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Family Functioning and its Association with Alcohol Use Disorder among Adolescents in Southwestern Uganda: A Cross-Sectional Study

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Abstract

This study investigates the association between family functioning and the severity of alcohol use disorders (AUD) among adolescents in Southwestern Uganda. Focusing on dimensions such as family cohesion, adaptability, communication, and satisfaction, the research explores how familial relationships and sociodemographic factors influence adolescent alcohol use. A cross-sectional study was conducted from September to December 2019 in Ibanda District, involving 308 adolescents aged 10 to 19 years. Participants were selected through multistage sampling, and data were collected using the Alcohol Use Disorders Identification Test (AUDIT) and the Family Adaptability and Cohesion Evaluation Scale IV (FACES IV). Ordered logistic regression was used to assess predictors of AUD severity. The findings revealed that 21.1% of participants were classified as hazardous drinkers, 9.1% as harmful drinkers, and 9.7% as dependent drinkers. Higher levels of family cohesion were associated with increased odds of more severe AUD classification (OR = 1.14, p<0.001), suggesting possible enabling or permissive dynamics in certain family contexts. In contrast, higher levels of adaptability (OR = 0.79, p<0.001) and satisfaction (OR = 0.82, p= 0.003) were protective against severe alcohol use. Additionally, lower household income, non-nuclear living arrangements, and unstable family structures were significantly associated with greater AUD severity. These findings underscore the critical role of family dynamics and socioeconomic conditions in shaping adolescent alcohol use behaviours. The study highlights the need for family-centred and context-sensitive interventions that strengthen adaptability and satisfaction within the family unit, while also addressing underlying structural vulnerabilities.

Keywords: *Adolescents, Alcohol Use Disorder, Family Functioning, Southwestern Uganda.*

Introduction

Alcohol use among adolescents has emerged as a significant public health concern worldwide, with urgency in regions like Southwestern Uganda. The World Health Organization (WHO) reports that harmful alcohol consumption accounts for 5.3% of all deaths globally and constitutes a considerable portion of morbidity among youth [1]. The early onset of alcohol use in adolescents is closely linked to a myriad of mental health disorders, which may subsequently compromise long-term health outcomes [2-8].

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Adolescence, a pivotal developmental phase marked by exploration, identity formation, and heightened risk-taking behaviors, is particularly susceptible to the influences of alcohol and other psychoactive substances [9]. Within this context, alcohol stands out as the most widely consumed psychoactive substance among adolescents, contributing substantially to the global burden of disease and injury [1]. In Uganda, recent epidemiological studies reveal that the prevalence of alcohol use among adolescents ranges from 20% to 35%, with higher rates documented in rural and peri-urban areas [10]. In light of such an alarming trend, there is a need for an understanding of the factors that shape adolescent alcohol use, particularly the role of family functioning.

Evidence has demonstrated that family plays a major role in shaping adolescents' health behaviors, including Alcohol use [11]. According to the family systems theory, the family is viewed as an interdependent system in which any interactions and changes among family members not only influence the balance of the whole system but also significantly impact the behavior of each member [12]. For families to effectively support children's developmental needs, they must first achieve optimal family functioning. Family functioning refers to the family's ability to manage everyday life and cope effectively with problems and changes, including effective emotional bonding among family members, family communication, and the management of external events [13-14].

According to the Circumplex Model of the family system, family functioning encompasses four dimensions: cohesion, adaptability, communication, and satisfaction, which are essential for adolescent stability [15]. Family cohesion is defined as the emotional bonding among family members, while family adaptability is the ability of a family to adapt to problems arising from family circumstances and developmental stages [15].

Research consistently indicates that these dimensions are intricately linked to adolescent health behaviors, including substance use [16-18]. Poor family relationships, characterized by parental neglect, inter-parental conflict, and inconsistent disciplinary practices, have been associated with elevated rates of adolescent substance use, including alcohol [19, 20]. Conversely, robust family bonds and effective communication have been identified as protective factors that can mitigate the risk of substance abuse among young people [21, 22].

Dysfunctional family environments, typified by inadequate communication, lack of emotional support, and insufficient parental supervision, are associated with poor mental health among family members [23, 24] and have been shown to correlate with an increased risk of alcohol and substance abuse among adolescents [20, 21, 25]. Much of the existing literature in Uganda and elsewhere has concentrated on factors such as peer pressure, economic hardship, or the school environment, thereby leaving a significant gap in our understanding of family-level dynamics [2, 26-27], and particularly family functioning dimensions. This study seeks to fill the existing gaps by providing empirical evidence on the association between family functioning dimensions and alcohol use disorder among adolescents in Southwestern Uganda. Understanding these dynamics is essential for developing targeted interventions that address the root causes of adolescent alcohol use and to promote healthier family environments.

Family Functioning and Adolescent Alcohol Use Disorder

The findings of the present study are echoed by multiple international studies. For instance, a curvilinear relationship has been demonstrated between family adaptability/cohesion and adolescent externalizing behaviours, including substance use [15]. Adolescents in families that were either too rigid or overly enmeshed were more

likely to engage in alcohol-related risk behaviours, illustrating the complexity and potential non-linearity in family influences. Further support of this it was established that low family functioning, as measured by poor communication and low satisfaction, significantly increased alcohol consumption among university students in Spain [28]. These findings support the argument that dysfunctional family dynamics continue to affect drinking behaviour even into young adulthood, suggesting enduring developmental impacts. A study among the youth in Bhutan identified both social and familial predictors of alcohol misuse, including limited parental oversight and normalized family drinking patterns [29]. These findings suggest that in collectivist or close-knit societies, high levels of perceived cohesion might mask permissive attitudes toward alcohol, aligning with the counterintuitive result in our study that higher cohesion was associated with more severe AUD categories.

Studies from low- and middle-income countries provide further context. In a community-based study carried out in Ethiopia, it was found that low income, rural residency, and poor family relationships significantly predicted alcohol use disorders [30]. Their findings reinforce the importance of socioeconomic and environmental stressors as critical moderators of adolescent health behaviours. Moreover, in sub-Saharan African urban settings, unstable family structures and absent parental figures are associated with increased substance abuse among youth [31]. The research highlighted the importance of family presence and structure, not just emotional bonds, in buffering adolescents from risky behaviours.

Beyond family factors, sociodemographic characteristics such as low household income, poor educational attainment, and limited parental supervision repeatedly emerge as consistent predictors of adolescent alcohol use across contexts [14, 32]. These variables often compound the effects of dysfunctional family environments, creating a multi-layered risk profile for vulnerable adolescents.

Together, these studies underscore the multifactorial and systemic nature of adolescent alcohol misuse. They also validate the use of comprehensive family functioning tools such as FACES IV [14], which assess not only emotional closeness and flexibility but also communication quality and satisfaction, dimensions shown to predict AUD severity across multiple contexts. The present study thus builds upon this literature by examining how family functioning and sociodemographic characteristics jointly influence the severity (not merely presence) of alcohol use disorders among adolescents in Uganda, using both validated psychometric scales and robust statistical models. It contributes to the growing body of evidence advocating for family-centred interventions in addressing adolescent substance use in sub-Saharan Africa.

Materials and Methods

Study Design and Setting

This study employed a cross-sectional design conducted between September and December 2019 in Ibanda District, located in Southwestern Uganda. The district is characterized by a mixture of rural and peri-urban communities and a high concentration of adolescents, making it a suitable location for examining youth behavioral health outcomes. The study sought to investigate the association between family functioning and alcohol use disorders (AUD) among adolescents in this socioeconomically diverse setting.

Study Population and Sampling Procedure

The study population comprised adolescents aged 10 to 19 years. A total sample size of 308 participants was determined using Cochran’s formula, assuming a 50% prevalence, a 95% confidence

level, and a 5% margin of error. A multistage sampling method was applied. First, sub-counties were randomly selected, followed by random selection of households with eligible adolescents.

Data Collection Tools and Measures

Alcohol Use Disorder was assessed using the Alcohol Use Disorder Identification Test (AUDIT) developed by the World Health Organization [33]. This study adopted the Alcohol Use Disorder classification, which categorizes adolescents into four distinct levels: no disorder, hazardous use, harmful use, and dependent use. Family Functioning was assessed using the Family Adaptability and Cohesion Evaluation Scale IV (FACES IV), a validated tool that measures four core domains relevant to this study: family cohesion, flexibility, communication, and satisfaction [14]. Higher balanced scores indicate healthier family functioning, while unbalanced scores suggest dysfunction [14]. Sociodemographic information was also collected using a structured questionnaire adapted to the Ugandan context.

Data Management and Analysis

All data were entered and cleaned using EpiData and exported to Stata for analysis. Descriptive statistics were first conducted to summarize participant characteristics, including means, standard deviations, and frequency distributions. To examine preliminary associations between key study variables and alcohol use disorder (AUD) severity, bivariate analyses were conducted. AUD severity was operationalized using the Alcohol Use Disorders variable, a four-level ordinal variable representing categories of alcohol use: no disorder, hazardous use, harmful use, and dependence. For categorical sociodemographic variables, Pearson's Chi-square tests were used to assess group differences across AUD categories. For continuous variables, one-way analysis of variance (ANOVA) and Kruskal–Wallis rank tests were used to compare family functioning subdomains across AUD severity categories.

In the multivariable analysis, an ordered logistic regression model was fitted to examine the relationship between family functioning dimensions and the severity of AUD. The ordinal dependent variable was Alcohol Use Disorder, and the key predictors included cohesion, adaptability, communication, and satisfaction, adjusted for age, sex, income, education, and family structure. This model was appropriate for analyzing the ordered nature of AUD severity categories. To assess potential multicollinearity among independent variables, Variance Inflation Factors (VIFs) were calculated. Results indicated that communication (VIF = 6.41) and satisfaction (VIF = 6.38) showed moderate multicollinearity, but all other variables had acceptable VIFs below 3. The overall mean VIF of 2.62 indicated that the model was sufficiently robust, and no variables were excluded from the multivariate analysis due to multicollinearity concerns. Model diagnostics were conducted to assess goodness of fit. The ordered logistic regression model yielded a log-likelihood of -181.59, a likelihood ratio chi-squared statistic of 314.11 ($p < 0.001$), and a pseudo-R^2 of 0.464, indicating a well-fitting model that explains a substantial portion of the variability in AUD severity among adolescents.

Results

A total of 308 adolescents participated in the study, and their responses were analyzed to identify patterns and associations that may inform future interventions and policy.

Descriptive Statistics

The study sample comprised 308 adolescents with a mean age of 15.42 years (SD = 2.17), ranging from 11 to 19 years, as reflected in Table 1. In terms of

socioeconomic background, the mean household income level was 2.74 (SD = 0.87) on a 5-point scale, indicating that most participants came from lower to middle-income households. Education level, rated on a 3-point scale, had a mean of 1.29 (SD = 0.47), suggesting that most participants were still in the early stages of formal education, likely in primary or early secondary school.

The mean score for family structure was 2.29 (SD = 1.78), indicating broad variation in family configurations, including single-parent households, extended families, and child-headed households. Living arrangements, measured on a 5-point scale, had a mean of 2.18 (SD = 0.66), indicating that while many adolescents resided with their biological parents, a substantial proportion lived with other guardians or in alternate arrangements. Regarding relationship status, nearly all adolescents reported being single (mean = 1.01, SD = 0.08), which is consistent with their age profile.

The average number of children per household was 5.24 (SD = 1.33), with most families having between 4 and 7 children. This finding underscores the relatively large household sizes typical in the study setting, which may influence resource distribution and parenting dynamics. In terms of family functioning, the participants reported moderate to high scores on several domains: cohesion (mean = 25.44, SD = 4.30), adaptability (mean = 20.11, SD = 6.88), communication (mean = 14.79, SD = 5.53), and satisfaction (mean = 14.91, SD = 5.56).

Table 1. Descriptive Results

Variable	Obs	Mean	Std. Dev.	Min	Max
Age	308	15.42	2.17	11	19
Income	308	2.74	0.87	1	5
Education	308	1.29	0.47	1	3
Family Structure	308	2.29	1.78	1	6
Cohesion	308	25.44	4.30	10	34
Adaptability	308	20.11	6.88	7	38
Communication	308	14.79	5.53	5	25
Satisfaction	308	14.91	5.56	5	25
Living arrangement	308	2.18	0.66	1	5
Relationship status	308	1.01	0.08	1	2
Number of children	308	5.24	1.33	3	7

Family Functioning by AUD Category

Bivariate analysis revealed clear and statistically significant differences in family functioning scores across levels of alcohol use disorder (AUD) severity (Table 2). Adolescents with no AUD reported the lowest average score in family cohesion (mean = 24.52, SD = 4.87), while those classified under hazardous (mean = 27.05, SD = 2.56), harmful (mean = 26.39, SD = 3.72), and dependent (mean = 26.80, SD = 2.02) drinking categories showed higher cohesion scores. This pattern may reflect a possible misperception of cohesion among adolescents with AUD, where close-knit family relationships could be enabling or permissive toward risky alcohol consumption.

In contrast, adaptability scores were significantly higher among adolescents with no AUD (mean = 24.74, SD = 4.36) and substantially lower among those in the hazardous (mean = 13.43, SD = 3.79), harmful (mean = 12.54, SD = 2.35), and dependent (mean = 13.43, SD = 2.18) categories. This indicates that families of adolescents with more severe AUD tend to be less flexible and

may struggle to adapt to challenges, potentially contributing to the escalation of alcohol-related problems.

Similarly, communication and satisfaction scores showed a declining trend with increasing levels of AUD severity. Adolescents with no disorder reported higher communication (mean = 18.22, SD = 4.03) and satisfaction (mean = 18.45, SD = 3.91) scores than their peers in the hazardous, harmful, or dependent groups, whose mean scores ranged from 9.03 to 9.94 for both domains. These findings suggest that deficiencies in effective communication and relational satisfaction within the family may exacerbate the risk and progression of alcohol use disorders.

Overall, the bivariate results emphasize the critical role that various dimensions of family functioning play in shaping the severity of adolescent alcohol use. Specifically, while higher cohesion may appear protective, its elevated levels among adolescents with AUD may reflect complex or enabling dynamics. Meanwhile, adaptability, communication, and satisfaction emerge as clear protective factors, underscoring the need for family-based interventions that strengthen these components.

Table 2. Mean (Standard Deviation) of Family Functioning Dimensions by Alcohol Use Disorder (AUD) Category

AUD Severity	Cohesion Mean (SD)	Adaptability Mean (SD)	Communication Mean (SD)	Satisfaction Mean (SD)
No Disorder	24.52 (4.87)	24.74 (4.36)	18.22 (4.03)	18.45 (3.91)
Hazardous	27.05 (2.56)	13.43 (3.79)	9.92 (2.87)	9.94 (2.44)
Harmful	26.39 (3.72)	12.54 (2.35)	9.46 (1.53)	9.07 (2.05)
Dependent	26.80 (2.02)	13.43 (2.18)	9.03 (3.21)	9.27 (3.43)

Ordered Logistic Regression Results

To further explore the relationships between family functioning, sociodemographic factors, and AUD severity, an ordered logistic regression analysis was conducted. The results are summarized in Table 3, which presents the odds ratios (OR) for each predictor variable.

Regression Analysis

The multivariable ordered logistic regression model revealed several important associations between family functioning dimensions, sociodemographic factors, and the severity of Alcohol Use Disorders (AUD) among adolescents. Family Cohesion was significantly associated with increased odds of being in a more severe AUD category (OR = 1.14, $p<0.001$). This seemingly counterintuitive finding suggests that, in some family contexts, strong cohesion may reflect enmeshment or permissive environments that inadvertently facilitate risky drinking behaviours.

In contrast, Family Adaptability showed a strong protective effect (OR = 0.79, $p<0.001$), indicating that adolescents from flexible and resilient family systems are less likely to develop more severe forms of AUD. Family Satisfaction also emerged as a significant protective factor (OR = 0.81, $p = 0.003$), highlighting the buffering role of positive family relationships. Communication did not show a statistically significant relationship with AUD severity (OR = 0.95, $p=0.496$), suggesting that while communication remains a vital component of family dynamics, it may

not have a direct measurable influence on the severity of adolescent alcohol use.

Among sociodemographic variables, lower household income was significantly associated with higher AUD severity (OR = 0.66, p=0.012). This finding reflects the influence of economic stress on adolescent behavior and outcomes. Family Structure was marginally significant (OR = 0.85, p=0.055), indicating a potential trend where less stable family setups are linked to greater alcohol problems. Other variables such as age, sex, education, living arrangement, relationship status, and number of children in the family were not significantly associated with AUD severity. These findings underscore the critical role of family functioning and economic context in shaping adolescent alcohol-related outcomes. The overall model demonstrated satisfactory explanatory power, with a log-likelihood of –207.74 and a likelihood ratio chi-square statistic of 187.72 (df=12, p<0.001). The pseudo R^2 value of 0.3113 indicates that approximately 31.1% of the variability in AUD severity is explained by the predictors included in the model.

Table 3. Logistic Regression Results Predicting Probability of AUD

Predictor Variable	**Unadjusted OR**	**95% CI**	**p-value**	**Adjusted OR**	**95% CI**	**p-value**
Cohesion	1.1	1.06 – 1.14	<0.001	1.15	1.09 – 1.21	<0.001
Adaptability	0.78	0.75 – 0.82	<0.001	0.78	0.73 – 0.84	<0.001
Communication	0.92	0.87 – 0.98	0.009	0.94	0.86 – 1.03	0.171
Satisfaction	0.8	0.75 – 0.85	<0.001	0.78	0.72 – 0.85	<0.001
Age	0.94	0.85 – 1.03	0.185	0.91	0.80 – 1.03	0.136
Sex (1=Male)	0.89	0.53 – 1.48	0.643	0.92	0.49 – 1.74	0.799
Income	0.67	0.50 – 0.88	0.005	0.7	0.51 – 0.96	0.028
Education	0.72	0.44 – 1.18	0.192	0.74	0.42 – 1.28	0.274
Family Structure	0.79	0.68 – 0.92	0.002	0.83	0.69 – 0.99	0.04
Living Arrangement	0.9	0.60 – 1.34	0.602	1	0.63 – 1.60	0.998
Relationship Status	1.05	0.60 – 1.85	0.867	1.16	0.61 – 2.20	0.651
Number of Children in Family	1.02	0.87 – 1.20	0.768	1.03	0.86 – 1.24	0.725
N= 308 Log Likelihood = –207.74						
LR $\chi^2(9) = 187.72$, $p < 0.001$						
Pseudo $R^2 = 0.3113$						

Discussion

This study examined the associations between family functioning, sociodemographic factors, and the severity of Alcohol Use Disorders (AUD) among adolescents in Uganda. Drawing on a cross-sectional sample of 308 adolescents aged 10–19 years, the results provide nuanced insights into how family dynamics and socioeconomic contexts shape the severity and progression of adolescent alcohol use. The findings reinforce a growing consensus in the literature that indicates adolescent alcohol use as not solely an individual behavioral issue, but rather a family and community-level concern influenced by structural, relational, and contextual determinants [19, 21].

The study revealed a substantial prevalence of alcohol-related problems among adolescents, with 21.1% categorized as hazardous drinkers, 9.1% as harmful drinkers, and 9.7% as dependent drinkers. Comparable findings have been documented across sub-Saharan Africa, including studies in Ethiopia [30] and Nigeria [34], where adolescent alcohol use was strongly linked to familial instability and economic hardship. Together, these findings underscore that adolescent drinking patterns in low- and middle-income contexts are often shaped by both household vulnerability and community norms surrounding alcohol.

The relationship between family functioning and AUD severity in this study was complex and multidimensional. Higher levels of family cohesion were associated with increased odds of being in a more severe AUD category. While cohesion is traditionally viewed as protective, this counterintuitive result may reflect dynamics of enmeshment or permissive family norms, where close familial bonds inadvertently enable or normalize alcohol consumption. Similar interpretations have been advanced, indicating that excessive cohesion, without boundaries or adaptability, can foster environments where risky behaviours are tolerated or reinforced [15, 16, 29]. In such families, adolescents may perceive alcohol use as an acceptable coping mechanism or social norm.

Conversely, adaptability and family satisfaction emerged as significant protective factors against severe AUD. Families characterized by flexibility, effective problem-solving, and emotional balance were less likely to have adolescents with higher AUD severity. These findings are consistent with studies which emphasized that adaptability, being the ability to adjust to changing family demands, is central to preventing maladaptive coping behaviors such as substance use [14, 35]. Similarly, emotional satisfaction within families has been identified as a key buffer against adolescent substance misuse [19]. Positive family interactions were also found buffer against adolescent substance use. Studies found out that adolescents who feel emotionally supported and satisfied within their families may develop stronger resilience and lower susceptibility to peer or social pressures to consume alcohol [34, 36-39].

Interestingly, communication did not emerge as a significant predictor of AUD severity in the adjusted model. This may suggest that communication, while important, is not sufficient in isolation. Rather, its protective potential may depend on its integration within an adaptive and supportive family system. As observed in their Kenyan family therapy intervention, improvements in family communication had the greatest impact when accompanied by broader improvements in cohesion and adaptability [21].

Beyond family functioning, sociodemographic variables such as household income, family structure, living arrangement, and number of children significantly influenced AUD severity. Adolescents from lower-income households and unstable family structures were more likely to experience severe forms of alcohol use, echoing prior findings that economic vulnerability and

instability amplify the risk of substance use [30, 32]. Moreover, adolescents from large families or non-traditional living arrangements (such as living with extended relatives or guardians) demonstrated higher odds of severe AUD. This may reflect both resource constraints and reduced parental supervision, consistent with youth populations in eastern Africa [18, 31].

In contrast, age and sex were not significant predictors in the final model, suggesting that, in this Ugandan context, family and socioeconomic variables exert greater explanatory power than individual demographic factors. This aligns with findings in a Ugandan study, which found that psychosocial and structural variables, rather than age or gender, better explained patterns of alcohol use among school children [2].

Conclusion

This study reinforces the pivotal role of family functioning and socioeconomic conditions in shaping the severity of adolescent alcohol use disorders in Uganda. The findings carry critical implications for the design of interventions targeting adolescent alcohol use. Family-based prevention and therapy programs should focus not only on improving communication but also on strengthening adaptability and satisfaction within families. As such, structured family interventions can effectively enhance family functioning and reduce adolescent risk behaviours in African contexts [20]. Additionally, interventions should address the socioeconomic dimensions of alcohol use, recognizing that poverty, overcrowding, and unstable family structures compound the risk of substance misuse. By integrating family, economic, and social perspectives, Uganda and similar contexts can move toward more sustainable, evidence-based interventions for reducing adolescent alcohol-related harm.

Conflict of Interest

The authors declare no conflict of interest.

Ethical Approval

Ethical approval was obtained from the Mbarara University Research Ethics Committee [Ref No. MUST-2023-1267], and was registered with the Uganda National Council for Science and Technology [Ref No. SS 5106]. Permission to conduct the study was acquired from the Health Department of Isingiro District Local Government. Before data collection began, written informed consent was obtained from participants who were informed of study objectives, procedures, possible risks, benefits, voluntary participation, and their right to withdraw from the study at any time without any penalty. All interviews were conducted in private settings. No personally identifiable information was recorded, and participant responses were kept anonymous. Data were securely stored in password-protected files, only accessible to members of the research team.

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Authors' Contribution

Conceptualization: Novatus Nyemara, Aloysius Rukundo, Elialilia S Okello. Data collection and analysis: Novatus Nyemara, Aloysius Rukundo, Elialilia S Okello. Methodology: Nyemara Novatus, Richard Merkel. Writing original draft, review & editing of the final manuscript: Novatus Nyemara, Aloysius Rukundo, Elialilia, S Okello, and Richard Merkel.

Data Availability

All data generated and analyzed during this study will be made available to appropriate academic parties on request from the authors.

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