

Correlates of binge drinking among Brazilian adolescents

Correlações do *binge drinking* entre adolescentes brasileiros

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Abstract *Adolescence is a vulnerable period for risk-taking tendencies, including binge drinking. The aim of this study was to examine the prevalence of binge drinking and its association with factors related to the consumption of alcoholic beverages by best friend, familial factors, socioeconomic status and religiosity. A Census of 633 students from public and private schools in Diamantina-MG was conducted. Participants completed a self-administered questionnaire, the Alcohol Use Disorders Identification Test-C (AUDIT-C) and, another on the consumption of alcohol by family and friends. Surveys inquiring about socioeconomic conditions were sent to parents/guardians. Descriptive and bivariate analyzes were performed ($p < 0.05$). The log-binomial model was used to calculate PR and 95% CI. The prevalence of binge drinking was 23.1%. The average age of onset of alcohol consumption was 10,8 years. Binge drinking was more prevalent among adolescents whose best friend [OR = 4.72 (95% CI 2.78-8.03)] and brother [PR = 1.46 (95% CI 1.10-1.92)] drink alcohol. Religiosity [PR = 0.40 (95% CI 0.27-0.62)] appeared as a possible protective factor. Our findings indicate that peer effects are important determinants of drinking and could be utilized as a potential target for interventions to reduce alcohol consumption rates.*

Key words *Binge drinking, Adolescents, Socioeconomic status, Religion*

Resumo *A adolescência é um período vulnerável da tendência em assumir riscos, incluindo consumo excessivo de álcool. Avaliou-se a prevalência de “binge drinking” e sua associação com o consumo de bebidas alcoólicas pelo melhor amigo, fatores familiares, condição socioeconômica e religiosidade. Foi conduzido um censo de 633 alunos de escolas públicas e privadas em Diamantina-MG. Os participantes preencheram o Alcohol Use Disorders Identification Test-C (AUDIT-C) e um questionário sobre o consumo de álcool por familiares e amigos. Questionários com perguntas sobre condições socioeconômicas foram enviados aos pais/responsáveis. Foram realizadas análises descritivas e bivariadas ($p < 0,05$). O modelo log-binomial foi usado para calcular RP e 95% IC. A prevalência de consumo excessivo de álcool foi de 23,1%. A idade média de início do consumo de álcool foi de 10,8 anos. O “binge drinking” foi mais prevalente entre adolescentes cujo melhor amigo [OR = 4,72 (95% IC 2,78-8,03)] e irmão [RP = 01,46 (IC 95% 1,10-1,92)] consumiam álcool. A religiosidade [RP = 0,40 (IC 95% 0,27-0,62)] apareceu como um possível fator de proteção. Os efeitos de pares são importantes determinantes do consumo de álcool e poderiam ser utilizados como um alvo potencial em intervenções para reduzir as taxas deste.*

Palavras-chave *Binge drinking, Adolescentes, Condição socioeconômica, Religião*

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Introdução

Binge drinking - defined as consuming 5 or more drinks on one occasion - is a serious public health problem¹. Consuming a large quantity of alcohol in a single sitting increases the risk of traffic accidents, as well as domestic and interpersonal violence². Among adolescents, binge drinking has been linked to poor educational outcomes, relationship difficulties, behavioral problems (aggression and impulsivity), and risk of psychiatric disorders³⁻⁵.

In the Brazilian context, binge drinking is more prevalent among adolescents from *higher* socioeconomic backgrounds, i.e. children attending private (as opposed to public) schools, and those residing in more advantaged neighborhoods (having the best housing conditions, schools, incomes and jobs)⁶⁻⁸. According to Sanchez et al.⁸ three main pathways can explain these findings: 1) financial: adolescents from more affluent families receive more pocket money to spend in nightclubs, pubs and parties for the purchase of drinks and/or 2) socio-cultural: families from different socioeconomic strata may vary with regard to the extent of parental monitoring and rules within families governing the behavior of children, and/or 3) psychological: perceptions of immunity from the consequences of intoxication - e.g. kids from more affluent backgrounds are less likely to face legal consequences when accosted by the police. However, the association between socioeconomic status and alcohol use among adolescents may vary according to regional patterns of income and inequality, and merits further analysis in different countries to improve the evidence.

Despite the fact that the legal age of drinking is 18 years in Brazil (Lei nº 9.294, de 15 de junho de 1996)⁹, alcoholic beverages are commonly consumed by teenagers and the average age for first alcohol use is 12.5 years¹⁰. Adolescents use substances to gain recognition and maintain their status among peers. Prior studies have shown that risky behaviors by adolescents may be influenced by norms within their own immediate subcultures¹¹. For example, some adolescents might be steered toward alcohol use by deviant peers and alcohol use over subsequent years could become a part of regular social interactions with peers. Other adolescents might be influenced primarily by parental alcoholism or family factors. Additionally, alcohol use during adolescence could be low but gradually increase into the high-school years because of more nor-

native experimentation with alcohol in social gatherings with peers¹².

The influence of religious factors on substance use is an additional focus of research interest. Involvement of adolescents in religious practices has been linked to lower alcohol use¹³⁻¹⁵. This result can be understood through the framework of social control theory which posits that the individual's association with non-deviant peers promotes conformity to pro-social norms. Thus, attendance of religious services and events could promote conformity to norms against substance use, reduced time for engagement in substance use, and provide a source of stability and support in the individual's life¹⁶.

Most research on binge drinking in youth has been conducted in specific settings (e.g. North American college students, adolescents in Australia etc.). Because binge drinking in Brazil tends to begin earlier in life, there is an urgent need to understand the correlates of this behavior in order to drive prevention efforts. Accordingly, in this paper, we examined the prevalence of binge drinking/alcohol consumption and its association with factors related to the consumption of alcoholic beverages by best friend, familial factors, socioeconomic status and religiosity among students in the municipality of Diamantina, state of Minas Gerais, Brazil.

Materials and methods

Study design and sample

The present cross-sectional study was carried out in southeastern Brazilian municipality with 47,952 inhabitants, an 83.4% literacy rate, a human development index (HDI) of 0.716 (among the best in cities of the region Vale do Jequitinhonha). A total of 7,474 schoolchildren are enrolled in elementary schools in urban and rural areas in the municipality (477 in private schools and 6,997 in public schools)¹⁷. We conducted a Census of all 12-year-old students enrolled at all thirteen public and private schools in urban areas (n=633). Surveys inquiring about socioeconomic conditions were sent to parents or guardians, along with the document seeking informed consent.

Measures

Socioeconomic status

To analyze the socioeconomic status this study adopted three measurements. The first

questionnaire adopted was the ABA-ABIPEME¹⁸. This instrument is relating to the possession of various assets, and was dichotomized into high socio-economic class (Class A and B) and lower (C, D and E). The socioeconomic indicators employed were monthly family income and mother's schooling. Family income was determined based on the sum of all salaries received by economically active residents in the home and categorized based on the current Brazilian minimum salary; the threshold was the median response. Mother's education was defined as the number of years of study, with seven years used as the cut-off point; the threshold was the median response.

Alcohol consumption

The short version of the AUDIT instrument (*Alcohol Use Disorders Identification Test C*) was included. The AUDIT-C consists of questions related to the frequency and quantity of alcohol consumption and has been validated in Brazil¹⁹. The instrument is composed of the following items: 1) "How often did you have a drink containing alcohol in the past year?" The response options were: "Never", "Monthly or less", "2 to 4 times a month", "2 to 3 times a week", and "4 or more times a week"; 2) "How many drinks containing alcohol did you have on a typical day when you were drinking?" and 3) "How often do you have five or more drinks on one occasion?". The response options for question 2 were: "1, 2 or 3", "4 or 5", "6 or 7", "8 or more" and for question 3: "Never", "Less than once per month", "once per month", "once per week", "daily", or "almost daily". The third item was used to classify binge drinking, which was dichotomized as 0 (never consumed five or more alcoholic beverages on a single occasion) and 1 (consumed five or more alcoholic beverages on a single occasion at a frequency of once a month to daily). The frequency of alcohol consumption by friends and family as well as the age that the respondent tried alcohol for the first time were also asked²⁰. To analyze the frequency of alcohol consumption by friends and family we dichotomized the variables as same we did with the frequency of consumption by the adolescent: 0 (never consumed five or more alcoholic beverages on a single occasion) and 1 (consumed five or more alcoholic beverages on a single occasion at a frequency of once a month to daily).

Parental control and Religious participation

The adolescent's perception about parental control was also asked with the statement: "My

mother controls everything I do". For the responses we used a Likert scale, with the options of agree, neither agree nor disagree and disagree²¹. To analyze parental control, we dichotomized the variable: 0 (agree) and 1 (neither agree nor disagree and disagree). Religious participation among the adolescents was evaluated through the following question: "Did you participate in religious activities in the last 6 months?". This variable was also dichotomized in 0 (no) and 1 (yes).

The questionnaires were self-administered in the classroom without the presence of the teacher, and all completed surveys were de-identified to maintain the students' confidentiality.

Statistical analysis

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS for Windows, version 22.0, SPSS Inc, Chicago, IL, USA) and included frequency distribution and association tests. The chi-square test was used to determine the statistical significance of associations between binge drinking and the independent variables ($p < 0.05$). Given the high prevalence of the outcome ($> 20\%$), we used log-binomial model to calculate prevalence ratios (PR) and 95% confidence intervals. The two-tailed p value was set at < 0.05 . We develop a single model of regression, adjusted for all the variables listed in the table.

Ethical considerations

This study received approval from the Human Research Ethics Committee of the Federal University of Minas Gerais (Brazil). All parents/guardians signed a statement of informed consent authorizing the participation of their children. All adolescents also signed a statement of assent.

Results

The sample comprised 588 students (participation rate: 92.89%). The reasons for non-response included non-authorization from parents/guardians or adolescents (4.62%; $n = 28$) and failure to complete the questionnaires (2.9%; $n = 17$). The average age of first use of alcohol was 10.8 years. The prevalence of binge drinking was 23.1%. The majority of schools in the sample were public ($n = 11$). Boys accounted for 48.6% ($n = 286$) of the

sample. Among these participants, the vast majority attended public schools (94.2%; $n = 542$). A total of 75.3% ($n = 488$) of adolescents were from families that earned up to three times the Brazilian monthly minimum wage, and 64.0% ($n = 376$) of the mothers had more than seven years of schooling (Table 1).

Table 2 shows the prevalence of binge drinking according to the background characteristics of the respondents. Male sex was associated with higher prevalence of binge drinking ($p = 0.014$). Students who enrolled in public schools ($n = 133$) were more likely to engage in binge drinking in comparison with adolescents who studied in private schools ($p = 0.003$). A significant protective association was found between religious participation and binge drinking ($p = 0.004$). However, neither perceived maternal control ($p = 0.658$) nor family income ($p = 0.496$) were associated with the binge drinking by students (Table 2).

Table 3 shows the prevalence ratios of binge drinking according to various risk factors. Adolescents who reported that their best friends engaged in binge drinking were 4.7 times more likely (95%CI 2.78-8.03) to binge drink them-

selves. The risk of binge drinking was also elevated among adolescents whose brothers (PR 1.46; 95%CI 1.10-1.92) also engaged in binge drinking. Adolescents who are engaged in religious activities were less likely (PR 0.40; 95%CI 0.27-0.62) to binge drinking than those students that no have participation in religious activities ($p = 0.000$).

Discussion

In a sample of 588 Brazilian adolescents 12 years of age, 23.1% of the participants reported binge drinking. The prevalence of binge drinking observed in this study was high for the participants' age, though comparable to previous studies conducted among Brazilian adolescents^{7,14,22}. Our study shows that the average age of first use of alcohol was 10.8 years. A national cross-sectional survey of 17 371 high-school students developed in Brazil⁸ reported that 11% of their sample had first used alcohol before age 12 years. The study indicated that the earlier the onset of alcohol use, the higher is the risk of binge drinking and heavy drinking. These results reinforce the hazards of early initiation in alcohol consumption among Brazilian adolescents. The literature reports that, among adolescents, binge drinking has been linked to poor educational outcomes, relationship difficulties, behavioral problems (aggression and impulsivity), and risk of psychiatric disorders³⁻⁵. Furthermore, the adolescent brain may be uniquely sensitive to alcohol's effects because major changes in brain structure and function occur during this developmental period. In this connection, it is reasonable to assume that disruption of these processes by alcohol could lead to long-term alterations that influence adult behavior and responses to alcohol²³.

Some studies reported that binge drinking is associated with male sex^{14,24,25}. On the other hand, others reported a higher rate among females²⁶. Consistent with some studies, we found that binge drinking was not associated with gender. One possible explanation for this finding is that risky behaviors, such as binge drinking, has become less important in presenting oneself as masculine²⁶ and that the behavior of girls is converging with boys²⁷.

There is no consensus in the literature about the relationship between socioeconomic status and binge drinking. In the present study, socioeconomic status (type of school and mother's education) was not associated with binge drinking. Some studies of alcohol consumption and binge

Table 1. Distribution of adolescents according to demographic and socioeconomic characteristics

Independent variables		N	%
Gender	Male	286	48.6
	Female	302	51.4
Type of school	Public	542	92.2
	Private	46	7.8
Mother's education(years)	0-7	210	35.7
	8 or more	376	64.0
	missing	2	0.3
Family income(wages)	½-3	442	75.2
	More than 3	145	24.7
	missing	1	0.1
ABA-ABIPEME	AB	73	12.4
	CDE	514	87.4
	missing	1	0.2
Binge drinking	Yes	136	23.1
	No	452	76.9
Mother's consumption	Yes	406	69.0
	No	182	31.0
Father's consumption	Yes	433	73.6
	No	155	26.4
Brother's consumption	Yes	230	39.1
	No	358	60.9
Best friend's consumption	Yes	297	50.5
	No	291	49.5
Religious participation	Yes	498	84.7
	No	90	15.3

Table 2. Sample distribution according to the prevalence of binge drinking and independent variables (Diamantina, Brazil).

Independent variables	Binge drinking		p-value*	
	Yes N(%)	No N(%)		
Demographic				
Gender	Male	79 (27.6)	207(72.4)	0.014
	Female	57 (18.9)	245(81.1)	
Age of first alcohol consumption (years)	8	5(83.3)	1(16.7)	0.096
	9	10(71.4)	4(28.6)	
	10	34(43.0)	45(57.0)	
	11	50(47.2)	56(52.8)	
	12	35(55.6)	28(44.4)	
SES				
Type of school	Public	133(24.5)	409(75.5)	0.003
	Private	3(6.5)	43(93.5)	
Mother's education(years)	0-7	60(28.6)	150(71.4)	0.019
	8 or more	75(19.9)	301(80.1)	
Family income(wages)	½-3	106(24.0)	336(76.0)	0.496
	More than 3	30(20.7)	115(79.3)	
ABA-ABIPEME	AB	11(15.1)	62(84.9)	0.102
	CDE	125(24.3)	389(75.7)	
Social Influence				
Maternal control	Yes	128(22.9)	430(77.1)	0.658
	No	8(26.7)	22(73.3)	
Mother's consumption	Yes	109(26.8)	297(73.2)	0.001
	No	27(14.8)	155(85.2)	
Father's consumption	Yes	116(26.8)	317(73.2)	< 0.001
	No	20(12.9)	135(87.1)	
Brother's consumption	Yes	83(36.1)	147(63.9)	< 0.001
	No	53(14.8)	305(85.2)	
Best friend's consumption	Yes	119(40.1)	178(59.9)	0.001
	No	17(5.8)	274(94.2)	
Religious participation	Yes	104(20.9)	394(79.1)	0.004
	No	32(35.6)	58(64.4)	

*Chi-square test.

drinking in adolescents have shown a statistically significant association with high socioeconomic status (family income, mother's education and type of school)^{7,24,28}. Other studies reported that alcohol consumption is inversely associated with socioeconomic status or reported no association^{6,29}. A nationally representative sample among 16,332 U.S. adolescents reported that students with college-educated parents were more likely to consume 5 or more drinks than students whose parents were not college educated²⁴. The higher rate of binge drinking in higher socioeconomic status groups may occur because of the higher discretionary income (pocket money) that affluent students receive from their parents¹⁴. However, exposure to different experiences, such as in-

creasing autonomy and independence, changing school environment, greater attachment to peers, and greater influence of youth culture during adolescence stage, may diminish the importance of family financial status. Some authors suggest that financial status exerts a relatively minor influence on adolescent health and behaviors³⁰.

Great influence of family environment is exercised at the beginning and maintenance of the consumption of licit and illicit drugs among adolescents. The literature suggests that there is a significant association between the quality of the parent-child relationship and life-time and recent alcohol use as well as binge drinking. Moreover, the higher consumption of alcohol has been associated with adolescents who have a bad

Table 3. Log-binomial model of the binge drinking and independent variables among adolescents of Diamantina, Minas Gerais, Brazil, 2014.

Independent variables		Prevalence Ratio [†] (95% CI)	p-value
Demographic			
Gender	Male	1.18 (0.91-1.53)	0.196
	Female	1	
SES			
Type of school	Public	2.53 (0.86-7.44)	0.092
	Private	1	
Mother's education(years)	0-7	1.11 (0.86-1.43)	0.393
	8 or more	1	
Social influence			
Mother's consumption	Yes	0.94 (0.64-1.38)	0.769
	No	1	
Father's consumption	Yes	1.12 (0.71-1.77)	0.602
	No	1	
Brother's consumption	Yes	1.46 (1.10-1.92)	0.007
	No	1	
Best friend's consumption	Yes	4.72 (2.78-8.03)	< 0.001
	No	1	
Religious participation	Yes	0.40 (0.27-0.62)	< 0.001
	No	1	

[†] Adjusted for all the variables listed in the table.

relationship with parents, a family member that uses psychoactive a substance, little communication or lack support and family monitoring³¹⁻³³. In this paper, binge drinking was not associated with maternal control. However, adolescents who reported that their brothers or best friends engaged in binge drinking had higher prevalence of binge drinking themselves. This result corroborates the finding in the Monitoring the Future (MTF), study that annually assessed various measures of alcohol use among adolescent students, and found that peer use is one of the strongest correlates of alcohol use during adolescence. This study also reported that having friends who routinely got drunk was the strongest risk factor for binge drinking³².

Similarly, a longitudinal survey among U.S. adolescents reported that having a friend who drinks to the point of intoxication increases the probability of the adolescent doing the same by 32% (95% C.I. 1%-72%)³⁴. Furthermore, adolescents who used alcohol were twice or three times more likely to have parents who have used and have problems with alcohol³⁰. It is expected that parents who drink are more tolerant of their

children's alcohol initiation and create a home environment that promotes alcohol availability²⁰. According to study by Hirschi³⁵, adolescents who spend less time with adults and in structured interactions with peers have ample opportunities to participate in non-normative activities, such as drinking. In addition, teenagers who belong to a group with little respect for the rules, or those in which young people are not seen as leaders and peers also binge drinking, have a higher risk of binge drinking. This results shows the pressure exerted peer socialization during adolescence³⁶. However, adolescents can also binge drinking because of peer selection with similar behaviors rather than the influence of peers.

Belonging to some religion was identified as a protective factor for substances use among adolescents¹³⁻¹⁵. Our results reveal that religious participation was directly associated with a lower binge drinking. Sanchez et al.¹⁴ reported that greater engagement with any religious activity (almost daily or at least weekly) is inversely associated with the abuse of alcohol. Another study, with a sample of seven hundred undergraduate students, found that spirituality or religiosity serves as a protective mechanism against heavy drinking suggesting that religiosity may serve as a positive coping strategy that reduces dependence on alcohol for relief of stress³⁷. A possible explanation is that the benefits of religious activity may provide psychological relief without resort to self-medication through alcohol³⁷. Thus, psychological relief may be the underlying mechanism that can promote the reduction of stress and reduction of the need to cope with drinking. Additionally, religious belief is a behavior regulation tool, which can strongly affect a person's behavior. The greatest part of religions reproves people for doing harmful things, such as smoking and drinking, to both others and themselves. For those people who believe in, or practice, a specific religion may have less harmful behaviors, including alcohol consumption³⁸.

The results suggested that it may be useful to conceive of church-attending youth as a subset of the adolescent social network when planning primary alcohol prevention programs for young people³⁸. Because family plays an important role in the lives of adolescents, we many consider use family-based interventions which uses a multisystem approach not only to change youth behavior but also to reduce risk factors for substance use present in the youth's family or other social systems (school, peers, or community)³⁹. The lack of clear rules on the behavior of ad-

olescents and spend most of his free time with friends were reported to be predisposing factors for drinking in adolescence. Because of that, parents become important both in control and in providing barriers against potentially harmful situations. The literature reports that the trial of alcohol is an important indicator monitoring³¹⁻³³. Adolescents whose parents are more aware of the activities the children have less involvement with alcohol and other drugs, and discourage risky behavior of their children³³. Furthermore, it is important to establish strategies that address the ease of access and low cost of products, mainly outside of supervised environments to avoid adolescent binge drinking.

The present study has a few limitations that should be mentioned. Due to the fact that a self-report questionnaire was used, the questions were subject to interpretation by the participants. However, the anonymous nature of the survey and the absence of a teacher in the classroom helped to promote response validity. Another limitation is social desirability. Boys might have exaggerated their drinking in order to appear “cool” while some girls may have under-reported their drinking because of feelings of social disapproval. Our cross-sectional study design does not permit causal inference. Some students were

excluded from the analysis because of nonparticipation (especially because of absence on the day of the survey) and missing data. However, the level of participation was high, considering that almost all the students who were invited agreed to participate in the study.

Conclusions

The findings of our study highlight the social determinants of binge drinking and drinking behavior among adolescents. Adolescents who reported that their brother or best friend were binge drinking were more likely to consume large amounts of alcohol in one sitting.

Knowledge about these relationships is the first step toward understanding the social influences on substance use. Our findings indicate that peer effects are important determinants of drinking and could be utilized as a potential target for interventions to reduce alcohol consumption rates among adolescents. In order to decrease the rate of adolescents with drink behavior, the implementation in schools of a curriculum focused on the prevention of binge consumption should be encouraged. However longitudinal studies need to be conducted.

Collaborations

JG Martins-Oliveira, I Kawachi and PM Zarzar conceptualized the study. PCP Paiva and HN Paiva collected the data. JG Martins-Oliveira drafted the first version and conducted the analysis. IA Pordeus, I Kawachi and PM Zarzar contributed substantially to the interpretation of the findings. PCP Paiva, HN Paiva, IA Pordeus, I Kawachi and PM Zarzar revised the manuscript for important intellectual content. All authors read and approved the final version of the manuscript.

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