Alcohol Use and Sexual Risk-taking Behavior: A Multilevel Investigation with African Data

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Introduction

Alcohol consumption has been recognized as a risk factor for HIV-related sexual risk behavior across the lifespan, but the magnitude and significance of the effects of alcohol use on sexual behavior remain a matter of debate even in developed countries where the bulk of evidence exists. In sub-Saharan Africa, evidence regarding the link between these two behaviors remains scanty at best because it remains under-researched. Yet, across the lifespan, there is growing recognition that individuals who engage in risk behaviors often participate in multiple types of behaviors. These include substance/alcohol use and unprotected sexual intercourse that are responsible for much of the mortality and morbidity experienced in adolescence and early adulthood (WHO, 2005a and 2005b). While older adults are more vulnerable to chronic conditions, the youth population is threatened by ailments that are behavioral and, thus, preventable (WHO, 2002).

The aim of this study is to examine the commonalities among alcohol use and risky sexual behavior from two standpoints. First, we will address the question of common antecedents or predictors of alcohol use and risky sexual behavior. Second, we will focus on the overlap in high-risk alcohol use and sexual behavior and answer the questions: "how many people aged 10-49 years in an African context are concomitantly at risk of alcohol abuse and risky sexual behavior?" and "what factors may account for the link between the two behaviors?" This is an opportune time to carry this type of research in an African context given the urgency to deal with high risk reproductive health problems and alcohol-use-related risks of HIV infection through unprotected sexual intercourse that have been suggested in the literature (Kuate-Defo, 2005a). Indeed: (i) Alcohol is now the most commonly used drug during adolescence both in rural and urban Africa (Kuate-Defo, 2005a); (ii) In a recent cross-cultural study of alcohol use and sexual risk behavior in eight countries (WHO, 2005a), the WHO urgently calls for "further investigation using quantitative methods and testable hypotheses"; (iii) Concern about HIV in adolescents and young adults has led a number of investigators to examine the link between drinking and risky behavior including failure to use condoms, but most of these studies are based on data from developed countries; and (iv) Most of such studies that conclude that this link exists have used global measures of both variables and have not investigated drinking and risky sexual behaviors across lifecourse and using a multilevel framework. Our approach provides an understanding of the importance of time and timing in associations between exposures and outcomes at the individual, household and community levels.

2. Conceptual framework and research hypothesis

Previous research based on problem-behavior theory has found that early age of onset of substance use is associated with engaging in multiple health risk behaviors. Available evidence suggests that adolescent risk behaviors share common underlying causes as well as having unique influences: individual, biological, family and neighborhood factors all influence the types of risks young people take. It is unknown whether these relationships begin during early adolescence and what are the factors that may account for them in specific social environments. Perhaps in no other area of the alcohol-use-sexual-behavior research is our information as rudimentary as in the socio-cultural context in which the constellation of such behavior takes place. What causes risky sexual behavior to decline in many countries (e.g., western countries with the lowest prevalence of HIV/AIDS) and to revive or to be rampant in others (e.g., African countries where HIV infection rates continue to rise despite the national/international efforts to halt/reverse the trend)? Why are these differences in behavior not only between cultures but within cultures? Alcohol use and sexual behavior are affected by decisions made in the context of a social and economic environment, often one that is undergoing rapid but uneven change. Large-scale surveys carried out by WHO and other international institutions have provided valuable comparative information on parameters such as the extent of alcohol use and sexual behavior among men and women in rural versus

urban areas, or among men and women of different educational levels (WHO, 2005a), but more detailed work is needed if we are to go beyond the recording of correlations to try to understand the many factors which influence patterns of alcohol use and the extent to which such behavior co-varies with sexual behavior at risk. Cross-cultural studies in a diverse country like Cameroon offer a promising tool for improved understanding of alcohol use and sexual risk-taking as biosocial processes.

Alcohol use has been proposed in some studies as a contributing factor to sexual risk-taking whereby alcohol use impairs individual judgment and decision-making and increases sexual risk-taking behavior (e.g., Grant & MacDonald, 2005). Other studies caution that both behaviors could be caused by other influential individual-level, household-level or contextual factors (e.g., Morrison et al., 2003). While the majority of studies show a positive correlation between alcohol use and sexual activity, the positive association between alcohol use and risky sexual behavior may be more likely attributable to some other influential variables operating at the individual, family or contextual levels. For instance, one alternative explanation for the positive association between substance use and sexual activity may be that these behaviors may reflect a common personality trait, such as thrill-seeking behavior. Another possible explanation may be that a person who is determined to have many sexual partners may use alcohol to cope with society's negative view of such behavior, thereby lowering the psychic costs of risky sex. The large number of existing studies has not been able to disentangle the variables intervening in the alcohol-sex relationship. A number of these studies typically use non-representative samples, and, most of them fail to control for a variety of neighborhood, household and individual factors that may confound estimated links between alcohol abuse and sexual practices.

Our main hypothesis is that alcohol use and sexual risk-taking are behaviors that are both influenced by many common factors and that depending on the socio-cultural environment, some individual, household or neighborhood factors may be more or less influential in affecting the strength of the link between the two behaviors. To test this hypothesis, we place our analyses within a lifespan multilevel framework whereby we assess the extent to which the determinants of the two behaviors are similar and whether the strength of the association between their specific measures is modified across a wide age span (10-49 years) given their age of onset and lifetime duration, and by individual-level, household-level and neighborhood-level variables that are commonly used in alcohol use and sexual behavior studies.

3. Data sources

Rich data from two population-based multilevel surveys – Cameroon Family and Health Surveys (CFHS) -- fielded between July 2002 and August 2003 in 141 urban and rural localities in French-speaking and English-speaking Cameroon to account for its linguistic diversity will be used. We propose to analyze data from two representative samples of the general population aged 10 years or older, collected as part of two large scale multilevel surveys in 2002 (sample of 4950 respondents living in 1765 households from all 75 villages and towns of the Bandjoun administrative division) and 2003 (sample of 2489 respondents living in 529 households from all 66 villages and towns forming the Bali administrative division) in Cameroon. The analyses are restricted to data on respondents aged 10-49 years because they are most at risk of alcohol use and sexual risk taking (Kuate-Defo, 2005). They are made of 5374 individuals aged 10-49 years belonging to 2261 households nested within 141 neighborhoods (on average, 2.4 individuals per household and 16.0 households or 38.1 individuals per neighborhood): 1895 respondents aged 10-49 years from 529 households nested within 66 neighborhoods in Bali (Northwest, English-speaking province); 3479 respondents aged 10-49 years from 1732 households nested within 75 neighborhoods in Bandjoun (West, French-speaking province). These data are part of clustered area probability samples of the household population of the 141 localities capturing much of the linguistic and ethno-cultural diversity of Cameroon. Interview instruments included measures of alcohol use, sexual activity, and a series of individual-level, household-level and neighborhood-level risk/protective influences on these behaviors.

4. Risk behaviors

Drawing from common approaches used in prior research, we define health risk behaviors as volitional involvement in established patterns of behavior that threaten the well-being of individuals and limit their potential for assuming responsible role. We distinguish risk-taking behaviors from risk outcomes - the consequences of the behavior. For

example, unprotected sexual intercourse is a risk behavior and is included in this analysis, while teenage pregnancy is a risk outcome and is not examined in this study. Ten dichotomized health-risk behaviors are examined in accordance with conventional measures of these behaviors in the existing literature and given our familiarity with Cameroon and data at hand: five alcohol-use health-risk behaviors (i.e., early onset of alcohol use, high frequency of alcohol use in the last month, at-risk situations of alcohol use in the last 12 months, third-party payment of drinking in general, and alcohol intoxication in the last 12 months); and five risky sex-related variables (i.e., early onset of sexual intercourse, age difference between partners at first sex is 5 years or more, multiple (2+) sexual partners in the last 12 months, no condom use at the first sexual intercourse or no/inconsistent condom use, coerced sexual intercourse at first sexual intercourse).

Our definitions will be designed to be comparable to measures of similar behaviors in previous studies so that our findings can be compared to those reported elsewhere. Although these 10 behaviors are not an exhaustive list of health risk, they reflect key areas of risk-taking behaviors that are potentially amenable to intervention in HIV/AIDS prevention efforts, notably in Africa. We will also assess the sensitivity of our estimates to alternative specifications of risk behaviors by considering for the alcohol-use health-risk behavior (or risky sex-related behavior), a risky behavior score. That is, the five items (coded 0 or 1) constituting the alcohol-use health-risk scale involve whether the respondent had early onset of alcohol use, had high frequency of alcohol use in the last month, was at-risk situations of alcohol use in the last 12 months, got third-party payment of drinking in general, and was alcohol intoxication in the last 12 months; the sum of these five binary measures will vary from 0 to 5, with a higher score indicating more risky alcohol-use behavior. A similar strategy will be used for sexual behavior.

5. Methods of analyses and expected findings

First, to address the question of common antecedents or predictors of alcohol use and risky sexual behavior, we will: a) describe the prevalence and patterns of alcohol use in the studied population under various occasions of alcohol consumption and across lifecourse from the age of drinking onset; and b) identify factors associated with alcohol use/intoxication and risky sexual behavior which may be amenable to intervention. Second, we will deal with the overlap in high-risk alcohol use and sexual behavior by examining the extent to which alcohol use is associated with sexual risk behavior in a wide age span from the age at onset of drinking and/or sexual initiation to the current age at interview in the two representative samples. Bivariate analyses of factors identified in the literature will be carried out and three-level (individual, household and neighborhood) logistic regressions will be fitted to the data to test the robustness of the various associations. Such analyses are designed so as to isolate contextual effects from individual and household influences on alcohol use, risky sexual behavior and the association between alcohol use and risky sexual behavior.

To illustrate our strategy of analyses, we will predict relevant alcohol-use measures (i.e., early onset of alcohol use, high frequency of alcohol use in the last month, at-risk situations of alcohol use in the last 12 months, third-party payment of drinking in general, and alcohol intoxication in the last 12 months) with age at first sexual intercourse (for respondents whose age at first use of alcohol is greater than age first sexual intercourse) as our primary explanatory variable, and we will then include each group of factors at a time (i.e., the individual characteristics, the household factors and neighborhood characteristics) as well as possible interactions between them. Similarly, we will predict risky sexual behaviors (i.e., early onset of sexual intercourse, age difference between partners at first sex is 5 years or more, multiple (2+) sexual partners in the last 12 months, no condom use at the first sexual intercourse or no/inconsistent condom use, coerced sexual intercourse at first sexual intercourse) among sexually active respondents whose age at first sexual intercourse is greater than age at first alcohol use) with age of drinking onset as our primary explanatory variable, and we will then include each group of factors at a time (i.e., the individual characteristics, the household factors and neighborhood characteristics) as well as possible interactions between them. Finally, we will consider the co-occurrence (same age) of onset of alcohol and sexual initiation as explanatory variable in predicting subsequent alcohol use (i.e., high frequency of alcohol use in the last month, at-risk situations of alcohol use in the last 12 months, third-party payment of drinking in general, and alcohol intoxication in the last 12 months) and subsequent risky sexual behavior (i.e., multiple (2+) sexual partners in the last 12 months, no/inconsistent condom use), and we will then include each group of factors at a time (i.e., the individual characteristics, the household factors and neighborhood

characteristics) as well as possible interactions between them. For instance, Morrison et al. (2003) found that in single-level logistic regression analyses, the odds of condom use were not associated either with whether a teenager had been drinking before sex or with the quantity of alcohol consumed. In contrast, Castilla et al. (1999) found that sexual risk behavior (i.e., more than one partner and failure to use a condom regularly) was more frequent among persons who had been drunk or used cannabis or cocaine, and concluded that excessive consumption of alcohol, and cannabis and cocaine use were independently associated with sexual behavior involving greater risk of HIV infection or transmission; Santelli et al. (2001) also found in a cross-sectional data analysis that failure to use condom was strongly associated with age of drinking onset. Thompson et al. (2005) found that more frequent episodes of alcohol intoxication were associated in a dose-response manner with an increased risk of having more (2+) sexual partners in the previous 12 months. These conflicting findings clearly challenge the widely accepted hypothesis that drinking is a cause of risky sexual behavior and underscore the urgent need for further research using the timing and sequencing of onset of alcohol use versus sexual intercourse and using state-of-the-art statistical methods as we propose here. To estimate the effects of factors associated with the probability of experiencing a given response variable, we will use multilevel logistic regression models given the dichotomous nature of the response variables considered.

6. Selected references

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