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BRIEF COMMUNICATION

Predictive factors of alcohol initiation among Brazilian adolescents: assessing the role of attitudes, decision-making, communication, and resistance skills

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Objective: To evaluate whether attitudes toward drug use, as well as decision-making, communication, and alcohol resistance skills, act as predictors of alcohol use and binge drinking initiation among Brazilian students, considering sex differences.
Methods: In a longitudinal sample of 1,103 seventh-grade students from 15 Brazilian public schools, we explored if attitudes toward drug use and decision-making, communication, and alcohol resistance skills at baseline predicted alcohol outcomes 9 months later.
Results: Lower levels of resistance skills (i.e., OR_{boys} = 0.29; 95%CI 0.12-0.70) and positive attitudes toward drugs (i.e., $OR_{girls:}$ = 1.41; 95%CI 1.02-1.94) were predictors of alcohol use onset and binge drinking, independently of sex. Decision-making predicted binge drinking initiation, but only for girls (OR = 0.73; 95%CI 0.59-0.91). Negative attitudes toward drugs were a risk factor for alcohol use initiation, but only for boys (OR = 0.78; 95%CI 0.64-0.95).
Conclusion: Our findings highlight the importance of understanding the predictors of alcohol initiation in adolescents, to inform which key components preventive programs should address in their activities to achieve the expected preventive outcomes.

Keywords: Prevention programs; key components; adolescents; alcohol use; binge drinking

Introduction

Alcohol use is one of the leading causes of disability-adjusted life years lost among young people,[1] and acting to delay the onset of alcohol use is an important approach to improving adolescents' well-being and preventing harmful consumption patterns later in life.[2] One of the most prevalent activities to prevent substance use among younger people worldwide consists of universal school-based prevention programs based on life skills training.[3] Prevention programs grounded in a social influence theoretical approach promote life skills, address behavioral intention predictors, and enhance drug resistance abilities, demonstrating more effectiveness.[3] Activities in these programs are specifically designed to target mediators such as attitudes toward drugs, decision-making, communication, and alcohol resistance skills. Attitudes toward drugs are recognized within the theory of planned behavior as predictors of behavioral intention.[4] They represent a subjective evaluation indicating how positively or negatively drug use is perceived, based on weighing its benefits and risks.[5] Refusal skills, essential for resisting peer pressure, involve the capacity to decline drug offers.[6] Decision-making is also widely implemented in general skills training, aiming to strengthen students' abilities to make informed decisions regarding drug use in contexts of proximal risk, such as peer pressure and life stressors.[7,8]

However, relatively few studies have explored the association between these variables and adolescents' alcohol and drug use in low- and middle-income countries.[9] Some components may be more important than others, depending on the context. Knowledge of predictors of alcohol use initiation is crucial for informing the development of effective prevention programs.

It is equally important to examine potential sex differences in these variables, as patterns of alcohol use can vary between boys and girls. Boys traditionally are at increased risk of drinking alcohol compared with girls, probably due to differences related to social and cultural norms.[10] However, emerging studies suggest that sex differences in alcohol-related outcomes are decreasing, or girls are starting to drink more than boys.[11] In Brazil, 36.8% of girls had already started drinking before age

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14 years compared to 32.3% of boys, suggesting a change in alcohol behavior among Brazilian students.[12] Thus, just as alcohol-related outcome rates differ by sex, the relationship with predictors of alcohol initiation may also vary.

Therefore, this study aims to investigate if attitudes toward drug use, as well as decision-making, communication, and alcohol resistance skills, can act as predictors of alcohol use onset and binge drinking among a sample of Brazilian adolescents, according to sex. By investigating and considering these predictors and sex-specific factors, prevention program developers can tailor interventions that effectively address the unique needs and challenges faced by both boys and girls in relation to alcohol use in their communities.

Methods

This study was conducted on a prospective longitudinal sample of 1,103 seventh-grade students from 15 public schools in the municipality of São Paulo, Brazil, who participated in the control group of a randomized controlled trial designed to evaluate the effect of a substance-use prevention intervention. We specifically selected the control group because these students had not been exposed to any intervention, ensuring that their behaviors reflected typical adolescent behavior, thus enhancing the real-world applicability of our findings.[13]

Schools that participated in the study were randomly selected from all Brazilian public schools in São Paulo, according to the following inclusion criteria: 1) state schools enrolling fifth- and seventh-grade students; and 2) schools that had not received the prevention program in the last 3 years. All seventh-grade students at the selected schools were invited to participate in the study.

The baseline evaluations took place from February to March 2019, before the beginning of the program, and after 9 months of follow-up, from November to December 2019. Researchers collected data through an anonymous self-report audio-guided questionnaire applied via smartphones in classrooms, without any teachers present.[13] Of the 1,103 students who answered the baseline questionnaire, 836 participated in the 9-month follow-up data collection (75.8%). Absenteeism and refusals were the main reasons for dropout.

Instrument and measures

The questionnaire used was based on the European Drug Addiction Prevention Trial Questionnaire (EU-Dap), adapted and validated for Portuguese.[14] All scales had previously undergone confirmatory factor analysis and demonstrated good fit indices.[15]

The outcome variables of interest were collected at follow-up: alcohol initiation and binge drinking. Alcohol use and binge drinking were evaluated as dichotomous questions (yes/no): ''Have you ever tried any alcoholic beverages?'' The binge drinking pattern was defined as consuming five or more alcoholic drinks on one occasion.

The explanatory variables (predictors) were from the baseline data collection: school experience, communication skills, decision-making skills, attitudes toward drugs (positive and negative), and refusal skills. Communication skills were analyzed using a 5-point scale,[16] ranging from ''very easy'' to ''very hard.'' Students' replies were assessed based on a score ranging from 0 to 15. Decision-making skills were evaluated using a 9-item scale (agree or disagree),[16] with students' replies assigned a score ranging from 0 to 9. Attitudes toward drugs were analyzed using an 11-item scale (agree or disagree),[16] which contained items evaluating positive and negative attitudes toward drugs. The replies were divided into two main scores: one related to the five positive items (ranging from 0 to 5) and the other to the six negative items (ranging from 0 to 6). Alcohol refusal skills were evaluated using one dichotomous (yes/no) question: ''What would you do if a member of your family offered you alcohol?.''[6]

Sociodemographic variables were sex (male or female), age, and socioeconomic status (SES). SES was assessed by a scale that includes the head of the household's education level and products and services consumed by the household, with scores ranging from 1 to 100 or categories from A to E.[17]

Statistical analysis

Initially, a descriptive analysis of all data was performed. Two multivariate logistic regressions, stratified by sex, were performed to verify if key component variables at baseline predicted alcohol outcomes (first alcohol use and binge drinking) 9 months later.

All analyses were controlled for age, SES, and baseline alcohol outcome measures. We selected age, SES, and baseline alcohol use as control variables due to their well-established associations with alcohol initiation and binge drinking in adolescence. Age is a key predictor of substance use onset, while SES has been linked to access and risk factors for alcohol use.[10] Baseline alcohol use is crucial to account for prior exposure and control for reverse causality. All analyses were run on STATA 16.

Ethics statement

All procedures in the present study were conducted in accordance with ethical standards. The study protocol was approved by the research ethics committee of the Universidade Federal de São Paulo (1327/2018).

Results

At baseline, most students were male (51.3%), had lower-middle SES (54.2%), and a mean age of 12.3 years (SD = 0.7). At the follow-up assessment, 37.6% of the students reported already having consumed alcohol, and 11.8% reported already having engaged in binge drinking at least once (Table 1).

Boys who had alcohol resistance skills at baseline were 70% less likely to use alcohol (odds ratio [OR] = 0.30, 95%CI 0.16-0.54) and binge drink (OR = 0.29, 95%CI 0.12-0.70) at follow-up. Boys with positive attitudes toward drug use were at risk for alcohol use initiation

Table 1 Distribution of sociodemographic and prevention-program ingredient variables at baseline and multivariate logistic regression for lifetime alcohol use and binge drinking, stratified by sex[†]

	Descriptive total sample	Lifetime alcohol use						Lifetime binge drinking					
		Boys			Girls			Boys			Girls		
	Mean ± SD	OR	95%CI	p-value	OR	95%CI	p-value	OR	95%CI	p-value	OR	95%CI	p-value
Skills													
Decision making	5.45±1.64	1.07	0.91-1.26	0.410	0.92	0.79-1.08	0.328	1.09	0.84-1.42	0.505	**0.73**	**0.59-0.91**	**0.006**
Alcohol resistance	30.55%	**0.30**	**0.16-0.54**	**0.000**	**0.18**	**0.09-0.32**	**0.000**	**0.29**	**0.12-0.70**	**0.006**	**0.23**	**0.11-0.49**	**0.000**
Communication	3.95±1.01	1.07	0.83-1.40	0.586	1.23	0.96-1.58	0.095	0.77	0.52-1.14	0.192	0.87	0.62-1.20	0.388
Negative attitudes	5.13±1.27	**0.78**	**0.64-0.95**	**0.015**	0.96	0.75-1.21	0.713	0.88	0.67-1.17	0.383	1.01	0.75-1.35	0.951
Positive attitudes	1.10±1.04	**1.37**	**1.07-1.74**	**0.012**	**1.35**	**1.02-1.77**	**0.032**	**1.42**	**1.01-2.01**	**0.047**	**1.41**	**1.02-1.94**	**0.038**
Age	12.30±0.71	1.09	0.69-1.71	0.716	0.88	0.58-1.34	0.564	**2.50**	**1.36-4.59**	0.003	1.03	0.62-1.73	0.898
SES	27.79±9.51	0.95	0.75-1.20	0.646	1.05	0.83;1.32	0.692	1.02	0.84-1.42	0.505	**0.73**	**0.59-0.91**	**0.006**

Bold type denotes statistical significance.
SES = socioeconomic status.
[†]Controlled for baseline lifetime alcohol use and binge drinking.

(OR = 1.37, 95%CI 1.07-1.74) and binge drinking (OR = 1.42, 95%CI 1.01-2.01). Conversely, negative attitudes toward drug use were considered protective factors against alcohol use initiation among boys (OR = 0.78 95%CI 0.64-0.95).

Girls who had alcohol resistance skills at baseline were 82% less likely to use alcohol at follow-up (OR = 0.18, 95%CI 0.10-0.32) and 77% less likely to report binge drinking (OR = 0.23, 95%CI 0.11-0.49). In addition, girls with positive attitudes toward drug use were 35% more likely to use alcohol (OR = 1.35%, 95%CI 1.02-1.77) and 41% more likely to report binge drinking (OR = 1.41, 95% CI 1.02-1.94) at follow-up. Nevertheless, decision-making skills seem to be a protective factor for binge drinking initiation, although only for girls (OR = 0.73, 95%CI 0.59-0.91) (Table 1).

Discussion

We found that students with higher resistance skills were less likely to start using alcohol and binge drinking, while those with higher positive attitudes toward drugs were more likely to have started consuming alcohol and binge drinking at follow-up. Additionally, higher levels of decision-making skills seemed to act as a protective factor against the initiation of binge drinking among girls, while higher negative attitudes toward drugs were predictors of a decrease in alcohol initiation among boys.

Our findings are in line with previous studies that also found positive attitudes toward drugs[9,18] and refusal skills[19,20] to be associated with patterns of alcohol consumption among adolescents, independent of sex. These findings demonstrate the importance of decreasing positive attitudes toward drugs and enhancing refusal skills as key components of alcohol prevention programs. Program activities should convey a clear message disapproving of underage alcohol use while correcting misperceptions surrounding norms related to alcohol use among adolescents. Activities targeting normative beliefs can also play a vital role in correcting misperceptions regarding peer alcohol use, which, in turn, can decrease positive attitudes toward drugs and increase refusal skills. The Unplugged program has effectively reduced drug use in Europe and alcohol use in Nigeria and Brazil by decreasing positive attitudes toward substances and enhancing refusal skills and alcohol-negative beliefs.[21,22]

Decision-making skills and negative attitudes toward drugs seem to play a sex-specific role in predicting alcohol use patterns. In our sample, decision-making acted as a protective factor against initiation of binge drinking only for girls, while negative attitudes toward drugs served as a protective factor against alcohol use initiation only for boys. These findings may be attributed to higher levels of sensation-seeking and lower impulse control among boys, which place them at greater risk for disruptive drinking compared to girls.[23] As such, negative attitudes toward drugs may have a more pronounced impact on alcohol prevention for boys.[24] Conversely, early adolescent girls tend to be more mature than boys, exhibiting higher levels of awareness of questions related to decision-making skills. Sex differences regarding key

components of prevention programs are complex, and further studies must continue to explore this topic.

It is worth mentioning that analysis of attrition revealed significant differences in refusal skills, with students lost to follow-up demonstrating a lower likelihood of refusal skills compared to those who remained in the study.[15] Although it was expected that students lost to follow-up would exhibit lower drug refusal skills, this attrition may have introduced potential biases; thus, findings should be interpreted with caution.

This study's first limitation concerns missing data due to losses to follow-up. However, this is expected in longitudinal studies, and a previous attrition analysis demonstrated insignificant differences between students who were lost to follow-up and those who were not.[13] Second, the selected schools were primarily located in lower-income areas, which may limit the generalizability of the findings, as they may not fully represent the broader population of the city of São Paulo. Moreover, we acknowledge that our analysis did not control for other potential confounding factors such as parental and peer influence. Future research could address these additional variables to further strengthen and validate our findings.

Our findings highlight that understanding the predictors of alcohol outcomes among adolescents in each cultural context and according to sex is essential to inform prevention program development and make interventions more effective and culturally sensitive.

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Disclosure

The authors report no conflicts of interest.

Author contributions

JYV: Conceptualization, Writing – original draft, Formal analysis.
SCC: Writing – review & editing.
MHSS: Writing – review & editing.
ZMS: Funding acquisition, Supervision, Writing – review & editing.
All authors have read and approved the final version to be published.

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