

Does religiosity impact binge drinking among early adolescents? A cross-sectional study in a city in Southeastern Brazil

A religiosidade impacta o *binge drinking* na adolescência precoce?
Um estudo transversal em uma cidade do sudeste do Brasil

Mariana Oliveira Guimarães (<https://orcid.org/0000-0002-4934-1055>)¹
 Gilberto de Lima Guimarães (<https://orcid.org/0000-0001-6027-372X>)²
 Jessica Walewska Rodrigues da Silva (<https://orcid.org/0000-0001-7189-7802>)³
 Kátia Kely Bragança de Souza (<https://orcid.org/0000-0003-4965-5043>)⁴
 Raquel Gonçalves Vieira-Andrade (<https://orcid.org/0000-0003-0284-7216>)¹
 Raquel Conceição Ferreira (<https://orcid.org/0000-0001-8897-9345>)³
 Patrícia Maria Pereira de Araújo Zarzar (<https://orcid.org/0000-0002-6952-5767>)¹

Abstract *This study evaluated the association between religiosity and binge drinking in early adolescence. A cross-sectional study was conducted with adolescents aged 10-13 from Belo Horizonte, Brazil. Stratified random sampling was performed considering the administrative district and school year. Adolescents filled an AUDIT-C form, containing questions about religiosity and binge drinking by parents and their best friends. Adolescents' caregivers answered a form regarding socioeconomic issues. Descriptive analysis, univariate, and multivariate logistic regression were performed. A total of 650 adolescents participated in the study. The frequency of binge drinking was 13.7%. In the adjusted model, religiosity was not associated with binge drinking. The covariates associated were the age of 12-13 years (OR: 1.94; CI95%: 1.06-3.56; p=0.030), maternal binge drinking (OR: 3.12; CI95%: 1.76-5.52; p<0.001) best friend binge drinking (OR: 6.01; CI95%: 3.40-10.62; p<0.001) and nonnuclear family (OR: 1.80; CI95%: 1.01-3.23; p=0.045). The findings revealed that, for binge drinking, the main factors that influenced this decision were the best friend and maternal binge drinking and family structure, although the adolescents claimed to be religious.*

Key words *Binge drinking, Adolescence, Religion, Family, Friends*

Resumo *O objetivo do estudo foi avaliar a associação entre religiosidade e binge drinking no início da adolescência. Um estudo transversal realizado com adolescentes de 10 a 13 anos de Belo Horizonte, Brasil. Foi realizada uma amostragem aleatória estratificada considerando distrito administrativo e ano escolar. Os adolescentes preencheram um formulário com o AUDIT C, perguntas sobre religiosidade e perguntas sobre binge drinking pelos pais e melhor amigo. Um formulário sobre questões socioeconômicas foi respondido pelos responsáveis. Foi realizada análise descritiva, regressão logística univariada e multivariada. Participaram do estudo 650 adolescentes. A frequência de binge drinking foi de 13,7%. No modelo ajustado, a religiosidade não esteve associada ao binge drinking. As covariáveis associadas foram idade de 12-13 anos (OR: 1,94 IC95%: 1,06-3,56; p=0,030), binge drinking pela mãe (OR: 3,12; IC95%: 1,76-5,52; p<0,001) binge drinking pelo melhor amigo (OR: 6,01; IC95%: 3,40-10,62; p<0,001) e família não nuclear (OR: 1,80; IC95%: 1,01-3,23; p=0,045). Os achados revelaram que apesar dos adolescentes afirmarem serem religiosos, para o binge drinking, os principais fatores que influenciaram essa decisão foi o binge drinking pelo melhor amigo, mãe e família não nuclear.*

Palavras-chave *Consumo excessivo de bebidas alcoólicas, Adolescência, Religião, Núcleo familiar, Amigos*

¹ Departamento de Saúde Bucal da Criança e do Adolescente, Faculdade de Odontologia, Universidade Federal de Minas Gerais (UFMG). R. Prof. Moacir Gomes de Freitas 688, Pampulha. 31270-901 Belo Horizonte MG Brasil. marianaolig@hotmail.com

² Departamento de Enfermagem Básica, Escola de Enfermagem, UFMG. Belo Horizonte MG Brasil.

³ Departamento de Odontologia Social e Preventiva, Faculdade de Odontologia, UFMG. Belo Horizonte MG Brasil.

⁴ Faculdade de Odontologia, UFMG. Belo Horizonte MG Brasil.

Introduction

Alcohol consumption among Brazilian adolescents is a major social and public health problem¹. Although it is legally permitted only after 18 (Law N° 9,294, of July 15, 1996)² approximately 41.3% of Brazilian adolescents aged 13-15 reported alcohol consumption in the last year, per the 2010 Household Survey on the Use of Psychotropics¹. Adolescent alcohol consumption is linked to many adverse health outcomes, including drunkenness, dependence, and alcohol-related problems throughout adolescence and adulthood³⁻⁶. The mean age at which Brazilian adolescents start to drink is 12.9 years⁷. Early adolescence is the critical developmental period for the onset of alcohol use. It has been pointed out as an essential predictor of binge drinking in middle and late adolescence^{6,8}.

Although binge drinking is a typical behavior among older adolescents, its adoption in younger age groups is noteworthy⁹⁻¹¹. In a study developed by Guimarães *et al.*¹¹, 23% of 12-year-old adolescents reported binge drinking. In another study by Oliveira-Filho *et al.*¹⁰ with 14-year-old adolescents, the prevalence of high risk for alcohol-related problems was 18.7%. Data from the National School Health Survey (PeNSE), which included 16,608 Brazilian adolescents aged 13-17, showed that 27.2% of adolescents had an episode of drunkenness in their lives, 9.3% had alcohol issues, and 29.3% reported alcohol use in the last 30 days¹². Heavy exposure to alcohol during intense physical and neurological maturation can interfere with the development of adequate coping strategies, problem-solving skills, and social relationships¹³.

Binge drinking is known to be determined by a large variety of factors both within the individual (e.g., genetic disposition, mood traits, behavioral problems, and neuropsychological deficits) and the environment (e.g., family history of alcoholism, peer and other social relationships, society, and neighborhood)¹⁴⁻¹⁶. As some risk factors are hard or impossible to change, research to identify protective factors that can delay, reduce, or prevent binge drinking is a crucial health objective¹⁵.

Studies have assessed the relationship between youth risk behaviors and religion (religious affiliation) and religiosity (individual's degree of adherence to the religion's principles)¹⁷⁻¹⁹. Regarding alcohol consumption, religious adolescents have delayed alcohol initiation, lifetime abstinence, and a lower likelihood of problematic

drinking and progression to alcohol use disorders^{20,21}. People's faith and their attachment to a religious group imply that their identity, behavior, and thoughts will be modeled on the official beliefs and doctrines of that religious group^{11,19}. However, the lack of appreciation of religious knowledge is growing due to secularization. We observe a decline of the religious domain in different social spheres and a greater tendency towards more subjective and privatized forms of religion, where individuals pay less attention to the external sources of religious authorities and allow themselves to be carried away by their intuitions and feelings that can interfere with the adoption of behaviors such as binge drinking²²⁻²⁴.

In the decision-making process of adolescents, it is crucial to know the factors that influence them to consume alcohol and other drugs²⁵. Also, religion can play a fundamental role in the psychosocial development of adolescents, as well as family and friends, and should be evaluated in terms of health²⁶. Therefore, this study aimed to evaluate the association between religiosity and binge drinking among adolescents aged 10-13 in Belo Horizonte, Minas Gerais, Brazil.

Methods

Study design and sample selection

An analytical, cross-sectional study was conducted with 10 to 13-year-old students enrolled in public schools in Belo Horizonte, Brazil. Data was collected from February 2018 to May 2019. Adolescents with cognitive impairment reported by a parent or teacher were excluded from the study.

The sample size was calculated using the formula to compare two proportions based on estimates of the relationship between binge drinking and maternal schooling because it led to the largest required sample size¹¹. The following parameters were considered: 80% power, 95% confidence interval (CI), and 5% error margin. The minimum sample was determined as 614 adolescents.

Stratified random sampling was performed by administrative district and school year, considering the city's proportionality of students within each administrative district and school year. The proportion of adolescents aged 10 to 13 enrolled in public schools was obtained from the Belo Horizonte Education Secretariat. The distribution of students in each of the nine ad-

ministrative districts of the city was estimated as follows: 11.16% of students were from the administrative district of the North, 5.83% from the Northwest, 14.89% from Barreiro, 10.03% from the Center-South, 7.66% from the East, 15.58% from Venda Nova, 11.34% from the West, 12.85% from the Northeast, and 10.66% from Pampulha.

One school was drawn separately in each administrative district to obtain the sample. All classes from fifth to seventh grade were included in this school. When the established proportion of students was not reached, or the selected school did not have all eligible school years, one more school was drawn for that administrative district. Thus, the sample comprised two or three schools per administrative district, considering the number of enrolled students necessary to achieve proportionality in each administrative district.

Pilot study

The pilot study was carried out with 44 adolescents aged 10-13 from a public school randomly selected to evaluate the methodology. The pilot study results indicated there was no need to change the proposed methods. Adolescents who participated in the pilot study were not included in the main study.

Data collection

Data was collected in the school environment. A written explanation of the study was sent through the adolescents to their parents/guardians to obtain permission for their children's participation. Parents/guardians completed the consent form and a self-administered paper-and-pencil questionnaire regarding socioeconomic issues. Adolescents brought the signed terms and parent's questionnaire to the school on the appointed day. In a separate classroom, the group of consenting adolescents received a written and verbal explanation of the study and assented to participate by signing the informed assent form. The paper-and-pencil questionnaires, Alcohol Use Disorders Identification Test Concise (AUDIT-C)²⁷ questions about religiosity and binge drinking by parents and best friend¹¹ were self-administered; however, to minimize any comprehension difficulty, the researcher read all the items aloud and clarified doubts. The questionnaire was completed in approximately 20 minutes.

Measures

Binge drinking

Binge drinking was defined as the equivalent of five drinks or more on a single occasion for all genders. Each of these drinks contains approximately 10 to 12 grams of alcohol. Through didactic figures added to the questionnaire, an alcoholic drink was defined as a can of beer (330 ml), a glass of wine (90 ml), or a shot of vodka (30 ml)¹.

The Alcohol Use Disorders Identification Test Concise (AUDIT-C)²⁷ validated in Brazil was applied to assess alcohol consumption among adolescents. This questionnaire has three items: "How often did you have a drink containing alcohol in the past year?"; the response options were: never, monthly or less, 2-4 times a month, 2-3 times a week, and 4 or more times a week; "How many drinks containing alcohol did you have on a typical day when you were drinking?"; the response options are 1 or 2, 3 or 4, 5 or 6, 7, 8, or 9, and 10 or more; and "How often do you have five or more drinks on one occasion?"; the response options are: never, less than monthly, monthly, weekly, and daily or almost daily. The third item was used to identify binge drinking. The response options were dichotomized into no (never consumed five or more alcoholic beverages on a single occasion) and yes (consumed five or more alcoholic beverages on a single occasion at a frequency of less than monthly, monthly, weekly, and daily or almost daily).

Religiosity

Religiosity was considered an organized system of beliefs and practices intended to mediate an individual's relationship to the transcendent and the community. Religiosity has two modes: explicit mode (or public/external mode) and subjective mode (or private/intrinsic mode). The explicit mode captures public religiosity (e.g., attending religious services), and the subjective mode captures intrinsic religiosity (e.g., religious belief). Both religiosity modes can influence alcohol use^{28,29}.

Religious attendance was defined as regular participation in activities or events such as religious services, religious study groups, prayer groups, and prayer meetings promoted by the religious group. The following question was asked to evaluate religious affiliation: "Did you participate in religious activities in the last six months?" (Response options: never, less than once, once a month, once a week, daily or almost every day)¹¹. The dichotomization was performed as no (nev-

er and less than once) and yes (once a month, once a week, daily or almost every day). Prayer practice was obtained through the question: "Did you pray in the last six months?" (Response options: never, less than once a month, once a week, daily or almost every day). The dichotomization was performed as no (never and less than once) and yes (once a month, once a week, daily or almost every day)¹¹. The religion's importance was obtained through the question: "How important is religion in your life?" (Response options: not important, somewhat important, neither somewhat nor very important, important, and very important)¹¹. The categorization was done as not important (not important and somewhat important), neither somewhat nor very important, and important (important and very important).

Binge drinking by parents and best friend

The following questions assessed current binge drinking by parents and best friend: "Does your mother usually drink five or more drinks on a single occasion?", "Does your father usually drink five or more drinks on a single occasion?", "Does your best friend usually drink five or more drinks on a single occasion?", the answer options for each question were no and yes¹¹.

Sociodemographic and socioeconomic condition

The sociodemographic profile of adolescents: gender (female and male), age (dichotomized by median: 10-11 years and 12-13 years), socioeconomic status of the family (household income), and family structure. Household income was determined from the sum of all salaries received by economically active residents in the home and on the current Brazilian minimum salary (207 U.S. dollars); the threshold was the dichotomized median response into \leq than 2 monthly minimum wages and $>$ than 2 monthly minimum wages. The family structure was dichotomized into nuclear when both parents lived with the adolescent and nonnuclear when only one parent lived with the adolescent.

Statistical analysis

The statistical procedures were performed in SPSS Statistics for Windows, version 21.0 (SPSS Inc, Chicago, IL, USA). Descriptive analysis was performed, followed by univariate and multivariate analyses using logistic regression. The dependent variable was dichotomized (yes/

no) based on the adolescents' binge drinking reports. The primary independent variable was religiosity (religious attendance, prayer practice, and religious importance). Descriptive analyses were initially performed. The association of the independent variables and the outcome was evaluated by logistic regression. The odds ratio (OR) and confidence intervals were calculated (95%CI) with this statistical approach. First, descriptive and univariate regression analyses were performed for each variable. Then, a multiple regression analysis was conducted considering the outcome, the leading independent variables, and all covariates. The adjusted model was created by inserting all the variables together, and the association of interest (religiosity x binge drinking) was adjusted for all covariates, regardless of their statistical significance. The Hosmer-Lemeshow test evaluated the goodness-of-fit test (0.94). The p -value <0.05 showed a significant association with the outcome.

Ethical considerations

This study was conducted per the Declaration of Helsinki (2013) and received approval from the Human Research Ethics Committee of The Federal University of Minas Gerais (Protocol N° 2.197.702). The guardians signed a statement of informed consent, and the students also signed a statement of consent agreeing to participate in the study.

Results

The sample consisted of 650 adolescents. The proportion of students in each stratum was similar to the original population. Table 1 shows the frequency distribution. Most adolescents were female (51.1%; $n=358$) and 46.5% ($n=302$) were aged 10-11. The prevalence of binge drinking was 13.7% ($n=89$; CI: 11%-16%). Regarding religiosity, 72.2% ($n=469$) reported having prayed in the last six months, 63.8% ($n=410$) participated in religious activities in the last six months and 74.6% ($n=485$) stated that religion was particularly important.

The unadjusted and adjusted regression analysis results are shown in Table 2. The association of interest and religiosity (participation in religious activities, prayer practice, and importance of religion) were not associated in any of the models. The covariates associated were the age of 12-13 years (OR: 1.94; CI95%: 1.06-3.56;

Table 1. Descriptive statistics of adolescents aged 10 to 13 years (n=650).

| Variables | Frequency n (%) |
|---|--------------------|
| Dependent variable | |
| Adolescent binge drinking | |
| No | 561 (86.3) |
| Yes | 89 (13.7) |
| Independent variables | |
| Adolescent characteristics | |
| Gender | |
| Female | 358 (51.1) |
| Male | 292 (44.9) |
| Age | |
| 10-11 years | 302 (46.5) |
| 12-13 years | 348 (53.5) |
| Religiosity | |
| Prayer practice | |
| Yes | 469 (72.2) |
| No | 181 (27.8) |
| Religious attendance | |
| Yes | 410 (63.8) |
| No | 233 (36.2) |
| Religion importance | |
| Important | 485 (74.6) |
| Neither somewhat nor very important | 79 (12.2) |
| Not important | 86 (13.2) |
| Binge drinking by parents and best friend | |
| Best friend binge drinking | |
| No | 537 (82.6) |
| Yes | 113 (17.4) |
| Maternal binge drinking | |
| No | 498 (76.6) |
| Yes | 152 (23.4) |
| Paternal binge drinking | |
| No | 357 (54.9) |
| Yes | 293 (45.1) |
| Sociodemographic condition and family structure | |
| Family structure | |
| Nuclear | 301 (48.5) |
| Nonnuclear | 319 (51.5) |
| Household income | |
| >2 monthly minimum wages | 153 (24.6) |
| ≤2 monthly minimum wages | 469 (75.4) |

Source: Authors.

p=0.030), maternal binge drinking (OR: 3.12; CI95%: 1.76-5.52; p<0.001) best friend binge drinking (OR: 6.01; CI95%: 3.40-10.62; p<0.001)

and nonnuclear family (OR: 1.80; CI95%: 1.01-3.23; p=0.045).

Discussion

This cross-sectional study analyzed the association between religiosity and binge drinking in early adolescence through a sample of 10- to 13-year-old adolescents from public schools in a city in southeast Brazil. The main result of this study was that religiosity was not associated with binge drinking. However, at the age of 12 to 13, maternal or best friend binge drinking, and nonnuclear family was associated with binge drinking in early adolescence.

This work evidenced a binge drinking frequency of 13.7%. In a study performed with 6,387 seventh- and eighth-graders from public schools in six Brazilian cities, 16.5% of the students reported binge drinking in the year before the interview¹³. In another study conducted with 1,154 students aged 13-17 in the Northeast of Brazil, 23.1% reported binge drinking³⁰. When adolescents in the United States aged 12-13 were analyzed, the prevalence of binge drinking in the last 30 days was 1.38% and 3.46%, respectively⁹. The prevalence rates in previous studies were higher than those in our study, probably because the students who participated in the previous studies were older. We should mention that the annual measure covers more binge episodes than the last month, which justifies the lower prevalence found among American adolescents.

Some epidemiological research has established associations between religiosity and binge drinking^{11,19,21}. Although different religious groups may have different rules for prescribing and prohibiting alcohol use, previous studies have supported the positive associations of religiosity with the absence of alcohol use¹⁸⁻²⁰. Adolescents with high levels of religiosity have behaviors and moral concepts that discourage the use of alcoholic beverages and increase faith^{11,19}. Religious teachings act as a protective factor, directly influencing the family and individual personality and bringing values related to the sanctity of life. The perception of personal responsibility for the physical and mental care brought about by religiosity can contribute to self-control concerning the use of alcohol and other drugs¹¹. Religiosity is not just a complex and multidimensional construct; it is dynamic, especially during adolescence, as young people learn about themselves and how they see the world around them²⁸.

Table 2. Logistic regression model for the association between binge drinking and the independent variables investigated in the study (n=650).

| Variables | OR Non-adjusted | P value | OR adjusted | P value* |
|--|---------------------|---------|----------------------|----------|
| Adolescent characteristics | | | | |
| Gender | | | | |
| Male | 1 | | 1 | |
| Female | 1.110 (0.707-1.744) | 0.650 | 0.915 (0.533-1.570) | 0.747 |
| Age | | | | |
| 10-11 years | 1 | | 1 | |
| 12-13 years | 2.080 (1.291-3.351) | 0.003 | 1.949 (1.065- 3.567) | 0.030 |
| Religiosity | | | | |
| Prayer practice | | | | |
| Yes | 1 | | 1 | |
| No | 0.950 (0.574-1.571) | 0.842 | 0.886 (0.478-1.641) | 0.700 |
| Religious attendance | | | | |
| Yes | 1 | | 1 | |
| No | 0.781 (0.484-1.262) | 0.313 | 0.825 (0.450-1.513) | 0.534 |
| Importance of Religion | | | | |
| Not Important | 1 | | 1 | |
| Neither little nor very important | 0.768 (0.292-2.020) | 0.593 | 1.157 (0.358-3.740) | 0.807 |
| Important | 0.926 (0.471-1.823) | 0.824 | 1.518 (0.609-3.781) | 0.371 |
| Binge drinking parents and friend | | | | |
| Maternal binge drinking | | | | |
| No | 1 | | 1 | |
| Yes | 3.273 (2.053-5.216) | <0,001 | 3.123 (1.767-5.521) | <0.001 |
| Paternal binge drinking | | | | |
| No | 1 | | 1 | |
| Yes | 1.866 (1.186-2.937) | 0.007 | 1.169 (0.667-2.048) | 0.585 |
| Best friend binge drinking | | | | |
| No | 1 | | 1 | |
| Yes | 5.801 (3.573-9.419) | <0.001 | 6.018 (3.409-10.624) | <0.001 |
| Socioeconomic condition and family structure | | | | |
| Family structure | | | | |
| Nuclear | 1 | | 1 | |
| Nonnuclear | 2.013 (1.219-3.323) | 0.006 | 1.809 (1.013-3.231) | 0.045 |
| Monthly minimum wages | | | | |
| >2 monthly minimum wages | 1 | | 1 | |
| ≤2 monthly minimum wages | 1.174 (0.662-2.080) | 0.584 | 0.844 (0.432-1.651) | 0.620 |

*Model adjusted for all covariables.

Source: Authors.

This study measured religiosity based on three dimensions: prayer practice, religious attendance, and religious importance for adolescent life. Regarding prayer practice, the personal connection with the sacred through prayer usually involves an individual religious behavior, which requires a certain level of personal dedication²⁸. In our paper, most adolescents declared that they had prayed in the last six months (72.2%), and similar results were found for religious attendance (63.8%) and the importance of religion

in life (74.6%). These three dimensions have already been used and indicated by other studies for application in adolescents^{11,19,28}. However, this study found no possible protective factors against binge drinking in early adolescence.

The decision-making process of adolescents involves several areas related to development²⁵. Regarding the use of psychotropic substances, we should understand the perception of adolescents regarding the main factors that influence their decision to consume alcoholic beverages

and other drugs^{26,31}. In a qualitative study conducted with adolescents²⁶, religion did not show a protective role when seeking to understand the motivation for not using alcoholic beverages and drugs. In the study mentioned above, the family was primarily responsible for defining moral values and influencing attitudes towards the non-use of drugs. There were three main reasons for drug use: the need to be part of a group, the influence, and existential questions.

Although adolescents claimed to be religious in this study regarding binge drinking, the main factors that influenced this decision were their best friend and their mother. This choice reflects elements that make up the value field of these adolescents (friendship and family)^{32,33}. The value determines human action, giving it meaning and direction. According to Max Scheler's *Axiological Theory*³⁴, it is the value that allows people to choose, justify and legitimize their actions. Character and attitudes reflect their personal and hierarchical axiological scale. Since the norms usually proposed by the sacred regarding alcohol consumption were not found in the social action of adolescents, it is inferred that religiosity was not directly configured as a value for alcohol consumption prevention. By participating in religious activities, adolescents can rationally recognize the harmful consequences of alcohol on health. However, if this knowledge is not internalized as a value, the simple information about the harm is ineffective in generating a consistent action.

It is worth mentioning that our findings must be seen in the light of some points: in the maturation process, adolescents become more aware of the role of religion in late adolescence²⁶. Although an association was not found, religion can indirectly influence family, friends, and school, transmitting beliefs and moral values that discourage drug use and will be transmitted to the adolescent²⁶. On the other hand, it is also inferred that more privatized forms of faith can give the individual greater autonomy to define their values and behaviors with the advancement of secularization, despite traditional religious conceptions, which can also influence the results²²⁻²⁴.

Our findings differ from other studies that found a negative association between religiosity with binge drinking in adolescence^{11,18-20}. A previous study performed in Diamantina, Minas Gerais, found that religiosity was a possible protective factor for binge drinking in early adolescence¹¹. A possible explanation for the difference in our findings is that religiosity in the

countryside, especially in Diamantina, seems to have a more significant impact on people's lives. Moreover, the effects of secularization are still not as seen in the capital. Religion has accompanied Diamantina since its foundation around 1722. The solid religious, folkloric, and musical tradition give the city a unique trait. Diamantina's landscape is marked by colonial and historical buildings of Baroque inspiration and many Catholic churches that reflect the high level of religiosity of its inhabitants³⁵.

Peers and family have been recognized as two critical social agents capable of influencing the initiation of alcohol consumption and the transition to alcohol problems in early adolescence^{14-16,33}. Parents usually are a source of alcohol for young adolescents^{32,36}. They may directly influence their children's drinking by offering sips of alcoholic drinks on special occasions, supervised parties, or by permitting them to take alcohol to drink in unsupervised settings^{32,36}.

In this study, maternal binge drinking was associated with adolescent binge drinking. One possible interpretation is that maternal binge drinking may not have been viewed from a negative perspective. The observable consequences of the adverse effects of alcohol may have been normalized as they are experienced by a maternal figure³⁶⁻³⁸.

Children and early adolescents may see their parents as positive authority figures. Therefore, the negative consequences may not be seen as that bad or uncommon³⁸. Our results have implications for preventive measures. Mothers of early adolescents should be aware that modeling binge drinking has a significant impact on adolescents' alcohol use. Therefore, preventive interventions should encourage mothers who do not binge drink (the majority of mothers in our sample) or who do not consume in the presence of their children to continue modeling this behavior.

In our paper, best friend binge drinking was associated with adolescents' binge drinking. In adolescence, behavioral similarities between teens and their peers gradually emerge in alcohol drinking and substance use^{26,33}. Evidence indicates that the observed behavioral homophily between adolescents and their peers may be the mixed results of two pathways: peer influence and peer selection³⁹. Peer influence is how an adolescent changes his behavior to align with his peers. Peer selection is how adolescents select friends similar to them in various dimensions. Adolescent alcohol use can result from peer influence and selection processes^{39,40}. In the acquisition and

maintenance of behaviors related to alcohol consumption, peers and friends may influence adolescents' alcohol use directly through suggestions, that is, availability and accessibility to alcoholic beverages, or indirectly by descriptive and injunctive norms related to alcohol^{11,33,40}. Alcohol consumption in adolescence is seen mainly as a social activity, and friends are essential in drinking experiences^{11,26,33,40}.

Concerning sociodemographic characteristics, previous research has provided evidence of several age-related changes in alcohol consumption. In our work, adolescents aged 12-13 were more likely to engage in binge drinking episodes. Despite the slight difference between the age groups, adolescents aged 10-11 are closer to childhood, where expectations regarding the effects of alcohol consumption are generally negative and reflected in the lack of interest in or even disgust for the drink^{14,41,42}. As adolescence is firmly rooted in someone's life, expectations regarding the effects of alcohol tend to become positive, and, once established, guide the behavior towards more frequent and greater consumption⁴¹.

Adolescents from nonnuclear families were more likely to engage in binge drinking. In childhood and early adolescence, parental divorce can be considered adversity with repercussions on mental health. An assumed "window of vulnerability" emerges during this period of life, in which exposure to stressful events favors the development of psychopathologies, which may include the use of psychoactive substances^{43,44}. The type of family conflict that may precede divorce or continue after the marriage is dissolved is a factor that may lead to some adverse consequences, such as initiation of alcohol use as a way of coping with suffering and stress⁴⁴.

Some strengths of this study should be highlighted. The 10-13 years age group is of fundamental importance because the first sips and drunkenness can occur^{1,7,11} during this period. Although some adolescents reported binge drinking in this study, this pattern tends to be restricted to once a month or less. Knowing the factors associated with this consumption before it becomes more frequent can positively influence the strengthening of prevention and intervention measures that can eliminate or reduce alcohol consumption in adolescence¹³. Universal and individual prevention programs often increase an individual's awareness of the risks of binge drinking and provide strategies and skills to prevent consumption and correct misperceptions

about social norms, motives, and expectations regarding alcohol use. Another set of prevention approaches is protective behavioral strategies, where the teenager learns to say no to offerings of alcoholic beverages⁴⁵. Few studies in Brazil have evaluated the association between religiosity and binge drinking among early adolescents^{11,30,46}. As religiosity and alcohol consumption have a vital cultural component, obtaining evidence from the Brazilian population can better guide specific control and prevention measures.

Another critical point is that the prevalence ratio is, in many cases, the most used and appropriate measure for cross-sectional studies. However, it is essential to note that, in the face of binary outcomes, the odds ratio also can be used as a measure of association⁴⁷. Much has been discussed about the use of odds ratio exclusively for case-control studies and the use of prevalence ratio for cross-sectional designs in epidemiology. However, the use of odds ratio in cross-sectional studies can also be applied, especially when the prevalence of the outcome is not frequent, as observed in our study. On the other hand, the odds ratio can strongly overestimate the results in cross-sectional studies with frequent outcomes. Thus, the log-binomial model, Poisson regression, and Poisson regression with robust variance are better alternatives to logistic regression⁴⁸.

This study has limitations. Questions about binge drinking in our research instrument required students to think about their alcohol consumption habits in the past, which probably resulted in recall bias. The data were based on self-reports, subject to response bias, mainly because they are questions related to alcohol and the possibility of influencing social life. The sample was drawn from one city in southeast Brazil and only from adolescents enrolled in public schools. Generalization to other national regions or other parts of the world may not be applicable.

In conclusion, religiosity was not associated with binge drinking in early adolescence. Binge drinking was associated with age (12-13 years), maternal and best friend binge drinking, and nonnuclear families. Although religiosity has no association with binge drinking in this study, it is known that it participates in constructing social norms that emphasize the restriction/moderate use of alcoholic beverages. The joint effort of the various spheres of society, government, family, schools, media, and religious groups can contribute to greater control of this public health problem in the country.

Collaborations

All authors are responsible for the content of this research and participated in the construction of this work, as follows: MO Guimarães, RG Vieira-Andrade, RC Ferreira and PMPA Zarzar: conceptualization of the study, sampling design, analysis, critical review of the manuscript, and response to reviewer comments. MO Guimarães, JWS Rodrigues, KKS Bragança: sampling design, data collection and response to reviewer comments. MO Guimarães and GL Guimarães: manuscript drafting, critical review of the manuscript and response to reviewer comments.

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