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Substance abuse among college youth in one of the largest transit hub in Machakos County Kenya; a cross sectional study on prevalence and associated factors

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ABSTRACT
BACKGROUND: Substance abuse among college students is a growing problem confronting Kenya today. Substance abuse in this population predicts substance related problems in later life. This study is a buildup of limited data evaluating the cases of substance abuse and associated factors among college students situated in the environment of a major transit point for trucks along Nairobi-Mombasa highway in Machakos County Kenya. **METHOD:** This descriptive cross-sectional survey used Self-Administered WHO Model Core Questionnaire, Focus group discussions (FGD) and Key Informant Interviews (KII) to gather information on the use of various drugs among students in colleges within Mlolongo transit point along Nairobi-Mombasa highway. Data were analyzed using bivariate and multivariable logistic regression to determine factors associated with being prepared, with statistically significant level at $p < 0.05$. **RESULTS:** Out of the 152 college students who consented, 53.9% were female verses 46.1% males. Their mean age was 21.26 (SD 2.43) years with 46.7% of them aged between 18 to 20 years. About 42 (27.6%) students were abusing different substances. Among them 66.7% were abusing alcohol, 19% Miraa and 14% tobacco. Marital status (OR 0.12, 95% CI 0.02 to 0.8), student's belief (OR 0.4, 95%CI 0.12 to 0.7) emotional effect (OR 2.9, 95% CI 1.55 to 5.7) and stimulation of moods (OR 4.5, 95% CI 2.1 to 10.2) influenced use of substance. **CONCLUSION:** The prevalence of substance use among Mlolongo college students is high. Addressing youthful factors such as demography, beliefs, and emotional needs which greatly influence substance abuse. The role of the truck transit point in the peddling, purchase and usage among the youth must be carefully evaluated.
Keywords: Substance abuse; Prevalence and associated factors; College students; largest transit hub in Machakos County Kenya

BACKGROUND

Substance use among college/university students remains an important area of focus because of the implications of early substance dependence on the future of the youth [Atwoli et al., 2011]. A number of problems are associated with the abuse of substance particularly among the youth such as alcohol related traffic injuries [Dupont et al., 2012; Brady & Li, 2013; Legrand et al., 2013], impact on the sexual behavior leading to infection with STDs and HIV [Kapadia et al., 2005], criminal behavior [de Voursney & Huang, 2016] and health problems which might result to death [Marzell et al., 2016]. Among students, substance abuse is associated with poor performance, truancy and drop out of colleges [Ellickson *et al.,* 2001; Henry, 2007].

Long-distance truck drivers have been for a long period implicated in the spread of human immunodeficiency virus (HIV) and other sexually transmitted infections (STIs) along major transportation routes in developing countries [Sunmola et al., 2005; Morris et al., 2007]. Reports are now emerging in their role not only for drugs transportation but also exchange money and/or drugs for sex [McCree et al., 2010]. Mlolonog which has been a major transit point for trucks along Nairobi-Mombasa highway in Machakos County Kenya over the years has experience exponential population growth, schools and colleges expansions have followed suit.

This study evaluated the extent of substance abuse and associated factors among youth attending colleges in the surrounding of a major transit point along Nairobi-Mombasa highway.

METHODS

Study design and Settings

Data collection This cross section study conducted from 2014 to 2015, recruited consenting youth aged (18-25 years) residing and attending the following three colleges; Machakos technical training institute, St. Joseph Vocational Training Centre and Rhematec Computer Training colleges located within Mlolongo. Formula for estimating the population proportion with specified relative precision described by Lemeshow *et al.* [1990] was

used to determine the number of participants in this study. Setting α at 0.05, and a substance abuse rate of 11%, a total of 152 youth were recruited to achieve 0.90 power.

Self-administered questionnaires

Self-administered questionnaires with semi-structured questions were used to collect relevant information related to substance abuse and associated factors from 152 consenting youths.

Focus group discussions

A total of six focus group discussions (FGD) were conducted to explore further, the levels of substance abuse awareness, utilization and associated factors in this region. Randomly 48 youth (16 from each of the three colleges) were consented and enrolled. These persons were invited to participate in a FGD on a fixed time and at a convenient location in each college. Up to 6 FGDs (depending on saturation point of the issues being probed) were carried out. Gender matched moderators were trained to help in conducting these discussions in the preferred language (English or Swahili-commonly used in Kenya) of the group, provided the moderator and note taker were fluent in the language. A guide was used for all FGDs, with appropriate modification for different age groups. The discussions lasted approximately 45 minutes.

Key informant interviews (KIIs)

Key informant interviews (KIIs) were conducted to confirm and clarify any pending or new issues described in the structured questionnaire and FGDs. Key informant interviews have been shown to provide a valuable foundation for a broader understanding of contextual matters relevant to the issues being explored [Bernard, 1994]. Randomly five KIIs were identified consented and interviewed at a place and time most convenient and confidential for the participants. The key informants were selected for their position of leadership, either formal or informal, in the community and their ability and willingness to reflect on our findings. The Key informants included teachers, the area chief and local administration police. In addition to being willing to share, reflect upon the findings of the study, key informants were those observant, articulate and available for multiple interviews of varying duration on an assortment of topics related to the study.

Ethical consideration

The research protocol was presented for scientific and ethical approvals by the Ethical Review Committee of Kenya Medical Research Institute prior to commencement of field activities. Written informed consent was obtained from each participant. Confidentiality was maintained by assigning all participants with a unique identification number. All data were stored in a restricted-access room at the research station. This research adhered to the STROBE guidelines for observational studies as outlined at: http://www.strobe-statement.org.

Statistical analyses

Proportions were used to describe categorical variables. Chi-square or Fisher's exact test were used to test for significance where applicable. The overall cases of substance abuse were determined for all participants. In bivariate analyses, odds ratios (OR) and 95% confidence intervals (CI) for the association between substance abuse and socio-demographic and economic characteristics were calculated using Poisson regression. In multivariate analyses, a manual backward elimination approach was utilized to reach the most parsimonious model, including factors that were independently associated with substance abuse at the significance level of $p \leq 0.05$. All statistical analyses were performed using STATA version 13 (StataCorp LP, Texas, USA).

The qualitative data (KII) were subjected to a thematic content analysis. This approach entails the categorization of recurrent data collected under thematic areas [Green & Thorogood, 2010]. The analysis was done manually using general purpose software tools using Microsoft Word [La Pelle, 2004].

RESULTS

Characteristics of study population

In this study, all the 152 recruited participants responded to the Self-administered questionnaires with semi-structured questions (100% response rate). As shown in Table 1, about 53.9% of the participants were females. The mean age of the participants was 21.26 (± SD 2.43) years and median (IQR) age of 21 (19 - 24) and a range of 18- 25 years. About 46.7% of participants were aged between 18 to 20 years, and 88.2% were single.

Table 1: Baseline demographic characteristics of the study participants

Baseline Characteristic	Sample size		χ2	df	P
	No	%			
Gender					
Male	70	46.1	0.947	1.0	0.33
Female	82	53.9			
Age Group					
18-20	71	46.7			
21-23	41	27.0	12.76	2	**0.002**
24-25	39	25.7			
Marital status					
Single	134	88.2			
Married	16	10.5	207.526	2	**0.001**
Separeted/Divorced/Widowed	2	1.3			
Religion					
Christianity	148	97.4	136.421	1	**0.001**
Muslim	4	2.6			

No-Number; %-Percentage; χ2-chi square; df-degrees of fredom; P-Level of significance
P values in bold that are ≤ 0.05 indicates the relationship is significant

Prevalence and types of substance abuse

Out of the 152 youths attending colleges in Mlolongo locality, 42 (27.6%) abused different substance. The commonly abused substances included 36.2% using single drug (either miraa, alcohol or tobacco). About 26.9% abused a combination of two substances tobacco and miraa or alcohol, and 15.8% abusing a combination of three substances (alcohol/miraa and Bhang) while about 10.5% abused more than four substances (tobacco/miraa/alcohol/bhang and hard drugs) (Figure 1).

The divergence in the proportion of youths abusing substance and types of abused substance was also evident from the FGDs and KII discussions.

From the discussions it emerged that a significant proportion of youths are abusing drugs. The trend on the rise of this cases was a big concern both to parents, leaders and the society as a whole. One FGD participant No 6 (Male age 22) ……*" As a young person I am saddened by the increasing number of the youths hooked into drugs within my locality…. Action should be taken to cube this trend".*

Some of the substance mentioned included; Tobacco found in cigarettes, cigars, bidis, and smokeless tobacco (snuff, spit tobacco, chew); Alcohol found in liquor, beer, and wine. Cannabinoids (marijuana and hashish). Opioids including heroin and opium. Stimulants such as cocaine and amphetamine. Prescription Medications such as CNS Depressants.

One FGD participant No 1 (Male age 27) ……*" Most commonly abused substance among the youths here include cigarettes, bhang and alcohol.*

KII participant no 3 (female teacher) said ". *I also know youths including females abusing heroin…and I feel very sad*"

Characteristics of substance abuser

As shown in Table 2, out of the 42 college students who abused substance, majority of them 66.7% consumed alcohol followed by 19% and 14% Tobacco and Miraa respectively (P=0.001). The frequency of substance abuse was not significantly different across study population (P=0.135). Nearly half 47.6% of them rarely used these substances verses 28.6% on a daily basis and 23.8% once or twice a week. Most of them 47.6% consumed a lot of these substance while 33.3% and 19.1% consumed substances in moderation or little quantity (P=0.001). Nearly all of the participants (92.9%) experienced unique feeling in the body function after using these substances verses only 7.1% who reported no unique bodily feelings (P=0.001). Most of the participants 76.2% liked the feelings induced by substance abuse verse 23.8% who disliked the feeling induced by substances (P=0.001). There were two peaks in the duration of substance abuse 35.7% had used these substances for one and two years each. About 16.7% others had used these substances for more than two years while 11.9% had just stated abusing substances (P=0.001). Near equal numbers had tried (54.8%) cutting down verses (45.2%) who had not tried cutting down on substance abuse (P=0.537). Similarly, about 47.6% had difficulties cutting back

verses 52.4% who reported no difficulties in cutting (P=0.758).

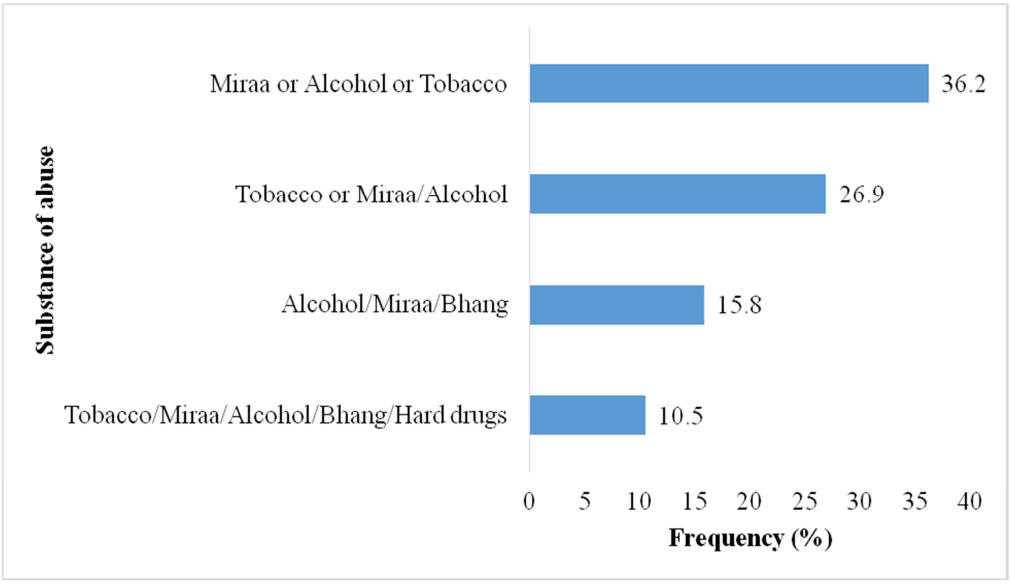

Figure 1: The frequency of substance of abuse by types

Table 2: Characteristics of college students abusing substance

Characteristics	Sample size		χ2	df	P value
	No	%			
Substance abuse					
Yes	42	27.6	30.42	1	0.001
No	110	72.4			
Type of substance abused					
Alcohol	28	66.7			
Tobacco	8	19.0	21.14	1	0.001
Miraa	6	14.3			
Requency of substance abuse					
Rarely	20	47.6			
Daily	12	28.6	4	2	0.135
Once or twice a week	10	23.8			
Quantity consumed					
Alot	20	47.6			
Little	8	19.1	155.77	2	0.001
Moderate	14	33.3			
Unique feeling in body functions					
Yes	39	92.9	30.86	1	0.001
No	3	7.1			
Like feeling due to substance					
Yes	32	76.2	11.524	1	0.001
No	10	23.8			
Duration of substance abuse					
One month	5	11.9			
One year	15	35.7	7.91	3	0.048
Two years	15	35.7			
More than two years	7	16.7			
Tried cutting back substance use					
Yes	23	54.8	0.38	1	0.537
No	19	45.2			
Having difficulties cutting back					
Yes	20	47.6	0.095	1	0.758
No	22	52.4			

No-Number; %-Percentage; χ2-chi square; df-degrees of fredom; P-Level of significance

Reasons for substance abuse

Among the substance abusers, 66.7% was due to peer pressure, 19.1% due to poor parenting, with 16.7% ease of availability, 7.1% weak substance abuse policies and 50% due to personal stress (Results not shown).

From the FGDs and KII gave varied response on reasons for substance abuse among college youths in Mlolongo included; lack of employment, poverty, easy of availability of these substance, peer pressure, poor upbringing and high cash flow.

One FGD participant No 4 (Male age 35) ……*" parents are bad role models"*.

KII participant no 3 (female teacher) said "*. The main reasons for substance abuse among the college youths in this locality is the bad influence especially due to these truck divers…they have brought drugs and lure our youths because of money*"

A second KII 2 participant (Male local administrator) ……*" availability of drugs at low prices is a lure for use…."*

Factors associated with substance abuse

Table 3 shows in bivariate analysis, the college youths who were currently married were less likely to abuse substances (OR 0.12, 95% CI 0.02 to 0.8) and those who believed that it was wrong to abuse substances were less likely to use these substance (OR 0.4, 95% CI 0.12 to 0.7). On the other hand, students who believed on the emotion boosting effect of substance were more likely to abuse substances (OR 2.9, 95% CI 1.55 to 5.7). Further, participants who stated that the substance affected their emotions positively were more likely to use these substances (OR 4.5, 95% CI 2.1 to 10.2). In multivariate analysis participants who stated that the substance affected their emotions remained more likely to abuse substance (OR 4.7, 95% CI 1.9 to 11.4).

DISCUSSION

Drug abuse has been identified among the top problems confronting the Kenya today especially among the youth. Incidences of drug and alcohol abuse and related anti-social behavior have tremendously increased in recent years. This has become a matter of concern to the government, parents, teachers, Non-governmental organizations and all other relevant agencies [Chesang, 2013]. Mlolongo, situated along Nairobi-Mombasa highway is an internationally recognized transit point for trucks where sex trade is very prevalent; Sex trade is known to be influenced by substance abuse. It is on this basis that this study was initiated to evaluate the frequency and types as well as factors influencing substance abuse among youth in colleges in Mlolongo Location. To the best of our knowledge, this study is among the very first of this nature to be carried out in Mlolongo among the college students.

In this study 27.6% college students abused substance. This is significant in our view given that these were only self-reported cases and we most likely to have missed the true picture. This prevalence was higher than a 15% reported among students in Karbala University in Iraq [Mousawi, 2005], 23.3% in Mbeere North of Kenya [Mutumi, 2013] and 26% in Brazil [Oliveira *et al*., 2013]. The prevalence was however lower than 29.6% in Kolkata, India [Bachi et al., 2014], 30% among students in North Carolina and Virginia, USA [Suerken *et al*., 2014]. The difference in prevalence could be due to variation in methods and design used in these studies.

In the current study, 66.7% abused alcohol, 19% tobacco and 14% Miraa. This is in agreement with previous Kenyan showing predominance of alcohol, khat and tobacco [NACADA, 2004; Mutumi, 2013; Otieno and Ofulla, 2009]. The predominance of alcohol as substance of abuse was also reported college students in Argentina [Pilatti *et al*., 2014], in Brazil [Oliveira *et al*., 2013] and in Jordan [McKelvey *et al*., 2013]. The predominance of alcohol in these settings could probably be due to ease of availability and the fact that alcohol is generally legalized in many countries.

Substance abuse in our study was majorly due to peer pressure, poor parenting, ease of availability, weak substance abuse policies and due to stress. Nearly all of them abused substance because of the perceived emotional boost/inducements. This is consistent with studies which have shown students abuse drugs for the purposes of managing emotional/psychiatric distress and avoidance of withdrawal symptoms [Merlo *et al*., 2013], peer influence [Sher and Rutledge, 2007; Quinn and Fromme, 2011], ease of access among groups [Grekin and Sher, 2006]. Some aspects of the family environment, such as parental monitoring and supervision, can exert a protective influence against drinking during high school [Barnes *et al*., 2006; Arria *et al*., 2008]. Conversely, having a family history of alcoholism increases the risk for drug abuse and other alcohol-related

consequences among college students [Elliott *et al*., 2012].

Table 3: Factors associated with substance abuse among study participants

Variable	Sample size	Substance abuse		Bivariate	Multivariate
		No	%	OR (95% CI)	OR (95% CI)
Gender					
Male	70	25	35.7	0.5(0.3-1.07)	NS
Female	82	17	20.7	Referent	
Age Group					
18-20	71	22	30.9	NS	NS
21-23	41	6	14.6	NS	
24-25	39	14	35.9	Referent	
Marital status					
Single	134	38	28.4	0.2(0.6-1.2)	
Married	16	2	12.5	**0.12(0.02-0.8)**	NS
Separeted/Divorced/Widowed	2	2	100	Referent	
Religion					
Christianity	148	40	27.1	0.5(0.1-2.2)	NS
Muslim	4	2	50	Referent	
Work perfomance boost					
Yes	65	29	44.6	**2.9(1.55-5.7)**	NS
No	87	13	14.9	Referent	
Is it wrong to take substance					
Yes	110	21.0	19.1	**0.4(0.21-0.7)**	NS
No	42	21.0	50	Referent	
Why wrong to abuse subantance					
Affects health	80	16.0	20	1.1(0.49-2.4)	
Affects academic	7	0.0	0	ND	NS
Affects economy	11	5.0	45.5	Referent	
Affects emortion	24	18.0	75	**4.5(2.1-10.2)**	**4.7(1.9-11.4)**
Peer incluence					
Yes	114	28.0	24.5	0.6(0.3-1.2)	NS
No	38	14.0	36.8	Referent	
Poor parental					
Yes	29	8.0	27.5	0.9(0.46-2.2)	NS
No	123	34.0	27.6	Referent	
Ease of availability					
Yes	23	7.0	30.4	1.2(0.4-2.5)	NS
No	129	35.0	27.2	Referent	
Weak policies					
Yes	10	3.0	30	1.2(0.3-3.5)	NS
No	142	39.0	27.5	Referent	
Emotional stress					
Yes	60	21.0	35	1.5(0.8-2.8)	NS
No	92	21.0	22.8	Referent	
Types of abused substance					
Tobacco/Miraa/Alcohol/Bhang/Hard	16	5.0	31.3	1.9(0.8-4.6)	
Alcohol/Miraa/Bhang	24	5.0	20.8	2.1(0.7-6.1)	NS
Tobacco or Miraa/Alcohol	41	11.0	26.8	0.5(0.2-1.9)	
Miraa or Alcohol or Tobacco	55	19.0	34.5	Referent	
College purnishment					
Suspension/Expulsion/Counselling/Punish	18	4	22.2	1.2(0.4-4.12)	
Suspension/Expulsion/Punishment	30	8	26.7	1.4(0.5-3.9)	NS
Suspension/Expulsion	24	8	33.3	1.8(0.7-4.9)	
Suspension or Expulsion or Counselling or Punishment	42	15	35.7	Referent	

No - Number; % - Percentage; OR - Odds ratio; CI - confidence interval; ND-Not Done; NS - Not significant

In this study marital status, students' belief values, emotional need influenced substance abuse. Studies have reported the role of social factors in college student substance abuse. College students are more likely to engage in heavy episodic drinking than their counterparts who aren't in college [Johnston *et al*., 2002; Dawson *et al*., 2004], even controlling for age, race, gender, and genetic predisposition [Slutske *et al*., 2004]. This strongly implicates the college environment as a risk factor for heavy drinking, beyond demographic and lifestyle factors. Study by Suerken *et al*., [2014] showed that having at least $100 per month in spending money, attending church rarely or never; current use of cigarettes, alcohol, and hookah tobacco; lifetime use of other illicit drugs; and a higher propensity toward sensation seeking were associated with a higher likelihood of having used marijuana at least once at college entry.

Some other studies among college students have identified other independent factors associated with substance abuse that we did not either measure or find to be significant in this study, including gender, age, religion, and awareness of substance abuse [Slutske *et al*., 2004]. Others included peer influence, lack of parental guidance, ease of availability, weak drug abuse policies, stress, presence of substance abuse in the institution, substance abuse against regulation, types of substance abused and punishment adduced to substance abuser [Dawson *et al*., 2004; Merlo *et al*., 2013]. The cross-sectional nature of this study and the relatively small sample size, could partly explain the observed lack of association between substance abuse and the documents factors predicting substance abuse among college students.

Conclusion

Significant proportion of college youths in Mlolongo, a major transit point for trucks along Nairobi-Mombasa highway are abusing substance of various types, varying frequency and quantity. The problem could be higher than believed because these study findings were based on participant's reports.

Addressing the youths social-economical and emotional needs are vital in reducing the prevalence for users and curbing the use for exposed non users.

Competing interests

The authors declare no competing interests.

Authors' contributions

This work was part of Master of Science degree for ALK in Medical Epidemiology at the Jomo Kenyatta University of Agriculture and Technology. ALK, MON, JG and MK conceived and designed the study. ALK conducted field work and collected data. MON and ALK conducted data analysis and wrote the draft manuscript. JG and MK advised and supervised data analysis and reviewed the manuscript. All authors read and approved the final manuscript.

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