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# Early alcohol use and problem drinking among students in Zambia and Uganda

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## Abstract

Excessive alcohol use is a serious public health concern worldwide, but less attention has been given to the prevalence, risk and protective factors, and consequences of early alcohol use in low-income, developing countries. The purpose of this study was to determine the associations between early alcohol use, before age 13, and problem drinking among adolescents in Uganda and Zambia. Data from students in Zambia (n=2257; 2004) and Uganda (n=3215; 2003) were obtained from the cross-sectional Global School-Based Student Health Survey (GSHS). The self-administered questionnaires were completed by students primarily 13 to 16 years of age. Multiple statistical models were computed using logistic regression analyses to test the associations between early alcohol initiation and problem drinking, while controlling for possible confounding factors (e.g., current alcohol use, bullying victimization, sadness, lack of friends, missing school, lack of parental monitoring, and drug use). Results show that early alcohol initiation was associated with problem drinking in both Zambia (AOR=1.28; 95% CI:1.02-1.61) and Uganda (AOR=1.48; 95% CI: 1.11-1.98) among youth after controlling for demographic characteristics, risky behaviors, and other possible confounders.The study shows that there is a significant association between alcohol initiation before 13 years of age and problem drinking among youth in these two countries. These findings underscore the need for interventions and strict alcohol controls as an important policy strategy for reducing alcohol use and its dire consequences among vulnerable youth.

## Introduction

Excessive alcohol use is a serious risk-factor for adverse health outcomes worldwide.[1] Globally, alcohol use causes 1.8 million or 3.2% of all deaths and accounts for 4.0% of the disease burden.[2] The disease burden related to alcohol use is especially great among low-income and middle-income populations and countries, where alcohol consumption is increasing and injury rates are high due to limited implementation of public health policies and prevention strategies.[1,2] A critical aspect of alcohol use is pre-teen alcohol initiation, which worsens adverse health outcomes among youth. Epidemiological studies in western countries have examined the association between early alcohol initiation and problems related to alcohol among youth, but data is lacking to study such associations in most developing countries.

Pre-teen alcohol use is of paramount concern to public health as it has been associated with alcohol dependence,[3] substance use and criminal activity,[4] unintentional injuries,[5,6] unplanned and unprotected sex,[5] involvement in physical fights,[7] and suicidal ideation and attempts.[8-10] Literature on pre-teen alcohol initiation have identified gender, age, monthly income, living arrangement, attitude toward alcohol use, perceived susceptibility of alcohol use, perceived self-efficacy, peer drinking, relatives drinking, accessibility of alcohol around university, accessibility of alcohol around community, exposure to anti-alcohol campaign,[11] exposure to alcohol advertising,[11-14] and ownership of alcohol promotional items[13,15] as significant correlates of alcohol use.

The risk of alcohol use among youth in low-income countries is a vital public health concern. In Africa, alcohol use is related to poverty,[16] road traffic crashes,[17] sexual intercourse among adolescents,[18] unprotect sex,[16,19,20] and psychological distress.[21] To exacerbate the conditions, heavy episodic drinking is prevalent among young adults in several African countries.[22] For example, more than one in every three Zambian adolescents have ever drunk alcohol,[23] and Uganda has been noted as having the highest alcohol per capital consumption in the world.[22]

The current study uses nationally representative samples to examine the associations between pre-teen alcohol use initiation and drinking problems among Zambian and Ugandan youth. The study controls for demographic characteristics and other potential confounding variables that have been linked to alcohol use, substance use or suicidal behaviors.[24-28]

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## Materials and Methods

The current study is based on the Global School-based Student Health Survey (GSHS),[29] developed and supported by the World Health Organization in collaboration with the United Nations Children's Fund, the United Nations Educational, Scientific, and Cultural Organization, the Joint United Nations Programme on HIV/AIDS, and with technical assistance from the Centers for Disease Control and Prevention. The goal of the GSHS is to provide data on health behaviors and relevant risk and protective factors among students across all regions served by the United Nations. Country specific questionnaires, fact sheets, public-use data files, documentation and reports are publicly available from the Centers for Disease Control and Prevention and the World Health Organization and have been described elsewhere.[23,30-32]

In brief, the GSHS consists of a self-administered questionnaire, administered primarily to students 13-16 years of age. The survey uses a standardized scientific sample selection process, common school-based methodology, and a combination of core questionnaire modules, core-expanded questions, and country-specific questions. This study conducted secondary analysis of the restricted data files for Zambia and Uganda. Data were collected from Zambian students (n=2257) in 2004 and from Ugandan students (n=3215) in 2003. The school response rates were 94% for Zambia and 80% for Uganda, and student response rate were 75% for Zambia and 76% for Uganda, yielding an overall response rates of 70% for Zambia and 69% for Uganda. IRB approvals

was obtained from Georgia State University to conduct these analyses.

## Measures

In Uganda, prior to asking any of the alcohol-related questions, participants were instructed to think of alcohol to include drinking Tonto, Mwenge, crude, Waragi, Kasese, Lira lira, Uganda Waragi, Whisky, Bond 7, Tyson, Malwa, Kwete, Komek, Bell Beer, Special, Pilsoner, Club, Chairman (ESB), Eagle, and Citizen and that drinking alcohol does not include drinking a few sips of church wine for religious purposes. Similarly, students in Zambia were given the following instructions when responding to the alcohol-related questions to include drinking Mosi, Castle, Katata, Kachasu, or Katubi and that drinking alcohol does not include drinking a few sips of wine for religious purposes.

The outcome measure was problem drinking, defined as the number of times the students had a hang-over, felt sick, got into trouble with family or friends, missed school, or got into fights due to alcohol use. The measure was assessed on a 4-item scale ranging from 0 times to 10 or more times. Responses to either outcome measure were dichotomized to reflect none versus any problem drinking behavior.

The main independent variable was alcohol initiation before or at age 13 years old, which was measured by students' response on their age at which they had their first drink of alcohol other than a few sips. The 7-item scale ranged from never drinking to initiating drinking at 16 years of age or older. All analyses were limited to students 14 years of age and older. The analyses controlled for the following potential confounders: current alcohol use, bullying victimization, sadness, lack of friends, missing school, lack of parental monitoring, and illicit drug use. Each preceding variable was dichotomized to reflect none versus any involvement or exposure to the particular factor measured. Table 1 describes each measure and its prevalence within each country among students age 14 and older.

## Analysis

Logistic regression analyses were conducted to identify odds of alcohol initiation ≤13 years old after controlling for sex, age, current alcohol use, bully victimization, sadness, lack of friends, missing school, lack of parental monitoring, and illicit drug use. Logistic regression analyses were also computed to determine the associations between alcohol initiation ≤13 years old and problem drinking. Model 1 included sex, age, and alcohol initiation ≤13 years age. Model 2 included variables from Model 1 along with bully victimization, sadness, lack of friends, missing school, lack of parental monitoring, and illicit drug use. For variables where the amount of missing data exceeded five percent, the commonly used missing-indicator method was applied.[33,34] In this method, a dummy category is created to reflect the missing data and thereby including nearly all participants in the analyses rather than omitting them using the default listwise deletion used in the logistic regression computation. While no statistical findings or associations are reported on the missing data, the Odds Ratio would be interpreted as the risk for the outcome for those with missing data relative to the reference category. Analyses were conducted with the SAS 9.1 and SUDAAN 10.0 statistical software packages to accommodate the sampling design, and produce weighted estimates.

## Results

The prevalence of problem drinking and other factors examined in both Zambia and Uganda are presented in Table 1.

Results from logistic regression indicate that early alcohol use initiation was most strongly associated with current alcohol use in Zambia (AOR=6.78; 95% CI: 4.28-10.76) and in Uganda (AOR=14.37; 95% CI: 14.37-20.06) (Table 2). Moreover there were no differences by sex in terms of reporting pre-teen drinking initiation in either country. In Uganda, missed school without excuse and also lack of parental monitoring were significant factors associated with early alcohol use.

Logistic regressions were also conducted to determine the associations between alcohol use initiation, other factors and problem drinking using two separate models. Model 1 included sex, age, and alcohol initiation before age 13. In Zambia, in model 1, boys had significantly lower risk than girls for problem drinking (AOR=0.69; 95% CI: 0.49- 0.97), age 14 was a significant risk factor for problem drinking (AOR=1.57; 95% CI: 1.04- 2.37) compared to age 16, and alcohol initiation before age 13 was a significant risk factor for problem drinking (AOR=2.66; 95% CI: 2.11- 3.34). In Uganda, in Model 1, alcohol initiation before age 13 was the only risk factor for problem drinking (AOR= 2.97; 95% CI: 2.34- 3.77) (Table 3).

Model 2 of the logistic regression analysis included sex, age, alcohol initiation before age 13, current alcohol use, bully victimization, sadness, no friends, missing school, no parental monitoring, and illicit drug use. Results show that after controlling for these risk factors, alcohol initiation was significant-

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**Table 1. Variable description and prevalence of factors examined.**

| Variable name | Variable description | Zambia n=2257 weighted % | Uganda n=3215 weighted % |
|---|---|---|---|
| Early alcohol use initiation | Students who were 13 years or younger when they had their first drink of alcohol other than a few sips. | 36.4% | 21.6% |
| Problem drinking | Students who ever had a hang-over, felt sick, got into trouble with family or friends, missed school, or got into fights, as a result of drinking alcohol. | 45.1% | 21.5% |
| Current alcohol use | Students who had at least one drink containing alcohol on one or more days during the past 30 days. | 42.6% | 24.1% |
| Bullying victimization | Students who were bullied on one or more days in the past 30 days. | 63.1% | 44.3% |
| Sadness | Students who felt so sad or hopeless almost every day for two weeks or more in a row that they stopped doing their usual activities during the past 12 months. | 53.3% | 51.4% |
| No friends | Students who have no close friends. | 15.7% | 14.7% |
| Missed school | Students who missed classes or school without permission on one or more days during the past 30 days. | 58.5% | 46.4% |
| No parental monitoring | Students whose parents or guardians really knew what they were doing with their free time in the past 30 days. | 35.2% | 29.8% |
| Illicit drug use | Students who used drugs during their life.* | 36.7% | 31.0% |

*The types of drugs included in the questions differed in the two countries. In Uganda the question was asked as follows "During your life, how many times have you used drugs, such as marijuana (njaga or bangi) or opium (njaye) or sniffed aviation fuel? In Zambia the question was asked as follows: During your life, how many times have you used marijuana or hashish (also called daga, ibange, mbanje, or chamba)?

ly associated with problem drinking (AOR= 1.28; 95% CI: 1.02- 1.61; AOR= 1.48; 95% CI: 1.11-1.98) in Zambia and Uganda, respectively. Other significant factors associated with problem drinking were also identified. Current alcohol use, experience with bully victimization, sadness, missing school, and illicit drug use were significant risk factors for problem drinking among youth in both Zambia and Uganda.

## Discussion

This study examined the association between pre-teen alcohol initiation and problem drinking among youth in Zambia and Uganda. The results show that early alcohol use is a significant risk factor for problem drinking among Zambian and Ugandan youth after controlling for potential environmental confounders. This finding is supported by previous studies, primarily conducted in the U.S., that have found that early alcohol use is associated with risk-taking and other behavior and mental health problems in adolescence as well as later in life in.[3-10]

Moreover in this study, current alcohol use, experience with bully victimization, sadness, missing school, and illicit drug use were significant risk factors for problem drinking among youth in both Zambia and Uganda. These findings suggest that other risky behaviors are accompanying behaviors related to drinking, which need to be incorporated in multi-component interventional strategies to reduce substance use among Zambian and Ugandan youth. This study also found that problem drinking is a greater risk among Zambian girls than boys, which is supported by a previous study on Zambian youth that reported higher prevalence of drinking alcohol among girls than boys.[23] Generally, current alcohol use is more common among boys than girls; therefore, this finding calls for possible sex-specific research and intervention to reduce drinking behavior and problems among girls in Zambia.

Our study noted that youth in Zambia and Uganda experience similar risk factors for problem drinking. Moreover, the study found that alcohol problem is associated with several environmental risk factors that need to be targeted through interventional strategies. The findings of the study urges the need for multi-component intervention to reduce pre-teen alcohol use because alcohol use in Africa has been linked to poverty and risky sexual practices,[16,18-20] which worsen already dire social and personal conditions. Also, including or amplifying strategies to increase protective factors, such as school attendance, parental or guardian connectedness, peer support at school, and parental supervision[35] are critical in preventing adverse health outcomes among African youth.

There are several limitations that should be considered when interpreting the findings of this study. The study is based on self-reported data of students in Zambia and Uganda. Therefore, the findings cannot be generalized to youth who are not attending school or other populations. The surveys were administered in 2003 and 2004, hence the findings do not reflect any changes that may have taken place, such as policies and strategies that affect pre-teen alcohol use after the surveys were conducted. Also, the findings are based on cross-sectional analysis, and temporal relationships cannot be determined nor can causality be inferred. Other factors may be related to alcohol use among youth, such as mental health and physical and sexual violence,[36] that were not included in the analysis. Lastly, several variables had a substantial amount of missing data and the missing-indicator method was applied[34] to include participants with partially missing data in the analyses. Such method, while commonly used, may have biased some of the regression coefficients and impacted the findings.[37] Few investigations have examined the impact of early alcohol use initiation on problem drinking among youth in Sub-Saharan Africa. The studies that have been conducted so far, primarily in the U.S., indicate that early alcohol use initiation is a significant problem, and the current analyses underscore that early alcohol use initiation is a significant public health problem also in Zambia and Uganda. While studies conducted primarily in the U.S. provide important information about the relationship between early alcohol use initiation and problem drinking, analyses conducted in different countries and settings are needed to provide additional perspectives and

**Table 2. Multivariate associations between sex, age, alcohol risk factors and early alcohol use initiation among students 14 years of age and older in Zambia and Uganda.**

| | Alcohol use initiation | |
|---|---|---|
| | Zambia AOR (95%CI) | Uganda AOR (95%CI) |
| Sex | | |
| Boys | 1.12 (0.82-1.52) | 1.24 (0.91-1.68) |
| Girls | 1.00 | 1.00 |
| Age | | |
| 14 | 1.56 (1.11-2.19) | 1.64 (1.10-2.45) |
| 15 | 1.14 (0.80-1.62) | 1.36 (1.05-1.76) |
| >16 | 1.00 | 1.00 |
| Current alcohol use | 6.78 (4.28-10.76) | 14.37 (10.29-20.06) |
| Bully victimization | 1.30 (0.92-1.84) | 1.15 (0.83-1.59) |
| Sadness | 0.84 (0.63-1.12) | 0.99 (0.77-1.28) |
| No friends | 1.22 (0.77-1.96) | 0.84 (0.46-1.54) |
| Missed school | 1.20 (0.86-1.68) | 1.41 (1.08-1.85) |
| No parental monitoring | 1.03 (0.78-1.39) | 1.71 (1.22-2.39) |
| Illicit drug use | 1.18 (0.93-1.51) | 0.99 (0.64-1.54) |

AOR, adjusted odds ratios including all variables listed in the table.

**Table 3. Multivariate associations between sex, age, early alcohol use initiation and problem drinking among students 14 years of age and older in Zambia and Uganda.**

| | Problem drinking | | | |
|---|---|---|---|---|
| | Zambia AOR (95%CI) | | Uganda AOR (95%CI) | |
| | Model 1 | Model 2 | Model 1 | Model 2 |
| Sex | | | | |
| Boys | 0.69 (0.49- 0.97) | 0.72 (0.54-0.98) | 1.03 (0.80-1.32) | 0.88 (0.69-1.14) |
| Girls | 1.00 | 1.00 | 1.00 | 1.00 |
| Age | | | | |
| 14 | 1.57 (1.04- 2.37) | 1.83 (1.17-2.84) | 0.91 (0.66-1.26) | 1.18 (0.84-1.66) |
| 15 | 1.09 (0.79- 1.49) | 1.09 (0.72-1.64) | 0.95 (0.71-1.28) | 1.02 (0.75-1.40) |
| >16 | 1.00 | 1.00 | 1.00 | 1.00 |
| Initiation age <13 | 2.66 (2.11- 3.34) | 1.28 (1.02-1.61) | 2.97 (2.34-3.77) | 1.48 (1.11-1.98) |
| Current alcohol use | – | 5.01 (3.52-7.12) | – | 3.45 (2.59-4.60) |
| Bully victimization | – | 2.09 (1.41-3.08) | – | 1.42 (1.08-1.85) |
| Sadness | – | 1.26 (1.01-1.57) | – | 1.57 (1.30-1.89) |
| No friends | – | 0.78 (0.52-1.19) | – | 0.74 (0.47-1.16) |
| Missed school | – | 2.25 (1.58- 3.21) | – | 1.44 (1.11-1.89) |
| No parental monitoring | – | 1.01 (0.71-1.42) | – | 1.19 (0.89-1.59) |
| Illicit drug use | – | 3.06 (2.18-4.30) | – | 3.90 (2.82-5.39) |

AOR, adjusted odds ratios including all variables listed in the table.

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context to potential cultural and regional differences that impact early substance use and its consequences. In this study, comparisons of two nationally representative samples of youth in Zambia and Uganda highlight similarities and differences in the associations between early alcohol use and problem drinking. These findings, placed into context, can assist the development and implementation of prevention and intervention strategies that seek to reduce the harmful consequences of early alcohol use among vulnerable youth. Meanwhile, our findings support increased efforts to develop and implement evidence-based interventions to prevent and reduce early alcohol use initiation among vulnerable populations with high levels of current alcohol use.

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