A Systematic Review of Substance Use and Substance Use Disorder Research in Kenya

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Abstract

Background: The burden of substance use in Kenya is significant. The objective of this study was to systematically summarize existing literature on substance use in Kenya, identify research gaps, and provide directions for future research.

Methods: This systematic review was conducted in line with the PRISMA guidelines. We conducted a search of 5 bibliographic databases (PubMed, PsychINFO, Web of Science, Cumulative Index of Nursing and Allied Professionals (CINAHL) and Cochrane Library) until 20 August 2020. In addition we searched all the volumes of the official journal of the National Authority for the Campaign Against Alcohol & Drug Abuse (the African Journal of Alcohol and Drug Abuse). The results of eligible studies have been summarized descriptively and organized by the three broad categories: (1) Studies evaluating the epidemiology of substance use, (2) studies evaluating interventions and programs, and (3) qualitative studies exploring various themes on substance use. The quality of the included studies was assessed with the Quality Assessment Tool for Studies with Diverse Designs.

Results: Of the 185 studies that were eligible for inclusion, 144 investigated the epidemiology of substance use, 23 qualitatively explored various substance use related themes, and 18 evaluated substance use interventions and programs. Key evidence gaps emerged. Firstly, vulnerable populations such as police officers, pregnant women, health care workers and persons with physical disability had been under-represented within the epidemiological and qualitative work. Secondly, no intervention study had been conducted among children and adolescents. Thirdly, most interventions had focused on alcohol to the exclusion of other prevalent substances such as tobacco and cannabis. Finally, little had been done to evaluate digital and population-level interventions.

Conclusions: The results of this systematic review provide important directions for future substance use research in Kenya.

Systematic review registration: PROSPERO: CRD42020203717

Background:

Globally, substance use is associated with significant morbidity and mortality. In the 2017 Global Burden of Disease (GBD) study, substance use disorders (SUDs) were the second leading cause of disability among the mental disorders with 31,052,000 (25%) Years Lived with Disability (YLD) attributed to them (1). In 2016, harmful alcohol use resulted in 3 million deaths (5.3% of all deaths) worldwide and 132.6 (5.1%) million disability-adjusted life years (DALYs) (2). Tobacco use, the leading cause of preventable death, kills more than 8 million people annually (3). Even though the prevalence of opioid use is small compared to that of tobacco and alcohol use, opioid use disorder contributes to 76% of all deaths from SUDs (4). Other psychoactive substances such as cannabis and amphetamines are similarly associated with significant health consequences (4). In addition to their impact on health, substance use is associated with significant socio-economic costs arising from their impact on health and criminal justice systems (5).

Low- and middle-income countries (LMICs) bear the burden of substance use. Over 80% of the 1.3 billion tobacco users worldwide live in LMICs (3). In 2016, the alcohol-attributable disease burden was highest in LMICs compared to upper-middle-income and high-income countries (HICs) (2). In Kenya, a nationwide survey conducted in 2017 reported that over 10% of Kenyans between the ages of 15 to 65 years had a SUD (6). In another survey, 20% of primary school children had ever used at least one substance in their lifetime (7). Moreover, Kenya has the third highest total DALYs (54,000) from alcohol use disorders (AUD) in Africa (4). Unfortunately, empirical work on substance use in LMICs is limited (8, 9). In a global mapping of SUD research, majority of the work had been conducted in upper-middle income and HICs (HICs) (9). In a study whose aim was to document the existing work on mental health in Botswana, only 7 studies had focused on substance use (8). Information upon which policy and interventions could be developed is therefore lacking in low-and-middle income settings.

Since the early 1980s, scholars in Kenya began engaging in research to document the burden and patterns of substance use (10). In 2001 the National Authority for the Campaign Against Alcohol and Drug Abuse (NACADA) was set up in response to the rising cases of harmful substance use in the country particularly among the youth. The mandate of the Authority was to educate the public on the harms associated with substance use (11). In addition to prevention work, NACADA contributes to research by conducting 5 year general population prevalence surveys and recently launched its journal, the African Journal of Alcohol and Drug Abuse (AJADA) (12). The amount of empirical work done on substance use in Kenya has expanded since these early years but has not been systematically summarized, and therefore the evidence gaps remain unclear.

In order to guide future research efforts and adequately address the substance use scourge in Kenya, there is need to document the scope and breadth of available scientific literature. The aim of this systematic review is therefore: (1) To describe the characteristics of research studies conducted on substance use and SUD in Kenya; (2) To assess the methodological quality of the studies; (3) To identify areas where there is limited research evidence and (4) To make recommendations for future research. This paper is in line the Vision 2030 (13), Kenya's national development policy framework, which directs that the government implements substance use treatment and prevention projects and programs, and target 3.5 of the Sustainable Development Goals (SDGs) which requires that countries strengthen the treatment and prevention for SUDs (14).

Methods:

Protocol and registration

In conducting this systematic review we adhered to the recommendations from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (15). A 27-item PRISMA checklist is available as an additional file to this protocol (Additional file 1). Our protocol was registered in the International Prospective Register of Systematic Reviews (PROSPERO): CRD42020203717.

Search strategy

A search was carried out in five electronic databases: PubMed, PsychINFO, Web of Science, Cumulative Index of Nursing and Allied Professionals (CINAHL) and Cochrane Library. The full search strategy can be found in Additional file 2 and takes the following form: *(terms for substance use) and (terms for substance use outcomes of interest) and (terms for region)*. The searches spanned the period from inception to date. No filter was applied. A manual search was done in Volumes 1, 2 and 3 (all published volumes by the time of the search) of the recently launched AJADA journal from the NACADA website and additional articles identified (12, 16, 17).

Study selection

Following the initial search, all articles were loaded onto Rayyan, a soft-ware for screening and selecting studies during the conduct of systematic reviews (18), and checked for duplicates. After duplicate removal, the abstract and titles of retrieved articles were independently screened by two authors based on a set of pre-determined eligibility criteria. A second screening of full text articles was also done independently by two authors and resulted in an 88.7% agreement. Disagreements during each stage of the screening were resolved through discussion and consensus.

Inclusion criteria

Since we sought to map existing literature on the subject, our inclusion criteria were broad. We included all studies on substance use if (i) the sample or part of the sample was from Kenya, (ii) they were original research articles, (iii) they had a substance use exposure, (iv) they had a substance use/SUD related outcome such as prevalence, pattern of use, prevention and treatment, and (iv) they were published in English or had an English translation available. We included studies conducted among all age groups and studies that used all designs both quantitative and qualitative.

Exclusion criteria

Studies were excluded if: (i) they were cross-national and did not report country specific results (ii) they did not report substance use as an exposure, and did not have substance use related outcomes or as part of the outcomes, (iii) they were review articles, dissertations, conference presentations/abstracts, commentaries or editorials, (iv) and the full text articles were not available.

Data extraction and synthesis

We prepared 3 data extraction forms based on three categories of studies i.e.:

1. Studies reporting on the epidemiology of substance use/SUD
2. Studies evaluating substance use/SUD interventions and programs
3. Studies qualitatively exploring various themes on substance use/SUD (but not assessing interventions)

The forms were piloted by F.J. and S.K. and adjustments made to the content. Data extraction was then done using the final form by all authors and double checked by F.J. for completeness and accuracy. Discrepancies were resolved by discussion with S.K. and E.T. until consensus was achieved. The following data was extracted for each study category:

1. Studies reporting on the epidemiology of substance use/SUD: study design, study population characteristics, study setting, sample size, age and gender distribution, substance(s) assessed, standardized tool/criteria used, main findings (prevalence, risk factors, other key findings).
2. Studies evaluating substance use/SUD interventions and programs: study design, study objective, sample size, name of the intervention/program, person delivering intervention, outcomes and measures, and main findings
3. Studies qualitatively exploring various aspects of substance use/SUD other than programs and interventions: study objective, methods of data collection, study setting, study population, age and gender distribution, and main findings

The results have been summarized descriptively and organized by the three categories above.

Quality assessment of the studies

Quality assessment was conducted by S.K. using the Quality Assessment Tool for Studies with Diverse Designs (QATSDD) (19). F.J. & J.B. double checked the scores for completeness and accuracy. Any disagreements were discussed and resolved by consensus. We had initially planned to use the National Institute of Health (NIH) set of quality assessment tools but due to the diverse nature of study designs, the authors agreed to use the QATSDD tool. The QATSDD is a 16-item tool for both qualitative and quantitative studies. Each item is scored on a 4-point scale (0–3), with a total of 14 criteria for each study design and 16 for studies with mixed methods. Scoring relies on guidance notes provided as well as judgment and expertise from the reviewers. The criteria used are: (i) theoretical framework; (ii) statement of aims/objectives; (iii) description of research setting; (iv) sample size consideration; (v) representative sample of target group (vi) data collection procedure description; (vii) rationale for choice of data collection tool(s); (viii) detailed recruitment data; (ix) statistical assessment of reliability and validity of measurement tools (quantitative only); (x) fit between research question and method of data collection (quantitative only); (xi) fit between research question and format and content data collection (qualitative only); (xii) fit between research question and method of analysis; (xiii) justification of analytical method; (xiv) assessment of reliability of analytical process (qualitative only); (xv) user involvement in design and (xvi) discussion on strengths and limitations (19). Scores are awarded for each criterion as follows: 0 = no mention at all; 1 = very brief description; 2 = moderate description; and 3 = complete description. The scores of each criterion are then summed up with a maximum score of 48 for mixed methods studies and 42 for studies using either qualitative only or quantitative only designs. For ease of interpretation, the scores were converted to percentages and classified as low (< 50%), medium (50–80%) or high (> 80%) quality of evidence (20).

Results:

Search results

The search from the five electronic databases and yielded 1535 results: 950 from PubMed, 173 from PsychINFO, 210 from web of science, 123 from CINAHL and 79 from Cochrane library. A further 13 studies were identified through a manual search of the AJADA journals (Volumes 1, 2 and 3). Studies were assessed for duplicates and 1154 articles remained after removal of duplicates. These underwent an initial screening based on abstracts and titles, and 946 articles were excluded. A second screen of full text articles was done for the 208 studies that were potentially eligible for the review. Twenty three studies were excluded as follows: 21 did not meet the eligibility criteria and 2 had duplicated results. A total of 185 studies were found to meet the inclusion criteria and were included in the review (Fig 1).

General description of studies

Of the 185 studies included in this review, 144 (77.8%) investigated the epidemiology of substance use/SUD (Additional file 3), 18 (9.7%) evaluated substance use/SUD interventions and programs (Additional file 4), and 23 (12.4%) were qualitative studies exploring perceptions on various substance use/SUD topics (Additional file 5). The studies were published between 1982 and 2020. The number of studies published has gradually increased in number over the years, particularly in the past decade. The graph below shows the trends in publications on substance use in Kenya.

Quality assessment:

The QATSDD scores ranged from 28.6% (21) to 92.9% (22). Only 14 studies (10,21,23–34) (all quantitative) had scores of less than 50%. Of these, the main items driving low quality were: no mention of user involvement in study design (n=14) (10,21,23–34), no explicit mention of a theoretical framework (n=10) (10,21,23,25–30,32) and a lack of a statistical assessment of reliability and validity of measurement tools (n=10) (10,21,23,25–27,30,32–34) (Additional file 6).

Studies examining the epidemiology of substance use/SUD

Description of epidemiological studies: 144 studies examined the prevalence and or risk factors for various substances. The studies were published between 1982 and 2020. The 4 main study designs were cross-sectional (n=126), cohort (n=5), case-control (n=10), and mixed methods (n=2). One study used a combination of the 'multiplier method', 'Wisdom of the Crowds' (WOTC) method and a published literature review to document the size of key populations (35). The sample size for this category of studies ranged from 42 (36) to 72292 (37).

The studies were conducted in diverse settings including the community (n=72), hospitals (n=41), institutions of learning (n=24), streets (n=5), prisons and courts (n=3), in charitable institutions (n=1), and in needle-syringe program (NSP) sites (n=1). Of the studies conducted within the community, 12 were conducted in informal settlements. The study populations were similarly diverse as follows: general population adults & adolescents (n=39), persons with NCDs (n=11), primary and secondary school students (n=15), people with injecting drug use (PWID) (n=11), general patients (n=5), Men who have Sex with Men (MSM) (n=8), university and college students (n=9), commercial sex workers (n=7), psychiatric patients (n=6), orphans and street connected children and youth (n=6), people living with HIV (PLHIV) (n=6), healthcare workers (n=3), law offenders (n=3), military (n=1), and teachers (n=1). Only one study was conducted among pregnant women (38).

Sixty nine studies (47.6%) used a standardized diagnostic tool to assess for substance use. The AUDIT (n=21) and the ASSIST (n=10) were the most frequently used tools. Most papers assessed for alcohol (n = 109) and tobacco (n = 80). Other substances assessed included amphetamines (n = 41), opioids (21), sedatives (n=19), cocaine (n=19), inhalants (n=16), cannabis (n = 14), hallucinogens (n=7), prescription pills (n=2), emerging drugs (n=1) and ecstasy (n=1).

Key findings on prevalence rates: One study with the largest sample size (n=72292) drawn from the community, reported the lifetime prevalence of tobacco smoking among adults as 11.2% and that of alcohol use as 20.7% (37). Using the Alcohol Use Disorder Identification Test (AUDIT), the 12 month prevalence of hazardous alcohol use ranged from 2.9% among adults drawn from the community (39), and 64.6% among female sex workers (FSW) (40). Based on the same tool, the lowest and highest rates of harmful alcohol use were both reported among FSWs i.e. 9.3% (41) and 64.0% (42) respectively, while the prevalence of alcohol dependence ranged from 8% among FSWs living with HIV (43) to 33% among MSM who sold sex (44).

Based on the Alcohol, Smoking & Substance Use Involvement Screening Test (ASSIST) questionnaire, the lifetime prevalence of tobacco use ranged from 23.5% among health care workers (HCWs) (45) to 95.7% among university students (46), that of khat use ranged from 11.5% among university students (47) to 55.2% among psychiatric inpatients (48), and that of cannabis use from 21.3% among persons with AUD (49) to 64.2% among psychiatric in-patients (48). The lifetime prevalence of opioid use ranged from 1.1% among PLHIV (50) to 8.2% among psychiatric in-patients as assessed using the ASSIST (48).

Key findings on associated/risk factors: Among children, youth and adolescents, substance use was associated with being male (32), engaging in sex (51), older age (52,53), being in a private school, living in an urban area (53), having a family member who uses substances (52), depression (38,54), suicidal behavior (55) and Human Immunodeficiency Virus (HIV) infection (56). Early substance use among this population was linked to ever engaging in sex, higher education, parental or guardian substance use, and suicidal ideation (57). Factors associated with multiple substance use were living in an urban area and being female (58).

Among adults, alcohol use was associated with several socio-demographic factors including being male (45,59–66), being unemployed (61), being self-employed (62), having a lower socio-economic status (SES) (37), being single or separated, living in large households (62), having a family member

struggling with alcohol use and alcohol being brewed in the home (67). Alcohol use was linked to various health factors including glucose intolerance (68); poor cardiovascular risk factor control (69), having a diabetes mellitus diagnosis (70), hypertension (65,71), default from tuberculosis (TB) treatment (72), depression (49), psychological Intimate Partner Violence (IPV) (73), physical and sexual violence (74), tobacco use (66,73), and increased risk laryngeal (75) and esophageal cancer (76,77). Finally alcohol use was associated with involvement in Road Traffic Accidents (RTAs) (78,79), having injuries (78,80,81), and with having concurrent sexual relationships (66).

Tobacco use among adults was associated with being male (45,59,65). Several health factors were linked to tobacco use including hypertension (65), development of oral leukoplakia (34), pneumonia (82), increased odds esophageal cancer (77), ischemic stroke (83) and diabetes mellitus (70). In addition, tobacco use was associated with having had an injury in the last 12 months (81), emotional abuse (48) and psychological IPV (73). Longer duration of smoking was associated with a diagnosis of diabetes mellitus (84), lower SES (37), and hypertension (85,86).

Two case-control studies documented increased odds of reporting psychotic symptoms (87,88), and PTSD (Post-Traumatic Stress Disorder) symptoms (88) among khat users compared to non-users, while IDU was associated with depression, risky sexual behavior (89), Hepatitis-C Virus (HCV) infection (90), and HIV-HCV co-infection (91).

Other topics explored: In addition to prevalence and associated factors, these studies explored other topics including agreement between self-reported alcohol use and the biomarker phosphatidyl ethanol (92), primary health care workers self-efficacy for SUD management (93), reasons for substance use (27,30,94,95), and tobacco quit intentions (96). Papas et al. (92) reported a lack of agreement between self-reported alcohol use and the biomarker phosphatidyl ethanol among PLHIV with AUD. Among primary health care workers, self-efficacy for SUD management was lower in those practicing in public facilities and perceiving a need for AUD training. In that study, higher self-efficacy correlated with a higher proportion of patients with AUD in one's setting, access to mental health worker support, HCW's cannabis use at a moderate risk level, and belief that AUD is manageable in outpatient settings. Common reasons for substance use included leisure, stress and peer pressure among psychiatric in-patients (30), curiosity, fun, and peer influence among college students (94); peer influence, idleness, easy access, and curiosity among adults in the community (27); and peer pressure, to get drunk, to feel better and to feel warm among street children (95). Atwoli et al. 2011 (97) reported that most students were introduced to substances by friends while Astrom et al. 2004 (98) reported that HCWs, parents and school teachers were not discussing tobacco harms with youth. Kaai et al. 2019 (96) conducted a study regarding quit intentions for tobacco use and reported that 28% had tried to quit in past 12 months; 60.9% had never tried to quit, only 13.8% had ever heard of smoking cessation medication. Intention to quit smoking was associated with being younger, having tried to quit previously, perceiving that quitting smoking was beneficial to health, worrying about future health consequences of smoking, and being low in nicotine dependence. A complete description of the prevalence studies has been provided in additional file 3.

Studies evaluating substance use/ SUD programs and interventions

A total of eighteen studies evaluated specific interventions or programs for the treatment and prevention of substance use (see Additional file 4). These were carried out between 2009 and 2020. The studies used various approaches including randomized control trials (RCT) (99–105) mixed methods (106–108), non-concurrent multiple baseline design (109), quasi experimental (110), cross-sectional (111,112), and qualitative (113–115). One study employed a combination of qualitative methods and mathematical modeling (116).

11 studies investigated feasibility, acceptability or efficacy of individual-level treatment or prevention interventions using various outcomes. The interventions evaluated included cognitive behavioral therapy (CBT) (101,106), motivational interviewing (MI) (99), a combination of behavioral activation, MI and gender norm transformative strategies (109), World Health Organization (WHO) brief intervention (100,102,103,107,110), psychoeducation sessions (105), and contingency management (104). Only one study evaluated family outcomes (109). All interventions were tested among adult populations. These included persons attending a Voluntary Counseling & Testing (VCT) center (107), PLHV (101,106), college students (105), FSWs (100,102), and adult males and females (103,109,110) drawn from the community.

The interventions were delivered using various approaches including trained lay providers (101,106,109,110), digital health means (99), and trained primary care workers such as nurses (100,102), and VCT service providers (Mackenzie 2009). The number of sessions ranged from one (103,107) to six (100–102,106). Most of the individual level interventions targeted harmful alcohol use (n=9) (99–102,104,106,107,109,110). One study targeted khat use among men (103), while another the use of multiple substances (105). All interventions had a positive impact on substance use except the study that used the contingency management approach (104). The interventions were delivered in various settings as follows: community settings (n=6) (99,102–104,109,110) of which one was delivered in a HIV prevention drop in center (102), HIV treatment or testing out-patient clinics (n=3) (101,106,107), alcohol and drug abuse rehabilitation facility (n=1) (100), and within a college (n=1) (105). One study described the process of culturally adapting a CBT intervention for alcohol use, for use among a population of PLHIV (106).

Five studies evaluated various aspects of substance use treatment programs. The studies evaluated perceptions on benefits of methadone programs (113,116) and NSPs (115), healthcare workers knowledge and practices on tobacco cessation (112), and utilization of community based outpatient SUD treatment services (111). The methadone and NSP programs were perceived as beneficial and impactful by stakeholders and service users (113,115) and knowledge and practice on tobacco cessation as inadequate (112). Deveau et al., 2010 (111) reported a 42% abstinence rate 0-36 months post-treatment termination.

Two studies evaluated population-level interventions. One evaluated the appropriateness and effectiveness of HIC anti-tobacco adverts in the African context and found the adverts to be effective and appropriate (108). Another study that examined community member's perspectives on the impact of the

government's public education messages on alcohol abuse reported the messages as ineffective and unpersuasive (114). A complete description of included intervention studies is in additional file 4.

Studies qualitatively exploring various substance use/SUD topics (other than interventions)

There were 23 qualitative studies included in our review. The studies were conducted between 2004 and 2020. Data was collected using several approaches including in-depth interviews (IDIs) only (n=6) (117–121), focus group discussions (FGDs) only (n=2) (122,123), a combination of FGDs and IDIs (n=10) (114,124–132), a combination of observation and individual IDIs (120,133), a combination of observation, IDIs and FGDs (134), a combination of literature review, observation, IDIs and FGDs (132). One study utilized the participatory research and action approach (135).

The study populations for the qualitative studies included persons using heroin (129,133), males and females with IDU (116,119,124,125,127,136), community based organizations (114,123), youth (120,131,134), FSWs (118,121), refugees and Internally Displaced Persons (IDPs) (132), and PLHIV (122,135).

Various themes were explored in these qualitative studies including risk and protective factors for substance use (120,127,131,134), health and or socio-economic effects of substance use (119,122,123,130,132), perceptions on heroin use (133), transitions from heroin smoking to injection (117), and stages of change in participants enrolled in an intervention (121). Substance use was perceived as having a negative socio-economic and health impact (122,132). Specifically, substance use was perceived to have a negative impact on contraceptive use (128), on utilization of antenatal and maternal & child health services (137), as well as on sexual and reproductive health (130). In addition, substance use emerged as a driver of risky sexual behavior and HIV among both adults (118,138) and adolescents (120,134). Several factors were perceived to contribute to substance use including gender inequality, influence of intimate partners and the need to cope with stress among women (119,124,125), and stigma and perceived medicinal value among PLHIV (135). Finally, access to care for substance use was reported as limited (119,132,135).

Discussion:

This is to our knowledge, the first study to summarize empirical work done on substance use and SUDs in Kenya. More than a half (77.8%) of the reviewed studies investigated the area of prevalence and risk factors. Less common were qualitative studies exploring various themes (12.4%) and studies evaluating interventions and programs (9.7%). The first study was conducted in 1982 and since then the number of publications has gradually risen. Most of the research papers (92.4%) were of moderate to high quality. The review finds that comparatively a lot of research work has been done on substance use in Kenya in relation to other Sub-Saharan African (SSA) countries, with 185 papers published by the time of the search. Two recent scoping reviews, reported that only 53 and 7 papers focusing on substance use had been published in South Africa (between 1971 and 2017) (9) and in Botswana (between 1983 and 2020) respectively (8).

Epidemiology of substance use/SUD

Studies assessing prevalence, patterns and risk factors dominated the literature. The studies were conducted across a broad range of study settings and populations. In addition, a wide range of important health and socio-demographic factors were examined for their association with substance use. Most studies had robust sample sizes and were conducted using diverse designs including cross-sectional, case-control and cohort. The studies showed a significant burden of substance use among both adults and children and adolescents. In addition substance use increased the odds of negative mental and physical health outcomes consistent with findings documented in global reports (2, 3). These findings highlight the importance of making the treatment and prevention of substance use and SUDs of high priority in Kenya.

Key evidence gaps were identified within this category:

1. The prevalence and risk factors for substance use among certain vulnerable populations for whom substance use can have severe negative consequences, had not been investigated. For example, no study had included police officers or persons with physical disability, only one study had its participants as pregnant women (38), and only 2 studies had been conducted among HCWs (93, 139).
2. The prevalence of emerging substances was investigated by only one study (140). These substances are increasingly becoming a public health threat globally (141) yet their use remains poorly documented in Kenya

Interventions and programs

Given the significant documented burden of substance use and SUDs in Kenya, it was surprising that few studies had focused on developing and testing treatment and prevention interventions for substance use. A possible reason for this is limited expertise in the area of intervention development and testing. For example, research capacity in implementation science has been shown to be limited in resource-poor settings such as ours (142).

Of note is that most of the tested interventions had been delivered by lay providers (101, 106, 109) and primary care workers (100, 102, 107) indicating a recognition of task-shifting as a strategy for filling the mental health human resource gap in Kenya.

Overall, study findings indicated feasibility and benefit for the programs and interventions evaluated except for one study which showed no effect for a contingency management type intervention (104). Several research gaps were identified within this category.

1. Out of the 11 individual-level interventions tested, all targeted alcohol use except one which focused on khat (103) and another that targeted several substances (105). No individual-level interventions targeted tobacco and cannabis use despite the two being the second and third most commonly used substances in Kenya (6).
2. Few studies had evaluated the impact of population-level interventions (108, 114). Several cost-effective population-level interventions have been recommended by WHO e.g. mass media education and national toll free quit line services for tobacco use, and brief interventions integrated into all levels of primary care for harmful alcohol use (143). Such strategies need to be tested for scaling up in Kenya.
3. None of the interventions had been tested among important vulnerable populations for whom local research already shows a significant burden e.g. children and adolescents, the Lesbian Gay Bisexual Transgender & Queer (LGBTQ) community, HCWs, prisoners, and refugees and IDPs. In addition, no interventions had been tested for police officers and pregnant women, and no studies had evaluated interventions to curb workplace substance use.
4. Only one study evaluated digital strategies for delivering substance use interventions (99) yet the feasibility of such strategies has been demonstrated for other mental disorders in Kenya (144). Moreover, the time is ripe for adopting such an approach to substance use treatment given the fact that the country currently has a mobile subscriptions penetration of greater than 90% (145).
5. No studies had evaluated the impact of other interventions such as mindfulness and physical exercise. Meta-analytic evidence suggests that such strategies hold promise for reducing the frequency and severity of substance use and craving (146, 147).

Qualitative studies

The qualitative studies provided in-depth understanding of the factors contributing to, and the socio-economic and health impact of substance use among both adults and adolescents. Most of the work however focused on PWID use and FSWs. Future qualitative work should focus on examining the drivers and impact of substance use in several other populations for example persons with other mental disorders, persons with physical disabilities, police officers, and persons using other substances such as tobacco and cannabis.

Limitations

The aim of this systematic review was to provide an overview of the existing literature on substance use and SUD research in Kenya, we therefore did not undertake a meta-analysis and detailed synthesis of the findings of studies included in this review. In addition, variability in measurements of substance use outcomes precluded ability to summarize the study findings. For quality assessment, detailed assessments using design specific tools were not possible given the diverse methodological approaches utilized in the studies. We therefore used a single tool for the quality assessment of all studies. The results of the quality assessment are therefore to be interpreted with caution. Nonetheless this review describes for the first time the breadth of existing literature on substance use and SUDs in Kenya, identifies research gaps and provides important directions for future research.

Conclusion:

The purpose of this systematic review was to map the research that has been undertaken on substance use and SUDs in Kenya. Epidemiological studies dominated the literature and indicated a significant burden of substance use among both adults and adolescents. Our findings indicate that there is a dearth of literature regarding interventions for substance use and we are calling for further research in this area. Specifically, interventions ought to be tested not just for alcohol but for other substances as well, and among important at risk populations. In addition, future research ought to explore the feasibility of delivering substance use interventions using digital means, and the benefit of other interventions such as mindfulness and physical exercise. Future qualitative work should aim at providing in-depth perspectives on substance use among a populations excluded from existing literature e.g. police officers, persons using other substances such as tobacco and cannabis and persons with physical disability.

List Of Abbreviations:

ASI Addiction Severity Index

ASSIST Alcohol Smoking and Substance Involvement Screening Test

AUD Alcohol Use Disorder

AUDIT Alcohol Use Identification Test

AUDIT-C Alcohol Use Identification Test – Concise

BAI Beck Anxiety Inventory

BDI Beck Depression Inventory

BHS Behavioral Health Screen

BMI Body Mass index

BSIS Beck Suicidal Intent Scale

CAD Coronary Artery Disease

CAGE Cut, Annoyed, Guilty, Eye-opener

CIDI Composite International Diagnostic Interview

CINAHL Cumulative Index of Nursing and Allied Professionals

CRAFT Car, Relax, Alone, Forget, Friends, Trouble

DAST Drug Abuse Screening Test

DSM-III Diagnostic & Statistical Manual Third Edition

DSM-III R Diagnostic & Statistical Manual Third Edition Revised

DSM-IV Diagnostic & Statistical Manual Fourth Edition

DSM-V Diagnostic & Statistical Manual Fifth Edition

DUSI-R Drug Use Screening Inventory - Revised

FGD Focus Group Discussion

FSW Female Sex Workers

GSHS Global School-based Health Survey

HCV Hepatitis C Virus

HCW Healthcare worker

HIC High Income Country

HIV Human Immunodeficiency Virus

ICD International Classification of Disease

IDI In-depth Interviews

IDP Internally Displaced Persons

IPV Intimate Partner Violence

KIs Key Informant Interviews

K-SADS Kiddie-Schedule for Affective Disorders

LGBTQ Lesbian, Gay, Bisexual, Transgender, Queer

LMIC Low and Middle Income Country

MAST Michigan Alcohol Screening Test

MI Motivational Interviewing

MINI Mini International Neuropsychiatric Interview

MMT Methadone Maintenance Therapy

MPBI Multiple Problem Behavior Inventory

MSM Men who have Sex with Men

MSME Men who have Sex with Men Exclusively

MSMW Men who have Sex with Men & Women

NIH National Institute of Health

NSP Needle Syringe Program

OST Opioid Substitution Therapy

PLHV People Living with HIV

PrEP Pre-exposure Prophylaxis

PTSD Post-Traumatic Stress Disorder

PWID People With Injecting Drug Use

QATSDD Quality Assessment Tool for Studies with Diverse Designs

RCT Randomized controlled trial

RTAs Road Traffic Accidents

SCID Structured Clinical interview for DSM

SES Socio-economic Status

SSA Sub-Saharan Africa

TB Tuberculosis

UNODC United Nations Office on Drugs and Crime

VCT Voluntary Counseling & Testing

WOTC Wisdom of the Crowds

Declarations:

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and materials

All data generated or analyzed during this study are included in this published article [and its supplementary information files].

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

F.J. and S.K. developed the protocol for the systematic review. S.K. searched the databases. S.K. and F.J. conducted the screening and selection of studies. All authors contributed to data extraction. Quality assessment was done by S.K., F.J. and J.B. All authors contributed to report writing. All authors read and approved the final manuscript.

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Figures

Figure 1

PRISMA flow chart diagram describing selection of studies for the systematic review mapping existing literature on substance use and SUD in Kenya.

Figure 2

Line graph showing the trends in publications on substance use/SUD in Kenya since inception

Figure 3

Bar chart showing the number of studies evaluating prevalence/risk factors for each substance

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