacco, alcohol and/or drug use among young people aged 11-21 years: A systematic review and meta-analysis. *Addiction*, 111(3), 391–407. <https://doi.org/10.1111/add.13224>
- Marsch, L. A. (2012). Leveraging technology to enhance addiction treatment and recovery. *Journal of Addictive Diseases*, 31(3), 313–318. <https://doi.org/10.1080/10550887.2012.694606>
- Marsch, L. A., & Borodovsky, J. T. (2017). Technology-based interventions for preventing and treating substance use among youth. *Child and Adolescent Psychiatric Clinics of North America*, 25(4), 755–768. <https://doi.org/10.1016/j.chc.2016.06.005>. Technology-based
- McCance-Katz, E. F. (2018, September). The national survey on drug use and health : 2017 National Survey on Drug Use and Health (NSDUH). SAMHSA - Substance Abuse and Mental Health Services Administration, 53.
- Mekonen, T., Fekadu, W., Mekonnen, T. C., & Workie, S. B. (2017). Substance use as a strong predictor of poor academic achievement among university students. *Psychiatry Journal*, 2017, 1–9. Article ID 7517450. <https://doi.org/10.1155/2017/7517450>
- Naing, L., Winn, T., & Rusli, B. N. (2006). Practical issues in calculating the sample size for prevalence studies. *Archives of Orofacial Sciences*, 1(Ci), 9–14.
- Organization of American States, C. (2019). *Report on drug use in the America 2019*. Inter-American Drug Abuse Control Commission (CICAD).
- Poushter, J. (2016). *Emerging, developing countries gain ground in the tech revolution*. Pew Research Center.
- Ross, V., Ph, D., & Dejong, W. (2008). Alcohol and other drug abuse among first-year college students. *Infofacts Resources*, 3, 1–8. <http://www.highercenter.org>
- Skidmore, C. R., Kaufman, E. A., & Crowell, S. E. (2016). Substance use among college students. *Child and Adolescent Psychiatric Clinics of North America*, 25(4), 735–753. <https://doi.org/10.1016/j.chc.2016.06.004>
- Thomas, L. D., & Spragins, W. (2011). Mentoring adolescents to prevent drug and alcohol use (Review). *Cochrane Database of Systematic Reviews*, 11, CD007381. <https://doi.org/10.1002/14651858.CD007381.pub2>. [www.cochranelibrary.com](http://www.cochranelibrary.com)
- Tumuti, S., Wang, T., Waweru, E. W., & Ronoh, A. K. (2014). Prevalence, drugs used, sources, and awareness of curative and

- preventive measures among Kenyatta University Students, Nairobi County, Kenya. *Journal of Emerging Trends in Educational Research and Policy Studies (JETERAPS)*, 5(3), 352–361. ISSN-2141-6990.
- United Nations Office on Drugs and Crime (UNODC). (2018). *Drug use in Nigeria*. United Nations publication.
- WHO | The ASSIST project - Alcohol, Smoking and Substance Involvement Screening Test. (2018) (testimony of WHO). WHO Press, World Health Organization.
- World Drug Report, U. (2018). *World drug report, youth*. United Nations publication, Sales No. E.18.XI.