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Examining the substance use, violence, and HIV and AIDS (SAVA) syndemic among urban refugee youth in Kampala, Uganda: cross-sectional survey findings

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ABSTRACT

Background Interactions between substance use, violence, HIV and AIDS, known as the 'SAVA' syndemic, are understudied among refugee youth. We assessed the synergistic effects of frequent alcohol use, depression and violence on HIV vulnerability among urban refugee youth aged 16–24 years in Kampala, Uganda.

Methods We conducted a cross-sectional survey between January and April 2018 with a convenience sample of refugee youth aged 16–24 years living in informal settlements in Kampala (Kabalagala, Rubaga, Kansanga, Katwe, Nsambya). We assessed non-communicable health conditions (frequent [≥3 times per week] alcohol use [FAU]; depression); violence (young adulthood violence [YAV] at age ≥16 years, intimate partner violence [IPV]), and HIV vulnerability (past 12-month transactional sex; recent [past 3-month] multiple [≥2] sex partners). We calculated the prevalence and co-occurrence of non-communicable health conditions, violence and HIV vulnerability variables. We then conducted multivariable logistic regression analyses to first create unique profiles of FAU, depression, YAV and IPV exposures, and second to assess for interactions between exposures on HIV vulnerability outcomes.

Results Most participants (n=445; mean age: 19.59, SD: 2.6; women: n=333, 74.8%, men: n=112, 25.2%) reported at least one non-communicable health condition or violence exposure (n=364, 81.8%), and over half (n=278, 62.4%) reported co-occurring exposures. One-fifth reported FAU (n=90; 20.2%) and one-tenth (n=49; 11%) major depression. In logistic regression models including all two-way product terms, adjusted for sociodemographics, we found (a) multiplicative interaction for joint effects of FAU and IPV (adjusted OR (aOR)=4.81, 95% CI: 1.32 to 17.52) on multiple sex partners, and (b) multiplicative interaction for joint effects of FAU and IPV (aOR=3.72, 95% CI: 1.42 to 9.74), and YAV and depression (aOR=7.13, 95% CI: 1.34 to 37.50), on transactional sex.

Conclusion Findings signal the importance of addressing the SAVA syndemic among urban refugee youth in Uganda. Synergistic interactions indicate that addressing FAU, depression or violence may concomitantly reduce HIV vulnerability with urban refugee youth.

WHAT IS ALREADY KNOWN?

⇒ Refugee youth disproportionately experience mental health challenges that are shaped in larger contexts of trauma, poverty and violence exposure.
⇒ There is a dearth of information regarding the SAVA syndemic, referring to synergistically interacting substance use, violence, and HIV and AIDS epidemics, among refugee youth.

WHAT ARE THE NEW FINDINGS?

⇒ In this sample of urban refugee youth living in informal settlements in Kampala, non-communicable health conditions and violence interacted to increase HIV vulnerability, for instance, co-occurring frequent alcohol use and intimate partner violence were associated with reporting recent multiple sex partners.
⇒ Intimate partner violence and frequent alcohol use interacted, as did non-partner violence and major depression, to increase the odds of transactional sex engagement.

WHAT DO THE NEW FINDINGS IMPLY?

⇒ Interventions informed by the model of synergistically interacting epidemics, congruent with our findings, suggest that addressing non-communicable health issues, such as alcohol use and depression, may reduce HIV vulnerability among urban refugee youth.

INTRODUCTION

Adolescents and children under 18 years old comprise 40% of the world's 79.5 million forcibly displaced persons.[1] Refugee youth disproportionately experience mental health challenges, for instance, a recent systematic review estimates refugee children and adolescents' overall prevalence of depression at 14%.[2] These mental health disparities are shaped in larger contexts of trauma, poverty, and elevated exposure to sexual and gender-based violence (SGBV).[3] A systematic review on substance use among forced migrants

documented co-occurring substance use and depression, yet few studies in this review focused on youth.[4]

Globally, alcohol use is a leading disease burden and elevates risk of premature death among persons aged 15–49 years,[5] but is understudied among refugee and displaced youth in low/middle-income countries.[4] HIV and sexual health are also understudied among refugee and displaced youth, despite increased vulnerability due to the convergence of poverty, SGBV, transactional sex, and constrained access to sexual and reproductive health services.[6 7] Transactional sex refers to the exchange of sex for basic needs (eg, money, clothing), social resources (eg, status, protection), and/or material expressions of love, and may include emotional intimacy in addition to instrumental needs.[8] Singer conceptualised the clustering and interplay of substance use, violence, and HIV and AIDS as the 'SAVA' syndemic.[9] The concept of syndemics refers to synergistically interacting health challenges that interact with social disparities.[10 11] There is a dearth of research examining the SAVA syndemic and its linkages with depression among young urban refugees in low/middle-income countries.

Refugees and mental health

The SAVA syndemic may be a particularly useful framework for exploring non-communicable health conditions, such as depression and hazardous substance use, among urban refugee youth in Uganda. Uganda, a low-income country, is the third largest refugee-hosting nation in the world and the largest in Africa, with 1.43 million refugees in 2020.[12] Over 80 000 refugees live in Kampala, Uganda's capital city, and 27% of these urban refugees—22 024 persons—are youth aged 15–24 years old.[12] There is a growing trend of refugee urbanisation: 60% of global refugees and 80% of internally displaced persons live in urban settings.[1 13] Despite refugee urbanisation, the health issues experienced by urban refugee youth in Uganda, as in other global contexts, are underexplored with the predominant focus on refugee camps/settlements.[14–18]

This is also true for non-communicable diseases (NCDs) such as frequent alcohol use that have largely been examined among refugees living in rural refugee camps or settlements.[4 19] It is urgent to explore the SAVA syndemic among urban refugee youth in Kampala. Most refugees in Kampala live in informal settlements (slums), environments in which general populations of youth have a higher prevalence of HIV, sex work, alcohol use and violence.[20–24] Urban refugee youth in Kampala's informal settlements are therefore at the nexus of refugee and slum disparities—violence, substance use, HIV vulnerability—that underpin the SAVA syndemic.

Syndemics and refugees

The concept of syndemics, and the SAVA syndemic specifically, has been applied to research in sub-Saharan Africa, yet is underexplored among refugees in this context. Among refugee youth, both hazardous alcohol use and violence appear to be important problems warranting further investigation. For instance, a study with refugee youth in Gambia reported higher levels of alcohol use and violence in schools and communities among refugee youth compared with non-refugee counterparts.[18] In another study, intimate partner violence (IPV) was reported among 10% of young women aged 15–19 years, and 41% of young women aged 20–24 years, in Shimelba refugee camp in Ethiopia, and was significantly associated with having a partner who consumes alcohol.[25] Syndemics theory has been applied with non-refugee youth in qualitative research in South Africa to explore the connections between alcohol consumption and sexual risk practices with young men in informal settlements,[26] and researchers found that alcohol consumption at parties and public venues was associated with both reduced condom use and with perpetrating violence. Another qualitative syndemics-informed study with young women in five South African districts revealed bidirectional, interconnected relationships between poor mental health and HIV risk.[27] For instance, this study identified that becoming pregnant or acquiring HIV was linked with suicidality, stress, social isolation and depression; IPV was also associated with stress and social isolation and emotional support mitigated the effect of stressors on mental health.

Most syndemics-focused research in sub-Saharan Africa has focused on non-refugee adults in South Africa. For instance, the SAVA syndemic was tested empirically among South African men, and study findings revealed associations between inequitable gender norms, physical and sexual violence against women, alcohol use and sexual risk practices.[28] Another study with young South African men aged 18–29 years examined multiple syndemic factors (binge drinking, polydrug use, depressive symptoms, violence, food insecurity) and linkages with sexual risk practices (transactional sex, multiple sex partners).[29] Findings revealed an interaction between binge drinking and violence that was associated with multiple sex partners. In a study with South African women attending drinking venues, authors identified the co-occurrence of psychosocial challenges including food insecurity, depression, violence, problematic drinking and sexual risk factors (sexually transmitted infection histories, condomless sex) that elevate HIV exposure.[30] The SAVA syndemic is also relevant to understanding experiences of pregnant women in South Africa, who may be disproportionately impacted by both IPV and HIV.[31] Authors suggest that IPV exposure may contribute to alcohol use, and alcohol use is a factor linked with IPV perpetration.[31]

Evidence gaps

While there is growing attention to the comorbidity between mental health and substance use among refugee and displaced persons,[4 32] a global systematic review of substance use among forced migrants identified key knowledge gaps.[4] First, most studies were conducted in high-income countries, and the studies in low/

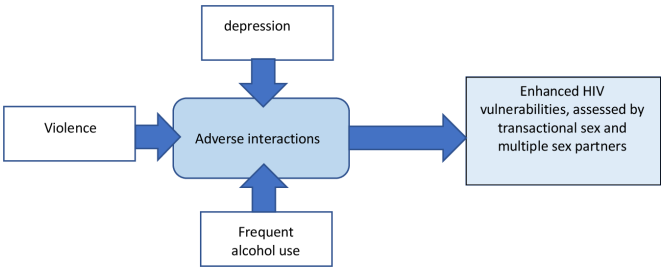

Figure 1 Model of a syndemic of depression, violence, and frequent alcohol use and associations with HIV vulnerability tested among a sample of urban refugee youth in Kampala, Uganda, adapted from Singer *et al*.[33]

middle-income countries were predominately in refugee camp or settlement settings, resulting in the experiences of urban refugees remaining largely overlooked.[4] Second, there is limited understanding of comorbidity between mental health and substance use among refugee youth, as most studies were conducted among adults.[4] Third, there is a need to better understand multilevel protective factors that are associated with improved mental health outcomes and reduced substance use in order to inform interventions.[4] Syndemic interactions between non-communicable health conditions and HIV vulnerability are thus understudied with refugees at large, and particularly among youth in low/middle-income countries, and warrant urgent attention.

This paper aims to deepen understanding of the syndemic of alcohol use, depression, violence and HIV vulnerability among urban refugee youth in Kampala and aligns with a syndemic conceptual model[33] (see figure 1). Applying Tsai's thoughtful approach to assess synergistically interacting epidemics,[34] we aimed to assess if HIV risks attributed to the synergistic effects of violence, depression and alcohol use were greater than the effects of each of these variables on HIV risks when examined separately. Specifically, our hypotheses were that, among this sample of urban refugee youth in Kampala: (1) frequent alcohol use, depression, violence and HIV vulnerability will co-occur; (2) increases in NCD (frequent alcohol use, depression) will be associated with increased HIV vulnerability (transactional sex, multiple sex partners); (3) frequent alcohol use, depression and violence will interact to increase the likelihood of HIV vulnerability; and (4) resilience and social support will be protective factors and associated with reduced odds of reporting HIV vulnerability.

METHODS

This community-based cross-sectional study was conducted in collaboration with refugee-led and government agencies from January to April 2018 in Kampala, Uganda. Eligible participants included young women and men aged 16–24 years who self-identified: as a refugee or displaced person or having refugee or displaced parents; living in one of Kampala's informal settlements of Kabalagala, Rubaga, Kansanga, Katwe, or Nsambya; and able to provide informed consent. We recruited and trained 12 refugee-identified peer research assistants (PRAs) (n=12; four young men, eight young women) aged 18–24 years. The study aimed to recruit 450 participants; a sample of 406 is sufficient for logistic regression (OR: 1.4, p<0.05, power: 0.85, calculated with G*Power 3.1). PRAs administered the tablet-based survey at a location of the participant's choice. To mitigate social desirability bias, participants could complete items regarding sexual practices and HIV on their own. The survey duration was approximately 35–45 min, and each participant received a 12 500 Ugandan shilling (US$3.74) honorarium.

Participants were recruited by PRAs using convenience sampling (eg, peer outreach and word of mouth). Adolescent girls and young women were oversampled to account for their over-representation in Uganda's HIV epidemic.

Patient and public involvement

This was a community-based study that meaningfully engaged the founder and a staff member of a community refugee agency, both with refugee lived experience, in developing the grant application, identifying priority research questions, in research training, in all facets of recruitment and data collection, and in interpreting the results and coauthoring this manuscript. Additionally, we hired and trained refugee and displaced youth living in the informal settlements the study was conducted in as PRAs, who contributed likewise to informing the study focus, survey pilot testing, recruitment and data collection efforts.

Measures

Sociodemographic variables

We asked about participants' age (continuous), education level (categorical: no education/less than secondary school and post-secondary education) and employment status (categorical: employed/student and unemployed).

Non-communicable health conditions

Depression was assessed using the Patient Health Questionnaire-9.[35] The Cronbach's α was 0.87, with nine items and empirical range from 0 to 27. Following scoring guidelines, we dichotomised the variable with participants indicating scores >15 classified as major/severe depression.

Frequent alcohol use was assessed with a single item: 'How often have you used/drank alcohol in the last 3 months?' We classified participants as frequent alcohol users if they reported alcohol use more than one to two times per week, following prior research that categorised higher usage as three or more times a week.[36] Response options coded as frequent alcohol use included: every day, five to six times a week, or three to four times a week. Response options of not drinking or drinking one to two times per week were coded as no frequent alcohol use.

Violence

We screened for two types of violence: (1) experiencing IPV in the last 12 months (recent IPV) and (2) ever

experiencing violence at the age of 16 years and over (classified as young adulthood violence [YAV]). The IPV questions from the Brief Inpatient Screen for IPV[37] were only completed by participants who were currently in an intimate relationship or had been in the past 12 months. Questions assessed physical, sexual and control violence in the last 12 months. To assess YAV, participants were asked: 'Have you ever experienced at age 16 years old and over (check all that apply): sexual violence (yes=1, no=0); physical violence (yes=1, no=0) or verbal abuse (yes=1, no=0)'. This question assessed the same dimensions of violence in the IPV screen and has been used in other studies.[38–40]

HIV vulnerability

We assessed HIV vulnerability using two variables: *transactional sex engagement* and *recent multiple sex partners*. Transactional sex engagement was assessed using a single question: 'In the past 12 months, have you exchanged in sex for the following: money, drugs, shelter, food, gifts, clothes, services, other?'. An affirmative response was coded as transactional sex engagement.[41] Recent multiple sex partners included a measure of more than one sex partner in the past 3 months, assessed with the question: 'With how many different partners have you had vaginal intercourse in the past 3 months?' Scores were dichotomised (0=0–1 partner, 1=2+ partners [recent multiple sex partners]).

Protective factors

We measured *resilience* and *social support* as protective factors. Resilience was assessed using the Child and Youth Resilience Measure, an 11-item scale that examines the availability of individual, communal and cultural resources.[42] We validated this scale as part of our study, and our five-item scale was reliable (Cronbach's α=0.78). Multiple sources of social support were measured using the 24-item Multidimensional Scale of Perceived Social Support that measures support from three sources (family, friends and a significant other).[43] The overall scale had high reliability (Cronbach's α=0.91) as did the subscales (family: Cronbach's α=0.85, friends: Cronbach's α=0.85, significant other: Cronbach's α=0.88) that were used in this study. Higher scores indicate greater social support.

Analyses

Following recommendations to assess synergistically interacting epidemics,[34] we conducted analyses in three steps with this sample of young urban refugees. We first calculated the prevalence of each NCD (depression, frequent alcohol use), violence experience (YAV, recent IPV) and HIV vulnerability (transactional sex, recent multiple sex partners). In this calculation, we identified the co-occurrence of health conditions using the additive approach commonly used to test syndemics theory.[44] We also examined gender differences in the frequency of reporting NCD, violence and HIV vulnerability. Only the IPV variable had missing responses. As only participants who indicated to be/ever having been in a dating relationship (329 of 445; 73.9%) completed the IPV variable, we excluded missing responses from analyses. There were significantly more young women (86%; n=100) than young men (13.8%; n=16) with missing data for this question that were subsequently excluded in the analyses.

Second, adjusting for sociodemographic factors (age, gender, education, food insecurity, employment), we tested sets of multivariable logistic regression models to create unique profiles of urban refugee youth on depression, frequent alcohol use, violence (YAV, IPV) and HIV vulnerability (transactional sex, recent multiple sex partners). We ran the same logistic regression model for each of the NCD (depression, frequent alcohol use), violence (YAV, IPV) and HIV vulnerability (transactional sex, recent multiple sex partners) factors. We excluded measures of a given condition from the logistic regression models that assessed that condition as the dependent variable.

Finally, we tested for synergistically interacting epidemics by assessing for interactions using multivariable logistic regression models. The dichotomous outcome measures were transactional sex and recent multiple sex partners. We included product terms representing two-way interactions between frequent alcohol use, YAV, IPV and depression. First, we adjusted for sociodemographic variables, and in the final model, we added resilience and multiple dimensions of social support (friends, family and partner) to test the role of protective factors in the associations between syndemic factors and HIV vulnerability outcomes. All models were adjusted for age, gender, food insecurity, education and employment.

RESULTS

Sample characteristics

Table 1 presents the sociodemographic characteristics of the full sample (N=445) as well as by gender for adolescent girls and young women (n=333) and adolescent boys and young men (n=112). Most of the sample consisted of young women (n=333; 74.8%), the mean age was 19.59 years old, most had less than secondary education (n=234; 52.6%), and most were from the Democratic Republic of Congo (n=249; 56.0%). More than two-thirds (n=166; 66.1%) of the participants reported recent multiple sex partners, and nearly one-third (n=128, 31.1%) reported past 12-month transactional sex.

There were gender differences across variables. Compared with young men, young women reported significantly lower education levels (less likely to have completed secondary school), lower resilience scores, and lower social support from friends and partners. Young men, in comparison with young women, were more likely to report transactional sex and seeking asylum (compared with having refugee status).

Table 1 Sample sociodemographic characteristics, HIV vulnerability and protective factors by gender (N=445)

Variables	Full sample (N=445) N (%)/mean (SD, range)	Adolescent boys and young men (N=112) N (%)/mean (SD, range)	Adolescent girls and young women (N=333) N (%)/mean (SD, range)	P value
Age*	19.59 (2.59, 16–24)	19.31 (2.56, 16–24)	20.45 (2.51, 16–24)	0.237
Education†				0.001***
Less than secondary school	234 (52.6)	44 (39.3)	190 (57.1)	
Secondary school education	211 (47.4)	68 (60.7)	143 (42.9)	
Place of birth†				0.001***
South Sudan	35 (7.9)	5 (4.5)	30 (9.0)	
Burundi	115 (25.8)	4 (3.6)	111 (33.3)	
Democratic Republic of Congo	249 (56.0)	96 (85.7)	153 (45.9)	
Rwanda	19 (4.3)	0 (0.0)	19 (5.7)	
Others	27 (6.1)	7 (6.3)	20 (6.0)	
Immigration status (n=442)†				0.001***
Refugee	391 (88.5)	86 (76.8)	305 (92.4)	
Seeking asylum	51 (11.5)	26 (23.2)	25 (7.6)	
Employment status (n=428)†				0.243
Employed/student	252 (58.9)	51 (53.7)	201 (60.4)	
Unemployed	176 (41.1)	44 (46.3)	132 (39.6)	
Food insecurity†				0.723
No	125 (28.1)	30 (26.8)	95 (28.5)	
Yes	320 (71.9)	82 (73.2)	238 (71.5)	
Protective factors				
Resilience*	12.05 (4.27, 4–20)	13.42 (3.67, 4–20)	11.59 (4.37, 4–20)	0.001***
Family social support*	11.45 (2.45, 4–16)	11.51 (1.90, 4–16)	11.43 (2.61, 4–16)	0.767
Friends' social support*	10.80 (2.04, 4–16)	11.12 (1.62, 4–16)	10.69 (2.15, 4–16)	0.029*
Significant other social support*	10.91 (2.55, 4–16)	11.51 (1.90, 4–16)	10.75 (2.73, 4–16)	0.006**
HIV vulnerability				
Past 12-month transactional sex engagement (n=412)†				0.001***
No	284 (58.9)	46 (52.3)	234 (73.1)	
Yes	128 (31.1)	42 (47.7)	86 (26.9)	
Recent (past 3-month) multiple sex partners (n=251)†				0.466
No	85 (33.9)	23 (37.7)	62 (32.6)	
Yes	166 (66.1)	38 (62.3)	128 (67.4)	

*p<0.05, **p<0.01, ***p<0.001.
*Independent t-test.
†X^2 test for independence.

Co-occurrence of adverse non-communicable health conditions and violence exposure

As illustrated in table 2, the majority of participants (n=364; 81.8%) reported at least one syndemic condition of either frequent alcohol use, major depression, recent IPV or YAV. One-fifth reported frequent alcohol use (n=90; 20.2%) and one-tenth (n=49; 11%) major depression. Over half of participants reported experiencing violence at age 16 years and above (n=241; 54.2%). Among those in a relationship in the past 12 months, the overwhelming majority (n=283; 86.0%) reported recent IPV. There were gender differences in NCD. Young men were more likely to report frequent alcohol use (with one-third reporting ≥3 drinks per week), while women were more likely to report major depression.

Multivariable logistic regression analyses among intersecting psychosocial health problems

Table 3 presents the multivariable logistic regression models for separate profiles of refugee youth who reported major/severe depression, frequent alcohol use, YAV, recent IPV and HIV vulnerability (transactional sex, recent multiple sex partners). Recent IPV (adjusted OR (aOR)=4.23, 95% CI: 1.08 to 16.57, p=0.038),

Table 2 Non-communicable health conditions and violence, and their combinations, by gender (N=445)

Adverse psychosocial exposures and their combinations	Full sample (N=445) N (%)	Adolescent boys and young men (n=112) N (%)	Adolescent girls and young women (n=333) N (%)	P value
Frequent alcohol use (>3 drinks per week)				0.001***
No	355 (79.8)	74 (66.1)	281 (84.4)	
Yes	90 (20.2)	38 (33.9)	52 (15.6)	
Major/severe depression				0.004**
No	396 (89.0)	108 (96.4)	288 (86.5)	
Yes	49 (11.0)	4 (3.6)	45 (13.5)	
Intimate partner violence (n=329)				0.883
No	46 (10.3)	13 (13.5)	33 (14.2)	
Yes	283 (86.0)	83 (86.5)	200 (85.8)	
Young adulthood violence				0.768
No	204 (45.8)	50 (44.6)	154 (46.2)	
Yes	241 (54.2)	62 (55.4)	179 (53.8)	
Syndemic condition				
No syndemic condition	81 (18.20)	12 (10.7)	69 (20.7)	0.098
One syndemic condition	141 (31.7)	37 (33.0)	104 (31.2)	
Two syndemic conditions	149 (33.5)	40 (35.7)	109 (32.7)	
Three or more syndemic conditions	74 (16.6)	23 (20.5)	51 (15.3)	

*P<0.05, **p<0.01, ***p<0.001.

transactional sex (aOR=5.45, 95% CI: 2.64 to 11.22, p=0.001) and recent multiple sex partners (aOR=4.10, 95% CI: 1.61 to 10.43, p=0.003) were significantly associated with higher odds of frequent alcohol use. Similarly, frequent alcohol use was significantly associated with higher odds of recent IPV (aOR=5.17, 95% CI: 1.34 to 19.99, p=0.017), transactional sex (aOR=5.48, 95% CI: 2.66 to 11.28, p=0.001) and recent multiple sexual partners (3.94, 95% CI: 1.58 to 9.89, p=0.003).

Model of synergistically interacting epidemics

Transactional sex engagement

We used multivariable logistic regression models with product terms to estimate a multiplicative interaction for psychosocial health conditions on transactional sex engagement (table 4). The joint effect of frequent alcohol use with major depression (model 1: aOR=9.97, 95% CI: 1.10 to 89.69, p=0.040), frequent alcohol use with recent IPV (model 3: aOR=5.56, 95% CI: 3.04 to 10.21, p=0.001), and frequent alcohol use and YAV (model 5: aOR=6.81, 95% CI: 3.48 to 13.31, p=0.001) were associated with transactional sex. In a logistic regression model including all two-way product terms and adjusting for age, gender, education, and employment (model 6 in table 4), we found multiplicative interaction for joint effects of recent IPV and frequent alcohol use (aOR=3.72, 95% CI: 1.42 to 9.74, p=0.010), and YAV and depression (aOR=7.13, 95% CI: 1.34 to 37.50, p=0.021) on transactional sex engagement. In the model introducing protective factors of resilience and social support (family, friend and significant other dimensions), we found that family social support acted as a protective factor (aOR=0.84, 95% CI: 0.72 to 0.98, p=0.025) on transactional sex. Although the joint effect of IPV and frequent alcohol use (aOR=3.51, 95% CI: 1.28 to 9.60, p=0.014) was still associated with transactional sex after adding the protective factors, the beta was reduced (3.72 to 3.51). The joint effect of YAV and depression was not significant when the protective factors were introduced in the model.

Recent multiple sex partners

Table 5 shows logistic regression models with product terms to assess the multiplicative effects of psychosocial health conditions on recent multiple sex partners. We found a joint effect of frequent alcohol use with recent IPV (model 3: aOR=4.70, 95% CI: 1.93 to 11.44, p=0.001), and frequent alcohol use and YAV (model 5: aOR=5.77, 95% CI: 2.11 to 15.79, p=0.001) on recent multiple sex partners. In a logistic regression model including all two-way product terms and controlling for age, gender, education, and employment (model 6 in table 5), we found a multiplicative interaction for joint effects of recent IPV and frequent alcohol use (aOR=4.81, 95% CI: 1.32 to 17.52, p=0.010) on recent multiple sex partners. In model 6, we did not find associations between the protective factors of resilience and social support (family, friend and significant other) on recent multiple sex partners. We found a joint effect of IPV and frequent alcohol use (aOR=4.52, 95% CI: 1.19 to 17.27, p=0.030) on multiple sex partners, adjusting for sociodemographic factors.

In sum, by examining synergistic effects, we find that depression and YAV—not independently associated with

Table 3 Multivariable logistic regression analyses of depression, frequent alcohol use, violence and HIV vulnerability variables (N=251)

Independent variables	Depression (aOR, 95% CI)	Frequent alcohol use (aOR, 95% CI)	Intimate partner violence (aOR, 95% CI)	Young adulthood violence (aOR, 95% CI)	Transactional sex engagement (aOR, 95% CI)	Recent multiple sex partners (aOR, 95% CI)
Depression		0.54 (0.15 to 1.89)	0.29 (0.09 to 0.94)*	2.18 (0.65 to 7.29)	2.60 (0.87 to 7.82)	0.79 (0.24 to 2.57)
Frequent alcohol use	0.36 (0.10 to 1.34)		5.17 (1.34 to 19.99)*	1.16 (0.55 to 2.47)	5.48 (2.66 to 11.28)***	3.94 (1.58 to 9.89)**
Intimate partner violence	0.32 (0.10 to 1.07)	4.23 (1.08 to 16.57)*		1.30 (0.47 to 3.64)	0.31 (0.11 to 0.87)*	2.48 (0.85 to 7.28)
Young adulthood violence	2.16 (0.65 to 7.10)	1.12 (0.53 to 2.39)	1.28 (0.45 to 3.61)		1.63 (0.84 to 3.18)	1.48 (0.71 to 3.09)
Transactional sex	2.60 (0.86 to 7.91)	5.45 (2.64 to 11.22)***	0.25 (0.08 to 0.75)*	1.63 (0.83 to 3.21)		1.37 (0.65 to 2.92)
Recent multiple sex partners	0.76 (0.24 to 2.40)	4.10 (1.61 to 10.43)**	2.90 (0.99 to 8.46)	1.54 (0.75 to 3.14)	1.24 (0.60 to 2.61)	

Covariates include sociodemographic factors such as age, gender, education, food insecurity and employment.
*P<0.05, **p<0.01, ***p<0.001.
aOR, adjusted OR.

transactional sex in multivariable analyses—are associated with transactional sex when they co-occur. The association between frequent alcohol use and transactional sex is also stronger when frequent alcohol use co-occurs with IPV. In multivariable analyses, only frequent alcohol use is associated with recent multiple sex partners independently, but the interactions between IPV and frequent alcohol use, YAV and frequent alcohol use, and young adulthood and depression are all associated with recent multiple sex partners.

DISCUSSION

Our study identifies the co-occurrence of violence and NCDs—frequent alcohol use and major depression—in varying combinations among most (>80%) of this sample of urban refugee youth in Kampala. Violence and these NCDs interacted synergistically to increase the odds of HIV exposure. For instance, two-way synergistic interactions between IPV and frequent alcohol use were associated with increased likelihood of transactional sex, as was experiencing violence in young adulthood alongside major depression. Co-occurring IPV and frequent alcohol use were also linked with the increased likelihood of reporting recent multiple sex partners. Together, these findings signal the salience of applying the SAVA syndemics approach[34] to understand the synergistic effects of frequent alcohol use, depression, and violence in communities and intimate relationships, in elevating HIV vulnerability among urban young refugees in Kampala.

The prevalence of frequent alcohol use is concerning in this sample of urban refugee youth, with 20% reporting alcohol use three or more times per week. Health risks increase with the frequency of alcohol consumption;[36 45] findings from the Global Burden of Disease Study report that across 195 countries, among persons aged 15–49 years, alcohol was a leading risk of death and of disability-adjusted life years.[46] Scant research has examined the *frequency* of alcohol use with urban refugee youth. The prevalence of frequent alcohol use identified in our study is similar to that among non-refugee youth in Kampala's informal settlements, whereby 31% reported consuming any alcohol in the past 12 months and approximately 15% reported three or more drinks weekly.[47] This suggests there may be similar alcohol use patterns among youth living in urban informal settlements that are largely slums in Kampala, regardless of refugee status. Mental health at large is understudied in slums, which are shared social and spatial environments where residents are exposed to stressors such as violence, overcrowding and poverty, producing neighbourhood effects of shared health risks.[48–50] Prior research with urban refugee youth in Gambia also noted reciprocal relationships between refugee and non-refugee health.[18] Future research could explore patterns of alcohol use among refugee and non-refugee youth in Kampala's informal settlements to disentangle shared and unique stressors

Table 4 Multiplicative two-way interactions of syndemic factors and protective factors on transactional sex engagement (N=251)

	Two-way product terms						
Variables and product term	**Model 1: depression× frequent alcohol use**	**Model 2: intimate partner violence (IPV)×depression**	**Model 3: IPV× frequent alcohol use**	**Model 4: young adulthood violence (YAV)*×depression**	**Model 5: YAV*× frequent alcohol use**	**Model 6: all two-way product terms**	**Model 7: all two-way product terms with protective factors**
Depression×frequent alcohol use	9.97 (1.10 to 89.69)*						
IPV×depression		0.95 (0.40 to 2.24)				0.21 (0.04 to 1.28)	0.41 (0.07 to 2.33)
IPV×frequent alcohol use			5.56 (3.04 to 10.21)***			3.72 (1.42 to 9.74)**	3.51 (1.28 to 9.60)*
YAV*×depression				1.29 (0.61 to 2.72)		7.13 (1.34 to 37.50)*	3.90 (0.71 to 22.36)
YAV*×frequent alcohol use					6.81 (3.48 to 13.31)***	1.44 (0.51 to 4.02)	1.41 (0.46 to 4.30)
Resilience							1.05 (0.97 to 1.17)
Family social support							0.84 (0.72 to 0.98)*
Friend social support							0.98 (0.82 to 1.18)
Significant other social support							0.89 (0.75 to 1.05)

Covariates include sociodemographic factors: age, gender, education, food insecurity and employment.
*P<0.05, **p<0.01, ***p<0.001.
*YAV is violence experienced at age 16 years and above.

Table 5 Multiplicative two-way interactions of syndemic factors and protective factors on recent multiple sexual partners (N=251)

	Two-way product terms						
Variables and product term	**Model 1: depression× frequent alcohol use**	**Model 2: intimate partner violence (IPV)×depression**	**Model 3: IPV× frequent alcohol use**	**Model 4: young adulthood violence (YAV)*×depression**	**Model 5: YAV*× frequent alcohol use**	**Model 6: all two-way product terms**	**Model 7: all two-way product terms with protective factors**
Depression×frequent alcohol use	1.02 (0.18 to 5.71)					0.33 (0.03 to 2.98)	0.30 (0.03 to 3.24)
IPV×depression		0.56 (0.19 to 1.66)				0.26 (0.04 to 1.91)	0.23 (0.03 to 1.81)
IPV×frequent alcohol use			4.70 (1.93 to 11.44)***			4.81 (1.32 to 17.52)*	4.52 (1.19 to 17.27)*
YAV*×depression				0.43 (0.19 to 0.96)*		3.81 (0.57 to 25.31)	5.83 (0.83 to 40.82)
YAV*×frequent alcohol use					5.77 (2.11 to 15.79)***	0.97 (0.24 to 3.92)	1.03 (0.24 to 4.24)
Resilience							0.97 (0.89 to 1.06)
Family social support							0.94 (0.79 to 1.11)
Friend social support							1.07 (0.86 to 1.32)
Significant other social support							1.12 (0.92 to 1.38)

Covariates include sociodemographic factors: age, gender, education, food insecurity and employment.
*P<0.05, **p<0.01, ***p<0.001.
*YAV is violence experienced at age 16 years and above.

that contribute to, and result from, frequent alcohol use by refugee status. Examining the role of gender norms in alcohol use among young refugee men is also important to understand root causes of frequent alcohol use and its potential role in social interactions and/or stress coping.

We found frequent alcohol use was associated with both of the sexual risk practices we examined: recent multiple sex partners and past-year transactional sex (table 3). Similarly, a study in Kampala's slums with non-refugee youth reported linkages between alcohol use and HIV vulnerability, finding associations between alcohol-related condomless sex and sex work.[51] There are complex linkages between alcohol use and transactional sex. Alcohol use can facilitate sociability and relaxation, reduce inhibitions regarding sex, and sex may be expected in return for men purchasing women alcohol.[52] In a South African study, transactional sex among young women was associated with: higher odds of having sex while drunk, having concurrent partners and being HIV positive.[53] Young women may frequent venues that serve alcohol to meet men to purchase them drinks, and sex may be expected in return.[54] Another South African study with young women reported that visiting alcohol outlets was linked with condomless sex, multiple sex partners and transactional sex.[55] The dynamics of transactional sex and alcohol use require further examination with young urban refugees.

We also found the co-occurrence of frequent alcohol use with IPV among nearly one-quarter of participants. This corroborates prior research in refugee settings that documents how young women with partners who consumed alcohol had higher IPV risk.[24] It also aligns with decades of research documenting that alcohol use can trigger and/or exacerbate aggression and in turn IPV.[56] We also found experiencing YAV, a proxy for community violence, co-occurred with depression and this was linked with transactional sex. Associations between experiencing community violence and depression have been reported in prior research with refugee youth in Gambia, who were more likely than non-refugee youth to report both community violence and past 12-month alcohol use.[18] A global systematic review of substance use with forced migrants noted the role of alcohol production and sales as sources of income for refugee communities, and linkages between alcohol consumption and SGBV and child neglect.[4] This review also highlighted the need for further investigation of alcohol use prevalence among refugee and displaced persons, including harmful use and dependence, with attention to differences by age and gender.[4]

Study limitations include the non-random sample that limits generalisability of the findings, and the cross-sectional survey design that does not allow inference of causality. Additionally, using a standardised substance use screening tool such as cut down, annoyed, guilty, eye-opener (CAGE) would strengthen the results. Future studies could also examine the type of alcohol (spirits, beer) and how much is consumed at one time[36] and employ longitudinal designs. Despite these limitations, we address notable gaps in the literature regarding alcohol use among urban refugee youth, and its intersections with depression, violence and HIV vulnerability. Findings also signal the need for gender-tailored approaches, whereby NCD prevention could focus attention on problematic alcohol use among refugee young men and address depression among refugee young women.

Interventions informed by the model of synergistically interacting epidemics,[34] congruent with our findings, suggest that addressing any one of the issues identified—IPV, community violence, depression or frequent alcohol use—may reduce HIV risks among urban refugee youth. Youth-centred, trauma-informed, gender and contextually tailored strategies are needed for NCD among urban refugee youth. In particular, substance use strategies tailored for refugee young men, who had higher prevalence of frequent alcohol use in our study, can address resilience, gender norms and expectations, and leverage community strengths and supports.[4 28 57] For instance, strategies that apply a common elements treatment approach delivered by lay persons and include components such as psychoeducation and engagement, anxiety management, behavioural activation, and cognitive coping and restructuring have the potential to reduce both hazardous alcohol use and IPV[58 59] and could be tailored for urban refugee youth. Community mobilisation, such as in SASA! (start, awareness, support, action), to prevent community-level IPV could be adapted to focus on refugee youth and integrate hazardous alcohol use.[60] There remain knowledge gaps regarding effective hazardous alcohol use prevention interventions among refugees, particularly regarding a comprehensive package of interventions that offer community engagement and awareness raising, focus on prevention as well as harm reduction, and include more intensive approaches for persons experiencing severe substance use concerns.[61 62] The COVID-19 pandemic has drawn attention to increased SGBV[63] and alcohol misuse,[64 65] resulting in calls for research in humanitarian contexts to address violence through improving services, tackling root causes and risk mitigation.[63]

In sum, findings suggest that the SAVA syndemic is an urgent issue to address with urban refugee youth in Kampala. To date, little research has focused on alcohol use among urban refugee youth,[4] this is an urgent area for future research. Systematic review findings report overall depression prevalence among refugee children and adolescents of 14%,[2] yet there is a scarcity of studies focused on urban refugee youth mental health. Not only are frequent alcohol use and depression harmful on their own, but their convergence with violence was also associated with increased HIV exposure. Urban refugee youth should be meaningfully engaged in the development of syndemics-informed interventions to address the root causes of depression, alcohol use, violence and HIV vulnerability to create health-enabling environments.

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REFERENCES

1 UNHCR. UNHCR - Global Trends 2019: Forced Displacement in 2019 [Internet], 2020. Available: https://www.unhcr.org/globaltrends2019/
2 Blackmore R, Gray KM, Boyle JA, *et al*. Systematic Review and Meta-analysis: The Prevalence of Mental Illness in Child and Adolescent Refugees and Asylum Seekers. *J Am Acad Child Adolesc Psychiatry* 2020;59:705–14.
3 Silove D, Ventevogel P, Rees S. The contemporary refugee crisis: an overview of mental health challenges. *World Psychiatry* 2017;16:130–9.
4 Horyniak D, Melo JS, Farrell RM, *et al*. Epidemiology of substance use among forced migrants: a global systematic review. *PLoS One* 2016;11:e0159134.
5 Stanaway JD, Afshin A, Gakidou E, *et al*. Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks for 195 countries and territories, 1990-2017: a systematic analysis for the global burden of disease study 2017. *Lancet* 2018;392:1923–94.
6 Singh NS, Smith J, Aryasinghe S, *et al*. Evaluating the effectiveness of sexual and reproductive health services during humanitarian crises: a systematic review. *PLoS One* 2018;13:e0199300.
7 Singh NS, Aryasinghe S, Smith J, *et al*. A long way to go: a systematic review to assess the utilisation of sexual and reproductive health services during humanitarian crises. *BMJ Glob Health* 2018;3:e000682.
8 Ranganathan M, MacPhail C, Pettifor A, *et al*. Young women's perceptions of transactional sex and sexual agency: a qualitative study in the context of rural South Africa. *BMC Public Health* 2017;17:666.
9 Singer M. A dose of drugs, a touch of violence, a case of AIDS: conceptualizing the SAVA syndemic. *Free Inq Creat Sociol* 2000;28:13–24 http://search.proquest.com/docview/60445294?pq-origsite=summon
10 Singer M, Clair S. Syndemics and public health: reconceptualizing disease in bio-social context. *Med Anthropol Q* 2003;17:423–41.
11 Singer M, Bulled N, Ostrach B, *et al*. Syndemics and the biosocial conception of health. *Lancet* 2017;389:941–50.
12 Uganda Country Refugee Response Plan [Internet]. UNHCR, 2019. Available: http://reporting.unhcr.org/sites/default/files/Uganda Country RRP 2019-20 %28January 2019%29.pdf
13 Park H. The power of cities [Internet]. UNHCR, 2016. Available: https://www.unhcr.org/innovation/the-power-of-cities/
14 Sabila S, Silver I. Cities as partners: the case of Kampala. *Forced Migr Rev* 2020;63:41–3 https://www.fmreview.org/cities/saliba-silver
15 Vann B, Beatty M, Ehrlich L. Supporting displaced communities to address gender-based violence. *Forced Migr Rev* 2004;19:28–9 https://doaj.org
16 Wolff J-S. Urban planning for refugee housing: responding to urgent needs. *Forced Migr Rev* 2020;63:11–13 https://www.fmreview.org/cities
17 Schell J, Hilmi M, Hirano S. Area-Based approaches: an alternative in contexts of urban displacement. *Forced Migr Rev* 2020;63:16–19 https://search.ebscohost.com/login.aspxdirect=true&AuthType=sso&db=a9h&AN=142385266&site=edslive&scope=site&custid=s2775460
18 O'Donnell DA, Roberts WC. Experiences of violence, perceptions of neighborhood, and psychosocial adjustment among West African refugee youth. *Int Perspect Psychol* 2015;4:1–18.
19 Ezard N, Oppenheimer E, Burton A, *et al*. Six rapid assessments of alcohol and other substance use in populations displaced by conflict. *Confl Health* 2011;5:1.
20 Swahn M, Haberlen M, Palmier JB. Alcohol and drug use and other high-risk behaviors among youth in the slums of Kampala, Uganda: perceptions and contexts obtained through focus groups. *Int J Alcohol Drug Res* 2014;3:289–95.
21 Swahn MH, Dill LJ, Palmier JB. Girls and young women living in the slums of Kampala: prevalence and correlates of physical and sexual violence victimization. *SAGE Open* 2015;5:2158244015580853.
22 Swahn MH, Culbreth R, Kasirye R. Alcohol use and other psychosocial correlates of self-reported HIV among youth living in the slums of Kampala, Uganda. *Alcohol Clin Exp Res* 2018.
23 Swahn MH, Culbreth R, Salazar LF, *et al*. Psychosocial correlates of self-reported HIV among youth in the slums of Kampala. *BMC Public Health* 2019;19:1176.
24 Culbreth R, Swahn MH, Salazar LF, *et al*. Risk factors associated with HIV, sexually transmitted infections (STI), and HIV/STI co-infection among youth living in the slums of Kampala, Uganda. *AIDS Behav* 2020;24:1023–31.
25 Feseha G, G/mariam A, Gerbaba M. Intimate partner physical violence among women in Shimelba refugee cAMP, Northern Ethiopia. *BMC Public Health* 2012;12:125.
26 Gibbs A, Sikweyiya Y, Jewkes R. "Men value their dignity": Securing respect and identity construction in urban informal settlements in South Africa. *Glob Health Action* 2015;8.
27 Duby Z, McClinton Appollis T, Jonas K, *et al*. "As a Young Pregnant Girl… The Challenges You Face": Exploring the Intersection Between Mental Health and Sexual and Reproductive Health Amongst Adolescent Girls and Young Women in South Africa. *AIDS Behav* 2021;25:344–53.
28 Hatcher AM, Gibbs A, McBride R-S, *et al*. Gendered syndemic of intimate partner violence, alcohol misuse, and HIV risk among peri-urban, heterosexual men in South Africa. *Soc Sci Med* 2022;295:112637.

29 Okafor CN, Christodoulou J, Bantjes J, *et al*. Understanding HIV risk behaviors among young men in South Africa: a Syndemic approach. *AIDS Behav* 2018;22:3962–70.
30 Pitpitan EV, Kalichman SC, Eaton LA, *et al*. Co-Occurring psychosocial problems and HIV risk among women attending drinking venues in a South African township: a syndemic approach. *Ann Behav Med* 2013;45:153–62.
31 Russell BS, Eaton LA, Petersen-Williams P. Intersecting epidemics among pregnant women: alcohol use, interpersonal violence, and HIV infection in South Africa. *Curr HIV/AIDS Rep* 2013;10:103–10.
32 Kozarić-Kovacić D, Ljubin T, Grappe M. Comorbidity of posttraumatic stress disorder and alcohol dependence in displaced persons. *Croat Med J* 2000;41:173-8.
33 Singer M, Bulled N, Ostrach B, *et al*. Syndemics and the biosocial conception of health. *Lancet* 2017;389:941–50 https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(17)30003-X/abstract
34 Tsai AC. Syndemics: a theory in search of data or data in search of a theory? *Soc Sci Med* 2018;206:117–22.
35 Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med* 2001;16:606–13.
36 Jani BD, McQueenie R, Nicholl BI, *et al*. Association between patterns of alcohol consumption (beverage type, frequency and consumption with food) and risk of adverse health outcomes: a prospective cohort study. *BMC Med* 2021;19:8.
37 Laurie AR, Showalter J, Pratt T, *et al*. Validity of the brief inpatient screen for intimate partner violence among adult women. *Women Health* 2012;52:679–99.
38 Logie CH, Okumu M, Mwima S, *et al*. Social ecological factors associated with experiencing violence among urban refugee and displaced adolescent girls and young women in informal settlements in Kampala, Uganda: a cross-sectional study. *Confl Health* 2019;13:60.
39 Logie CH, Wang Y, Marcus N, *et al*. Pathways from police, intimate partner, and client violence to condom use outcomes among sex workers in Jamaica. *Int J Behav Med* 2020;27:378–88.
40 Logie CH, Wang Y, Lacombe-Duncan A, *et al*. Factors associated with sex work involvement among transgender women in Jamaica: a cross-sectional study. *J Int AIDS Soc* 2017;20:21422.
41 Logie CH, Okumu M, Mwima S, *et al*. Gender, transactional sex, and HIV prevention cascade engagement among urban refugee and displaced adolescents and youth in Kampala, Uganda. *AIDS Care* 2021;33:897-903.
42 Ungar M, Liebenberg L. Assessing resilience across cultures using mixed methods: construction of the child and youth resilience measure. *J Mix Methods Res* 2011;5:126–49.
43 Zimet GD, Dahlem NW, Zimet SG, *et al*. The multidimensional scale of perceived social support. *J Pers Assess* 1988;52:30–41.
44 Tsai AC, Venkataramani AS. Syndemics and health disparities: a methodological note. *AIDS Behav* 2016;20:423–30.
45 Rantakömi SH, Kurl S, Sivenius J, *et al*. The frequency of alcohol consumption is associated with the stroke mortality. *Acta Neurol Scand* 2014;130:118–24.
46 Griswold MG, Fullman N, Hawley C, *et al*. Alcohol use and burden for 195 countries and territories, 1990–2016: a systematic analysis for the global burden of disease study 2016. *The Lancet* 2018;392:1015–35.
47 Swahn MH, Culbreth R, Salazar LF, *et al*. The prevalence and context of alcohol use, problem drinking and alcohol-related harm among youth living in the slums of Kampala, Uganda. *Int J Environ Res Public Health* 2020;17. doi:10.3390/ijerph17072451. [Epub ahead of print: 03 04 2020].
48 Ezeh A, Oyebode O, Satterthwaite D, *et al*. The history, geography, and sociology of slums and the health problems of people who live in slums. *Lancet* 2017;389:547–58.
49 Subbaraman R, Nolan LB, Shitole T. The psychological toll of slum living—an assessment of mental health, disability, and slum-related adversities in Mumbai, India. *Lancet Glob Heal* 2014;2.
50 Lilford RJ, Oyebode O, Satterthwaite D, *et al*. Improving the health and welfare of people who live in slums. *Lancet* 2017;389:559–70.
51 Kumar S, Culbreth RE, Swahn MH, *et al*. Examining correlates of alcohol related condom-less sex among youth living in the slums of Kampala, Uganda. *AIDS Care* 2020;32:1246–50.
52 Norris AH, Kitali AJ, Worby E. Alcohol and transactional sex: how risky is the mix? *Soc Sci Med* 2009;69:1167–76.
53 Ranganathan M, Heise L, Pettifor A, *et al*. Transactional sex among young women in rural South Africa: prevalence, mediators and association with HIV infection. *J Int AIDS Soc* 2016;19:20749.
54 Watt MH, Aunon FM, Skinner D, *et al*. "Because he has bought for her, he wants to sleep with her": alcohol as a currency for sexual exchange in South African drinking venues. *Soc Sci Med* 2012;74:1005–12.
55 Rosenberg M, Pettifor A, Van Rie A, *et al*. The relationship between alcohol outlets, HIV risk behavior, and HSV-2 infection among South African young women: a cross-sectional study. *PLoS One* 2015;10:e0125510.
56 Leonard KE, Quigley BM. Thirty years of research show alcohol to be a cause of intimate partner violence: future research needs to identify who to treat and how to treat them. *Drug Alcohol Rev* 2017;36:7–9.
57 Gibbs A, Sikweyiya Y, Jewkes R. "Men value their dignity": Securing respect and identity construction in urban informal settlements in South Africa. *Glob Health Action* 2015;8.
58 Murray LK, Kane JC, Glass N, *et al*. Effectiveness of the common elements treatment approach (Ceta) in reducing intimate partner violence and hazardous alcohol use in Zambia (VATU): a randomized controlled trial. *PLoS Med* 2020;17:e1003056.
59 Kane JC, Glass N, Bolton PA, *et al*. Two-Year treatment effects of the common elements treatment approach (Ceta) for reducing intimate partner violence and unhealthy alcohol use in Zambia. *Glob Ment Health* 2021;8:e4.
60 Abramsky T, Devries KM, Michau L, *et al*. Ecological pathways to prevention: how does the Sasa! community mobilisation model work to prevent physical intimate partner violence against women? *BMC Public Health* 2016;16:339.
61 Greene MC, Ventevogel P, Kane JC. Substance use services for refugees. *Bull World Health Organ* 2019;97:246-246A.
62 Roberts B, Ezard N. Why are we not doing more for alcohol use disorder among conflict-affected populations? *Addiction* 2015;110:889–90.
63 Sharma V, Ausubel E, Heckman C, *et al*. Mitigating gender-based violence risk in the context of COVID-19: lessons from humanitarian crises. *BMJ Glob Health* 2021;6:e005448–8.
64 Clay JM, Parker MO. Alcohol use and misuse during the COVID-19 pandemic: a potential public health crisis? *Lancet Public Health* 2020;5:e259.
65 Jaguga F, Kiburi SK. Reducing alcohol misuse during the COVID-19 pandemic in Kenya. *Lancet Psychiatry* 2020;7:935–6.