

# Socioeconomic Disparities in Drugs and Substance Abuse: results from a Household Cross-sectional Survey in Murang' a County, Kenya

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## Research

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# Abstract

## Introduction

Drugs and substance abuse has adverse health effects and substantial economic burden to the global economies and at the household level. There is, however, limited data on socio-economic inequalities disparities in drugs and substance abuse in low-to-middle income countries such as Kenya. This study aimed to assess the socio-economic inequalities in a selected county of central Kenya.

## Method

The study design was cross-sectional, and data collection was conducted between November and December 2017. A total of 449 households with a least one person who uses any drugs or substance of abuse were randomly sampled from 4 purposively selected sub-locations of Murang' a County, central Kenya. Structured questionnaires were used to collect data on types of drugs used, economic burden, and gender roles at the household level. Household socio-economic status (SES) was established ( low, middle, and high SES ) using principal component analysis f(PCA) from a set of household assets and characteristics. Multivariate logistic regression analysis was used to assess the association between SES, gender, and other factors on the uptake of drugs and substance of abuse.

## Results

Individuals in higher SES were more likely to use cigarettes ( OR = 2.13; 95%CI = 1.25–3.61, p = 0.005) or piped tobacco (OR = 11.37; 95% CI, 2.55–50.8; p-value = 0.001) than those in low SES. The wealthier individuals were less likely to use legal alcohol (OR = 0.39; 95%CI = 0.21–0.71, p = 0.002) than the poorest individuals. The use of prescription drugs did not vary with SES. A comparison of the median amount of money spent on acquiring drugs showed that richer individuals spent a significantly higher amount than the poorest individuals (Ksh 1500 vs. Ksh 1000, p = 0.0310). Deaths related to drugs and substance abuse were more likely to occur in middle SES than amongst the poorest households (OR = 2.96; 95%CI = 1.03–8.45).

## Conclusion

Socioeconomic disparities exist in the use of drugs and substance abuse. The low-income individuals are at a higher risk of abuse and thus of economic burden due to catastrophic expenditure in acquiring the drugs. Cases of deaths were likely to occur in middle-income groups. Strategies to reduce drugs and substance abuse must address socio-economic inequalities through targeted approaches to individuals in low-income groups.

## Introduction

The excessive use of alcohol, drugs, prescription medicine, or even other substances leading to significant distress or impairment is termed as drugs and substance abuse (1). Drugs and substance

abuse has a substantial economic burden globally (2). Numerous surveys on alcohol economic burden have been done globally through a review on the same is needed (2). The cost of alcohol consumption is above 1 percent of gross national income (GNI) in both middle and low-income countries globally (3). The worldwide economic burden of alcohol as per 2002 reviewed studies suggested a range of costs between 210 to 665 billion US dollars (4).

Drugs and substance abuse is also common in Africa, with the most abused drugs being Cannabis, *Khat*, Amphetamine, Opium, and Glue (5). Those who chew *Khat* spend most of their time chewing than engaging in economic activity, negatively affecting the economic development of countries as production level tends to be low (5). In Africa, the youths who constitute 40–50% of the population are the biggest abusers of drugs and substances, thus causing a gradual reduction of the workforce and negatively impacting on productivity (6, 7).

Kenya is experiencing an increasing problem of drug and substance abuse, with several studies carried out in the Nation showing that at least at one point in time, every young Kenyan consumes drugs especially, cigarettes and beer (8). The attempts of urbanization and industrialization of developing countries have been faced by drawbacks from drugs and substance abuse and, as a result, low economic growth, and therefore Kenya being one of the developing countries faces these challenges (9). The exploitation of drugs and substance mostly by the youths drains the country's economy as controlling the demand and supply prove to be expensive and is also a significant impediment to the country's growth as productivity of the youths become reduced(9).

Most strikes in Kenya that end up with schools being burnt are attributed to drug use, and this deters economic development as money that would have been used for other projects is invested in rebuilding the schools (9). A study by Chege et al. stated that drugs and substance abuse leads to socio-economic problems by increasing violence, criminal activities, and drain of human resources, which in turn deter the development of the Kenyan economy(10).

A study conducted in Murang' a county to establish student perception of drugs abuse, found that drug abuse is associated with school dropout and thus lowering education level and in turn deterring innovations and human resource and therefore preventing the development of the economy as students fail to reach productive working-level (11). A study conducted in Kangema sub-county in Murang' a county reported that parents' alcoholism gets to the extent of them failing to pay school fees, and hence students drop out of school, which eventually leads to criminal activities thus hindering economic development (11, 12).

There are limited studies on the economic impact of drugs and substance abuse. This survey focuses on socio-economic inequalities in drugs and substance abuse in Murang' a county, Central Kenya.

## Methods

### Study site

The survey was conducted in Murang' a County, which is in the central region of Kenya. The county has a population of 1,056,640 people consisting of 532,669 females and 523,940 males in the year 2019, according to the KNBS (2019), and has a total surface area of 2,558.8 Square Kilometres. The county mainly relies on agriculture as its principal economic activity. Coffee and tea are the main cash crops grown while beans and maize are the subsistence crops in the area.

## **Sample Size And Sampling**

The study design was cross-sectional. The survey purposively selected the Kiharu sub-county based on its high burden of drugs and substance abuse as perceived by the local administration. Random sampling was used to sample 449 heads of households from the four sub-locations of the sub-county, including Karuri (n = 109), Gikandu (n = 114), Gakuyu (n = 114) and Kambirwa (n = 112). Within the community, which were both urban and rural, we systematically sampled households at intervals of about 200 meters from a randomly selected landmark, which was either as school or a church until the target sample size was achieved. This method helped ensure that each of the four sub-locations was covered.

## **Data Collection**

Quantitative data were collected using a user-friendly structured questionnaire developed using Open Data Kit (ODK), which prevented data entry errors via data quality checks, which are in-built and deployed into tablets. The study adopted questions from a validated tool used in health economics to estimate the overall cost of drug abuse treatment, called (13). Participating household heads were approached by the study teams and informed consent obtained. Only households with at least one drug abuser were selected to ensure enough data about the usage of drug and substance abuse was captured. The interviews were conducted at the household level, where confidentiality and privacy were assured. Before data collection, the research assistants underwent four days of training, followed by piloting for the reliability of the data collection tools.

The questionnaire included socio-economic indicators such as ownership of assets, household characteristics, cooking fuel, and source of water. Other variables included drug abuse-related illnesses, whether an individual has been admitted for drug abuse-related illness, if care had to be given during injury or if there was a case of reported deaths and the amount of money spent to acquire drugs or substances of abuse. Data on socio-demographic variables, age group, marital status, education, occupation, and religion was also collected.

## **Data Management And Statistical Analysis**

Raw data were first downloaded from the ODK cloud server in Ms excel format before being exported to Stata version 15 (College Station, TX: StataCorp LLC. StataCorp) for management. The cleaning codes were developed to identify missing data, inconsistent information, and the recording of variables. Missing data were excluded from the analysis. Chi-square was computed to measure the association between socio-demographic characteristics and wealth tertiles. The three socioeconomic status categories divided the data into three equal groups, with approximately 33.3% of the observations (Low, Middle, and high). Where the cell counts were less than five, Fisher's exact test was computed instead of chi-square. A bivariable logistic regression model was used to examine the association between drugs and drug-related illness treatment with a wealth quintile. All the drugs and drug-related illnesses with a p-value of less than 0.05 were considered significant in the bivariate logistic regression. The socio-demographic variables included in the chi-square and Fisher's exact test for cell counts less than five were age group, marital status, education, occupation, and religion. Age group was categorized into 6 groups (Less than 18 years, 18–29, 30–44, 45–59, 60–75 and above 75). Level of education was recorded into six categories (never been to school, attended primary school but did not complete, completed primary school level, attended secondary school but did not complete, completed secondary school level and College/University).

Socio-economic status was measured using assets of household and characteristics. Household ownership (the owner of house dwelling and goods) and amenities (materials used for the construction of the dwelling, water source, source of lighting fuel, and cooking fuel) was used as a measure of house status socio-economically (14). The standardized weight scores were generated using the method of the principal component. Weight scores were ranked to get the wealth tertiles (low, middle, high) (14). The analysis was done separately for the low, middle, and high income except for the socio-demographic characteristic where there was an overall analysis for both categories of wealth quintile in addition to the separate one for each category. The overall factor effect was tested using p-values. Kruskal-Wallis test was used to test the null hypothesis of equality of means within the wealth quintile groups.

## Ethical approval

Ethical clearance was received from the Kenya Medical Research Institute (KEMRI), Scientific and Ethics Review Unit (SERU No. 3237), and written informed consent sought from all the study participants. The study participants were household heads, and an information sheet was provided to all individuals who were 18 years and above invited to participate in the study in *Gikuyu*, the local language. Participants underwent written informed consent and agreed to have the questionnaire data captured in ODK. During data capture, participant names were replaced with unique alphanumeric identifiers to ensure anonymity and confidentiality.

## Results

### Socio-demographic characteristics of study participants

A total of 449 household heads were interviewed, out of whom 28.51% (n = 128) were of age 30–44 yrs, and 28.06% (n = 126) were 45–59 years. Regarding education, more than 60% of those who responded had at least completed primary level schooling. About 30.87% of the low income, 8% of the middle-income, and 20% of the high-income household heads had never married (Table 1).

<b>Table 1. Socio-demographic characteristics of study participants in Muranga County, Kenya</b>				
	Poorest n (%)	Middle n (%)	Rich n (%)	Overall n (%)
	n = 149	n = 150	n = 150	449
<b>Age group</b>				
18–29	51(34.22)	12(8)	15(10)	78(17.37)
30–44	45(30.2)	40(26.67)	43(28.67)	128(28.51)
45–59	36(24.16)	44(29.33)	46(30.67)	126(28.06)
60–75	15(10.07)	43(28.67)	34(22.67)	92(20.49)
Above 75	1(0.67)	11(7.33)	11(7.33)	23(5.12)
Less than 18	1(0.67)	0(0)	1(0.67)	2(0.45)
<b>Marital Status</b>				
Never married	46(30.87)	12(8)	30(20)	88(19.6)
Currently married	82(55.03)	103(68.67)	85(56.67)	270(60.13)
Separated	12(8.05)	14(9.33)	14(9.33)	40(8.19)
Divorced	9(6.04)	21(14)	21(14)	51(11.36)
<b>Education</b>				
Never been to school	0(0)	10(6.67)	11(7.33)	21(4.68)
Primary incomplete	7(4.70)	21(14)	43(28.67)	71(15.81)
Primary complete	18(12.08)	47(31.33)	52(34.67)	117(26.06)
Secondary incomplete	18(12.08)	18(12)	26(17.33)	62(13.81)
Secondary complete	40(26.85)	33(22)	16(10.67)	89(19.82)
College/University	66(44.30)	21(14)	2(1.33)	89(19.82)
<b>Occupation</b>				
Government employee	22(14.77)	81(54)	80(53.33)	183(40.76)
Nongovernment employee	27(18.12)	7(4.67)	0(0)	34(7.57)
Self-employed	28(18.79)	1(0.67)	2(1.33)	31(6.9)
Homemaker	1(0.67)	0(0)	0(0)	1(0.22)
Not-paid/volunteer	13(18.72)	3(2)	1(0.67)	17(3.79)
Student	23(15.44)	29(19.33)	48(32)	100(22.27)

Religion				
Christian	139(93.29)	144(96)	144(96)	427(95.21)
Islam	7(4.7)	0(0)	0(0)	7(1.56)
Non-practicing	20(2.01)	6(4)	6(4)	15(3.34)

## Association between household socio-economic status and use of drug and substance

The results show a statistically significant association between household socio-economic status and abuse of various types of drugs and substances. Individuals in middle SES were less likely to take legal alcohol compared to those in low SES (OR = 0.45; 95% CI, 0.25–0.78; p-value = 0.005). However, those individuals in the middle (OR = 5.41; 95% CI, 1.14–25.67; p-value = 0.033) or higher SES (OR 11.37; 95% CI = 2.55–50.8, p = 0.001) were more likely to use piped tobacco compared to those in lower SES.

Those in high SES were more likely to abuse cigarettes (OR = 2.13; 95% CI, 1.25–3.61; p-value = 0.005) but less likely to abuse legal alcohol (OR = 0.39; 95% CI, 0.21–0.71; p-value = 0.002). The individuals in high SES were more likely to use piped tobacco compared to those of low SES (OR = 11.37; 95% CI, 2.55–50.8; p-value = 0.001) (Table 2).

Table 2  
Socioeconomic inequalities in drug and substance abuse

Outcomes	Wealth quintile						
	Low	Middle			High		
<b>Uptake</b>	OR	OR	95% CI	P-Value	OR	95% CI	P-Value
Cigarettes	1.00	1.66	[0.97–2.85]	0.064	2.13	[1.25–3.61]	0.005
legal alcohol	1.00	0.45	[0.25–0.78]	0.005	0.39	[0.21–0.71]	0.002
piped tobacco	1.00	5.41	[1.14–25.67]	0.033	11.37	[2.55–50.8]	0.001
Prescription drugs	1.00	1.33	[0.47–3.79]	0.591	0.35	[0.09–1.33]	0.124

## Mean amount of money spent on acquiring drugs in one month by household socio-economic status

Table 3 shows the comparison of the mean and median amount of money spent on drugs by households per SES in one month. Low-income households (n = 129) spent a median of Ksh 1,500 (Inter-quantile range IQR (Ksh 500-3,600) compared to high-income households (n = 115), which spent a median of Ksh 1000 (IQR Ksh 300 to 2,000). The difference was statistically significant (p = 0.0310) (Table 3).

Table 3  
Mean amount of money spent on acquiring drugs in one month by wealth quintile.

SES	N	Mean (Ksh)	95% CI	Median (Ksh)	25 to 75 percentile
Low	129	2662.64	[2072.24:3253.05]	1500	[500,3600]
Middle	120	2016.67	[1482.82:2550.51]	800	[300,3000]
High	115	1940.09	[1463.40:2416.77]	1000	[300,2000]
Kruskal-Wallis				p-value = 0.0310	

## Pairwise comparison of the mean amount of money spent to acquire drugs in one month by SES

A posthoc Dunn's test was performed in Stata to assess if there was a significant difference in mean expenditure between the wealth quintile categories. The results show that the difference in the amount spent to acquire drugs was significantly higher amongst the low SES (Ksh 2662.60; 95%CI= [Ksh 2072.24-KSh 3253.05] than amongst the high (Ksh 1940.09; 95%CI= [Ksh 1463.40:2416.80], t-test p-value = 0.044). There was no significant difference between the high and the middle-income level in expenditures to acquire drugs and substances of abuse (p-value = 0.999) (Table 4). Results in Table 4 compares the differences in the mean amount of expenditures to acquire drugs between socioeconomic groups.

Table 4  
Comparison of the amount spent to acquire drugs is typically one month by wealth quintile in Murang'a County

SES	Mean (Ksh)	95%CI (Ksh)	SES	Mean (Ksh)	95%CI (Ksh)	T-test p-value
Low	2662.60	[2072.24:3253.05]	Low	2016.67	[1482.82:2550.50]	<b>0.029</b>
Middle	2662.60	[2072.24:3253.05]	Middle	1940.09	[1463.40:2416.80]	<b>0.044</b>
High	2016.70	[1482.82:2550.50]	High	1940.09	[1463.40:2416.80]	0.999

## Association between drug-related illness treatments of household heads by wealth quintile

Table 5 shows the drug-related illness treatment of household heads by wealth quintile. Households in the middle SES were significantly more likely than those in the low SES (OR = 2.96; 95% CI, 1.03–8.45; p-value = 0.042). There was no difference between wealth quintiles in terms of the proportion of those treated for an illness, admitted for drug illness, and the probability of providing care.

Table 5  
Association between drug-related illness treatments of household heads by wealth quintile

	Low		Middle		High		
Household head	OR	OR	[95% CI]	p-value	OR	[95% CI]	p-value
Treated for drug illness	1.00	0.92	[0.46–1.84]	0.812	0.78	[0.37–1.64]	0.512
Admitted for drug illness	1.00	1.85	[0.52–6.47]	0.341	3.00	[0.80–11.31]	0.105
Caregiver during injury	1.00	0.23	[0.02–2.46]	0.225	0.17	[0.02–1.77]	0.149
Death	1.00	2.96	[1.03–8.45]	0.042	2.06	[0.69–6.17]	0.208

## Discussion

This study has established that burden of use of drug and substance abuse is significantly higher amongst low than higher-income level individuals. Low-income individuals spend significantly higher amongst money to purchase drugs and substances of abuse. We had hypothesised that low-income individuals would suffer socio-economic inequalities in illness and expenditure due to drugs and substance abuse. From our results, we confirmed our hypothesis, hence reject the null hypothesis of no relationship between SES and the burden of drugs and substances of abuse. We further examined the association between household socioeconomic status and usage of four different types of drugs that are often abused. These included; legal alcohol, piped tobacco, cigarettes, and prescription drugs. The study established that a household member from the middle quintile was more likely to die of drug-related illness than a household member from the low quintile group. A previous study, however, indicated that the most abused drugs in Africa are Cannabis, Khat, Amphetamine, Glue, and Opium (5).

This study also established that a person who is in high SES is more likely to abuse cigarettes than one in a low-income level. This result is similar to that of a previous study that indicated that adolescents from the highest personal income quintile were more likely to be smoking (15). The study results, however, contradict a study conducted in India, which indicated that the regular use of alcohol and tobacco had a significant increase with decreasing wealth quintile (16).

The current study has established that there is a significant difference in the amount of money spent to acquire drugs between the different wealth quintile groups. The study results indicate that the low income in terms of wealth quintile spends the highest amount, followed by the middle income and, lastly, the highest income level. Results of a previous study, however, show that the amount spent to acquire drugs increased with increasing quintile (17). The likely explanation for this distribution of spending is that

most of the poorest people lack jobs and therefore have much time to spend drinking and smoking than the middle and the high-income level groups. They, therefore, end up spending much money on drugs and substances. Wealthier individuals were more likely to be admitted for drug-related illnesses than the poor. The likely explanation could be that the more affluent persons can afford the cost of admission to the hospital wards than the poor and may have higher wish to have the members to get well quickly. This result is similar to that of a previous study that indicated a similar trend across the wealth quintile (18).

The study results further showed that those in middle SES were more likely to experience death in the household than those in low SES. Having stronger purchasing power may lead to an increase in the likelihood of spending more money if individuals are addicted to drugs. This could, in effect, increase the risk of death in middle and high income than it would in low-income households. The reduction of socio-economic inequalities is part of several sustainable development goals to achieve universal health coverage. One of the strategies of the Kenya Health Policy 2014–2030 was to improve health indicators through equitable distribution of health services and interventions in line with the Sustainable Development Goal (SDG) to achieve universal access to safe, effective, quality and affordable health care services for all. However, the existence of socioeconomic inequalities is a crucial barrier to achieving international development goals.

## **Strength and limitations**

This study has a strength in that the reasonably large sample size is a vital strength of this survey to provide estimates that can be generalized to the whole population. However, the data on the economic impact of drugs and substance abuse was taken in a single visit, and hence the burden might have been over-estimated. The findings of this study are only generalizable to this study site only and not nationally, but the methods can be applied nationally. This was a cross-sectional study design that cannot monitor time effect and has confounding factors not addressed in the analysis, which can be looked into for future research.

## **Conclusions**

This survey established a significant association between drugs and substance abuse with household wealth quintile. The low-income level is more affected by expenditures and illnesses than those of high SES. This survey is essential as it shows the economic impact of drugs and substance abuse situation, which can be used in making policies and guiding interventions. There was a significant difference in the amount used to acquire drugs between the three groups of wealth quintile. The low-income level in terms of wealth quintile was found to spend the highest amount of money on drugs and substances of abuse, in which the high-income level spent the least amount of money.

The results from this survey support an urgent requirement to establish new policies and strategies to curb the economic impact of drugs and substances by reducing the amount spent to acquire drugs. The results from this study are also relevant as they highlight the high risk of death of a household member

from the middle and high quintile group compared to one in a low quintile. These differences in quintile underscore the requirement for integrated policies and programs that address the middle and high quintile needs for services and information related deaths associated with drugs and substance abuse.

This may be the first survey to dwell on the economic impact of drugs and substance abuse in the County of Murang'a. The methods used for analysis can be replicated in the future for detailed analysis.

## Abbreviations

CI: Confidence Interval; IQR: GNO: Gross National Income; Inter-quantile Range; KEMRI: Kenya Medical Research Institute; NACADA: National Agency for Campaign against Drug Abuse; ODK: Open Data Kit; OR: Odds Ratio; SES: Socioeconomic Status; SDGs: Sustainable Development Goals

## Declarations

## Ethical approval

Ethical clearance was received from the Kenya Medical Research Institute (KEMRI), Scientific and Ethics Review Unit (SERU No. 3237), and written informed consent sought from all the study participants. The study participants were household heads, and an information sheet was provided to all individuals who were 18 years and above invited to participate in the study in *Gikuyu*, the local language. Participants underwent written informed consent and agreed to have the questionnaire data captured in ODK. During data capture, participant names were replaced with unique alphanumeric identifiers to ensure anonymity and confidentiality.

## Ethics approval and consent to participate

The protocol with consent procedures was approved by the Kenya Medical Research Institute (KEMRI) Scientific and Ethics Review Unit (SERU) of the Kenya steering committee (#3237). The consent forms outline details and procedures in the study as required by the Institutional Review Board (IRB)

### Consent for publication

Not applicable

## Availability of data and materials

The study data are available by contacting the lead author, Vincent Were, [vwere@kemri-wellcome.org](mailto:vwere@kemri-wellcome.org)

## Competing interests

The authors declare that they have no competing interests.

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## Authors' contributions

DWN, CO, CM, SA, HK, EE, and VW conceived the study. DWN, CO, CM, and VW contributed to the study design. DWN, CO, CM, SA, HK, and VW coordinated the data collection. VW and CO conducted the data analysis. VW wrote the manuscript, DWN contributed to its refinement, and all authors approved the final manuscript.

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