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# Socioeconomic Inequalities in Substance Use: Findings from a Household Cross-Sectional Survey in Murang a County, Kenya

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## Abstract

Substance and drug misuse leads to serious health consequences and imposes a significant financial strain on global economies as well as individual households. Nevertheless, there is scarce information regarding socioeconomic inequalities in the consumption of substances of abuse in low- and middle-income nations, including Kenya. This research sought to examine the socioeconomic differences in the patterns of drug and substance use within Murang'a County in central Kenya. A cross-sectional study design was employed, with data gathered from November to December 2017. A sample of 449 households, each having at least one member with a history of substance misuse, was drawn from four deliberately chosen sub-locations in Murang'a County. Heads of households provided responses about housing features and, either personally as users or representing users in their homes. Standardized questionnaires collected information on the kinds of substances consumed, financial implications, and gender dynamics within households. Socioeconomic status (SES) of households was determined (categorized as low, middle, or high) through principal component analysis (PCA) based on various household assets and attributes. Bivariable logistic regression was applied to evaluate links between SES, gender, and additional variables with the adoption of substances and drugs. People from higher SES groups showed greater odds of smoking cigarettes (OR = 2.13; 95% CI = 1.25–3.61, p = 0.005) or using piped tobacco (OR = 11.37; 95% CI = 2.55–50.8; p = 0.001) compared to those from low SES. Wealthier people had lower odds of consuming legal alcohol (OR = 0.39; 95% CI = 0.21–0.71, p = 0.002) relative to the most impoverished. No SES differences were observed in the misuse of prescription medications. When comparing median expenditures on obtaining substances, affluent individuals allocated considerably less money than the poorest (USD 9.71 versus Ksh 14.56, p = 0.031). Fatalities linked to substance and drug misuse were more probable in middle SES households than in the lowest SES ones (OR = 2.96; 95% CI = 1.03–8.45, p = 0.042). Differences based on socioeconomic factors are evident in patterns of drug and substance misuse. People from lower-income backgrounds face elevated risks of misuse, higher spending, and mortality. Efforts to curb substance and drug abuse should tackle these socioeconomic inequalities by implementing focused interventions aimed at lower-income populations.

**Keywords:** Substance use, Drug misuse, Socioeconomic factors, Kenya

## Introduction

The overuse of alcohol, illicit drugs, prescribed medications, or various other materials that causes notable impairment or distress is defined as substance and drug misuse [1]. This issue places a considerable economic load on the world at large [2]. A person's socioeconomic position is linked to their engagement with substances and drugs of abuse [3]. Expenditures related to alcohol exceed 1% of gross national income (GNI) in middle- and low-income countries worldwide [4]. Estimates from reviews of 2002 data indicated that

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the global economic cost of alcohol ranged from 210 to 665 billion US dollars [5].

In Kenya, the rate of alcohol consumption among those aged 15–65 years stood at 12.2% in 2017 [6]. Figures across age groups revealed that 0.9% of individuals aged 10–19 years, 5.6% of those aged 15–24 years, and 15.1% of participants aged 25–35 years reported alcohol use. This marked a decrease from 14.2% in 2007 and 13.6% in 2012. Regions with the highest alcohol use prevalence included Nairobi (17.5%), Eastern (14.3%), and Western (13.4%) [6]. Tobacco use prevalence dropped from 9% in 2012 to approximately 8.2% in 2017. The use of khat/miraa among individuals aged 15–65 years was 4.1% in 2017. Cannabis (bhang) emerged as the primary narcotic drug misused in Kenya, with its prevalence among those aged 15–65 years remaining steady at 1% from 2007 through 2017. Leading regions for cannabis use were Coast, Nyanza, and Nairobi. Overall use of at least one substance among ages 15–65 years declined from 19.9% in 2012 to 18% in 2017 [6].

While alcohol remains the predominant misused substance in Kenya, others include tobacco, cannabis, cocaine, amphetamines/khat, and sedatives [7]. Individuals who chew khat often dedicate extensive time to the habit rather than productive work, which adversely influences economic progress in nations due to reduced output [8]. In Africa, young people, making up 40–50% of the population, represent the primary group involved in substance and drug misuse, leading to a progressive decline in the labor force, diminished productivity, worsening health, and premature deaths [9, 10].

Kenya faces a growing challenge with substance and drug misuse, as various national studies indicate that young Kenyans frequently consume items like cigarettes and beer at any given time [11]. Pursuits toward urbanization and industrialization in developing nations have encountered obstacles from substance and drug misuse, resulting in slower economic advancement, and Kenya is among the affected developing countries [12]. The widespread use of substances of abuse, particularly among youth, depletes national resources as efforts to manage supply and demand become costly, while also hindering growth through lowered youth productivity [12].

Misuse of substances has indirectly influenced the socioeconomic standing of users and their households. Potential health outcomes include physical impairments, illnesses, and injuries from incidents [13]. Those engaged in alcohol or other drug misuse face increased risks of mortality via homicide, suicide, disease, or accidents [14]. This can heighten child dependency if parents or caregivers pass away. Involvement in substance use may lead to interventions, detentions, and processing through juvenile justice systems. Misuse of substances is associated with aggressive income-seeking actions among young people [15]. This escalates the need for criminal justice resources, adding to the strain on available funds.

Many school strikes in Kenya that result in arson are linked to drug involvement, impeding economic progress as funds meant for other initiatives are diverted to reconstruction [12]. A report from the United Nations Office on Drugs and Crime highlighted that the societal impacts of illicit drug misuse and trafficking harm individual health and national development [16].

Research in Murang'a County on students' views of drug misuse indicated that it contributes to school abandonment, thereby reducing educational attainment, stifling innovation, and obstructing economic growth as learners do not achieve productive employment levels [17]. Another study in Kangema sub-county of Murang'a County noted that parental alcoholism can reach levels where school fees go unpaid, causing student dropout and subsequent involvement in crime, which ultimately hampers economic advancement [17, 18].

Research exploring the socioeconomic consequences of substance and drug misuse in Kenya remains limited. The present analysis examines socioeconomic differences in substance and drug misuse in Murang'a County, located in Central Kenya.

## Materials and Methods

### *Study design and population*

The research employed a cross-sectional approach, targeting households where at least one member had engaged in the use of drugs or substances of abuse during the 12 months prior to the data collection. Responses were provided by household heads on behalf of their families. The study deliberately chose Kiharu sub-county due to its elevated prevalence of drug and substance misuse, as documented by the National Authority for the Campaign against Alcohol and Drug Abuse (NACADA) [6].

### *Study site*

Data collection took place in Murang'a County, which is among the five counties located in the Central Region of

Kenya. It shares borders with Nyeri to the north, Kiambu to the south, Nyandarua to the west, and Kirinyaga, Embu, and Machakos counties to the east. Murang'a County ranks as one of the most populous counties in Kenya and records a notably high incidence of drug and substance misuse [6].

*Sampling procedure and sample size*

A total of 449 households were selected through systematic random sampling across four sub-locations in Kiharu sub-county: Karuri (n = 109), Gikandu (n = 114), Gakuyu (n = 114), and Kambirwa (n = 112). In the mixed urban and rural communities, households were chosen systematically at approximate 200-meter intervals starting from a randomly identified landmark, such as a school or church. The starting landmark was selected randomly, and the sampling direction was decided by spinning a pen and allowing it to point upon landing on the ground. This technique ensured comprehensive coverage of all four sub-locations [6]. During visits, interviewers inquired whether the household included an individual who had used drugs or substances of abuse in the preceding 12 months. When no eligible household was identified at a selected residence, a snowballing technique was applied to locate the nearest qualifying household in the surrounding area.

*Determination of sample size*

The required sample size was calculated using the formula outlined by Fischer *et al*. (1998), incorporating the estimated proportion of households containing at least one individual with a history of drug or substance misuse, a 5% margin of error, and an adjustment for 15% non-response.

$$n = \frac{(Z)^2 pq}{(e)^2} \quad (1)$$

Here, n represents the required sample size, z is the z-score corresponding to a 5% Type I error rate in a normal distribution (z = 1.96), p is the estimated prevalence of drug abusers in the households (set at 50%), q = 1 – p (also 50 percent), and e is the desired margin of error (5%).

The calculated minimum sample size was 384 participants per county. To account for an anticipated 15% non-response rate, this figure was increased to 444 participants per county.

The prevalence was assumed to be 50 percent in order to yield the largest possible sample size, thereby providing sufficient statistical power across a variety of substance abuse indicators.

*Data collection*

Quantitative data were gathered using a structured, user-friendly questionnaire designed in Open Data Kit (ODK). The ODK platform incorporated built-in data quality checks to minimize entry errors, and the questionnaires were deployed on tablets for field use. The study adapted questions from the validated Drug Abuse Treatment Cost Analysis Program (DATCAP), a health economics instrument widely used to assess the overall costs associated with drug abuse and treatment [19]. DATCAP serves as both a cost data collection tool and an interview guide, suitable for application across diverse medical treatment and social service settings. Its primary purpose is to systematically collect and organize data on resources utilized in service delivery, while also capturing details on client caseloads and program revenues [20].

The DATCAP framework emphasizes principles related to economic costing, treatment program evaluation, cost estimation, and resource utilization—all of which were examined in this study. Given the limited application of DATCAP in low- and middle-income countries (LMICs), its use in this context was particularly warranted.

Household heads were approached by trained research teams, and informed consent was obtained from participants aged 18 years or older. Only households reporting at least one member with drug or substance abuse were included, to ensure adequate capture of relevant data. Interviews were conducted at the household level, with strict assurances of confidentiality and privacy. The questionnaire was administered to the household head, who provided information on household characteristics as well as the abuser's patterns of use, associated costs, and care-seeking behaviors (including their own, if applicable). One interview was completed per household.

Prior to data collection, research assistants received four days of comprehensive training, followed by a pilot phase to test and confirm the reliability of the data collection instruments.

*Study tools*

The questionnaire consisted of two main sections: Part One targeted the household head, while Part Two focused

on the substance abuser. Key topics covered included household characteristics, socioeconomic indicators (e.g., asset ownership, type of cooking fuel, and water source), types of drugs or substances abused, patterns of illness and mortality risk, and expenditure related to care-seeking and treatment.

To determine household eligibility, a screening question was posed: "Does any member of your household currently, or in the previous 12 months, abuse any drugs or substances (including cigarettes, legal alcohol, piped tobacco, and prescription drugs)?" Additional variables captured details on care provided during injuries, reported deaths, and expenditures on acquiring drugs or substances of abuse. Socio-demographic data for the household head—such as age group, marital status, education level, occupation, and religion—were also recorded.

*Data handling and statistical methods*

The initial dataset was retrieved from the ODK cloud platform in CSV format and subsequently imported into Stata version 15 (College Station, TX: StataCorp LLC) for organization and processing. Data validation scripts were prepared to detect absent values, inconsistencies, and issues with variable documentation. Observations containing missing values were omitted from subsequent analyses.

The chi-square test was employed to evaluate associations between sociodemographic variables and wealth categories. When expected cell frequencies fell below five, Fisher's exact test was used in place of the chi-square test. Bivariate logistic regression analysis was conducted to explore relationships between drug use, management of drug-related health issues, and socioeconomic position. Statistical significance was defined as a p-value under 0.05. The sociodemographic factors subjected to chi-square testing or Fisher's exact test (for low cell counts) encompassed age categories, marital status, educational achievement, employment type, and religious background. Age was grouped into six intervals (under 18 years, 18–29, 30–44, 45–59, 60–75, and over 75). Educational attainment was divided into six levels (no schooling, incomplete primary, completed primary, incomplete secondary, completed secondary, and college or university).

Socioeconomic status was determined based on possession of durable goods and housing attributes, such as ownership of the dwelling and items, together with facilities including construction materials, water access, lighting source, and cooking fuel, which served as proxies for household economic standing [21]. Normalized scores were calculated through principal component analysis (PCA). PCA, a statistical approach, derived factor loadings from the various socioeconomic inputs [22]. These loadings produced an overall household score, with elevated scores reflecting higher SES and reduced scores indicating lower SES. Scores were sorted to establish wealth tertiles (lowest, middle, highest) [21]. Households in the lowest tertile possessed fewer assets and facilities, in contrast to those in the highest tertile with greater endowments. The three SES levels (low, middle, high) partitioned the sample into roughly equal thirds, each containing about 33.3% of cases. SES functioned as the key predictor variable. The Kruskal-Wallis test assessed median equivalence across wealth tertiles for non-normal distributions, whereas the independent samples t-test compared means for data following a normal distribution. Monetary values were converted using an exchange rate of 1 USD to 103 Kenyan shillings, representing the 2017 mean.

## Results and Discussion

*Sociodemographic profile of the study participants*

Interviews were carried out with 449 heads of households in total, of whom 365 (81.3%) reported engaging in drug abuse and 84 (18.7%) denied any drug abuse during the 12 months prior to the survey. Among those surveyed, 28.5% (n=128) belonged to the 30–44 age bracket, while 28.1% (n=126) were in the 45–59 bracket. Over 60% of participants had attained at least primary-level education completion. Roughly 30.9% of household heads from low-income groups, 8% from middle-income groups, and 20% from high-income groups reported never having married **(Table 1).** Inclusion criteria allowed for two respondents aged 16 and 17 years (treated as emancipated minors) due to their established family responsibilities.

**Table 1.** Sociodemographic profile of the study participants by socioeconomic status in Murang'a County, Kenya

| Characteristic | Rich (n=150) n (%) | Middle (n=150) n (%) | Poorest (n=149) n (%) | Total (n=449) n (%) | $\chi^2$ | p-value |
|---|---|---|---|---|---|---|
| **Age group** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **18–29** | 15 (10.0) | 12 (8.0) | 51 (34.2) | 78 (17.4) | 61.00 | <0.001 |
| **30–44** | 43 (28.7) | 40 (26.7) | 45 (30.2) | 128 (28.5) | | |
| **45–59** | 46 (30.7) | 44 (29.3) | 36 (24.2) | 126 (28.1) | | |
| **60–75** | 34 (22.7) | 43 (28.7) | 15 (10.1) | 92 (20.5) | | |
| **Above 75** | 11 (7.3) | 11 (7.3) | 1 (0.7) | 23 (5.1) | | |
| **Less than 18** | 1 (0.7) | 0 (0.0) | 1 (0.7) | 2 (0.5) | | |
| **Marital status** | | | | | | |
| **Never married** | 30 (20.0) | 12 (8.0) | 46 (30.9) | 88 (19.6) | 28.47 | <0.001 |
| **Currently married** | 85 (56.7) | 103 (68.7) | 82 (55.0) | 270 (60.1) | | |
| **Separated** | 14 (9.3) | 14 (9.3) | 12 (8.1) | 40 (8.9) | | |
| **Divorced** | 21 (14.0) | 21 (14.0) | 9 (6.0) | 51 (11.4) | | |
| **Education** | | | | | | |
| **Never been to school** | 11 (7.3) | 10 (6.7) | 0 (0.0) | 21 (4.7) | 141.06 | <0.001 |
| **Primary incomplete** | 43 (28.7) | 21 (14.0) | 7 (4.7) | 71 (15.8) | | |
| **Primary complete** | 52 (34.7) | 47 (31.3) | 18 (12.1) | 117 (26.1) | | |
| **Secondary incomplete** | 26 (17.3) | 18 (12.0) | 18 (12.1) | 62 (13.8) | | |
| **Secondary complete** | 16 (10.7) | 33 (22.0) | 40 (26.9) | 89 (19.8) | | |
| **College/University** | 2 (1.3) | 21 (14.0) | 66 (44.3) | 89 (19.8) | | |
| **Occupation** | | | | | | |
| **Government employee** | 80 (53.3) | 81 (54.0) | 22 (14.8) | 183 (40.8) | 149.87 | <0.001 |
| **Nongovernment employee** | 0 (0.0) | 7 (4.7) | 27 (18.1) | 34 (7.6) | | |
| **Self-employed** | 2 (1.3) | 1 (0.7) | 28 (18.8) | 31 (6.9) | | |
| **Homemaker** | 0 (0.0) | 0 (0.0) | 1 (0.7) | 1 (0.2) | | |
| **Not-paid/volunteer** | 1 (0.7) | 3 (2.0) | 13 (8.7) | 17 (3.8) | | |
| **Student** | 48 (32.0) | 29 (19.3) | 23 (15.4) | 100 (22.3) | | |
| **Religion** | | | | | | |
| **Christian** | 144 (96.0) | 144 (96.0) | 139 (93.3) | 427 (95.2) | 15.34 | 0.004 |
| **Islam** | 0 (0.0) | 0 (0.0) | 7 (4.7) | 7 (1.6) | | |
| **Non-practicing** | 6 (4.0) | 6 (4.0) | 3 (2.0) | 15 (3.3) | | |
| **Drug abuse (past 12 months)** | | | | | | |
| **Yes** | 116 (77.3) | 120 (80.0) | 129 (86.6) | 365 (81.3) | 4.45 | 0.108 |
| **No** | 34 (22.7) | 30 (20.0) | 20 (13.4) | 84 (18.7) | | |

*Relationship between household socioeconomic position and categories of substances abused*

The findings indicate that **Table 2** presents the odds ratios for substance use according to household socioeconomic level. With the lowest SES group serving as the reference category, participants from the middle SES group exhibited a reduced likelihood of consuming legal alcohol (OR = 0.45; 95 percent CI: 0.25–0.78; p = 0.005). In contrast, respondents in the middle SES (OR = 5.41; 95 percent CI: 1.14–25.67; p = 0.033) and high SES (OR = 11.37; 95% CI: 2.55–50.8; p = 0.001) categories showed a higher probability of using piped tobacco compared to those in the lowest SES. Individuals from the highest SES group demonstrated an elevated risk of cigarette abuse (OR = 2.13; 95 percent CI: 1.25–3.61; p = 0.005), yet a lower risk of abusing legal alcohol (OR = 0.39; 95 percent CI: 0.21–0.71; p = 0.002) **(Table 2).**

**Table 2.** Socioeconomic disparities in the odds of substance abuse among individuals reporting drug use in Murang'a County, Kenya

| Substance | Reference: Low SES OR | Middle vs. Low OR | 95% CI | p-value | High vs. Low 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 |

The relationship between wealth tertile and substance uptake was assessed through bivariate logistic regression. OR = Odds ratio; 95% CI = 95% confidence interval

*Average monthly expenditure on drugs by individuals, stratified by household socioeconomic status*

**Table 3** illustrates the differences in mean and median monthly spending on substances among individuals reporting drug use, categorized by household SES. Households in the lowest SES group (n = 129) had a median expenditure of USD 14.56 (interquartile range [IQR]: USD 4.85–34.95), whereas those in the highest SES group (n = 115) reported a median of USD 9.71 (IQR: USD 2.91–19.42). This difference across socioeconomic categories was statistically significant (p = 0.031) **(Table 3).**

**Table 3.** Monthly expenditure on substances among individuals reporting drug use, stratified by wealth tertile

| Socioeconomic Status | n | Median Cost (USD) | 95% CI for Mean (USD) | Interquartile Range (25th–75th percentile, USD) |
|---|---|---|---|---|
| **Low** | 129 | 14.56 | 20.12–31.58 | 4.85–34.95 |
| **Middle** | 120 | 7.77 | 14.40–24.76 | 2.91–29.13 |
| **High** | 115 | 9.71 | 14.21–23.46 | 2.91–19.42 |

*Kruskal–Wallis test p-value = 0.031 for comparison of medians. Currency conversion based on 2017 average rate: 1 USD = 103 KES.

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

A post-hoc Dunn's test [23] conducted in Stata was used to evaluate potential significant differences in average monthly household spending on drugs across wealth quintile groups. The analysis revealed that households in the low socioeconomic status category spent significantly more on obtaining drugs (USD 25.85; 95% CI = [20.12–31.85]) compared to those in the high socioeconomic status category (USD 18.84; 95% CI = [14.21–23.46]; p = 0.044 from the t-test). In contrast, no significant difference was observed in drug acquisition expenditures between the high and middle socioeconomic groups (p = 0.999) (**Table 4**). **Table 4** presents the pairwise comparisons of mean expenditures on drugs among the different socioeconomic categories.

**Table 4.** Pairwise comparisons of monthly household expenditure on drug acquisition across wealth quintiles in Murang'a County

| SES Group A | 95% CI (USD) | Mean Expenditure (USD) | SES Group B | 95% CI (USD) | Mean Expenditure (USD) | *T-test p-value (Group A vs. Group B) |
|---|---|---|---|---|---|---|
| **Low** | [20.12–31.58] | 25.85 | Middle | [14.40–24.76] | 19.58 | 0.029 |
| **Middle** | [14.40–24.76] | 19.58 | High | [14.21–23.46] | 18.84 | 0.999 |
| **Low** | [20.12–31.58] | 25.85 | High | [14.21–23.46] | 18.84 | **0.044** |

Values in bold indicate statistical significance at p < 0.05. Currency conversion: 1 USD = 103 KES (2017 rate). P-values reflect comparisons of expenditure between the respective SES groups (A vs. B).

*Association between treatments for drug-related illnesses among household heads with substance abuse experience, by wealth quintile*

**Table 5** presents data on the management of drug-related illnesses among individuals across different wealth quintiles. Households in the middle socioeconomic status group were significantly more likely to report death due

to drug-related illness compared to those in the low socioeconomic status group (OR = 2.96; 95 percent CI = 1.03–8.45; p = 0.042). No significant differences were observed across wealth quintiles with respect to the proportion of individuals receiving treatment for drug-related illness, being admitted to hospital for such illness, or the likelihood of receiving care.

**Table 5.** The odds of drug-related health outcomes amongst those who abused drugs compared by SES

| Health outcomes | Household Socioeconomic status | | | | | | |
|---|---|---|---|---|---|---|---|
| | Low SES | Middle vs Low SES | | | High vs low SES | | |
| | 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 |

Association between wealth quintile and health outcomes using bivariable logistic regression, *OR* Odd ratio, *95% CI* 95% confidence intervals

The findings of this study indicate that the burden associated with drug and substance abuse is considerably greater among individuals from lower socioeconomic backgrounds compared to those from higher-income groups. Households in low-income categories allocated significantly more funds toward the purchase of drugs and substances of abuse. Our initial hypothesis posited that individuals from lower-income households would face greater socioeconomic disadvantages in terms of drug-related illnesses and expenditures. The results supported this hypothesis, leading to the rejection of the null hypothesis that there is no association between socioeconomic status (SES) and the burden imposed by drug and substance abuse.

We additionally investigated the relationship between household SES and the abuse of four commonly misused substances: legal alcohol, pipe tobacco, cigarettes, and prescription drugs. Consistent with prior research, which has documented stronger links between low SES and the uptake of cigarettes and alcohol [24-26], our analysis revealed similar patterns. Notably, the study found that household members from the middle wealth quintile were at a higher risk of death due to drug-related illnesses compared to those from the low quintile.

Furthermore, individuals from higher SES groups were more prone to cigarette abuse than those from low-income backgrounds. This observation aligns with earlier research showing that adolescents in the highest income quintiles were more likely to smoke [27]. However, these findings contrast with a study from India, where regular alcohol and tobacco consumption increased significantly as wealth quintiles decreased [28].

Significant variations were also observed in monthly expenditure on drug acquisition across wealth quintiles, with the lowest quintile incurring the highest costs, followed by the middle quintile, and the highest quintile spending the least. This contrasts with prior research indicating that drug acquisition costs rose with increasing wealth quintiles [29]. One possible explanation is that individuals in the poorest groups, often unemployed, may have more leisure time available for substance use, leading to higher overall spending despite limited resources. In contrast, wealthier individuals were more likely to be hospitalized for drug-related conditions, potentially because they could better afford the associated costs—a pattern echoed in another previous study [30].

The results also demonstrated that middle-SES households were more likely to experience drug-related deaths than low-SES households. This may reflect greater purchasing power among middle-income groups, enabling heavier consumption among those addicted and thereby elevating mortality risk compared to low-income households.

Addressing socioeconomic inequalities is central to multiple Sustainable Development Goals aimed at achieving universal health coverage [31]. The Kenya Health Policy 2014–2030 emphasizes improving health outcomes through equitable service distribution, in alignment with SDGs targeting universal access to safe, effective, quality, and affordable healthcare [32]. Nevertheless, persistent socioeconomic disparities remain a major obstacle to meeting global development targets [33].

A key strength of this study lies in its relatively large sample size, which enhances the generalizability of estimates to the broader population [34]. Limitations include the collection of economic impact data during a

single visit, which may have led to overestimation of the burden. The results are applicable primarily to the study area and not nationally, although the analytical approaches could be scaled up. As a cross-sectional design, the study could not assess temporal effects and may be influenced by unadjusted confounding variables, warranting further investigation in future work.

## Conclusion

This study identified a clear association between drug and substance abuse and household wealth quintiles, with low-income groups experiencing a disproportionately higher burden in terms of both expenditures and health consequences compared to higher-SES groups. These insights are valuable for highlighting the economic consequences of substance abuse, informing policy development, and shaping targeted interventions. Notably, substantial differences emerged in spending on drug acquisition across the three wealth categories, with the lowest quintile expending the most and the highest quintile the least.

The findings underscore the pressing need for updated policies and interventions aimed at mitigating the economic toll of drug and substance abuse, particularly by curbing expenditure on acquisition [35]. Additionally, the elevated risk of drug-related mortality observed among middle- and high-quintile households relative to low-quintile ones highlights the importance of tailored programs and policies that meet the specific service and informational needs of these groups regarding substance-related deaths.

As potentially the first investigation focused on the economic effects of drug and substance abuse in Murang'a County, this work contributes meaningfully to the literature and provides a foundation for future scholarship in this domain. The analytical methods employed are replicable and suitable for broader application.

Policy and practice implications include bridging knowledge gaps through research that more thoroughly examines socioeconomic disparities in substance abuse across different regions. Current drug-related policies should be strengthened and integrated, with explicit attention to prescription drug misuse. Further research is recommended to evaluate the cost-effectiveness of interventions to ensure their feasibility and impact. Finally, there is a need for comprehensive, coordinated service delivery that extends beyond substance use alone, incorporating intersectoral collaboration into national strategies and frameworks.

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