Determinants of harmful use of alcohol among urban slum dwelling adults in Kenya

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Abstract

Background: Harmful alcohol use is a public health problem associated with negative health and socio-economic impacts. However, patterns and dynamics of alcohol use among slum-dwellers in Kenya are poorly understood.

Objective: To establish determinants of harmful alcohol use among adults in an urban slum setting in Kenya.

Materials and methods: Cross-sectional study involving a consecutively selected sample (N=215) from Githurai, in Nairobi. A pre-tested questionnaire that captured data on socio-demographics, drinking patterns, type, reasons, initiator, and support system.

Results: Of the respondents, those above 31 years, married, separated/divorced/widowed, of high education, earning above 50 USD, and from dysfunctional families consumed more alcohol. Low earners consumed ($p < 0.05$) unrecorded while high earners drank ($p< 0.001$) recorded alcohol. Adults from families with a drinking father and sibling consumed more alcohol ($p=0.001$). Single, low educational attainment/earners, and those in dysfunctional families ($p <0.05$) drank due to stress and reported alcohol-related problems. Young, unmarried, and casual laborers were introduced ($p < 0.05$) to alcohol by friends.

Conclusion: Socio-demographic, economic, familial, social interactions, and stress are associated with harmful alcohol use among adults from slums calling for interventions targeting these factors.

Keywords: Determinants; urban slum dwelling; alcohol use; alcohol abuse; adults; informal.

DOI: https://dx.doi.org/10.4314/ahs.v19i4.12

Cite as: *Gitatui M, Kimani S, Muniu S, Okube O. Determinants of harmful use of alcohol among urban slum dwelling adults in Kenya. Afri Health Sci. 2019;19(4):2906-2925. https://dx.doi.org/10.4314/ahs.v19i4.12*

Background

Alcohol use and/or abuse has been in existence since antiquity. Harmful use of alcohol is associated with social, economic, psychological and physical consequences on individual, family, and the community [1, 2], with increased propensity for toxicity, injuries, and violence [3, 4]. Approximately 2.5 million deaths occur annually attributed to alcohol consumption resulting to significant morbidity, disability, violence, child neglect, abuse, and economic deprivation [4]. Indeed, harmful use of alcohol ranks top five risk factors for chronic diseases, disability and death globally [4, 5]. Specifically, alcohol use is linked to heart diseases, liver cirrhosis, cancers, high blood pressure, high cholesterol and their attendant morbidity and mortality[6], whose direct relationship has been clearly established. Furthermore, there is increased risk of accidental injuries, suicides, murders, and domestic violence associated with alcohol use [7]. Moreover, studies have demonstrated that children of alcoholics have increased risk for violent behavior, [9] perform poorly in academics [10] and are vulnerable to higher incidence of depression, anxiety, stress and lower self-esteem among some of the serious long term sequelae [11, 9].

Alcoholic beverages consumed across regions are either recorded (wine, beer and spirits) or unrecorded (allegedly cheaper homemade undocumented brands) depending on culture and settings [4]. The magnitude of alcohol consumption varies geographically, with highest quantities of recorded alcohol use reported in high-income countries, while unrecorded type is consumed in low income nations [4]. Regionally, Southern African countries (Namibia

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and republic of South Africa) top in alcohol consumption compared to their neighbouring nations [4]. In East Africa, Kenya (31.7%) and Uganda (28.6%) have highest alcohol consumption rates, respectively [4, 8, 9], with proportions higher in urban relative to rural settings [9, 10].

The Kenyan urban, slum, and informal settings dwellers consume more unrecorded alcohol, sometimes risking their lives [9]. Substantial consumption of unrecorded alcohol is attributed to high prices, taxes, and legal requirements associated with recorded alcoholic drinks as well as it is a cultural norm [4, 9]. The consumption of the unrecorded alcohol is associated with social-cultural activities and less stringent measures which sometimes may promote excessive intake. Unrecorded alcohol is implicated in increased risk of harm because of unknown and potentially dangerous impurities or contaminants [4, 11-13]. The alcohol-related complications are related to the type of alcohol (recorded vs unrecorded), amount, frequency and the health status of the consumer. The complications manifest even after several hours after taking alcohol and are reported as headache, fatigue and irritability as well as the need to drink in the morning for one to start working- dependence syndrome [14]. It is worth noting however, that consumption and the attendant alcohol-related complications are disproportionally higher in men compared to women, with 6.2% all male vs 1.1% female deaths attributed to alcohol [4]. The gender differences are attributed to cultural acceptability and economic capability in favour of men thus high consumption among men [9].

Locally, the prevalence of alcohol-related problems is high with an estimated 5.8% of adult Kenyan males (15-64 years old) having some level of alcohol dependency and 2.4% categorized as abusing alcohol [4, 10, 15, 16]. Alcohol-related problems are attributed to unrecorded alcohol, an issue that has a national dimension with urban slum settlements significantly affected because of affordability [9, 11, 15]. The unrecorded alcoholic beverages that are commonly consumed in these settings are chang'aa and busaa. Chang'aa is a high (15.3-34%) alcohol content spirit-like clear drink made by fermenting a mixture of corn/sorghum/millet and sugar for a week, followed by distillation. The busaa on the other hand, is a malt liquor with an alcohol content of 3.9%–5.4% made from fermenting corn flour/sorghum/millet over a shorter period of about two days [9, 17, 18]. These alcoholic beverages are prone to abuse because they are affordable, available and culturally acceptable products that are consumed during community activities and special occasions [4, 9, 10, 15, 16, 19].

Alcohol use and/or abuse commences during adolescence and young adulthood progressing into adulthood 1. This age cohort has been reported to engage in hazardous and harmful alcohol use practices characterized by regular, intoxication, and binge drinking [20-22]. Their alcohol use is influenced by family and social environment they live and grow [23]. They commence alcohol consumption within the family, with parental knowledge [24]. Thus, there are family related factors that promote alcohol use for example; family conflict, poor communication, parental drinking, and permissiveness [25]. Indeed, evidence show a parent who abuses alcohol is a risk factor for children becoming alcoholics [26], while having siblings who misuse alcohol is even stronger risk factor towards other sibling drinking [27-29]. Additionally, family conflict have been linked to adolescent alcohol abuse either directly [30], or through reduced effectiveness of parental monitoring [31]. Importantly, the parental attitude that favors antisocial behavior tends to increase the risk of children abusing alcohol [32, 33]. Similarly, peer effect, wider social, environmental and legislative contexts influence the use of alcohol [34]. The peers and social norms determine adolescent alcohol use behaviour [35-38]. In this regard, as one grows social contacts expands and friends' approval influence consumption of alcohol [39]. However, parental influence has been shown to remain stronger particularly where family relationships are perceived to be close by the child [40, 41].

Recently, changes in trends and patterns associated with alcohol use such as; drinking at young age, increased amount consumed, and lack of support system to address impacts of alcohol use have been observed [42]. Taken together, the aforementioned depicts harmful alcohol use is a socio-economic and public health problem affecting the young productive population. Indeed, evidence link young age drinking to alcohol dependency and related social economic impacts. Therefore, delayed initiation to alcohol significantly impede alcohol misuse over a longer term [43]. Importantly, alcohol-related health consequences are inversely related to the age when drinking commenced [44, 45], availability of support systems as well as directly linked to the amount [46]. The factors surrounding pervasive alcohol use and/or abuse are poorly understood in Kenya despite alcoholism having reached alarming levels. High alcohol abuse has been thought to

contribute to increased morbidity and mortality among Kenyan adult men [10, 15, 16]. Studies delineating the factors influencing alcohol use patterns in informal (slums) settlements in Kenya are lacking. Thus, this study sought to establish the determinants of alcohol consumption among young adults in an urban slum setting in Kenya.

Materials and methods

Study setting

The study was conducted in Soweto slum, an informal settlement located in Githurai sub-location, East of Nairobi City and County. The slum is located approximately 12 KM from Nairobi central business district, 300 meters off Thika super highway. The slum sits on approximately 13 acres of land, borders Thika super highway to the South, Maziwa estate to the North, Githurai 44 to the East, Farmers choice industries and Kahawa Army barracks to the West. The area has 3 registered bars and 10 chang'aa brewing homesteads doubling up as drinking places. The slum is inhabited by about 10, 000 people among them 40% are adults [47].

Study design and sampling

This was a cross-sectional study conducted between April and July 2016 involving 215 adults (over 18 years) who reported to be regular alcohol drinkers regardless of the amount from Soweto Slum in Githurai Nairobi, Kenya. A two stage cluster sampling was used to select one Sub-location and five data collection sites that were proximal to the drinking places. Consecutive sampling that is considered the best type onon-probability sampling with good representation of entire population, was used to include all accessible alcohol users as part of the sample. This is a form of convenient sampling method where participants are selected in order of appearance. The sample size was calculated based on the recommendation by Mugenda and Mugenda [48] which indicates that if the target population is less than 10,000, the a sample size of 10 to 30% is adequate. For this study 20% was considered adequate and since the target population was 4,000 people, the minimum sample size required was 200 respondents. The participants were recruited from the five data collection sites resulting with 43 respondents from each site consecutively sampled until the total number was achieved.

Study participants

The participants for this study were alcohol users (self-reported) male and female aged 18 years and above. All men and women who reported to be current alcohol users of alcohol on at least one day per week and who availed themselves at the data collection sites were eligible for the study. The participants were approached for recruitment by research assistants who had been recruited for their role in the community as mobilizers, social workers or peer educators to participate in collecting data for this study. The research assistants were trained on the study methodology, consent and recruitment processes. The research assistant conducted face-to-face interviews using the language participant was most comfortable with. All alcohol users who met the inclusion criteria were informed and explained to about the objective, procedure of the study, and informed consent process. In this regard, the study participants provided their individual verbal and written informed consent before participating in the study. The content of the informed consent was read by or to each of respondent depending on one's choice or whether one could read or not. The informed consent process involved explanation by the researcher on: what the study was all about; aim of the study and methods for data collection; anticipated benefits including non-monetary compensation; potential risks in which case no risks were involved apart from being interviewed; measures to ensure confidentiality and anonymity of the information; voluntarism and the right to withdraw from the study it at any time without reprisal; institutional affiliations and contacts of the researchers, as well as contacts for ethical review committee person to report any adverse outcome/events. All those who agreed to participate in the study after the consent process were requested to signed a consent certificate and were recruited to participate in the study. Participation was limited to adults aged over 18 years. Those recruited received a soft drink for participating in the study.

Data collection

Data were collected using a researcher-assisted structured questionnaire. The questionnaire was structured into socio-demographic characteristics as well as closed ended questions to capture quantitative data on alcohol consumption in the past thirty days. Specifically, the components of the questionnaire included; socio-demographic characteristics, drinking patterns, type of drink, other drugs, reasons for drinking, persons that introduced respondent to alcohol, support system for alcohol

problems, and reported feelings after waking up among others. The questionnaire was developed following a discussion with the study investigators on the variables that are pertinent in the issue of alcohol use. Once developed the question was shared with a panel of experts who had knowledge of the topic and the emerging issues were further refined and included in the questionnaire. Finally, the questionnaire was validated by a group of the investigators and experts ready for pre-testing. This process was to guarantee validity and reliability of the questionnaire. The questionnaires were pre-tested among 10 respondents who reported to have been users of alcohol sampled from the neighbouring Githurai area. The responses from pre testing were assessed and used to review the final data collection tool.

Data analyses

Data were organized, screened and checked for completeness. Thereafter coding, input into computer, and cross checking against the original data set for accuracy was conducted. Data were analyzed using computer software (SPSS Ver. 22) for which descriptive and inferential statistical outputs were generated and reported appropriately. Categorical data were summarized into proportions and presented in frequency tables. To determine relationships between various variables Chi-square test of independence and Fisher's Exact test were performed. For variables that were found to have a significant difference and had more than two categories a logistic regression waperformed to determine the group responsible for the difference. Numeric data was summarized into mean and standard deviations. The difference between variables was determined using independent t-test and one-Way ANOVA.

Ethical consideration

Ethical approval for the study was obtained from Kenyatta National Hospital-University of Nairobi Ethical Review Committee (KNH-UoN ERC) (Approval number UP365/05/2016). Permission to conduct the study in the slum area was sought and granted by the Githurai Assistant County Commissioner (Ref. KASD/ADM/1/1VOL.5/192). Both verbal and written consents were obtained from respondents after comprehensive explanation.

Results

Socio-demographic characteristics of the respondents

Of the respondents, majority were males, aged 30 years or below (Table 1), married (42.3%), single (42.3%) or separated/divorced/widowed (15.3%). Most of the respondents had attained primary education, were self-employed, and earned monthly income of less than USD 50 (Ksh: 5, 000), and described their families as happy.

Table 1: Socio-demographic characteristics of the respondents

Variable	Frequency	Percent
Age		
≤ 30 years	111	51.6
31 - 40 years	76	35.3
Over 40 years	28	13.0
Gender		
Female	43	20.0
Male	172	80.0
Marital status		
Single	91	42.3
Married	91	42.3
Separated/Divorced/Widowed	33	15.3
Education		
None - Primary	142	66.0
Post-primary	73	34.0
Employment status		
Casual laborer	31	14.6
Employed	18	8.5
Self-employed	164	77.0
Monthly earning (USD)		
Less than 50	131	61.8
50 – 100	51	24.1
Over 100	30	14.2
Family description		
Abusive/broken home	34	16.0
Happy home	178	84.0

Relationship between socio-demographic characteristics and alcohol use

Analysis of the relationship between social demographic factors and the patterns of alcohol use revealed that respondents who consumed more than three drinks were more likely ($p < 0.05$) to be older (OR = 5.8, 95% CI: 2.3 - 14.2 and OR = 2.6, 95% CI: 1.1 - 6.4), married (OR = 8.3, 95% CI: 3.3 – 21.1), separated/divorced/widowed (OR = 2.8, 95% CI: 1.3 – 6.5), had attained post primary education (OR = 2.1, 05% CI: 1.1 – 3.8), and of income above 50 USD (OR = 5.8, 95% CI: 2.5 - 13.8 and OR = 8.8, 95% CI: 3.1 - 25.5) (Table 2). Specifically, those aged 31 – 40 years were 5.8 times likely to consume more than three drinks compared with other age groups. The married were 8.3 times likely to consume more than three drinks. Those with post-primary education were 2.1 times

likely to consume more than three drinks. Respondents earning USD 50 above were likely to consume more than three drinks in one sitting. Although marginally significant, respondents from happy homes were less likely to consume three alcoholic drinks per day.

Table 2: Relationship between demographic characteristics and daily alcohol use

Characteristic	Drinks per day		Total	AOR (95% CI)
	More than 3 drinks	1 - 3 drinks		
Age				
Less than 30 years	18(16.7)	90(83.3)	108(100)	Reference
31 - 40 years	23(30.7)	52(69.3)	75(100)	5.8 (2.3 - 14.2)*
Over 40 years	15(53.6)	13(46.4)	28(100)	2.6 (1.1 - 6.4)*
Gender				
Female	8(18.6)	35(81.4)	43(100)	Reference
Male	48(28.6)	120(71.4)	168(100)	1.8 (0.9 - 4.0)
Marital status				
Single	11(12.6)	76(87.4)	87(100)	Reference
Married	27(29.7)	64(70.3)	91(100)	8.3 (3.3 – 21.1)*
Separated/Divorced/Widowed	18(54.5)	15(45.5)	33(100)	2.8 (1.3 – 6.5)*
Education				
None - Primary	30(21.6)	109(78.4)	139(100)	Reference
Post-primary	26(36.1)	46(63.9)	72(100)	2.1 (1.1 – 3.8)*
Religion				
Christians	41(21.9)	146(78.1)	187(100)	Reference
Islam	12(70.6)	5(29.4)	17(100)	2.7 (0.6 - 12.4)
Others	3(42.9)	4(57.1)	7(100)	0.3 (0.1 - 1.9)
Monthly earning (USD)				
Less than 50	28(21.9)	100(78.1)	128(100)	Reference
50 - 100	8(15.7)	43(84.3)	51(100)	5.8 (2.5 - 13.8)*
Over 100	18(62.1)	11(37.9)	29(100)	8.8 (3.1 - 25.5)*
Family description				
Abusive/broken home	13(39.4)	20(60.6)	33(100)	Reference
Happy home	41(23.4)	134(76.6)	175(100)	0.5 (0.2 - 1.0)†
Total	54(26)	154(74)	208(100)	

AOR – Adjusted Odds Ratio; * - p-value < 0.05; † - p-value = 0.059

Relationship between socio-demographics factors and alcohol use per week

Respondents reported consuming alcohol on average 4.15 ± 2.8 (Mean ± SD) days per week. A One-Way ANOVA revealed age, marital status, religion, employment status, and monthly earnings were associated with more days of alcohol consumption per week (Table 3). Respondents who were older ($F(2, 210) = 5.786$, $p = 0.004$), separated, widowed or divorced ($F(2,210) = 5.766$, $p = 0.004$), employed ($F(2,208) = 6.016$, $p = 0.003$), and higher earners ($F(2,207) = 3.505$, $p = 0.032$) were more likely to consume alcohol in most days of the week.

Table 3: Relationship between demographic characteristics and weekly alcohol use

Variable	N	Mean drinking days per week	SD	F	df	P
Age				5.786	2, 210	0.004
Less than 30 years	110	3.60	2.72			
31 - 40 years	75	4.51	2.83			
Over 40 years	28	5.39	2.44			
Total	213	4.15 (4.50)	2.79			
Gender				0.919	1, 211	0.339
Female	43	3.79	2.756			
Male	170	4.25	2.796			
Total	213	4.15	2.788			
Marital status				5.766	2, 210	0.004
Single	89	3.56	2.80			
Married	91	4.27	2.74			
Separated/Divorced/Widowed	33	5.42	2.48			
Total	213	4.15	2.79			
Education				0.059	1, 211	0.809
None – Primary	140	4.12	2.835			
Post-primary	73	4.22	2.714			
Total	213	4.15	2.788			
Religion				3.867	2, 201	0.022
Christians	189	3.97	2.79			
Islam	17	5.59	2.50			
Others	7	5.71	2.21			
Total	213	4.15	2.79			
Employment status				6.016	2, 208	0.003
Casual laborer	31	4.84	2.81			
Employed	17	6.00	1.77			
Self-employed	163	3.83	2.78			
Total	211	4.16	2.79			
Monthly earning				3.505	2, 207	0.032
Less than 50	130	4.21	2.79			
50 – 100	51	3.43	2.83			
Over 100	29	5.10	2.41			
Total	210	4.14	2.79			
Family description				2.231	1, 208	0.137
Abusive/broken home	34	4.79	2.496			
Happy home	176	4.02	2.827			
Total	210	4.14	2.786			

Reported type of alcoholic drink consumed by the respondents

The majority of the respondents reported consuming chang'aa regardless of gender (Table 4). However, further analyses showed respondents earning a monthly income of over 50 USD were more likely ($p < 0.05$) to consume beer and wine. Specifically, those earning monthly income of 50 – 100 or above 100 USD were 7.1 and 4.8 times likely to consume beer, respectively. Monthly earners of 50 – 100 USD or above 100 USD were 6.3 and 6.2 times more likely to consume wine. Additionally, those earning over 50-100 USD were likely to consume muratina and busaa, however, those with high income were less likely to consume Changaa.

Table 4. Relationship between income and the type of alcohol consumed among respondents

Monthly earning (in USD)	Alcohol type		Total	AOR (95% CI)
	Yes	No		
Chang'aa				
Less than 50	122 (93.8)	8 (6.2)	130 (100)	Reference
50 - 100	49 (96.1)	2 (3.9)	51 (100)	0.2 (0.07 - 0.63)*
Over 100	22 (75.9)	7 (24.1)	29 (100)	0.1 (0.03 - 0.67)*
Muratina				
Less than 50	16 (12.3)	114 (87.7)	130 (100)	Reference
50 - 100	10 (19.6)	41 (80.4)	51 (100)	2.7 (1.03 - 7.15)*
Over 100	8 (27.6)	21 (72.4)	29 (100)	1.6 (0.54 - 4.55)
Busaa				
Less than 50	11 (8.5)	119 (91.5)	130 (100)	Reference
50 - 100	4 (7.8)	47 (92.2)	51 (100)	4.9 (1.79 - 13.24)*
Over 100	9 (31)	20 (69)	29 (100)	5.3 (1.46 - 19.19)*
Beer				
Less than 50	9 (6.9)	121 (93.1)	130 (100)	Reference
50 - 100	5 (9.8)	46 (90.2)	51 (100)	7.1 (2.55 - 19.67)*
Over 100	10 (34.5)	19 (65.5)	29 (100)	4.8 (1.46 - 16.06)*
Wine				
Less than 50	10 (7.7)	120 (92.3)	130 (100)	Reference
50 - 100	4 (7.8)	47 (92.2)	51 (100)	6.3 (2.32 - 17.19)*
Over 100	10 (34.5)	19 (65.5)	29 (100)	6.2 (1.73 - 22.16)*
Spirits				
Less than 50	14 (10.8)	116 (89.2)	130 (100)	Reference
50 - 100	5 (9.8)	46 (90.2)	51 (100)	3.2 (1.18 - 8.45)*
Over 100	8 (27.6)	21 (72.4)	29 (100)	3.5 (1.02 - 12.00)*

AOR – Adjusted Odds Ratio; * - p-value < 0.05

Presence of family members who consumed alcohol

Most respondents reported having family members who consumed alcohol (Table 5). Fathers and siblings were mostly reported to have been consumers of alcohol. Further analyses showed, respondents whose father consumed alcohol were 5.5 times likely to drink more than three drinks per day for more days per week ($t = 2.284$, $df=140$, $p = 0.024$). Similarly, those with drinking siblings were more likely to consume more than 3 drinks per day as well as engage in drinking for more days in a week ($t = 5.86$, $df=140$, $p < 0.001$).

Table 5: Relationship between presence of a drinking family member and alcohol use

Family member drinks alcohol	Drinks per day		AOR (95% CI)	Drinking days per week		t	df	P
	More than 3 drinks	1 - 3 drinks		Mean	SD			
Father						2.284	140	0.024
Yes	10 (10.3)	87 (89.7)	Reference	3.29	2.679			
No	17 (38.6)	27 (61.4)	5.5 (2.2 - 13.4)*	4.41	2.781			
Mother						0.702	140	0.484
Yes	1 (7.1)	13 (92.9)	Reference	3.14	2.507			
No	26 (20.5)	101 (79.5)	3.3 (0.4 - 26.8)	3.69	2.78			
Siblings						5.859	140	0.000
Yes	20 (64.5)	11 (35.5)	Reference	5.94	2.081			
No	7 (6.4)	103 (93.6)	0.04 (0.01 - 0.11)*	2.99	2.571			
Wife						1.132	140	0.260
Yes	2 (40.0)	3 (60.0)	Reference	5	2.739			
No	25 (18.4)	111 (81.6)	0.3 (0.05 - 2.13)	3.58	2.748			
Children						1.299	140	0.196
Yes	3 (60.0)	2 (40.0)	Reference	5.2	2.49			
No	24 (17.6)	112 (82.4)	0.14 (0.02 - 0.90)*	3.58	2.751			
Total	27 (19.1)	114 (80.9)		3.63	2.751			

AOR – Adjusted Odds Ratio; CI - Confidence Interval; * - p-value < 0.05

Reported reasons for alcohol consumption among the respondents

Respondents advanced several reasons for engaging in alcohol consumption including; stress, peer pressure, fun, and addiction. Further analysis revealed that respondents with post-primary education and those from happy homes were 0.5 and 0.4 less likely to have stress, respectively. However, those earning a monthly income of 50 – 100 USD were 4.1 times more likely to have stress (Table 6).

Table 6: Reported reasons for alcohol use among respondents

Characteristic	Stress		Total	AOR (95% CI)
	Yes	No		
Marital status				
Single	54(59.3)	37(40.7)	91(100)	Reference
Married	36(39.6)	55(60.4)	91(100)	0.5 (0.2 - 1.2)
Separated/Divorced/Widowed	14(43.8)	18(56.3)	32(100)	1.2 (0.5 - 2.7)
Education				
None - Primary	77(54.6)	64(45.4)	141(100)	Reference
Post-primary	27(37)	46(63)	73(100)	0.5 (0.3 - 0.9)*
Monthly earning (USD)				
Over 100	7(23.3)	23(76.7)	30(100)	Reference
50 - 100	23(45.1)	28(54.9)	51(100)	4.1 (1.7 - 10.3)*
Less than 50	73(55.7)	58(44.3)	131(100)	1.5 (0.8 - 2.9)
Family description				
Abusive/broken home	22(64.7)	12(35.3)	34(100)	Reference
Happy home	80(44.9)	98(55.1)	178(100)	0.4 (0.2 - 0.96)*
Total	104(48.6)	110(51.4)	214(100)	

AOR – Adjusted Odds Ratio; CI - Confidence Interval; * - p-value < 0.05

Introduction into alcohol consumption among the respondents

A majority of the respondents reported having been introduced by their friends into drinking alcohol (Table 7). Further analysis revealed that the young (χ^2 = 18.55, p = 0.002), unmarried (single) (χ^2 = 16.56, p = 0.005) and casual laborer (χ^2 = 15.28, p = 0.008) were likely to have been introduced into drinking by friends.

Table 7: Introduction into alcohol consumption among the respondents

Characteristic	Introduced to take alcohol by				Total	Fisher's Exact Test
	Friends	Own initiative	Siblings	Relatives		
Age						18.55
Less than 30 years	99(90.0)	2(1.8)	2(1.8)	7(6.4)	110(100)	
31 - 40 years	62(82.7)	6(8.0)	1(1.3)	6(8.0)	75(100)	
Over 40 years	16(59.3)	2(7.4)	4(14.8)	5(18.5)	27(100)	
Marital status						16.56
Single	81(92.0)	2(2.3)	1(1.1)	4(4.5)	88(100)	
Married	76(83.5)	4(4.4)	4(4.4)	7(7.7)	91(100)	
Separated/Divorced/Widowed	20(60.6)	4(12.1)	2(6.1)	7(21.2)	33(100)	
Employment status						15.28
Casual laborer	27(87.1)	2(6.5)	1(3.2)	1(3.2)	31(100)	
Employed	9(52.9)	2(11.8)	3(17.6)	3(17.6)	17(100)	
Self-employed	140(85.9)	6(3.7)	3(1.8)	14(8.6)	163(100)	
Total	177(83.5)	10(4.7)	7(3.3)	18(8.5)	212(100)	

Knowledge on the negative effects of alcohol among the respondents

Most respondents acknowledged alcohol was harmful. Those with post-primary education were 0.5 time less likely to acknowledge the negative effects of alcohol (Table 8). The self-employed and those earning a monthly income of 50 – 100 USD were 5.9 and 2.5 times more likely to acknowledge the negative effects of alcohol, respectively.

Table 8: Knowledge on the negative effects of alcohol among the respondents

Variables	Know alcohol is not good		Total	AOR (95% CI)
	Yes	No		
Education				
None – Primary	123 (87.9)	17 (12.1)	140 (100)	Reference
Post-primary	55 (77.5)	16 (22.5)	71 (100)	0.5 (0.2 - 1.0)*
Total	178 (84.4)	33 (15.6)	211 (100)	
Employment status				
Casual laborer	23 (76.7)	7 (23.3)	30 (100)	Reference
Employed	9 (56.3)	7 (43.8)	16 (100)	2.3 (0.9 - 6.1)
Self-employed	144 (88.3)	19 (11.7)	163 (100)	5.9 (2.0 - 17.7)*
Total	176 (84.2)	33 (15.8)	209 (100)	
Monthly earning (USD)				
Over 100	20 (69.0)	9 (31.0)	29 (100)	Reference
50 – 100	47 (94.0)	3 (6.0)	50 (100)	2.5 (1.0 - 6.2)*
Less than 50	109 (84.5)	20 (15.5)	129 (100)	0.3 (0.1 - 1.2)
Total	176 (84.6)	32 (15.4)	208 (100)	

AOR – Adjusted Odds Ratio; CI - Confidence Interval; * - p-value < 0.05

Attempts to stop consuming alcohol by respondents

Of the respondents, 58.5% reported having attempted to stop alcohol consumption. Furthermore, those that were married were 3.3 more likely to have attempted to stop (Table 9). However, other socio-demographic factors did not yield statistical difference on the attempt to stop alcohol consumption.

Table 9: Relationship between attempts to stop alcohol use and social characteristics

Variable	Tried to stop		Total	AOR (95% CI)
	Yes	No		
Marital status				
Single	43 (47.8)	47 (52.2)	90 (100)	Reference
Married	57 (63.3)	33 (36.7)	90 (100)	3.3 (1.3 - 8.1)*
Separated/Divorced/Widowed	24 (75.0)	8 (25.0)	32 (100)	1.7 (0.7 - 4.3)
Total	124 (58.5)	88 (41.5)	212 (100)	

AOR – Adjusted Odds Ratio; CI - Confidence Interval; * - p-value < 0.05

Reasons for attempting to stop alcohol consumption
There were various reasons given for attempt to stop alcohol consumption including; addiction (42.3%), harmfulness (38.5%), as well as not being beneficial (19.2%).

Source of advice to stop alcohol use
Most of the respondents reported having been advised to stop consumption of alcohol. The advice was mainly from family members (68.0%), professionals (18.7%) and friends (13.3%).

Respondent feelings after waking up
The respondents expressed different feelings on waking up associated with alcohol use including; tiredness (45.2%), need to take alcohol (29.5%), headache (21.4%) and okay (3.8%), respectively.

Respondents level of responsibility
Of the respondents, 62% had children (3 ± 2) (Mean ± SD), of which they were likely to consume more than three drinks in a day and more frequently (t = 3.93, df=209, p < 0.001) (Table 10). Those who did not live with their children were 3.9 times likely to consume more than three drinks per day and drank more frequently (t = 2.481, df=130, p < 0.014). Moreover, those who did not take care of their children were 2.4 times likely to drink more per day and more frequently.

Table 10: Relationship between family responsibilities and level of alcohol use among respondents

	Drinks per day		Total	AOR (95% CI)	Drinking days per week		t	df	p-value
	More than 3 drinks	1 - 3 drinks			Mean	SD			
Have kids							3.925	209	**0.000**
Yes	45 (34.1)	87 (65.9)	132 (100)	Reference	4.72	2.694			
No	10 (13.0)	67 (87.0)	77 (100)	0.3 (0.1 - 0.6)*	3.22	2.697			
Total	55 (26.3)	154 (73.7)	209 (100)		4.16	2.786			
Live with kids							2.481	130	**0.014**
Yes	20 (23.3)	66 (76.7)	86 (100)	Reference	4.3	2.723			
No	25 (54.3)	21 (45.7)	46 (100)	3.9 (1.8 - 8.5)*	5.5	2.483			
Total	45 (34.1)	87 (65.9)	132 (100)		4.72	2.694			
Take care of kids							0.925	129	0.357
Yes	30 (29.7)	71 (70.3)	101 (100)	Reference	4.61	2.717			
No	15 (50.0)	15 (50.0)	30 (100)	2.4 (1.0 - 5.4)*	5.13	2.649			
Total	45 (34.4)	86 (65.6)	131 (100)		4.73	2.7			

AOR – Adjusted Odds Ratio; CI - Confidence Interval; * - p-value < 0.05

Availability of support systems for addressing harmful use of alcohol
Respondents reported existence of support systems for harmful alcohol use including; religious institutions, family and friends, and youth centers (Table 11). Further, those with low education attainment (χ^2 = 18.16, df=3, p < 0.001), unmarried (single) (χ^2 = 32.14, p < 0.001) and those that consumed less drinks per day were more likely to seek support from religious institutions. Majority of respondents expressed that the support systems were helpful, with religious institutions more likely (χ^2 = 36.62, p < 0.001) to be rated high.

Table 11: Reported support systems for addressing harmful use of alcohol

Characteristic	Support system				Total	χ^2	df	p-value
	Family and friends	Religious bodies	Youth centers	None				
Education						18.16	3	< 0.001
None – Primary	13(9.4)	95(68.3)	7(5.0)	24(17.3)	139(100)			
Post-primary	15(21.4)	35(50.0)	13(18.6)	7(10.0)	70(100)			
Total	28(13.4)	130(62.2)	20(9.6)	31(14.8)	209(100)			
Marital status*						32.14		< 0.001
Single	5(5.6)	68(76.4)	8(9.0)	8(9.0)	89(100)			
Married	14(15.7)	54(60.7)	10(11.2)	11(12.4)	89(100)			
Separated/Divorced/Widowed	9(29.0)	8(25.8)	2(6.5)	12(38.7)	31(100)			
Total	28(13.4)	130(62.2)	20(9.6)	31(14.8)	209(100)			
Drinks per day						61.62	3	< 0.001
1 - 3 drinks	14(9.2)	118(77.1)	7(4.6)	14(9.2)	153(100)			
More than 3 drinks	14(26.4)	9(17.0)	13(24.5)	17(32.1)	53(100)			
Total	28(13.6)	127(61.7)	20(9.7)	31(15)	206(100)			
Support system help*						38.62		< 0.001
Disagree	5(25.0)	7(35.0)	6(30.0)	2(10.0)	20(100)			
Not sure	7(46.7)	3(20.0)	3(20.0)	2(13.3)	15(100)			
Agree	16(10.7)	120(80.0)	11(7.3)	3(2.0)	150(100)			
Total	28(15.1)	130(70.3)	20(10.8)	7(3.8.0)	185(100)			

* Fisher's Exact Test

Discussion

Our findings revealed that: individuals who were older, married, separated/divorced/widowed, of high educational level and earnings consumed more alcohol per session and more frequently; low income earners consumed unrecorded drinks while high earners drank recorded alcohol (beer and wines); families with a drinking father and drinking siblings were likely to consume more; individuals who reported consuming alcohol but were single, attained low educational, low earners and from broken families attributed their drinking to stress; the younger, unmarried, and casual laborers were likely to have been introduced to drinking by friends; alcohol-related negative effects were reported by individuals with low educational attainment, ernings and the self-employed; the separated, divorced and widowed were likely to have attempted to stop alcohol use; individuals with family responsibilities were likely to drink less; and the support offered by religious institutions were perceived to be useful among individuals with low educational attainment, unmarried and those who consumed less alcohol. These findings are elaborated in the subsequent narrative.

The older (above 31 years) individuals consumed more drinks per session as well as more frequently. Adults above 31 years old have the financial capability and can afford

frequent and high amount of alcohol, in trying to quench their bodies which may have been exposed to long-term alcohol intake. Evidence link increased consumption of alcohol with increasing age [49, 50], with other reports showing later teenage and early adult years being associated with heaviest drinking [51, 52]. The findings concur with regional reports from Uganda [8], Ethiopia [53], Ghana [54] and Nigeria [55] where the older drank heavily per drinking session than the young. Similarly, WHO global reports show older drinkers consume alcohol more frequently than other age groups [4]. The observed drinking pattern among the older individuals is despite their vulnerability to alcohol related complications associated with diminished volume of distribution as a result of decreased lean body mass [56], as well as increased sensitivity to blood alcohol level [57].

Interesting, married individuals consumed more alcoholic per session and frequently regardless of gender. Married individuals are more likely to be financially secured and socially involved which might contribute to their drinking behavior as compared to people who are single. However, previous studies show marriage is associated with less drinking in amount and frequency in both men and women linked to direct spousal regulation[58-60], as well as indirect instrumental, emotional, and informational support that pacifies psychological distress [61]. Additionally, marriage regulate stress and offer greater life satisfaction[62] and social control [63]. On the contrary, the separated, divorced or widowed loose social support and social control, as well as have increased stress during dissolution that may contribute to heavy alcohol use [63-65]. Men are more vulnerable to this risk and often engage in externalizing behaviors such as heavy drinking to cope with stress[66, 67]. Indeed, in comparison with married adults, greater alcohol consumption is characteristic of the divorced 68, 69 and the never married [70, 71].

Surprisingly, individuals with higher educational attainment and earnings consume more alcoholic drinks per session as well as drink most days of the week. Educational status has been touted as a marker of social economic status [72]. Those with higher education are formally employed, with higher earnings, thus can afford recorded alcohol. Educational institutions are the main socialization agents, people who spend substantial time in school may commence alcohol consumption as part of socialization, peer pressure, school-related stresses and financial security compared to people who spend less time in schooling[73]. The prolonged schooling acquired drinking behavior could continue into adulthood resulting into alcohol dependence and abuse later in life [74, 75]. These findings corroborate regional reports from Uganda, Ethiopia, Ghana and Nigeria that showed individuals with high education drank more [54, 76-78]. Similarly, higher socioeconomic status is associated with higher alcohol consumption in older people, with income showing an association between moderate and heavy drinking [79-83]. However, a negative relationship between educational status and/or socioeconomic status and unrecorded alcohol consumption have been reported mainly because of affordability and availability. For example, in this study individuals with low education attainment and socioeconomic level were reported to drink more unrecorded alcohol. The findings are supported by reports from Uganda that have shown that youth participating in vocational training programs to build their skills and knowledge were less likely to report drinking of alcohol than those who did not attend such [84]. Related to the aforesaid, socioeconomic deprivation is a significant predictor of unsafe alcohol consumption[85] with the attendant health consequences. No wonder, consumers of unrecorded alcohol were likely to report alcohol-related negative effects because of the toxicity effects and the tendency to consume high amounts. Similar findings have been adduced from Nigeria where abusers of local brew were found to have lower educational attainment [86, 87]. Traditional alcoholic beverages are widely available in rural communities, often at a cost most people can afford for which alcohol pricing has long been recognized as a tool for the control of alcohol abuse [88].

Adults from families with a drinking father and none drinking siblings were more likely to drink less, while those with both drinking consumed more alcohol. This is supported by the fact that siblings are likely to emulate, support and approve each other drinking behavior as well as copying their fathers. The role of parents in influencing drinking has gained traction for example, very recently in Uganda reports indicate that youth drinking is linked to their parental drinking [89], underscoring the role of parent in influencing alcohol use behavior. Indeed, paternal drinking problem has been linked with alcohol use and/or abuse in younger adolescents as well [90-93]. The risk of adolescent alcohol misuse is positively associated with increased alcohol use by parents including parental provision of alcohol, favorable parental attitudes towards

alcohol use and parental drinking [41, 94-98]. Additionally, drinking by siblings [99-103], even when unrelated biologically 104, is associated with alcohol use and/or abuse among adolescents and young adults.

Individuals who are young, unmarried, and casual laborers were likely to have been introduced to drinking by friends. Social groupings and support from friends on matters lifestyle are very important and considered as group social and moral norms. This is consistent with evidence that the young people tend to form an identity independent from their families and foster tighter bonds with their friends during adolescence. Indeed, the friends' drinking patterns are considered to be the strongest predictors of adolescents' and young adults' alcohol use mainly because of peer influence [37, 41, 100, 103, 105-1118]. The influence is also determined by the kind of bond, for example the stronger the social interaction the more the likelihood of taking alcohol frequently [111, 112].
The adults who reported consuming alcohol but were single, of low educational attainment and earnings as well as those from broken families attributed their drinking to stress. Alcohol use has been used dysfunctionally to wade off stress and distress among individuals. This is supported by evidence that high prevalence of alcohol use is associated with psychological distress (anxiety-induced sleeplessness and/or depression) among adolescent students in Asia [113], poor life satisfaction [114, 115] as well as psychological stress related to heavy drinking [55, 62, 116]. Men have been attributed with increased alcohol consumption to overcome societal stresses [117]. Elsewhere, frustrations associated with work topped the list of reasons adduced for drinking [118]. Thus it is from aforesaid stress and related problems that motivate the alcohol consumers seek support from religious institutions. Indeed, the support was perceived to be useful among those who sought religious intervention.

Our study holds a number of limitations. The assessment of alcohol consumption was retrospective thus recall bias may not have been completely eliminated. However, such bias may not have been substantial as we collected data on alcohol consumption in the last 30 days. In addition, the study did not assess the quantity of alcohol intake an important measure for both recorded as well as unrecorded alcohol consumption. Finally, this was a cross-sectional study and because of the design, the causal relationship cannot be strongly established.

Conclusion

Social economic status is a predictor of the category of alcoholic drink and drinking patterns. Both parental and sibling alcohol consumption is a strong determinant for other sibling drinking. Stress is a contributory factor to consumption of alcohol among adults of low socioeconomic status, single and those from dysfunctional families as well as suffer alcohol-related negative effects. Friends play key role in introducing their peers to alcohol use. However, marriage and family responsibility appears to be protective against high alcohol consumption. Additionally, religious institutional support is perceived to be useful among individuals with low educational level, unmarried and those who consumed less alcohol.

Our findings show that socio-demographic, economic, being married or separated, familial, social interactions and stress are associated with harmful alcohol use among adults in slum settings in Kenya. However, being a responsible family person is a protective factor against abuse of alcohol. Interventional programs involving young adolescents, families, communities, poverty alleviation, social support, and awareness creation can help address the harmful us of alcohol among slum and informal dwellers in Kenya.

Declarations

Ethics approval and consent to participate

Informed consent was obtained from the respondents before they participated in the study. Ethical approval to conduct the study was obtained from Kenyatta National Hospital-University of Nairobi Ethical Review Committee (KNH-UoN ERC) (Approval number UP365/05/2016) and permission sought from the Githurai Assistant County Commissioner (Ref. KASD/ADM/1/1VOL.5/192).

Consent for publication

Not Applicable

Availability of data and material

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request

Competing interest

The authors declare that they have no competing interests.

Funding
There was no funding for this work

Authors' contributions
MG and SK conceptualized and designed the study, and drafted the initial manuscript. SM carried out the initial analyses, and reviewed and revised the manuscript. OTO critically reviewed the manuscript and contributed equally to this paper.

Acknowledgements
The authors acknowledge the support received from the study respondents and the local administration

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