INFLUENCE OF COMMUNITY-LEVEL FACTORS ON ALCOHOL CONSUMPTION AMONG ADOLESCENTS IN SECONDARY SCHOOLS IN KAKAMEGA COUNTY, KENYA

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Abstract

The alcohol abuse issue in Kenya poses significant challenges to health, the economy, and national security, particularly in the Western region where there is the highest prevalence of alcohol consumption among adolescents in Kenya, standing at 42.5%. This paper explores the social phenomenon of alcohol consumption, specifically examining community-level factors influencing adolescents in Kakamega County. While theoretical frameworks like Bronfenbrenner's theory suggest a link between social factors and alcohol use, empirical evidence in Kakamega County is lacking. The current study, rooted in both positivism and post-positivism, employed a mixed-methods approach involving a cross-sectional survey to quantitatively describe community factors and alcohol consumption among adolescents in Kakamega County. Adopting Max Weber's definition, community-level factors are considered as elements of social values and norms adhered to over time within the community. Despite theoretical reasoning highlighting the connection between social factors and alcohol use, a gap exists in empirical evidence in Kakamega County. The primary aim of this paper was to determine the influence of community-level factors on alcoholism in the region. The study, encompassed three sub-counties in Kakamega, sampled 381 respondents from a total adolescent population of 41,373. Employing questionnaire and interview methods, the research found that community-level factors exhibited a positive association (p-value 0.023) with alcoholism among adolescents. The regression coefficient suggested a predicted increase in the log odds of alcohol consumption with a one-unit rise in community factors. However, this association was deemed insignificant at a 95% confidence interval (p-value 0.826). In conclusion, community-level factors may not be the most effective predictors of alcoholism; instead, other factors, particularly individual-level factors, play a more crucial role. The study emphasizes the need for heightened attention to individual and family-level factors, while also acknowledging the role of community-level factors, such as advertisements, availability, and affordability of alcohol, after adolescents have been influenced by individual factors. This nuanced understanding is vital for developing targeted interventions and policies to address alcohol consumption among adolescents in Kakamega County and similar contexts.

Key Words: Community –level factors, alcoholism, individual –level factors, adolescents (students), ordinal logistic regression; post-positivism; positivism; log odds; and odds ratio.

Introduction

The history of alcohol consumption dates back to ancient times, with the earliest known evidence traced back to around 7,000 BC in China. Archaeological findings from this period, particularly residues in clay pots, indicated that people were producing alcoholic beverages through the fermentation of rice, millet, grapes, and honey (Philips, 2020). The exact circumstances of how humans first encountered fermented drinks, such as wine or beer, remain unclear – whether accidental or intentional. Nevertheless, since then, alcoholic beverages have played a significant role in the diets and cultures of various civilizations that preceded contemporary humanity (Maicas, 2020).

Native American civilizations in pre-Columbian times also developed alcoholic beverages. In South America, a range of fermented drinks known as "chicha" was crafted from ingredients like corn, grapes, or apples (Donegan, 2021). Alcohol and its consumption hold contextual meanings. Kang (2023) defines alcohol as a drug present in beer, wine, and hard liquor, produced through fermentation and distillation processes. Flor (2020) characterizes alcohol as a psychoactive substance with toxic and dependence-producing properties, contributing to a high burden of disease. Scientifically, Savage (2023) defines alcohol as a liquid composed of distilled hydrocarbons, while Wen (2023) considers alcohol as a chemical compound viewed as organic derivatives of water (H_2O), with one hydrogen atom replaced by an alkyl group.

Adolescence is recognized as the second critical period in neurodevelopment, marked by experience-dependent plasticity affecting higher-order cognitive functions such as memory and self-control (Graf, 2021). This stage is characterized by physical growth, emotional, psychosocial, and behavioral changes that signify the transition from childhood to adulthood (World Health Organization, WHO, 2023). Unfortunately, alcohol consumption is increasingly prevalent worldwide, and youth often initiate alcohol use during adolescence, with some starting as early as ten years old. This trend of alcohol use among teenagers is a global concern (Jiang, 2022).

The issue of alcohol abuse in Kenya, particularly among adolescents, is a significant concern with implications for health, the economy, and national security, posing a threat to the achievement of development goals. According to NACADA (2022), approximately 18% of individuals aged 10-24 years in Kenya have experimented with alcohol at least once in their lifetime, with the Western region experiencing the highest prevalence of severe alcohol abuse disorders at 24.5%.

In the context of the current study, community factors are crucial elements that influence individuals' likelihood of experiencing alcohol-related issues. These factors encompass various aspects such as social support, life stress, social capital, school readiness, housing affordability, and literacy (Perrin, 2019). The community can play a pivotal role in shaping adolescents' behavior by providing both responsibility and opportunities to look outward, fostering awareness of the needs of others (NASEM, 2023). Additionally, factors like the availability of alcohol, peer pressure, the behavior of older individuals, and advertisements contribute to shaping behavior at the community level (Ember, 2022). Economic activities, community customs and beliefs, and information on the phenomenon are also highlighted as important community factors (Hanson, 2021). For the purpose of the current study, the main focus was on accessibility, availability, customs, and values of the community.

Globally, adolescent alcohol consumption is recognized as a menace, with a substantial percentage having tried alcohol by the age of 15 or 18. Binge drinking is prevalent among adolescents, with various harmful effects, including risky sexual behaviors, delinquency, poor academic performance, maladaptive behavior, violence, accidents, and social exclusion. In Kenya, alcohol abuse is a pressing concern, and Kakamega County,

despite implementing the Alcoholic Drinks Control Act (2014), still grapples with a high prevalence of severe alcohol abuse disorders in the Western region.

The study acknowledged the efforts made by both the national and county governments to manage and control alcohol use among adolescents. However, despite these measures, the prevalence of alcohol use remains high. The social theories, especially the socio-ecological theory, strongly link social dynamics to alcohol consumption, but specific social dynamics predisposing adolescents to alcohol consumption have not been scientifically determined. While factors like poverty have been suggested, there is a need for empirical evidence to support these assertions.

Therefore, the study aimed at determining the social dynamics variables that predispose adolescents to alcohol consumption. The goal was to identify predictors that can serve as basis for mitigating alcohol consumption and its related consequences among adolescents in Kakamega County. This research is crucial for informing evidence-based interventions and policies to address the complex issue of adolescent alcohol use.

The study is grounded in the socio-ecological theory, which was proposed by Bronfenbrenner (2000). According to this theoretical framework, individuals and social groupings are considered integral components of an ecological system, and the system is seen as predictive of social functions at both the individual and group levels. This perspective emphasizes the interconnectedness of various environmental layers and their impact on human behavior.

Guttmacher et al. (2010) further expanded upon Bronfenbrenner's socio-ecological theory by introducing the socio-ecological model of health behavior. In this modification, they underscored the idea that individuals, families, and communities are not isolated entities but are interconnected parts of larger ecological systems. The model suggests that each individual, family, or community adapts to changes occurring in other parts of the system, highlighting the dynamic and interactive nature of these relationships.

The overlapping rings depicted in Figure 1 of the model visually represent how elements at one tier influence factors at another. This illustration is likely to demonstrate the interdependence and reciprocal influences across different levels of the socio-ecological model. These levels may include individual factors, interpersonal relationships, community dynamics, and broader societal influences.

Figure 1

The Socio-Ecological Model of Health Behaviour (adopted from Guttmacher, Vana, and Ruiz-Janecko 2010)
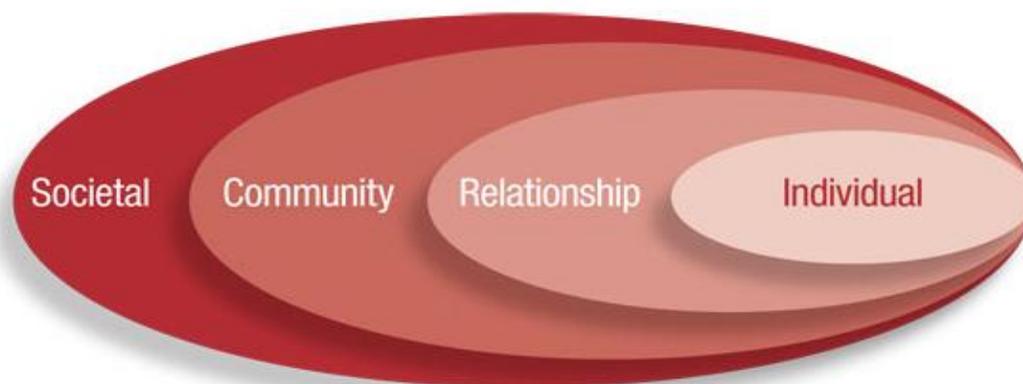
The use of Bronfenbrenner's theory in the study takes into consideration the intricate interplay of individual, relationship, community, and social factors. This approach is particularly relevant in understanding the diverse circumstances that contribute to teenagers being at risk of alcohol intake. By adopting a socio-ecological perspective, the study acknowledged the multifaceted nature of influences on adolescent behavior, going beyond individual factors to explore the broader environmental and social contexts.

Materials and Methods of Study

This section describes the techniques used in the investigation. It outlines the study design, study area, population, sample size, and sampling processes, data collection tools, and fieldwork procedures. It also discusses data sources, management, and analysis, as well as the methodologies applied for data presentation and analysis. The chapter finishes with the ethical considerations that guided the research.

Area of Study

The study was conducted in Kakamega County, located in the western region of Kenya. highest prevalence of alcohol consumption among adolescents in Kenya, standing at 42.5%according to the National Authority for the Campaign Against Alcohol and Drug Abuse (NACCADA, 2022). This choice aimed to offer a comprehensive understanding of the predictors of alcohol use among adolescents in the country.

Geographically, Kakamega County covers 3,051.3 km^2 in the western part of Kenya, situated at coordinates 0° 17′ 0″ N, 34° 45′ 0″ E, and at an altitude ranging from 1,240 meters to 2,000 meters above sea level. It shares borders with Vihiga County to the south, Siaya County to the west, Bungoma and Trans Nzoia counties to the north, and Nandi and Uasin Gishu Counties to the east (Government of Kenya, County Integrated Development Plan CIDP, 2018).

as shown in Figure 2.

Figure 2

Map of Kakamega County.
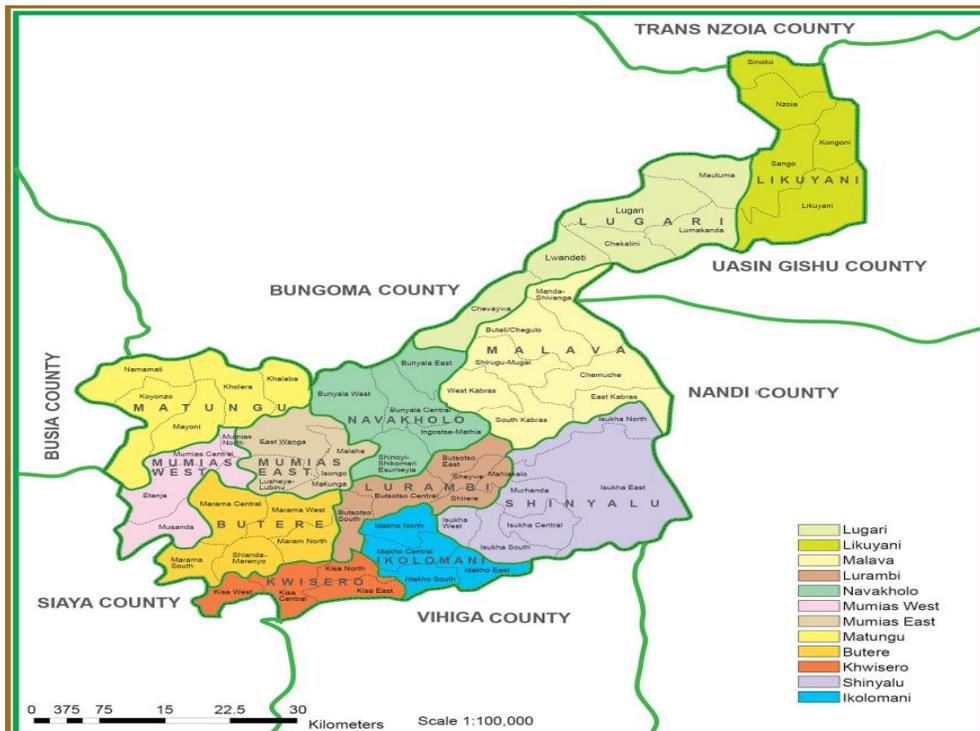
Kakamega County has a total population of 1,867,579, with 897,133 males and 970,406 females. The population is distributed across 12 sub-counties: Butere, Mumias, Matungu, Likuyani, Mumias East, Khwisero, Shinyalu, Lurambi, Ikolomani, Lugari, Malava, and Navakholo (National Bureau of Statistics, KNBS, 2019). Despite being predominantly rural, Kakamega is one of the most populated counties in Kenya, with 90% of its population residing in rural areas. More than half of the county's population comprises minors and adolescents. The primary economic activity is farming, including the cultivation of sugarcane, millet, tea, maize, soya beans, dairy products, and sunflower. Additionally, small-scale gold mining contributes to the local economy. Due to its high population, Kakamega town serves as a prominent commercial business center.

The target population consisted of all 77,610 (35,307 boys and 42,303 girls) students in all the 441 secondary schools in Kakamega county. Secondary schools were purposively selected due to the fact that the county has the highest enrolment rate at 96.0%, which implies that a vast majority of adolescents are in secondary school (NACADA 2022).

Research Design

The study's overall methodology was grounded in both positivism and post-positivism (interpretivism) schools of thought, reflecting a mixed-methods approach that combined quantitative and qualitative elements. Recognizing secondary schools as living organizations within specific environments, the interpretivist perspective was considered. According to Thomas (2022), interpretivism posits that social realities, meanings, and knowledge are socially constructed, allowing for multiple understandings.

To achieve the study's goal of generating generalizable knowledge applicable to adolescents in secondary schools beyond Kakamega County, a positivist approach was also embraced. This necessitated the use of quantitative data that could be generalized across similar populations. Given the norm that adolescents in secondary schools should not use alcohol, a positivist standpoint was adopted to uphold this principle.

The research design employed was a cross-sectional survey, chosen to provide a quantitative, numeric depiction of the relationship between community factors and alcohol consumption among adolescents in secondary schools in Kakamega County (Ellis, 2021). A survey, as described by William (2022), is a present-oriented methodology used to investigate populations by selecting samples to analyze and discover occurrences. It facilitates providing quantitative descriptions of populations or groups of interest.

During the data analysis phase, descriptive statistics such as frequencies, means, modes, and percentages were employed, aligning with the quantitative nature of the study. Additionally, binary and multiple logistic regressions were used to analyze the relationships between variables in a more nuanced manner. This methodological combination aimed to capture both the breadth and depth of the research questions and provide a comprehensive understanding of the factors influencing alcohol consumption among adolescents in secondary schools.

Data Set, Sources, and Collection

Out of a total population of 41,373 adolescents in the three sub-counties of Kakamega, the study sampled 381 as the main respondents.

To determine the sample size, the study adopted Cochran's (2020) correction formula:

$$\tilde{n} = \frac{\frac{Z^2 pq}{d^2}}{1 + (\frac{Z^2 pq}{d^2}/N)}$$

Where: ñ is the sample size of the finite population;

N is the population size;

Z=Normal deviant at 95% confidence level;

p=Sample proportion;

q=(1-p); and

d=Significance level (5%)

$$\tilde{n} = \frac{1.96^2*0.5*0.5}{0.05^2}/1+\left(\frac{1.96^2*0.5*0.5}{0.05^2}/41,373\right)$$

$$= \frac{384.16}{1+(384.16/41,373)} = 380.625 \cong \mathbf{381}$$

The study adopted the sample size of 381, with 95% confidence level.

The study employed a mixed sampling approach, combining multi-stage clustering, proportionate stratified random sampling, and purposive sampling methods. In the first stage, the study area (Kakamega County) was clustered into twelve sub-counties, from which three sub-counties were purposively selected based on statistics indicating high prevalence of adolescent alcohol consumption. The selected sub-counties were Kakamega North, Kakamega Central, and Mumias West, which had prevalence rates of 22.3%, 20.2%, and 12.4% respectively (GoK, 2022).

In the second stage, stratified sampling was used to select schools in the three sub-counties. Stratification was employed to create homogeneous subsets within each sub-county based on school characteristics. Schools were categorized into four types (national, extra-county, county, and sub-county), and from the extra-county and county strata, one boys' school and one girls' school were selected from each of the sub-counties. Additionally, one mixed school, one boys' school, and one girls' school were randomly selected from each sub-county within the sub-county stratum. The only national school for boys in Kakamega County, which is located within Kakamega Central sub-county, was purposively selected. The distribution of schools per stratum per sub-county is shown in Table 1.

Table 1

Distribution of schools per stratum per sub-county

Sub-County	National		Extra County		County		Sub-County			Total
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Mixed	
Kakamega North	1	0	1	1	1	1	1	1	1	8
Kakamega Central	0	0	1	1	1	1	1	1	1	7
Mumias West	0	0	1	1	1	1	1	1	1	7
Total	**1**	**0**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**22**

In the third stage, proportionate stratified random sampling was employed to determine the number of students to be included from each sub-county in the sample. Each sub-county was allocated a quota, proportionate to the total number of students enrolled in secondary schools. This approach ensured that the sample distribution accurately reflected the proportional representation of student populations across the three selected sub-counties. The proportionate allocations are detailed in Table 2.

Table 2

Proportionate distribution of the sample

Sub-County	Total Students Population	Schools Selected	Proportionate Sample
Kakamega North	18,673	8	172
Kakamega Central	11,465	7	106
Mumias West	11,235	7	103
Total	**41,373**	**22**	**381**

In the final stage, quotas were allocated to each of the selected schools. From each of the selected school, study respondents were then randomly selected in collaboration with the school administration, utilizing the school nominal rolls. This process ensured that the selection of respondents was unbiased and representative of the student body within each school.

Additionally, 14 key informants were purposively selected based on their roles and expertise related to adolescent alcohol consumption in Kakamega County. The key informants included 9 school principals (one from each boys' school, girls' school, and mixed school) from each of the three selected sub-counties. Additionally, one official from the NACADA regional office in Kakamega and one representative from the Western Regional Commissioner's office were selected for their insights into regional alcohol consumption trends and government policies. Furthermore, one chief from each of the three sub-counties was chosen for their knowledge of community-level dynamics and challenges. The selection criteria ensured representation from various levels of authority and expertise relevant to the study objectives.

Before initiating the data collection process, the researcher planned for secure data storage to prevent any leakage of sensitive information. To ensure systematic and high-quality data collection, the researcher recorded essential information promptly as data was obtained. The instruments underwent rigorous piloting in Shinyalu Sub-County, involving one school and a sample of 20 students. This initial phase allowed for the identification and rectification of any shortcomings in the data collection tools before the main study commenced. Shinyalu Sub County was randomly selected from the nine sub-counties not included in the study.

Data Collection Instruments

This section details the instruments utilized to gather information pertinent to the study objectives. A combination of questionnaires, focus group discussions (FGDs), and interview guides were employed to collect data from main respondents and key informants, respectively. These tools were carefully designed to capture comprehensive insights into the social dynamics influencing alcohol consumption among adolescents in secondary schools in Kakamega County, Kenya.

Focus Group Discussion (FGD) Guide

The study incorporated focus group discussions (FGDs) as a supplementary qualitative data collection method to complement insights gathered from adolescents aged 14 to 18 years, the main respondents. FGDs were administered to respondents who had completed the questionnaire, enabling triangulation of findings and enriching the study's credibility and validity. FGDs were selected because they foster interactive group dynamics, encouraging open discussions and diverse perspectives on adolescent alcohol consumption (Krueger & Casey, 2015). This technique facilitated peer interaction, making

respondents feel more comfortable expressing their views and promoting mutual understanding. Additionally, FGDs yielded rich qualitative data by encouraging respondents to build upon each other's responses and explore emerging themes in real time. Observing non-verbal cues further enhanced data collection, capturing respondents ' emotions, attitudes, and social dynamics.

The FGDs comprised six open-ended discussion topics, with each topic addressing one of the three study objectives. These topics were carefully designed to delve into various aspects related to adolescent alcohol consumption, allowing respondents to express their thoughts, experiences, and perceptions freely. The open-ended nature of the discussion topics encouraged respondents to share their insights in-depth, facilitating a thorough exploration of the research objectives. By covering each study objective comprehensively, the FGDs provided a holistic understanding of the factors influencing adolescent alcohol consumption from the perspectives of the respondents.

The Questionnaire

The study employed a semi-structured questionnaire as the primary data collection tool, specifically designed to gather information from adolescents aged 14 to 18 years, the main respondents of the study. This choice was informed by the questionnaire's efficiency in swiftly gathering data from a large population (Kothari, 2004), which was necessary for the current study's scale. Its structured format ensures uniformity and consistency during administration, simplifying the process (Muhoza et al., 2021; Oso, 2016). Moreover, its semi-structured nature allows for flexibility in probing responses, accommodating both quantitative and qualitative data collection needs. Given the literacy of the respondents, the

questionnaire's reliance on written responses proved suitable, eliminating potential communication barriers. Additionally, it affords respondents ample time to consider their answers, promoting thoughtful responses and enhancing data reliability (Kothari, 2004).

The questionnaire was structured into four parts, with the first section dedicated to gathering respondents' basic demographic information. The three subsequent sections corresponded to each study objective. Though the questionnaire predominantly consisted of closed-ended questions, the sections dedicated to the study objectives also included some open-ended questions. This design facilitated a comprehensive exploration of each objective while allowing for efficient data collection and analysis.

Key Informant Interview Guide

An interview guide was selected as the data collection tool for key informants in the current study due to its flexibility, depth of inquiry, and ability to facilitate contextual understanding and rapport-building. Interviews allow for open-ended questioning, follow-up inquiries, and probing, enabling researchers to explore complex topics in depth and gain insights into key informants' experiences, perspectives, and expertise (Richards, 2009; Kothari, 2004). This interactive process fosters a supportive environment that encourages honest and detailed responses, while also documenting verbal responses directly from key informants (Cossham & Johanson, 2019). Overall, interviews were chosen to elicit rich, nuanced insights and contribute to a comprehensive understanding of the research topic.

Response Rate

The current study achieved a 100% response rate, as shown in Table 3.

Table 3

Study response rate

Data Collection Strategy	Planned	Actual	Variance
Questionnaire	381	381	0%
Focus Group Discussion (FGDs)	06	06	0%
Key Informant Interviews (KIIs)	17	17	0%

The achievement of a 100% response rate, as depicted in Table 3, can be attributed to the execution of a comprehensive data collection process. At each selected school, copies of the questionnaire were administered to respondents, with research assistants employing the "drop-wait and collect technique." This approach involved distributing copies of the questionnaire, waiting for respondents to complete them, and then collecting them before moving on to the next school. Collaborating with teachers, the study ensured that all questionnaires were promptly filled, with administrators available to assist respondents as needed.

The confinement of respondents to the school environment facilitated questionnaire administration, as respondents were accessible and easily managed within a familiar setting. Additionally, the relatively small number of respondents at each school contributed to the smooth administration of the data collection process. Furthermore, the literacy of the respondents enabled them to navigate the questionnaires effectively, further enhancing the success of the data collection procedure.

Diagnostic Tests

During data analysis, the study performed the following tests to ensure minimal or no violation of statistical principles.

Normality, Validity, and Reliability

The study employed the Kolmogorov-Smirnov (K-S) criterion to assess the normality of the data. This decision was made based on the sample size exceeding 100, which led to the choice of K-S over the Shapiro-Wilk (S-W) criterion, typically used for sample sizes below 100. The Kolmogorov-Smirnov (KS) test, a non-parametric statistical test, is designed to determine whether two distributions originate from the same source or differ from each other.

Upon analysis, it was observed that the data did not exhibit a normal distribution, evidenced by all p-values being less than 0.05 at a 95% confidence interval. Consequently, the study opted for logit regression as the appropriate statistical method for analysis. Logit regression, a form of logistic regression, is particularly suitable for datasets with non-normally distributed data, especially when dealing with binary or ordinal outcomes.

Content validity was ensured through expert judgement technique using two experts. Two experts each rated each item on the instrument on a scale of $1 - 4$; with $1 =$ Not Relevant; $2 =$ Somewhat Relevant, $3 =$ Quite Relevant, and $4 =$ Very Relevant. Content validity index (CVI) was determined as:

$$CVI = \frac{n_{3/4}}{N}$$

where $n_{3/4}$ is the number of items evaluated as *quite relevant* or *very relevant* by both judges, and N the total number of items assesed. The instruments were rated as summarized in Table 4.

Table 4

Validity Assessment

		Judge 2				
		1	2	3	4	Total
	1	1	1	1	0	3
	2	1	1	3	3	8
Judge 1	3	0	0	18	11	29
	4	0	0	11	8	19
	Total	2	2	33	22	59

A validity index of 0.790 **CVI** $= \frac{48}{59} = 0.813$ was reported. This was acceptable, being higher than the minimum validity index of 0.70 accepted in social science research (Oso, 2016) as this one. Therefore, out of any 10 items in the tools, at least 8 correctly measured what they are supposed to measure.

Reliability was determined by test-retest method and Cronbach's alpha. In the test-retest method, the instruments were administered to the same sample of 30 students twice after 14 days. The outcomes from the two administrations were correlated using Oso (2012) formula;

$$R = 1 - \frac{T_2 - T_1}{T_1}$$

where T_1 and T_2 are the total scores of the first and second administrations respectively. A reliability index of 0.806 was reported.

$$R = 1 - \frac{74 - 62}{62} = 0.806$$

Analysis Tools

Utilizing SPSS IBM Version 22 and Microsoft Excel, the study employed both simple binary and multiple binary logistic regression analyses. The initial step involved establishing the proportional odds (log odds), which were then used to calculate the odds ratio. Bock (2023) defines odds as a comparison of the likelihood of two distinct outcomes occurring. Additionally, Sefidian (2022) characterizes the odds ratio as the ratio between the probability of success and the probability of failure.

Results and Discussion

The study incorporated both descriptive and inferential statistical analyses. Subsequently, the obtained results were thoroughly discussed and compared with findings from empirical studies to draw valid conclusions and formulate recommendations.

Descriptive Statistics

The study administered questionnaires to a total population of 381 respondents. The questionnaires were delivered by research assistants to all respondents in the selected schools. Out of these, 45% of the students were from Kakamega North, 27.8% of the total students came from Kakamega Central and only 27% of the total respondents were from Mumias West. More than a half of the respondents were females, (61%) while males were 39% respondents in the area of study.

For the community level factors, the standard deviation was 0.894 and variance as 0.800, as indicated in table (5). Since the deviation and variance were too small, it implied that all features were from the same data set. This means that, on average, the value within the data set was not far from the mean.

Table 5

Descriptive Statistics; Community level factors

Mean	2.680
Median	3.000
Std. Deviation	0.894
Variance	0.800

The current study examined the extent to which community-level factors act as predictors of alcohol consumption among adolescents in secondary schools in Kakamega County. Community level factors were measured from accessibility and availability of alcohol in the community. Accessibility was operationalized as distance to the nearest alcohol selling point, time for selling alcohol and cost of alcohol. Availability was operationalized as the types of alcohol found in the community (beer, wine, spirits/brandy and traditional brews). Respondents were also asked to react to several statements intended to determine community perception of adolescents' consumption of alcohol. Responses on accessibility, affordability and community perception of alcohol consumption by adolescents are summarized in Table 6.

Table 6

Accessibility, Affordability and Community Perception of Alcohol Consumption by Adolescents in Secondary Schools in Kakamega County

Variable	Level	Count	Percent
Distance to alcohol selling point	0 - < ½ km	43	11.3%
	½ km - < 1 km	36	9.4%
	1 km - < 1½ km	48	12.6%
	1½ km - < 2 km	125	32.8%
	2 km and above	129	33.9%
	Total	381	100.0%
Time of selling alcohol	At night	119	31.2%
	In the evening	61	16.0%
	In the morning	135	35.4%
	At all times	66	17.3%
	Total	381	100.0%
Cost of alcohol	Very Expensive	158	41.5%
	Rather expensive	122	32.0%
	Fair	43	11.3%
	Rather Cheap	18	4.7%
	Very Cheap	40	10.5%
	Total	381	100.0%
	1.00	134	35.2%

Variable	Level	Count	Percent
Availability (Type of alcohol)	2.00	67	17.6%
	3.00	132	34.6%
	4.00	48	12.6%
	Total	381	100.0%
Community Perception	Negative	53	13.9%
	Neutral	293	76.9%
	Positive	35	9.2%
	Total	381	100.0%

Table 6 provides a comprehensive overview of community-level factors influencing alcohol consumption among adolescents in secondary schools in Kakamega County. The factors considered included accessibility, affordability, types of available alcohol, and the community's perception of adolescents' alcohol consumption.

Accessibility:

Distance to alcohol selling point: Only 11.3% of students live within less than ½ km of the nearest alcohol selling point, while a majority (66.7%) live at least 1½ km away. This suggests that proximity alone does not significantly influence alcohol consumption.

Time of selling alcohol: Most alcohol (35.4%) is sold in the morning, and 17.3% of selling points operate at all times. Approximately 52.7% of available alcohol selling points expose adolescents to alcohol consumption during critical times, such as the morning before school.

Affordability:

Cost of alcohol: A majority (73.5%) of students find the cost of alcohol high, with 41.5% considering it very expensive. Despite the perceived high cost, a substantial number of adolescents (53.8%) still consume alcohol.

Availability:

Types of alcohol: Over half (51.2%) of adolescents have access to only one type of alcohol, while 12.6% have access to four types. The availability of multiple types of alcohol may contribute to high consumption, as 52.2% of adolescents have access to 2-3 types.

Community Perception:

Community Perception: The majority (76.9%) of students perceive the community's attitude toward adolescent alcohol consumption as neutral. Only 13.9% feel the community has a negative perception. The neutral or ambivalent stance may suggest a lack of community concern, making it easier for adolescents to be influenced towards alcohol consumption.

In conclusion, while factors like distance, cost, and community perception might be expected to deter alcohol consumption, the high prevalence of alcohol use among adolescents in Kakamega County indicates the existence of other compelling reasons. The availability of alcohol during critical times, the diversity of alcohol types, and the perception of community indifference contribute to the complex dynamics of adolescent alcohol consumption in the region.

On further analysis, alcohol consumption was regressed on community level factors to determine whether community level factors are significant predictors of alcohol consumption among adolescents in secondary schools in Kakamega County. The study investigated the null hypothesis that community level factors are not significant predictors of alcohol consumption among adolescents in secondary schools in Kakamega County; against the research hypothesis.

Statistically, the study tested the hypothesis that;

There is no significant difference in the log-odds of alcohol consumption among adolescents in secondary schools in Kakamega County based on accessibility and availability of alcohol.

H_{o3}: Logit(ALC) $= b_o + b_1$ ACC $+ b_2$ AVL $+ \varepsilon$………………………………(1)

H_{a3}: Logit(ALC) $\neq b_o + b_1$ ACC $+ b_2$ AVL $+ \varepsilon$………………………………(2)

where ALC = alcohol consumption, ACC = accessibility, AVL = availability, b_{is} = coefficients of regression, and ε = error of prediction. The results of the analysis are summarized in Table 7.

Table 7

Results of Regression of Alcohol Consumption on Community Level Factors of Adolescents in Secondary Schools in Kakamega County

Variable	B	ε	W	df	Sig.	e^B	-2LL	NR^2	Fit
Constant	.255	.506	.254	1	.614	1.291			
DST_1	.620	.412	2.262	1	.133	1.859			
DST_2	.067	.432	.024	1	.877	1.069			
DST_3	.194	.383	.256	1	.613	1.214			
DST_4	-.218	.279	.607	1	.436	.804			
TME_1	-.204	.359	.325	1	.569	.815			
TME_2*	-.825	.398	4.301	1	.038	.438			
TME_3*	-1.062	.353	9.079	1	.003	.346			
CST_1*	-1.048	.375	7.788	1	.005	.350			
CST_2*	-.794	.406	3.826	1	.049	.452			
CST_3	.488	.464	1.105	1	.293	1.629			
CST_4	.923	.615	2.254	1	.133	2.516			
AVL	.077	.114	.461	1	.497	1.080			
Summary			76.398	12	.001		499.571	.243	69.300

Note. Variable(s) entered on step 1: Distance to the nearest alcohol selling point (DST_1, DST_2, DST_3, DST_4), Time of selling alcohol (TME_1, TME_2, TME_3,), The average cost of alcohol (CST_1 CST_2, CST_3, CST_4), availability of alcohol (AVL), 2LL = loglikelihood, NR^2 = Nagelkerke R Square; W = Wald.

Table 7 shows a summary of regression of alcohol consumption on community level factors (accessibility and availability) of adolescents in secondary schools in Kakamega County. The results show that there is a significant difference in the log-odds of alcohol consumption among adolescents in secondary schools in Kakamega County based on community level factors, -2LL $= 499.571, p = .001$; $\chi^2 (12) = 76.398, p = .001$. Therefore at least one of the elements of community level factors is a significant predictor of alcohol consumption

among adolescents in secondary schools in Kakamega County.

Accessibility was measured from distance to the nearest alcohol selling point, time of selling alcohol and cost of alcohol in the community. Data on distance was analyzed against the level of 2 km and above as the base; while data on time was analyzed against "at all times" as the base. Data on cost of alcohol was analyzed against "affordable' as the base. Analyses of the Wald statistics shows that there is NO significant difference in the log-odds of alcohol consumption among adolescents in Kakamega County living at different distances from the nearest local selling points, and those living at least 2km from the nearest alcohol selling point, DST_1 $W(1) = 2.262, p = .133$; DST_2, $W(1) = .024$, $p = .877$; DST_3, $W(1) = .256, p = .613$; $DST_4 W(1) = .607, p = .436$. Hence proximity to alcohol selling point is not a significant predictor of alcohol consumption among adolescents in secondary schools in Kakamega County.

Time data shows that there is a significant difference in the log-odds of alcohol consumption among adolescents from communities where alcohol is sold in the evening (TME_2), ($W(1) = 4.301, p = .038$) and in the morning (TME_3), ($W(1) = 9.079, p = .003$) as compared to communities where alcohol is sold at all times. But there is no significant difference in the log-odds of alcohol consumption among adolescents from communities where alcohol is sold at night and adolescents from communities where alcohol is sold at all times, (TME_1) $W(1) = 0.325, p = .569$. Therefore, time of selling alcohol (evening and morning) are significant predictors of alcohol consumption among adolescents in secondary schools in Kakamega County.

Cost data shows that there is a significant difference in the log-odds of alcohol consumption among adolescents from communities where alcohol is very expensive, (CST_1) ($W(1) = 7.788, p = .005$) and adolescents from communities where alcohol is expensive, (CST_2) ($W(1) = 3.826, p = .049$) as compared to adolescents from communities where

alcohol is affordable But there is no significant difference in the log-odds of alcohol consumption among adolescents from communities where alcohol is cheap, or (CST_3) ($W(1) = 1.105, p = .293$), and adolescents from communities where alcohol is very cheap, (CST_4) ($W(1) = 2.254, p = .133$) as compared to adolescents from communities where alcohol is affordable. Adolescents from communities where alcohol is cheap, or is very cheap, or is affordable drink alcohol at the same rate. Therefore, cost of alcohol (high and very high) are significant predictors of alcohol consumption among adolescents in secondary schools in Kakamega County.

Availability data shows that there is NO significant difference in the log-odds of alcohol consumption among adolescents based on availability of alcohol, (AVL) $W(1) = .461, p = .497$). Availability of alcohol in not a significant predictor of alcohol consumption among adolescents in secondary schools in Kakamega County. This result supports that on consumption vi-a-vis distance to the nearest selling point. It indicates that adolescents can walk long distances to obtain alcohol. Adolescents from communities where alcohol is readily available and those from communities where alcohol is not readily available still drink alcohol at the same rate.

From the analyses above, alcohol consumption among adolescents in secondary schools in Kakamega County can be predicted from community level factors (accessibility) using the model in equation 3:

Logit (ALC) = $0.255 - .825$ $TME_2 - 1.062$ $TME_3 - 1.048$ $CST_1 - .794$ CST_2 $+ \varepsilon$ … …..(3)

where ALC = alcohol consumption, TME_2 = evening, TME_3 = morning, CST_1 = very expensive, CST_2 = expensive, ε = error of prediction.

Examination of Eq. 3 shows that if the cost of alcohol is constant, the log-odds of alcohol consumption among adolescents from communities where alcohol is sold in the evening is 0.825 points lower than the log-odds of alcohol consumption among adolescents from

communities in Kakamega County where alcohol is sold at all times if selling in the morning is not factored in. The log-odds of alcohol consumption among adolescents from communities where alcohol is sold in the morning is 1.062 points lower than the log-odds of alcohol consumption among adolescents from communities in Kakamega County where alcohol is sold at all times if selling in the evening is not factored in. With cost of alcohol held constant, the log-odds of alcohol consumption among adolescents from communities where alcohol is sold in the morning is 0.237 points lower than the log-odds of alcohol consumption among adolescents from communities in Kakamega County where alcohol is sold in the evening.

Further, with the cost of alcohol constant and if selling in the morning is not factored in, the odds of alcohol consumption among adolescents from communities where alcohol is sold in the evening is 0.438 times the odds of alcohol consumption among adolescents from communities in Kakamega County where alcohol is sold at all times. Further, if selling in the evening is not factored in, the odds of alcohol consumption among adolescents from communities where alcohol is sold in the morning is 0.346 times the odds of alcohol consumption among adolescents from communities in Kakamega County where alcohol is sold at all times. The odds of alcohol consumption among adolescents from communities where alcohol is sold in the morning is 0.788 times the odds of alcohol consumption among adolescents from communities in Kakamega County where alcohol is sold in the evening.

Additionally, if selling in the morning is not held constant, the chances that an adolescent from a community where alcohol is sold in the evening will consume alcohol is 56.20% times lower than the chances that an adolescent from a community in Kakamega County where alcohol is sold at all times will consume alcohol. On the other hand, if selling in the evening remains constant, the chances that an adolescent from a community where alcohol is sold in the morning will consume

alcohol is 65.40% lower than the chances that an adolescent from a community in Kakamega County where alcohol is sold at all times will consume alcohol. The chances that an adolescent from a community where alcohol is sold in the morning will consume is 21.20% times lower than the chances that an adolescent from a community in Kakamega County where alcohol is sold in the evening will consume alcohol, so long as the cost of alcohol remains the same.

Further analysis of Eq. 3 and Table 6, with the time of selling alcohol kept constant, the log-odds of alcohol consumption among adolescents from communities where alcohol is very expensive is 1.048 points lower than the log-odds of alcohol consumption among adolescents from communities in Kakamega County where alcohol is just affordable, if expensive is not considered. The log-odds of alcohol consumption among adolescents from communities where alcohol is expensive is 0.794 points lower than the log-odds of alcohol consumption among adolescents from communities in Kakamega County where alcohol is just affordable, if very expensive is not factored in. So long as time of selling alcohol is held constant, the log-odds of alcohol consumption among adolescents from communities where alcohol very expensive is 0.254 points lower than the log-odds of alcohol consumption among adolescents from communities in Kakamega County where alcohol is sold is expensive.

As time for selling alcohol remains constant, the odds of alcohol consumption among adolescents from communities where alcohol is very expensive is 0.350 times the odds of alcohol consumption among adolescents from communities in Kakamega County where alcohol is affordable, if expensive is removed from the model. On the other hand, the odds of alcohol consumption among adolescents from communities where alcohol is expensive is 0.452 times the odds of alcohol consumption among adolescents from communities in Kakamega County where alcohol is affordable, if very expensive is eliminated. As long as the time of

selling alcohol is held constant, the odds of alcohol consumption among adolescents from communities where alcohol is very expensive is 0.775 times the odds of alcohol consumption among adolescents from communities in Kakamega County where alcohol is expensive.

Following from the above analyses, if expensive is held constant, the chances that an adolescent from a community where alcohol is very expensive will consume alcohol is 65% times lower than the chances that an adolescent from a community in Kakamega County where alcohol is affordable will consume alcohol. But if very expensive is held constant, the chances that an adolescent from a community where alcohol is expensive will consume alcohol is 54.80% times lower than the chances that an adolescent from a community in Kakamega County where alcohol is affordable will consume alcohol. Put in perspective, the chances that an adolescent from a community where alcohol is very expensive will consume alcohol is 22.50% times lower than the chances that an adolescent from a community in Kakamega County where alcohol is expensive will consume alcohol.

Based on the analysis above, the study established that community level factors (time of selling alcohol: evening/morning and cost of alcohol: very expensive/expensive) are significant predictors of alcohol consumption among adolescents in secondary schools in Kakamega County. If other factors remain constant, community level factors account for 24.30% of the predictors of alcohol consumption among adolescents in secondary schools in Kakamega County, $NR^2 = .243$, $p = .001$. The model in Eq. 3 is 69.30% fit within the margin of error, other factors being constant.

Analysis of qualitative data from key informant interviews and FGDs identified several community factors that predispose students to alcohol consumption. The key issues identified from key informants' interviews were child labour, boda-boda, legislation and implementation, supply of raw materials, mushrooming slums, and customs. It was noted that there is plenty of child labour within the municipality and that children have access to easy money which they use to buy alcohol. Boda-Boda riding is a thriving business in the area. The informants pointed out that adolescent students ride boda-boda in the evening or weekends and get extra money which they use to buy alcohol and even bhang.

One important community related promoter is legislation and implementation. The chiefs pointed out that the law regulating sale and access of alcohol has been a big challenge. This is because other law enforcers are aiding and abetting the sale of alcohol to the adolescents. One chief stated, *"Minors are arrested by the administrators and the police and in most cases are coerced to pay bribes for them to be released"*. The informants noted that there is lack of harmonized operations between administrators and other security agents against alcohol consumption. Moreover, they observed, that court fines are very lenient and do not discourage brewing and dealing in alcohol. Another respondent concurred that law application is a challenge. He argued that *"The culprits lock themselves in selling premises making it difficult for Chiefs to arrest since warrant of arrest will be required before they break in to the building. This is notorious in Jua kali areas"*. Further, there is unregulated mushrooming "Busaa" clubs, and of wines and spirits shops in residential areas.

The informants told the researcher that there is plenty of supply of raw materials for alcohol making. A respondent remarked, *"Molasses is readily available"*. Moreover, there is rampant supply of cheap liquor from Uganda that finds its way to the urban areas; and in the villages/estates and backstreets in urban areas, and at the backyard of established bars. These unregulated practices enable adolescents to have easy access to it.

Some respondents expressed the opinion that community customs and practices promote adolescents' alcohol consumption. They pointed out that as a result, some leaders are not keen and interested in fighting alcohol consumption in the society and even condone and tolerate the practice.

A respondent pointed that, *"Some leaders including political leaders even go public in saying they grew up as a result of their parents selling alcohol".* It was also noted that there is an intentional way of using the adolescents to traffic alcohol at a fee. Another respondent argued that collective responsibility in handling children issues has died and this has greatly affected the adolescents. This has been compounded by the banning of caning and discipline of children in homes and schools which has relaxed discipline among adolescents. Respondents were all agreed that cultural practices like circumcision ceremonies, dancers, *disco-matangas*, house warming, and family get together all allow free use of alcohol by all present. In any case, the community feels and believes that "Traditionally business in alcohol is as good as any other economic endeavor".

The community level factors identified from the FGDs were more or the same as those pointed out in the key informant interviews. These included availability of plenty of unlicensed and unregulated alcohol especially for free in the community, unregulated advertisement of alcohol on billboards, TVs, social media posts; and customs and traditional beliefs that allow drinking of alcohol.

The main finding of the current study on this objective is that community level factors have significant influence on alcohol consumption among adolescents in secondary schools in Kakamega County. This accounts for 24.30% of the variance in alcohol consumption among adolescents in secondary schools in Kakamega County, other factors being constant. In essence, accessibility, availability, community cultural practices predispose adolescents in secondary schools in Kakamega County to alcohol consumption. The essence of this finding is that environment is a predisposing factor to adolescents' alcohol consumption.

There are many environmental factors, and they may vary from one place to another. However, cumulatively, they have a positive influence on adolescents' alcohol consumption. As DeCooman (2022) pointed out, and as the current study has established, the environment plays a significant role in the likelihood of developing alcohol problem. This can be explained from the fact the society or the environment is responsible for over 50% of the social factors like cultural acceptance of alcohol. Further, availability of alcohol and its exposure to advertising promote adolescent alcohol use.

This finding supports the positions held by Parry et al. (2019) that adolescents' desire to consume alcohol is heightened by its availability in the community. This agrees with the position of Guertler (2021) that the more prevalent alcohol is in a given setting, the more probable an individual will roll into alcoholism. It also supports the position of the American Psychological Association (2023) that social and environmental factors including easy availability of alcohol play a key role in promoting alcohol consumption among adolescents. It is also in concurrence with Schölin et al. (2022) who found that availability, accessibility and low prices of illicit alcohol in Sri Lanka resulted in tendency for it to be consumed in large quantities.

This finding further agrees the opinions of Mathibe et al. (2022) in South Africa, and the findings of Ochaba (2021) and Cooke (2017). Mathibe et al. (2022) found that accessibility and availability of alcohol from various sources increased alcohol use among adolescents in South Africa. Ochaba (2021) concluded that the degree of normative support for drinking provided by the neighborhood exacerbates the drinking habit. Cooke (2017) also concluded that one of the most powerful indicators of adolescent drinking behaviour is the overall social environment, especially the prevalence of drinking among the general adult population. This is also the position and the finding of the current study.

Kyei-Gyamfi (2023) in a study in Ghana, also found that alcohol consumption is related to the social

context and social norms, which in the context of the current study are community related variables. Carels et al. (2022) also foiund that availability and accessibility of alcohol remain a major contributing factor to alcohol-related harm among adolescents. Halsall et al. (2022) also concluded in a study conducted in Iceland, that social and physical environments predict alcohol consumption among adolescents. Social and physical environments are also indicators of community level factors. And as was established in the interviews, Halsall et al. (2022) also found, in addition, that adolescent alcohol use is also the consequence of group pressure and employment conditions, which are generally community level factors.

The finding that community level factors influence alcohol consumption among adolescents in secondary schools in Kakamega County fits into the context of other studies that have been done before. While the specific community level factors studied in these studies may vary, the lager picture is that are all indicators were selected from the larger pool of community of community level factors. It is appropriate to conclude from the above discussion that alcoholism is influenced by the community in which one lives, and that adolescents are less likely to acquire alcoholism when they have limited access. Adolescent alcohol consumption is likely to exist in communities where drinking is socially accepted. Peer pressure, wider social, environmental and legal contexts will shape adolescent alcohol use.

In a study among secondary school students in Madrid city, Spain neighborhood accessibility and availability of alcohol products within school environment has been associated with increased alcohol consumption and harms among adolescents (Martín-Turrero et al, 2022). This availability has been shown to be higher in neighborhoods with lower socio-economic status. Alcohol outlet density and proximity have been shown to contribute to alcohol consumption among adolescents.

Alcohol affordability measures are important instruments to monitor alcohol control policy in Sweden (Müller., et al 2023). Alcohol in Sweden is generally becoming more affordable, with high-priced alcoholic beverages becoming comparably more affordable than low-priced alcohol while low low-priced beer has become less affordable over the last decade.

The current study investigated community level factors as predictors of alcohol consumption among adolescents in secondary schools in Kakamega County. Community level factors were measured from accessibility and availability of alcohol in the community. Accessibility was operationalized as distance to the nearest alcohol selling point, time for selling alcohol and cost of alcohol. Availability was operationalized as the types of alcohol found in the community (beer, wine, spirits/brandy and traditional brews). Descriptive analysis showed that only 11.3% of the students live within less than ½ km to the nearest alcohol selling point, and only 20.7% of adolescents in secondary schools in Kakamega County live within less than 1 km to the nearest alcohol selling point. Further, most (35.4%) of alcohol is sold in the morning while 17.3% of the selling points sell alcohol at all times; which means that up to 52.7% of the available alcohol selling points grossly expose adolescents in secondary schools in Kakamega County to alcohol consumption. Moreover, a majority (73.5%) of the students feel that the cost of alcohol is high. Additionally, a majority (52.2%) of the adolescents in secondary schools in Kakamega County have 2-3 types of alcohol. This shows that alcohol is readily available to the adolescents in secondary schools in Kakamega County. In summary, a majority (76.9%) of the students feel that the community has a neutral perception of consumption of alcohol by adolescents in secondary schools. Therefore, adolescents can easily be swayed into alcohol consumption.

Inferential analysis returned a significant difference in the log-odds of alcohol consumption among

adolescents in secondary schools in Kakamega County based on community level factors, $-2LL = 499.571$, $p = .001$; $\chi^2 (12) = 76.398$, $p = .001$. There was a significant difference in the log-odds of alcohol consumption among adolescents from communities where alcohol is sold in the evening (TME_2), ($W(1) = 4.301$, $p = .038$) and in the morning (TME_3), ($W(1) = 9.079$, $p = .003$) as compared to communities where alcohol is sold at all times. There was also a significant difference in the log-odds of alcohol consumption among adolescents from communities where alcohol is very expensive, (CST_1) ($W(1) = 7.788$, $p = .005$) and adolescents from communities where alcohol is expensive, (CST_2) ($W(1) = 3.826$, $p = .049$). Alcohol consumption among adolescents in secondary schools in Kakamega County can be predicted from community level factors (accessibility and availability) using the model:

Logit (ALC) $= 0.255 - .825\ TME_2 - 1.062\ TME_3 - 1.048\ CST_1 - .794\ CST_2 + \varepsilon$ ……..(4)

The study established that community level factors are significant predictors of alcohol consumption among adolescents in secondary schools in Kakamega County. Community level factors account for 24.30% of the variance in alcohol consumption among adolescents in secondary schools in Kakamega County. The main community level factors that are derivers of alcohol consumption among adolescents in secondary schools in Kakamega County include child labour, boda-boda, legislation and implementation, supply of raw materials, mushrooming slums, and customs.

Study Conclusion

Community level factors were measured from accessibility and availability of alcohol in the community. Descriptive analysis showed that only 11.3 percent of the students live within less than ½ km to the nearest alcohol selling point. Further, most (35.4 percent) of alcohol is sold in the morning. A majority (73.5 percent) of the students feel that the cost of alcohol is high while (52.2 percent) of the adolescents have 2-3 types of alcohol. A majority (76.9 percent) of the students feel that the community has a neutral perception of consumption of alcohol by adolescents in secondary schools. Inferential analysis returned a significant difference in the log-odds of alcohol consumption ($p = .001$), ($p = .038$) and ($p = .003$) significant difference in the log-odds from communities where alcohol is sold in the evening and in the morning respectively. There was also a significant difference in the log-odds of alcohol consumption where alcohol is very expensive, ($p = .005$) and where alcohol is expensive, ($p = .049$). This account for 24.30 percent of the variance in alcohol consumption, other factors kept constant.

Study Recommendations

1. The County Government of Kakamega should work with the Ministry of Interior and community leaders to:

    a) Strictly implement existing regulations on alcohol production, sale, and consumption, especially those relating to the sale of alcohol to minors.

    b) Establish community task forces or coalitions to address alcohol availability and accessibility issues, involving key stakeholders such as schools, businesses, and community members.

    c) Strictly implement zoning regulations that limit the density and proximity of alcohol selling points near schools and residential areas, creating safer environments for adolescents.

    d) Allocate funding for community-based prevention programs and initiatives that promote positive social norms and attitudes towards responsible alcohol use.

2. Alcohol retailers and business owners should:

a) Implement responsible retailing practices, such as age verification checks and responsible beverage service training for staff, to prevent underage alcohol sales.

b) Engage in community partnerships and initiatives aimed at reducing alcohol-related harm, including supporting local prevention efforts and providing resources for youth diversion programs.

Table 8

Contributions to Knowledge

1. Determine whether community level factors are predictors of alcohol consumption among adolescents in secondary schools in Kakamega County. Community level factors were measured from accessibility and availability of alcohol in the community.	i. It is now known that community level factors are significant predictors of alcohol consumption among adolescents in secondary schools in Kakamega County. ii. The model from predicting alcohol consumption among adolescents in secondary schools in Kakamega from community level factors now exist: $\text{Logit (ALC}^I) = 0.255 - .825\,TME_2 - 1.062\,TME_3 - 1.048\,CST_1 - .794\,CST_2 + \varepsilon$ iii. The overall contribution of community level factors to the variance in alcohol consumption among adolescents in secondary schools in Kakamega County is known to be 24.30%.

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