EXPLORING THE TAPESTRY OF ADOLESCENT ALCOHOL CONSUMPTION: A SOCIO-ECOLOGICAL PERSPECTIVE FROM KAKAMEGA COUNTY, KENYA

[1]John Kipng'etich Korir[*]; [1]Wilson A. P. Otengah; [2]Susan M. Kilonzo; [1]Taji I. Shivachi; [1]Jonathan Omollo; [1]Pauline Chemutai Lang'at

[*]Corresponding Author: jkorrir@yahoo.com

https://orcid.org/0000-0002-9656-0760; https://orcid.org/0009-0002-4774-1968; https://orcid.org/0000-0003-1982-2250; https://orcid.org/0000-0003-4851-3756; https://orcid.org/0009-0002-6250-5787; https://orcid.org/0009-0006-8359-217X

[1]Rongo University, Kenya; [2]Maseno University, Kenya

Abstract

This paper explores adolescent alcohol consumption in Kakamega County, Kenya, employing a socio-ecological perspective rooted in Bronfenbrenner's theory. The study, a cross-sectional survey, combines qualitative and quantitative data to understand the prevalence, patterns, and predictors of alcohol consumption. Findings reveal a significant prevalence of alcohol consumption among adolescents, with a focus on heavy episodic drinking. Individual-level factors, particularly gender and place of residence, emerge as significant predictors. Despite the model's statistical significance, it explains only a small proportion of the variance, indicating the influence of other factors. The paper highlights the urgent need for targeted interventions considering socio-ecological factors to address the complex tapestry of adolescent alcohol consumption in Kakamega County.

Key Words: *Adolescent Alcohol Consumption; Socio-ecological Perspective; Kakamega County; Underage Drinking; Individual-Level Factors*

1. Introduction

Alcohol consumption is universal, cuts across all cultures, and is believed to be as old as human society (Botzet, Dittel & Birkeland, 2019). Since ancient times, alcohol consumption has been a common feature of human society, with the substance being consumed for psychological, medical, spiritual and social reasons, by a large proportion of human society (Chinman, Ebener, Burkhat, Osilla, Imm & Paddock, 2018.

Alcohol is a depressant (Sellers & O'brien, 2018), which when taken in small doses, has been found to cause euphoria, reduce anxiety and increase sociability (Sellers, Mc Roy & O'brien, 2019). As

such, consumption of alcoholic beverages *per se* does not constitute a problem. However, there is evidence of a causal relationship between harmful consumption and unfavourable outcomes. According to Trangenstein, Morojele, Lombard, Jernigan and Parry (2018), harmful consumption of alcohol may be categorized into four broad segments: 1) consuming large volumes of alcohol during one occasion in a short period of time, 2) excessive, uncontrolled and repeated consumption resulting in alcoholism; 3) consumption of illicit brews and 4) consumption by persons who are prohibited from use (expectant mothers, patients, invalids and children).

More than 5% of the global burden of disease and injury is attributable to alcohol, as measured in disability-adjusted life years (WHO, 2018). Harmful consumption of alcohol has also been associated with a more fatal outcome – death; approximately three million deaths annually can be directly related to harmful alcohol consumption, which represents 5.3% of all deaths worldwide (WHO, 2018).

Although the adverse effects of harmful alcohol consumption cut across all populations, the impacts are worse among adolescent consumers. Alcohol consumption, in whatever quantities, is harmful to children, including adolescents, because their brains are still in the formation stage (Grigsby & Forster 2018. Similarly, early debut of alcohol consumption has also been identified as one of the most important predictors of alcoholism in adults. Adolescents who consume alcohol are more likely to engage in other forms of risky behaviour like dangerous driving (Robbins, Russel & Chapman 2019), as well as violence and crime (Laqueur, Kagawa, Wright & Wintemute 2019; Snowden 2019). Likewise, alcohol consumption by adolescents may also cause unfavourable school outcomes such as poor academic performance, truancy, unrest, irresponsible behaviour and high dropout rates (Larimer, Parker, Lostutter, Rhew & Eakins 2020; Heradstveit & Skogen 2019).

Underage drinking in Sub-Saharan Africa has been documented to have more serious consequences than elsewhere because approximately one-third of all the alcohol consumed in Sub-Saharan Africa is home brewed and unsafe (Trangenstein *et al*., 2018). Consumption of homemade alcohol is associated with increased risk because of the undocumented and potentially dangerous ingredients, in addition to unstandardized processes. Moreover, weak healthcare systems, coupled with poverty, imply that adolescents who suffer from health-related consequences of harmful alcohol consumption in Africa may not access adequate healthcare (WHO, 2018).

Nonetheless, alcohol consumption is still very prevalent among adolescents worldwide, with the WHO (2019) estimating that 29.8% and 58% of adolescents have experimented with alcoholic drink by the age 15 and 18 years respectively. Although adolescents drink less often than adults due to limitations of finances, when they drink, they drink larger quantities at one sitting. That is because according to the WHO (2018), young people consume 90% of their alcohol by binge drinking, which is consumption of many drinks on one occasion.

A study carried out in Australia (Marayza, 2012), reported that 19.2% of adolescents consume one or more drinks regularly. In Portugal, approximately 50% of adolescents report having experimented with alcohol. Studies carried out in Brazil report prevalence values of alcohol experimentation ranging from 48.3 to 71.4% in adolescence, as well as a 27.3% frequency of regular use. In the United States, it is estimated that 4.6% of adolescents between 12 and 17 years of age have an alcohol dependence (Marayza, 2012).

A similar trend has been noted in Africa, where according to WHO (2018), 41% of adolescents had used alcohol, and 34% had used it in the preceding year. Another study reported that although the prevalence of heavy episodic drinking in adolescents was 6% in Africa compared to 8% globally, it was higher among adolescents than adults (Francis, Weiss, Mshana, Baisley, Grosskurth, & Kapiga, 2015). In East Africa, Kenya, and Uganda have the highest adolescent alcohol consumption rates, at 31.7% and 28.6% respectively, with proportions higher in urban relative to rural settings (Gitatui, Kimani, Muniu & Okube, 2012). Studies by Guyo, Abdirizak Garo (2018) found that alcohol is one of the major social problems in Kenya, with serious public health ramifications. The aforementioned studies found that alcohol consumption in Kenya starts at a very young age – as young as 10 years, and that approximately 8% of all children aged between 10 and 14 years have experimented with alcohol at some point.

In an attempt to deal with the problem in Kenya, various interventions have been implemented by the government. One such intervention is the enactment of legislation to regulate the sale and consumption of alcohol. Kenya has enacted laws such as the Narcotic Drugs and Psychotropic Substances (Control) Act (1994) that prohibits the sale of alcohol to persons aged below 18 years; Alcoholic control Act (2010), which prohibits and criminalizes consumption of alcohol by persons aged below 18 years. At the county level, many counties have also enacted legislation to control harmful drinking. Kakamega County where this study was conducted, has enacted Alcoholic Drinks Control Act (2014) that outlaws the sale of alcohol to minors and prohibits consumption by persons aged below 18 years. Further, the National Guidelines for Alcohol and Substance Use Prevention and Management in Basic Institutions (Ministry of Education, 2021) also prohibit alcohol consumption in all primary and secondary schools in Kenya, which typically cater for learners aged 19 years and below.

Further to the aforementioned prohibitive legal provisions, many governmental and non-governmental agencies in Kenya have rolled out various other interventions. These include preventive education campaigns, supply reduction, as well as rehabilitation and aftercare services for adolescents who are consumers (Gitau, Kiiyukia & Mutai 2018)

Despite the abovementioned interventions, alcohol consumption among adolescents persists. Notably however, the distribution of the vice is disproportionate across the country, with some counties reporting higher prevalence than others. For instance, the area of this study was reported as having the highest prevalence at 46.3%, followed by Bungoma County with 31.7% (GoK, 2019). In view of the persistence of the vice amidst all the interventions, there is need to understand the individual-level social dynamics that contribute to alcohol consumption among adolescents considering that some of the individual consumers may come from families where their siblings are not consumers.

The study was guided by socio-ecological theory, which posits that individuals and social groupings are components of a socio-ecological system, and that the system predicts social functions at the individual and group levels (Bronfenbrenner, 2000). Guttmacher et al. (2010) introduced the socio-ecological model of health behaviour in a modification of the socio-ecological theory, in which the authors amplify the argument that individuals, families, and communities are not isolated entities, but rather parts of interconnected ecological systems in which each individual, family, or community adapts to change that occurs in other parts (Benson & Stephanie, 2018). It provides a comprehensive framework for understanding the multi-level influences on adolescent behavior. This theoretical lens offers valuable insights into the diverse factors contributing to adolescent alcohol consumption, spanning from individual attitudes and beliefs to familial and community-level influences. Further it amplifies the argument that individuals, families, and communities are not isolated entities, but rather parts of interconnected ecological systems in which each individual, family, or community adapts to change that occurs in other parts. As seen in Figure 1, the model's overlapping rings show how elements at one tier influence factors at another layer.

Figure 1

The Socio-Ecological Model of Health Behaviour (adopted from Guttmacher, Vana, and Ruiz-Janecko 2010)
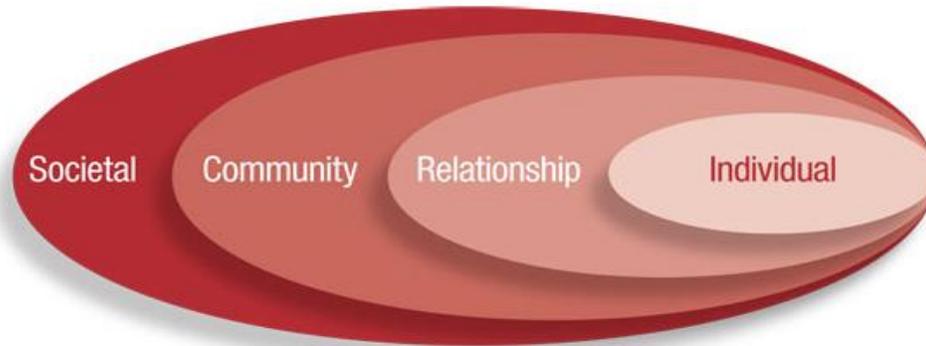
Source. *The socio-ecological model of health behaviour (adopted from Guttmacher et al., 2010)*

Bronfenbrenner's theory considers the intricate interplay of individual, relationship, community, and social influences, and it aids in understanding the variety of circumstances that place teenagers at risk of alcohol intake.

Individual-level characteristics, as shown in Figure 1, are the fundamental determinants of deviant behaviour, such as alcohol consumption. Individual-level determinants include sex, age, and religious affiliations, as well as socioeconomic factors like access to cash and education, among others, as well as socio-emotional and psychological disposition (Bronfenbrenner, 2000). Family-level factors include peer influence, media, social network connection, self-esteem, and influences from direct family or schoolmates may impact alcohol intake at the relationship level. Impacts from the neighbourhood as well as the overall effect from school are examples of community-level factors. At the societal level, macro variables like the availability of alcohol and race may predict teenage alcohol usage.

Briefly put, this idea suggests that human well-being is a continuum that extends from the individual to the larger, social levels. People's intake of alcohol is nested inside the family and larger community and within their micro-systems (their families, workplaces, and educational settings). Macro-level factors, such as exposure to advertisements, may forecast the opinions and standards of one's family and peer group, which then affects one's actions and mindset.

Drawing on Bronfenbrenner's socio-ecological theory, this study seeks to elucidate the underlying mechanisms driving adolescent alcohol consumption, with a focus on social constructs and contextual influences. By examining the reciprocal interactions between individuals, families, and communities, this research aims to uncover predisposing factors and inform targeted interventions to mitigate the prevalence of alcohol misuse among adolescents in Kakamega County.

Statement of the Problem

Despite the implementation of legislative measures by both the Kenya national government and the county government of Kakamega, adolescent alcohol consumption remains prevalent, particularly in Kakamega County. Statistics from the National Authority for the Campaign Against Alcohol and Drug Abuse (2022) reveal that approximately 42.5 % of youths in Kakamega County have reported the highest prevalence of lifetime use of alcohol. Furthermore, data from the alcohol consumption survey conducted in 2019 indicates that Kakamega County exhibits a

significantly higher prevalence rate (46.3%) of alcohol consumption compared to the national average of 10 %.

Western region of Kenya is reported to have the highest prevalence of severe alcohol abuse disorders at 24.5 % and the highest prevalence of both chang'aa (13.5 %) and traditional liquor brewing (17.4 %) in Kenya (National Authority for the Campaign Against Alcohol and Drug Abuse, 2022).

In response to this pressing issue, the national government has enacted legislative frameworks such as the Narcotic Drugs and Psychotropic Substances (Control) Act (1994) and the Alcoholic Control Act (2010) to regulate alcohol access and consumption, supplemented by Kakamega County's Alcoholic Drinks Control Act (2014). Despite these regulatory efforts, the enforcement and efficacy of these statutes remain questionable, with adolescent alcohol consumption persisting as a formidable challenge.

Furthermore, while theoretical frameworks like the socio-ecological theory provide valuable insights into the multifaceted nature of alcohol consumption behavior, empirical research specifically identifying the social dynamics driving adolescent alcohol use in Kakamega County is conspicuously lacking. Existing studies often rely on conjectures and anecdotal evidence, failing to provide the rigorous scientific foundation necessary for targeted interventions.

Hence, there exists a critical knowledge gap regarding the specific social dynamic variables contributing to adolescent alcohol consumption in Kakamega County. Addressing this gap is paramount to developing evidence-based strategies aimed at mitigating the prevalence of alcohol consumption and its adverse consequences among adolescents in the region

Knowledge Gap

The literature review reveals several critical gaps that this study aimed to address. A prominent gap is the lack of direct, empirically substantiated correlations between social dynamics and adolescent alcohol consumption. While the existing literature provides compelling evidence of significant adolescent alcohol consumption, much of the evidence is descriptive and anecdotal, relying more on observations rather than rigorous statistical analyses that establish clear causal links between social factors and drinking behaviors. This study, therefore, sought to move beyond mere conjecture by providing a rigorous scientific foundation that unravels the complex social underpinnings influencing adolescent alcohol use.

Another gap is the scarcity of local, context-specific research, particularly in non-Western or low-income settings like Kakamega County. Much of the existing literature is Western-centric, creating a knowledge void in understanding how family dynamics, cultural norms, and socioeconomic factors shape adolescent drinking in distinct cultural environments. Given Kakamega County's unique context, this study was poised to make a substantial contribution by testing whether Western-derived models hold true in this setting and accounting for local nuances.

Furthermore, the literature lacks predictive and integrative research that equips policymakers and educators with actionable insights to combat adolescent alcohol consumption effectively. While describing the problem's prevalence, the literature falls short in providing a comprehensive understanding of the multifaceted factors that drive this issue, hindering the development of targeted, evidence-based interventions.

Within the realm of family dynamics, several gaps emerge. The review identifies a need for nuanced explorations of the complexities within nuclear families, such as parenting styles, division of supervisory roles, and how these dynamics influence adolescent drinking. Additionally, the impact of sibling influence, particularly the protective effects of older siblings, and the understudied influence of polygamous family

arrangements on adolescent alcohol use, warrant further investigation.

The review also underscores gaps in understanding the interplay between environmental, social, and individual factors that may moderate the relationship between variables like proximity to alcohol outlets and adolescent alcohol consumption. This interplay is crucial for developing a comprehensive understanding of the determinants of adolescent drinking behaviors.

Lastly, the review acknowledges gaps in comprehending how cultural norms, socioeconomic factors, and specific rural practices in Kakamega County influence adolescent drinking behaviors. This contextual understanding is essential for tailoring interventions to the local cultural landscape and addressing the unique challenges faced by the communities in this region.

Research Methodology

The overall approach of the study was rooted in both positivism and post-positivism (interpretivism) schools of thought. From the point of view of interpretivism, social realities, meanings and knowledge are socially constructed and multiple understandings of them may exist (Thomas, 2022). Deriving from this, the study adopted a cross-sectional survey research design through which both qualitative and quantitative data were collected and analyzed.

The study was conducted in Kakamega County, in the western region of Kenya. The county was selected because it had the highest prevalence of adolescents' alcohol consumption in Kenya, at 42.5% (NACADA, 2022). It borders several counties as shown in figure 2

Figure 2

Map of Kakamega County

Source: Google Maps 2024

Kakamega county has a total population of 1,867,579, with 897,133 males, 970,406 females, distributed across 12 sub counties (National Bureau of Statistics, KNBS, 2019). Despite being predominantly rural, it is one of the most populated counties in Kenya after Nairobi, and Kiambu. Rural population accounts for 90% of the total population. More than half of the county population are minors and adolescents. The main economic activity is farming (County government of Kakamega, *Source. National Bureau of Statistics, KNBS, (2019).* 2022). Due to its high population, Kakamega town translates into high 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 the 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).

The sample size for this study was 381, arrived at using Cochran (2020) correction formula: $ñ = ((Z^2 pq)/d^2)/(1 + (\llbracket(Z^2 pq)/d^2\rrbracket / N))$; 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 = level of significance. Sample selection involved clustering the county into sub-counties, then purposively selected three sub counties – Mumias West, Kakamega Central and Kakamega North. These sub counties were selected on purpose because of a history of high prevalence of alcohol consumption. The three account for over half (51.0%) the total population of the county. In each of the selected sub-counties, secondary schools were stratified into national, extra-county, county and sub-county schools. From each stratum, one school was randomly selected for boys, another for girls, and one mixed school and a day school. Proportionate

to the population quotas were allocated to each selected sub-county, and respondents were then randomly selected from each school, in consultation with school principals. Key informants included five school principles (one each from boys, girls, mixed school, day school and day and boarding), three chiefs (one from each selected sub counties) and NACADA official based at the regional office in Kakamega town.

Data was collected from the main respondents using a semi-structured questionnaire and focus group discussions and from key informant using interviews schedule. The questionnaire was tested for reliability using the test-retest method. All ethical principles were strictly adhered to. In particular, to protect child respondents (those between age 13- 17) assent form for child participants were availed with a statement of the person obtaining informed consent. It further provided and stated that a participant was given sufficient information about the study, including that on procedures, risks and benefits, to enable the prospective participant to make an informed decision to or not to participate. At the end of the assent form was a place to append signature of acceptance to participate willingly

Quantitative data were sorted, checked for completeness and consistency and then coded and entered into SPSS version 27. Quantitative data was analyzed using descriptive and inferential statistics, while qualitative data were analyzed thematically.

Results and Discussion

The study collected data on respondents' demographic features with an aim of establishing the representativeness of the sample for generalization of the study findings. Data were collected on respondents' home, age, gender, regions, religion and type of residence of respondents, and the results are summarized in Table 1.

Table 1

Demographic Information

Characteristic	Levels	Frequency	Percent
Sub-County	Kakamega North	172	45.1%
	Kakamega Central	106	27.8%
	Mumias West	103	27.0%
	Total	**381**	**100.0%**
Residence	Rural set up	218	57.2%
	Urban set up	84	22.0%
	Semi-unban set up	74	20.7%
	Total	**381**	**100.0%**
Gender	Male	234	61.4%
	Female	147	38.6%
	Total	**381**	**100.0%**
Age	13-14	59	15.5%
	15-16	149	39.1%
	17-18	161	42.3%
	19 and above	12	3.1%
	Total	**381**	**100.0%**
Religious Affiliation	Catholic	222	58.3%
	Muslim	64	16.8%
	Protestants	95	24.9%
	Total	**381**	**100.0%**

Source, Author, (2024).

As can be seen in Table 1, close to half of the respondents (45.1 %) were from Kakamega North sub-county, with both Kakamega Central and Mumias West each accounted for close to one-third (27%). These percentages are proportionate to the number of schools in each of the sub-counties. Data on the age of respondents shows that slightly more than two-fifths (42.3%) of the respondents were aged between 17 and 18 years, while 15.5% were in the 13-14 years age bracket.

Regarding gender, Table 1 shows that a majority (61.4%) of the respondents were males. Data in Table 1 also reveals that the largest proportion of the respondents (58.3%) were Catholics, followed Protestants (23.9%) and Muslims (16.8). The relatively high proportion of Catholics could be attributed to the fact that most of the schools in Kakamega County are sponsored by the Catholic Church (Lusambili *et al*., 2022).

Data in Table 1 further indicate that more than half (57.2%) of the respondents were from rural areas, while 22% were from urban areas, with the remaining one fifth (20.7%) were from semi-urban areas. This data is generally reflective of the population distribution in Kakamega County (County Government of Kakamega, 2022).

Prevalence of Alcohol Consumption

The study sought to establish the prevalence of alcohol consumption among adolescents in the study area. To realize this, the study applied four sets of guidelines for measuring alcohol consumption: 1) the World Health Organization's international guide for monitoring alcohol consumption and related harm (WHO, 2010; WHO, 2000); 2) the Kettil Bruun Society's agreement on ways to measure alcohol consumption (Dawson and Room, 2000); 3) recommended alcohol

questions by the national institute on alcohol abuse and alcoholism (National Institute on Alcohol Abuse and Alcoholism, 2003); and 4) the standardized measurement of alcohol-related troubles (SMART) project guidelines by the European Commission (Moskalewicz and Sieroslawski, 2010). Deriving from the guidelines, this study captured data on five aspects of alcohol consumption: 1) consumption status; 2) frequency of consumption; 3) average volume of consumption; 4) frequency of heavy episodic drinking; and 5) type of alcohol consumed. The results are presented in Table 2.

Table 2

Prevalence and frequency of alcohol consumption

Measure of Consumption	Response						Totals	
Status of Consumption	Never Consumed		Consumed Only Once		Consumed more than Once			
	F	%	F	%	F	%		
	176	46.19	63	16.54	142	37.27	381	100.00
Frequency of Consumption	Rarely		Frequently		Very Frequently			
	F	%	F	%	F	%		
	73	19.16	48	12.60	21	5.51	142	37.27
Frequency of Heavy Episodic Drinking	Rarely		Frequently		Very Frequently			
	F	%	F	%	F	%		
	31	8.14	79	20.73	32	8.40	142	37.27
Type of Alcohol Consumed	Bottled Beer		Bottled Spirits		Traditional Brew			
	F	%	F	%	F	%		
	11	2.89	91	23.88	40	10.50	142	37.27

Source. Author, (2024).

Table 2 unveils a comprehensive overview of alcohol consumption patterns among the respondents, offering valuable insights into the prevalence, frequency and preferences within the surveyed population. A significant revelation emerges as more than half of the respondents, (53.8%) have consumed alcohol at least once. This revelation underscores the pervasive nature of alcohol consumption among adolescents in the study area, indicating a widespread familiarity with this substance. Furthermore, a notable 37.27% of respondents surpass a single instance of consumption, suggesting a recurrent engagement with alcohol.

The findings in Table 2 were corroborated by qualitative data obtained from Key informant interviews (KIIs) with chiefs and head teachers. For instance, as one chief in Kakamega Central pointed out:*"There are very many dens selling the local brew - chang'aa, especially in the informal settlements such as Jua Kali, Masingo and Makaburini. Small boys are known to frequent these dens to partake of the brew."* Another chief, from Kakamega North added, *"Alcohol consumption among youth in the school-going age bracket is very high in this location. The problem is worse during school holidays when the children are back from school".*

The prevalence of alcohol and its high consumption is greatly felt according to these administrators. This is manifested in the participation of adolescents, in particular boys of school going age, in alcohol consumption. Similarly, qualitative data collected from head

teachers seemed to concur with the findings in Table 2. According to one head teacher in a boys' boarding school in Mumias West:

> "Alcohol consumption among high school children is at alarming proportions, with boys' schools appearing to bear the brunt of the vice. As teachers and school managers, we have to be very vigilant, lest schools are turned into alcohol dens. If we are not vigilant, alphol can even be sold in schools. This is why we many schools, including ours, have installed CCTV cameras in strategic locations"

The aforementioned insights are indicative of a high prevalence of alcohol consumption among adolescents in the study area. The insights also support the quantitative data in table 2, which indicates a high prevalence.

The high prevalence of alcohol consumption as revealed in Table 2 appears to somewhat contradict with statistics obtained from NACADA (2022), which show that Kakamega County, where this study was situated, has the highest prevalence of alcohol consumption in Kenya, at 24.5%. Nonetheless, as revealed in Table 2, more than two thirds (37.27%) of respondents in this study reported having consumed alcohol more than once. This therefore implies that the consumption rate as captured in this study is actually higher than rate for County, which is incidentally the highest in Kenya. The findings of this study are also contradictory to the results of Musyoki, Arakala, Mogi and Muthee (2015), who found a prevalence rate of 21% in 2015, implying an increase in underage drinking in the study area.

Delving into the frequency of alcohol consumption, Table 2 exposes that 18.11% of respondents fall into the categories of frequent or very frequent consumers. Furthermore, nearly one-third of respondents (29.13%) engaged in heavy episodic drinking either frequently or very frequently. This information was confirmed by qualitative data obtained from FGDs, which indicates that heavy episodic drinking, or binge drinking, is common among adolescents in the study area. This could be attributed to the possibility that adolescents are under strict scrutiny while at school and therefore do not get opportunities to drink as frequently as they would wish. Therefore, whenever an opportunity presents itself, the adolescents take full advantage of it by engaging in binging. In the words of one FGD participant in Kakamega North: *"It is not every day that we get an opportunity to drink, so when we get such a chance, we usually take our full fill, because one never knows when next they will get the opportunity."* This information was corroborated by a NACADA official in the study area, who reiterated that: *"Most adolescents binge during birthday parties and similar occasions, during which they take full advantage to drink heavily."*

The above-mentioned sentiments indicate that adolescent in the study area are likely to engage in heavy episodic drinking or binging, whose dangers cannot be overstated. According to Chung, Creswell, and Bachrach (2021), exceeding the binge threshold increases the risk of acute harm, such as blackouts, overdoses, falls, drownings, and unsafe sexual behaviour with their resultant consequences such as sexually transmitted diseases and unplanned pregnancies. Furthermore, the authors suggest that even one episode of binging can compromise function of the immune system and result in acute inflammation of the pancreases. Repeated incidences of binging have been linked to liver disease, and an increase in the risk of head and neck, esophageal, liver, breast, as well as colorectal cancers. Furthermore, binging is particularly risky for adolescents because according to Jones, Lueras, and Nagel (2021), repeated incidences during teenage can alter the trajectory of brain development and result in various types of cognitive dysfunction, such as attention deficit disorder (ADD), and memory disorders among others. The findings in Table 2 regarding the frequency of binging are therefore particularly disheartening.

Regarding beverage preferences, data in Table 2 unveils a diverse landscape. A substantial portion (34.38%) of respondents reported consuming either bottled spirits (23.88%) or traditional brew (10.50%), with only a small minority, constituting 2.89%, reporting consumption of bottled beer. Qualitative data obtained from FGDs and KIIs revealed that the apparent preference for cheap bottled spirits and traditional brews could be related to two factors. The first one is economic: that bottled beer is considered expensive since one must take large quantities in order to get drunk. As stated by one of the FGD participants in Kakamega Central,

> "School-going youths are not social drinkers. They drink because they want to get high at minimum cost. In order to get high on bottled beer, one must drink eight or more bottles depending on the brand, yet one bottle costs around KES 200. At the price of one bottle of beer, one can buy two quarters of bottled spirits, or a whole bottle of the traditional brew chang'aa, which are enough to make two people get fairly high. Therefore, only the rich kids drink beer."

The above observations confirm the influence of community level factors and how in particular the availability of various type of drinks can act as am impetus driving the adolescents in the study area to consume alcohol.

The second factor is availability and ease of purchase. Bottled spirits are easily available at wines and spirits shops that are dotted all over the county, even in small shopping centers. Traditional brews are equally easily available in many villages in the study area. According to a NACADA official in the study area, *"One of the biggest challenges that we have encountered in ending the vice in this region is the ease of availability of cheap spirits and local brews. This is a real challenge".* This finding was corroborated by a chief in Mumias West, who said that

> "Most of the adolescents access alcohol from local unlicensed sellers who are only after making money and do not care about the age factor". Another chief, from Kakamega North added, "There is high availability of cheap illicit brews like busaa and chang'aa, as well as cheap spirits, which can be easily afforded by majority of the youths".

The abovementioned qualitative data further reinforce the finding that show that alcoholic drinks are available and accessible to adolescents in the study area. This finding corresponds with the findings of similar studies elsewhere, which found that adolescents in the 15 – 19 years age bracket prefer hard spirits in the USA (Miller, Naimi, Brewer & Jones, 2016; Kuntsche, Knibbe, Gmel, & Engels, 2016); United Kingdom (Cable & Sacker, 2017); Italy (Benzi, Stival, & al, 2023); Ghana (Kyei-Gyamfi, Wellington, & Kyei-Arthur, 2023); and Uganda (Swahn, et al., 2022). Other than the cost and availability eplanations presented in this study, other schoalrs argue that the preference for hard spirits is influenced by a desire to appear tough, mature or sophisticated (Benzi, Stival, & al, 2023) peer influence (Kuntsche, Knibbe, Gmel, & Engels, 2016) cultural and family influences (Musyoki, Arakala, Mogi, & Muthee, 2015) as well as socio-cultural norms (Chung, Creswell, & Bachrach, 2021)

Hypothesis Testing

The study sought to test the null hypothesis: "individual level factors are not significant predictors of alcohol consumption among adolescents in secondary schools in Kakamega County" A logistic regression analysis was conducted to examine the relationship between alcohol consumption and various individual-level factors among the respondents. Results of the regression analysis are presented in Table 3

Table 3

Results of Regression Analysis

Variable	B	ε	W	Df	Sig.	eB	-2LL	NR2	Fit
Constant	-.591	1.160	.260	1	.610	.554			
GND1*	.738	.216	11.670	1	.001	2.092			
AGE	.025	.070	.129	1	.719	1.025			
RSD1*	-.582	.271	4.626	1	.029	.558			
RSD2	.040	.323	.015	1	.902	1.040			
Summary			14.356	4	.006		511.613	.041	59.800

***Source;** Author, (2024)*

Notes. Variable(s) entered on step 1: gender of respondent, age of respondent, residence. GND_1 = males, RSD_1 = Rural set up, RSD_2 = urban set up, 2LL = log likelihood, NR^2 = Nagelkerke R Square; W = Wald.

Table 3 provides valuable insights into the relationships between individual-level factors and the likelihood of alcohol consumption. Overall, the Wald statistic for the model is 14.356 with a p-value of .006. This is an indication that the model, as a whole, is statistically significant. In other words, at least one of the predictors in the model is related to the likelihood of alcohol consumption among adolescents.

The constant term (-.591) represents the baseline log-odds of alcohol consumption for females in an urban setup. It is not statistically significant (with a p-value of .610), suggesting that, on its own, it does not significantly contribute to predicting alcohol consumption among adolescents in the study area. On the other hand, Table 3 reveals that the coefficient for males (GND1) is .738 with a highly significant p-value of .001. This implies that being male is a significant predictor of increased log-odds of alcohol consumption, since the odds of alcohol consumption for males are 2.092 times higher than for females.

Table 3 also shows that the coefficient for AGE is .025 with a non-significant p-value of .719, thereby suggesting that age is not a statistically significant predictor of alcohol consumption among adolescents in the study area.

Regarding residence, the coefficient for RSD1 (rural setup) is -.582 with a significant p-value of .029. This negative coefficient implies that adolescents in rural setups are associated with a decrease in the log-odds of alcohol consumption. Conversely, the coefficient for RSD2 (urban setup) is .040 with a non-significant p-value of .902. This suggests that residence in an urban setup is not a statistically significant predictor of alcohol consumption among adolescents in the study area.

The Nagelkerke R Square (NR2) is .041, indicating that the model explains a small proportion (4.1%) of the variance in alcohol consumption among adolescents. While statistically significant, it suggests that other factors not included in the model contribute to alcohol consumption.

Table 4 displays the summary of regression of alcohol consumption on individual level factors of adolescents in the study area. In the analysis, age was a continuous variable. On gender, alcohol consumption of males was compared against consumption by females as the base; while on residence, alcohol consumption among students in the rural set up and students in the urban set up was compared against consumption among students in the semi-urban set up as the base. The results show that there is a significant difference in the log-odds of alcohol consumption among

adolescents in study area based on individual level factors, $-2LL = 511.613$, $\chi^2 (4) = 14.356$, $p = .006$. Analyses of the Wald statistics shows that there is a significant difference in the log-odds of alcohol consumption among adolescents in secondary schools in Kakamega county based on gender of respondents ($W (1) = 11.670$, $p = .001$) and place of residence, $W(1) = 4.626$, $p = .029$. But there is no significant difference in the log-odds of alcohol consumption among adolescents in secondary schools in Kakamega county based on age of respondents, $W (1) = .129$, $p = .719$. Therefore, gender and place of residence are significant predictors of alcohol consumption among adolescents in secondary schools in Kakamega county. Alcohol consumption among adolescents in secondary schools in Kakamega county can be predicted from gender and place of residence of respondents based on the model in equation 1:

$Logit(ALC^1) = .738\ GND_1 - .582\ RSD_1 - .591 + \varepsilon$

$\dots$ Eq. 1; where ALC = alcohol consumption, GND_1 = males, RSD_1 = rural set up, ε = error of prediction.

Analysis of Eq. 1 shows that if residence is kept constant, the log-odds of alcohol consumption among male students in secondary schools in Kakamega county is .738 points above the log-odds of alcohol consumption among female students in secondary schools in Kakamega county. The odds that a male student in a secondary school in Kakamega county will consume alcohol are 2.092 times the odds that a female student in a secondary school in Kakamega county will consume alcohol. The chances that a male student in secondary school in Kakamega county will consume alcohol is 109.2% times the chances that a female student in a secondary school in Kakamega county will consume alcohol.

Further analysis of Eq. 1 shows that if gender is kept constant, then the log-odds of alcohol consumption among students in rural set ups in Kakamega county is .582 points lower than the log-odds of alcohol consumption among students in semi-urban set ups in Kakamega county. The odds

that a student in secondary school in a rural set up in Kakamega county will consume alcohol are .558 times the odds that a student in a secondary school in a semi-urban set up in Kakamega county will consume alcohol. The chances that a student in a secondary school in a rural set up in Kakamega county will consume alcohol is 44.20% times lower than the chances that a student in a secondary school in a semi-urban set up in Kakamega county will consume alcohol. But there is no significant difference in the log-odds of alcohol consumption among adolescents in secondary schools in urban set ups and adolescents in secondary schools in semi-urban set ups in Kakamega county, $W (1) = .015$, $p = .902$.

Based on the analysis above, the study has established that individual level factors are significant predictors of alcohol consumption among adolescents in secondary schools in Kakamega county. Individual level factors account for 4.10% of the predictors of alcohol consumption among adolescents in secondary schools in Kakamega county, other factors being constant, $NR^2 = .041$, $p = .006$. The model in Eq. 1 is 59.80% fit within the margin of error, other factors being constant.

Analysis of the qualitative data on individual level drivers of alcohol consumption among the adolescents in in secondary school in Kakamega County found the key individual drivers to be children attending *disco-matangas*, poor performance in school, school dropout and peer pressure. As one informant pointed out, *"Some children copy trade in alcohol from their colleagues who are already recruited into trade in alcohol and even consumption."* On school performance, an informant said, *"There is an illusion that alcohol consumption can make one cleverer in class work".* And another informant said, "Stress in academic programs can force adolescents into alcohol consumption". But some adolescents just desire to try or to discover alcohol. This is a confirmation that individual level factors in particular peer pressure can drive adolescents to

alcohol consumption. The factors raised in the FGDs were also the same factors advanced in the key informants interviews. Some of the major individual level factors emerging from the FGDs included curiosity, motivation from friends and peer pressure, pleasure and the desire to relieve stress.

The basic finding of the study on this objective is that individual level factors have a significant influence on alcohol consumption among adolescents in the study area and account for 4.10% of the variance in alcohol consumption among adolescents in secondary schools in Kakamega County, other factors being constant. This means that age, gender and place of residence influence alcohol consumption among adolescents in the study area, and individual level factors predispose adolescent to alcohol. This is understood because as Sampedro-Piquero et. al. (2023) point out, adolescence is a period of storm and stress, and is characterized by a greater impulsivity, and less control over impulses, behaviors, and emotions, and reward sensitivity, which cumulatively contribute to risky and disruptive behaviors such as alcohol consumption. Moreover, as Freichel et al. (2023) also notes, and has been found in the current study, adolescence is characterized by rapidly increasing rates of alcohol use.

Drawing from the findings of many scholars have pointed out, it is clear that many secondary school children are exposed to risk of alcohol consumption because of the high prevalence. This increasing prevalence was established both quantitatively and qualitatively and this portent a bad future to the youth. This is because as Kyei-Gyamfi (2023) found, early alcohol usage is linked to future dependency, health problems, and poor ability to interact with others. Harmful patterns of alcohol consumption, such as binge drinking that emerge during adolescence and become established in adulthood. In any case, the author concurs with Pourmovahed (2021) that early alcohol use point to future drinking patterns and contributes to long-term health consequences.

This finding supports the finding of several previous studies including the finding of a study by Sadeghzadeh et. al. in South Africa who found that 49.6 % of school-age adolescents had consumed alcohol. It also agrees with Carels et al. (2022) who found that the individual factors comprising age, race, gender and religiosity are associated with alcohol consumption among adolescents in South Africa. This study established many adolescents drink for coping reasons. This puts the youth into heightened risk for alcohol problems. This is because as Wardell et. al. (2020) point out, earlier initiation of alcohol use in adolescence is associated not only with increased risk of dependence but also with anti-social behavior and impairments of adaptive functioning, including relationship difficulties, academic failure, unemployment.

It is true therefore, due to age, gender and place of residence predisposing adolescents in secondary schools in Kakamega County to drinking, students will have low self-efficacy. Self-efficacy is related to vulnerability to engaging in negative behavior such as alcohol consumption and to information processing in different contexts (Gázquez et al., 2023). Self-efficacy in refusing to drink shows the confidence that students place in their abilities to resist drinking alcohol. But high prevalence of alcohol consumption among the adolescents in Kakamega County is evidence of low self-efficacy. As Muchiri and Santos (2018) found, risk factors associated with underage alcohol use in South Africa include being male and of a younger age. These are also the same variables in the current study.

Discussion

The findings of this study provide valuable insights into the complex landscape of adolescent alcohol consumption in Kakamega County, Kenya, from a socio-ecological perspective. The study employed a comprehensive approach rooted in Bronfenbrenner's socio-ecological theory, acknowledging the interconnectedness of

individual, interpersonal, community, and societal factors that shape adolescent behaviors, particularly alcohol consumption.

The prevalence of alcohol consumption among adolescents in Kakamega County is alarming, with more than half of the respondents reporting having consumed alcohol at least once. This finding is consistent with the socio-ecological framework, emphasizing that individual behaviors are influenced by factors at multiple levels. The high prevalence underscores the need for targeted interventions that address the socio-ecological determinants of alcohol consumption.

The patterns of alcohol consumption, especially the prevalence of heavy episodic drinking, raise concerns about the immediate and long-term health consequences for adolescents. The study's quantitative data, supported by qualitative insights from key informants and focus group discussions, highlight the pervasive nature of heavy episodic drinking, often associated with specific occasions and locations. This aligns with existing literature indicating the risks associated with binge drinking during adolescence, including acute harm, compromised immune function, and potential long-term health implications.

The study identifies gender and place of residence as significant individual-level predictors of adolescent alcohol consumption. Males show higher odds of alcohol consumption than females, aligning with broader societal trends. The influence of gender on alcohol consumption may be linked to societal expectations, peer dynamics, and cultural norms.

Place of residence also plays a crucial role, with adolescents in rural setups showing a decrease in the log-odds of alcohol consumption compared to their semi-urban counterparts. This suggests that environmental and contextual factors within different residential settings contribute to variations in alcohol consumption patterns.

The socio-ecological framework proves instrumental in understanding the intricate web of influences on adolescent alcohol consumption. Beyond individual-level factors, the study highlights the importance of considering broader ecological systems, including family, school, and community dynamics. The interconnectedness of these factors necessitates holistic intervention strategies that address multiple levels simultaneously.

The qualitative data reaffirm the quantitative findings, providing rich contextual insights into the factors contributing to adolescent alcohol consumption. From peer pressure to academic stress, the socio-ecological lens captures the multifaceted nature of influences on adolescents' behaviors.

The study's findings have practical implications for designing intervention programs in Kakamega County. Policy advocacy is imperative to regulate the availability of cheap spirits and traditional brews, as they emerge as preferred choices among adolescents due to economic factors and ease of access. Collaboration with policymakers is essential to enforce age restrictions and licensing for alcohol vendors, creating a safer environment for adolescents.

Conclusion and Recommendations

The study sheds light on the intricate fabric of adolescent alcohol consumption in Kakamega County, unveiling a substantial prevalence and the prominence of heavy episodic drinking. Individual-level factors, particularly gender and place of residence, prove to be significant predictors, though the model's explanatory power remains limited. The findings underscore the importance of adopting a socio-ecological lens to comprehend the multifaceted influences on adolescent alcohol consumption. As interventions are designed, it is crucial to consider the broader socio-ecological context to create effective strategies that go beyond individual-level factors.

Deriving from the findings, this paper makes the following recommendations:

1. Kenya's ministry of interior, under whose docket alcohol control falls, should engage community members, including parents, schools, and local leaders, in the design and implementation of prevention programs. Community involvement ensures cultural relevance and enhances the effectiveness of interventions.

2. The ministry of education should implement comprehensive education programs in schools to increase awareness about the risks associated with adolescent alcohol consumption. Emphasize the long-term consequences of heavy episodic drinking and dispel myths around the perceived benefits of alcohol use.

3. Change agents such as NGOs should advocate for policies that regulate the availability of cheap spirits and traditional brews, considering their impact on adolescent alcohol consumption.

4. There is need for further research to explore additional factors contributing to adolescent alcohol consumption, expanding the socio-ecological framework. Longitudinal studies can provide insights into the dynamic nature of these influences over time.

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