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Characteristics of school-based drug prevention programs in Brazil

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Abstract *The aim of this study was to identify the main characteristics of school-based drug prevention programs in Brazil and verify whether these interventions apply the prevention principles suggested by the National Institute on Drug Abuse (NIDA). A cross-sectional study was conducted using a random national sample of 1,151 public and private school managers. The data were collected using an online questionnaire. Poisson regression was used to identify factors associated with the application of a greater number of prevention principles in the programs. The findings showed that programs were generally sporadic, had an average duration of one semester, incorporated different program models, and primarily directed at students. The most active organization in the delivery of programs was the Military Police. Private schools were shown to be 14% more likely to apply more good practice principles than public schools. Furthermore, programs delivered by school staff, health institutions, or departments of education were more likely to apply more prevention principles. Efforts are needed to improve drug prevention practice in Brazilian schools. Our findings show that, overall, school-based drug prevention programs do not apply the NIDA prevention principles.*

Key words *Prevention, Drugs, Programs, School Health*

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Introduction

Prevention programs focusing on specific risk and protective factors have been found to be effective strategies for preventing school drug use[1] aiming to create new protective factors and reduce the risk factors of school-age students[2,3]. Although many studies have shown the effectiveness of school-based programs in reducing or delaying the onset of alcohol and drug use[4,5], others have documented iatrogenic program effects[6].

Studies in the field of prevention suggest that school-based drug prevention interventions should be research-based. That is, their effectiveness should have been demonstrated by evaluation studies, thus avoiding the waste of human and financial resources associated with actions that have little or no effect[2,4,7]. However, the implementation of research-based programs poses a challenge in various countries[8].

Systematic reviews of the characteristics of drug prevention programs that produced positive outcomes identified the following effective elements: the use of interactive methods; adequate session length, number, and spacing; well-trained staff; and interventions that provide opportunities to practice and learn personal and social skills and address multiple domains such as family and community[9,10].

Based on the common elements of effective prevention programs, the National Institute on Drug Abuse (NIDA)[11] suggests a number of prevention principles that favor positive outcomes; that is, reductions in drug use among participants. It is suggested that prevention practitioners should be guided by recommendations on good practices based on the common characteristics of effective programs in order to increase the chances of success of preventions actions[12].

In Brazil, little is known about the characteristics of school-based drug prevention programs and whether such interventions incorporate the core elements of good prevention practices. It is therefore vital to identify and obtain a better understanding of these initiatives to support the safe implementation of effective programs in Brazilian schools.

The aim of the present study is therefore to identify the main characteristics of school-based drug prevention programs in Brazil and verify whether these interventions apply the prevention principles suggested by NIDA.

Method

Using a probability sample design, we conducted a cross-sectional study with a sample of managers of public and private schools located across Brazil's five regions (South, Southeast, North, Northeast, and Center-West).

Sample

The target audience of this study were the managers of public and private middle schools and high schools located in urban areas and included in the national registry of basic education schools based on the 2012 School Census provided by the National Institute for Educational Studies and Research. A random sample was generated using Excel's RAND function. The sample size of each region was directly proportional to the overall population of schools in the region by type (public and private), thus resulting in a self-weighted sample.

Sample size was calculated considering the finite population of schools (n = 52,065), a 95% confidence interval, absolute error of 3%, and response distribution of 50% (due to the lack of previous data on the prevalence of school-based prevention programs in Brazil), resulting in a sample of 1,046 schools. Considering that Web-based surveys have been shown to produce a lower response rate than traditional surveys[13,14], we opted for a final sample of 2,090 schools to account for potential non-responses.

A total of 1,151 valid questionnaires were received, 580 (51.1%) of which affirmed that the school had a drug prevention program (Figure 1).

Data collection

The managers were initially invited to participate in the study by a message sent to the school's email using the online survey software SurveyMonkey. The respondents that failed to answer the survey after sending four emails were then contacted by telephone. The data were collected in the 2014 school year.

Instruments and variables

We used a self-administered anonymous survey with 45 closed-ended questions assessing the following: respondent characteristics; school characteristics; health education at the school; and respondent training in drug education and

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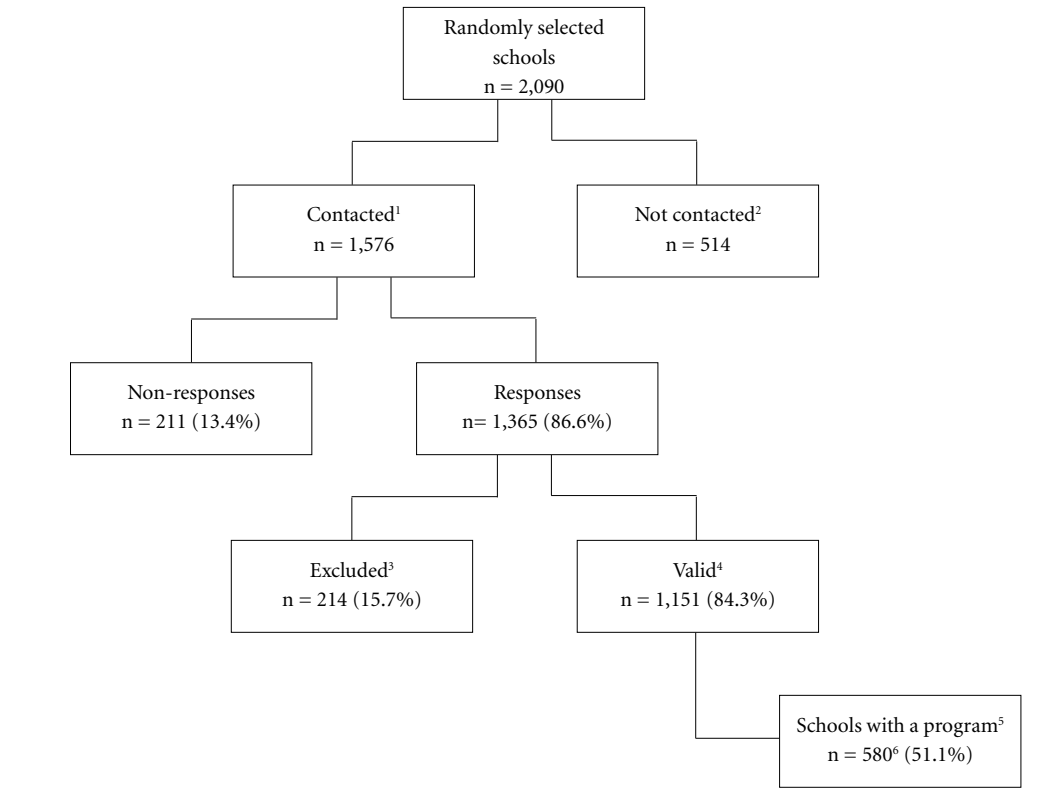

Figure 1. Flowchart of the sample selection process. Brazil, 2014.

[1]Contacts made by telephone or email; [2]Unable to make contact by telephone or email after several attempts; [3]Questionnaires with less than 30% of the questions completed were excluded; [4]Analyzed questionnaires; [5]15 non-responses – basis for calculation of percentage n = 1,136; [6]Analyzed questionnaires that affirmed that the school had a drug prevention program.

NIDA's prevention principles. Some of the questions were taken from a questionnaire developed by Ringwalt et al.[15]. The other questions were formulated by the authors to gain an understanding of characteristics specific to school-based prevention programs in Brazil. The understanding of these questions was tested by a previous study conducted in São Paulo[16].

The respondent characteristics assessed by this study were sex, age, education level, position at the school, and training in drug education. The school characteristics were school type (public or private), region, location, and school size. With regard to school prevention programs, we assessed the annual frequency of activities, duration, target audience, school grades targeted by the program, organizations conducting the programs, program model, and type of activities developed at the school addressing drug issues.

Finally, we assessed the adoption of good prevention practices based on 15 of the principles suggested by NIDA[11], in which programs should: enhance protective factors and reverse or reduce risk factors; address all types of drugs; address the type of drug abuse problems in the school; be tailored to the age and characteristics of the students; focus on family participation; focus on community participation; develop activities as early as preschool to address risk factors such as aggressive behavior, poor social skills, and academic difficulties; for elementary school children, focus on training skills such as self-control, emotional awareness, communication, social problem-solving, and academic support; for

high school students, focus on study habits and academic support, communication, peer relationships, self-efficacy and assertiveness, drug resistance skills, and reinforcement of antidrug attitudes; reinforce the program at key transition points, such as the transition from middle school to high school and the last year of high school; combine two or more domains of prevention, involving school, family, and community-based programs; be adapted from research-based interventions; be continuous and long-term, reaching different grades at different times throughout the year; include teacher training on good classroom management practices; and employ interactive techniques, such as workshops, talking circles, role-playing, and group activities.

Data analysis

The qualitative variables were described using absolute frequencies, prevalence, and 95% confidence intervals. The numerical variable (number of prevention principles) was presented using means, minimum/maximum, and standard deviation. Inferential analysis was performed using Poisson regression to identify factors associated with a greater number of prevention principles, where the dependent variable (outcome) was the sum of prevention principles applied, ranging from zero to 15.

The independent (explanatory) variables were school characteristics (public or private, region, school size, and location) and the organizations conducting the drug prevention programs. A first model was applied including all variables that obtained $p < 0.20$ in the univariate analysis. Non-significant variables were then excluded in a step-by-step manner up to the final model, adopting a significance level of 5%. The results from the Poisson regression are presented as incidence rate ratios (IRR) and 95% confidence intervals (95% CI). All analyses were performed using the statistical software program Stata 13. Weighting adjustment was not applied because the sample was self-weighted. Non-responses were proportional across regions.

Ethical approval

This study was approved by the Research Ethics Committee at the Federal University of São Paulo. All respondents signed an informed consent form.

Results

Table 1 shows the characteristics of the respondents and schools. The results show that the majority of the schools were public, small, located in the Southeast region and in non-capital cities. The majority of respondents were school principals, women, aged between 40 and 49 years, and educated to postgraduate level.

Over half of the respondents (51.1%) reported that their school had a drug prevention program and were therefore asked to answer the questions regarding program characteristics (Table 2). In the majority of schools, the frequency of activities was irregular and the average duration of interventions was one trimester. Almost all the programs were directed at students and less than half involved the family and community. The data show that the majority of programs were directed at middle school students (sixth to ninth grade). Around 40% of the schools implemented programs delivered by school staff, while 30% reported that the programs were provided by health institutions. The most active organization conducting programs in the schools was the Military Police, delivering programs in 70% of schools. In this respect, 35.7% of the overall sample (411/1151) reported that they participated in PROERD, a national drug and violence resistance program implemented by the Military Police.

Table 2 also shows that the schools combined one or more program models. In this regard, more than 80% of the schools reported that they applied programs that focused on health education, affective education, and scientific knowledge, while 45% used scare tactics.

Almost 90% of the schools provided presentations with invited guests and around 40% used presentations with former drug users. Films and school assignments about drugs were also common drug prevention activities developed in the schools (Table 2).

Table 3 shows the prevention principles applied by the schools in drug prevention programs. The findings show that the majority of schools dealt with risk and protective factors and addressed all drugs and that programs were tailored to the age of the participants.

The average number of prevention principles applied was 8.3, ranging from 0 (the minimum) to 15 (the maximum) (standard deviation = 3.3; results not shown).

Table 4 shows the factors associated with the application of a greater number of prevention principles by programs. The results of the final

Table 1. Characteristics of the respondents and schools assessed by the study. Brazil, 2014 (n=1,151).

Variables	Total		
	n = 1,151		
	n	%	95%IC
Respondent characteristics			
Sex			
Female	855	74.4	71.8 - 76.9
Male	294	25.6	23.1 - 28.2
Age			
20 – 29 years	55	4.8	3.6 - 6.2
30 – 39 years	343	29.8	27.2 - 32.5
40 – 49 years	471	40.9	38.1 - 43.8
50 – 59 years	239	20.8	18.4 - 23.2
60 – 69 years	43	3.7	2.7 - 5.0
Education level			
High school	29	2.5	1.7 - 3.6
Higher education	259	22.5	20.1 - 25.0
Postgraduate (Specialization)	773	67.2	64.4 - 69.9
Postgraduate (Masters/PhD)	89	7.7	6.3 - 9.4
Position			
Principal	505	51.2	48.0 - 54.3
Education coordinator	397	40.2	37.1 - 43.3
Prevention program coordinator	60	6.1	4.7 - 7.7
Other	25	2.5	1.6 - 3.7
Has completed a course on drug education	739	65.1	62.2 - 67.8
School characteristics			
Type			
Public	893	77.6	75.1 - 80.0
Private	258	22.4	20.0 - 24.9
Region			
Southeast	524	45.5	42.6 - 48.4
South	163	14.2	12.2 - 16.3
Northeast	287	24.9	22.5 - 27.5
North	77	6.7	5.3 - 8.3
Center-West	100	8.7	7.1 - 10.5
Size*			
Small	809	70.3	67.5 - 72.9
Medium	281	24.4	22.0 - 27.0
Large	61	5.3	4.1 - 6.8
Location			
Non-capital	908	79.6	77.2 - 81.9
Capital	232	20.4	18.0 - 22.8

* Small (up to 800 students); Medium (between 801 and 1,600 students); Large (more than 1,600 students).

model show that private schools were 14% more likely to apply more prevention principles than public schools. Furthermore, that fact that programs were delivered by school staff, a health institution, or the department of education led to an increase in the number of prevention principles applied by programs.

Discussion

The data presented suggest that school-based drug prevention programs are sporadic, directed primarily at middle school students (sixth to ninth grades), delivered mainly by the Military Police, have an average duration of one trimester,

Table 2. Characteristics of the school-based drug prevention programs, Brazil, 2014 (n = 580).

Variables	Total		
	n = 580[1]		
	n	%	95%IC
Frequency of activities			
Sporadic (irregular)	340	58.6	54.5 - 62.7
Systematic (regular)	240	41.4	37.3 - 45.5
Duration			
One year	65	11.6	9.1 - 14.5
One semester	116	20.7	17.4 - 24.3
One trimester	321	57.2	53.0 - 61.4
One month	26	4.6	3.0 - 6.7
Less than a month	33	5.9	4.1 - 8.2
Target audience			
Students	555	97.4	95.7 - 98.5
Teachers	267	46.8	42.7 - 51.0
Parents	230	40.4	36.3 - 44.5
Community	180	31.6	27.8 - 35.6
Non-teaching staff	184	32.3	28.5 - 36.3
Grades			
Elementary	195	33.6	29.8 - 37.6
Middle school	380	65.5	61.5 - 69.4
High school	253	43.6	39.5 - 47.8
Organizations conducting programs			
Military Police	411	73.4	69.5 - 77.0
School staff	238	42.5	38.4 - 46.7
Health institution	176	31.4	27.6 - 35.4
Department of education	101	18.0	14.9 - 21.5
Religious group	55	9.8	7.5 - 12.6
Non-religious NGO	35	6.3	4.4 - 8.6
Drug prevention program model			
Health education	515	90.5	87.8 - 92.8
Affective education	501	88.5	85.6 - 91.0
Scientific knowledge	461	81.3	77.8 - 84.4
Provision of alternatives	389	69.1	65.1 - 72.9
Personal and social skills	386	68.1	64.1 - 71.9
Drug resistance training	383	67.1	63.0 - 70.9
Scare tactics	253	45.1	40.9 - 49.3
Positive group pressure	159	28.4	24.7 - 32.4
Drug prevention activities developed in the schools			
Presentations with invited guests	505	87.7	84.7 - 90.2
School assignments	496	86.7	83.6 - 89.4
Films	463	81.2	77.8 - 84.3
Group activities	340	70.0	65.7 - 74.0
Educational material	392	69.0	65.0 - 72.8
Special events	344	60.1	56.0 - 64.2
Multidisciplinary projects	339	59.3	55.1 - 63.3
Theater	273	56.6	52.1 - 61.1
Presentations by former drug users	235	42.0	37.8 - 46.2
Project linked to a specific subject	229	40.0	36.0 - 44.2
Curricular classes	196	34.3	30.4 - 38.3
Questionnaires about drugs	169	35.4	31.1 - 39.9

[1]Total number of schools answering that they had a drug prevention program.

and incorporate different program models. The factors associated with the application of a greater number of prevention principles were: being a private school and the fact that programs were delivered by school staff, a health institution, or the department of education.

Some of the characteristics of drug prevention programs identified by this study are similar to those reported by a study involving 79 schools conducted in São Paulo in the 1980s by Carlini-Cotrim and Rosemberg[17]. These authors reported that programs were sporadic, implemented by non-educational entities, and directed primarily at students. This finding suggests that little progress has been made towards the implementation of research-based drug prevention curricula over the last three decades.

Studies of school-based drug prevention programs in the United States showed that progress toward the implementation of evidence-based drug prevention curricula was slow[5,18-21]. The findings showed that gradual progress was made in terms of investment and the development of consistent policy measures and the National Registry of Effective Programs and Practices[19,20]. In Brazil, drug use prevention is one of the components of country's national school health program (*Programa Saúde na Escola* - PSE), a partnership between the health and education ministries, the program is implemented in public schools with the support of primary healthcare centers[22], in addition to being part of chapter 4 of the National Drug Policy[23].

Our findings show that the primary target audience of programs are students (94.0%) and families have only limited involvement. This suggests that the majority of programs are not integrated with the community and family, one of the key elements of effective interventions for preventing substance use in adolescents[24-27].

The average duration of interventions was one trimester. This time period may be considered adequate depending on program content[9]. The literature recommends that programs should consist of a series of 10 to 15 structured sessions to achieve positive prevention outcomes[12]. Thus, considering that sessions are delivered once a week, this would require a program duration of between 3 and 4 months.

The findings also show that the Military Police was the most active organization in the delivery of programs. At the time of the study, PROERD was based on the Drug Abuse Resistance Education (DARE) program developed by the Los Angeles Police Department[28]. An evaluation of the DARE program in the United States showed that the program was not effective in preventing drug use among adolescentes[29-32].

Table 3. Prevention principles applied in drug prevention programs developed in the schools, Brazil, 2014 (n = 382[1]).

Prevention principles	Total		
	n = 382		
	N	%	95% IC
Risk and protective factors	362	94.8	92.0 - 96.8
Address all types of drugs	349	92.6	89.4 - 95.0
Tailored to the age/characteristics of the students	284	76.3	71.7 - 80.6
For elementary school children, focus on training skills	240	64.5	59.4 - 69.4
Employ interactive techniques	229	61.7	56.6 - 66.7
Continuous and long-term	221	59.4	54.2 - 64.4
Family participation	192	51.3	46.1 - 56.5
Combine two or more domains of prevention (school, family, and community-based programs)	184	50.8	45.5 - 56.1
For high school students: drug resistance skills	164	46.9	41.5 - 52.2
Preschool (address aggressive behavior, poor social skills, and academic difficulties)	172	46.4	41.2 - 51.6
Address the type of drug abuse problems in the school	160	43.0	37.9 - 48.2
Community participation	144	38.7	33.7 - 43.9
Adapted from research-based interventions	137	37.7	32.7 - 42.9
Teacher training	119	32.2	27.4 - 37.2
Reinforce the program at key transition points	115	32.1	27.3 - 37.2

[1]Total number of schools that completed all questions on prevention principles. Non-responses were not included.

Table 4. Poisson regression of the number of prevention principles applied in the prevention programs, according to the interviewees' self-report. Brazil, 2014 (n = 318).

Variables	Univariate regression			Multivariate regression		
	IRR	95%IC	p-value	IRR	95%IC	p-value
School characteristics						
Type						
Public	1.00	--	--	1.00	--	--
Private	1.11	1.01 - 1.21	0.030	1.14	1.03 - 1.25	0.008
Region						
Southeast	1.00	--	--	--	--	--
South	0.97	0.88 - 1.08	0.645	--	--	--
Northeast	1.01	0.90 - 1.12	0.907	--	--	--
North	0.98	0.83 - 1.15	0.793	--	--	--
Center-West	1.04	0.90 - 1.19	0.623	--	--	--
Size						
Small	1.00	--	--	--	--	--
Medium	1.10	1.01 - 1.20	0.031	--	--	--
Large	1.16	0.98 - 1.38	0.074	--	--	--
Location						
Capital	1.00	--	--	--	--	--
Non-capital	1.04	0.94 - 1.14	0.471	--	--	--
Organizations conducting programs						
Military Police (Proerd)[1]	0.93	0.86 - 1.01	0.092	--	--	--
School staff[1]	1.22	1.13 - 1.32	<0.001	1.17	1.08 - 1.27	<0.001
Health institution[1]	1.17	1.08 - 1.27	<0.001	1.09	1.00 - 1.19	0.048
Department of education[1]	1.21	1.10 - 1.32	<0.001	1.20	1.09 - 1.33	<0.001
Non-religious NGO[1]	1.12	0.98 - 1.28	0.096	--	--	--
Religious group[1]	1.09	0.96 - 1.24	0.201	--	--	--

[1]The reference is "No".

The data also show that the drug prevention programs combined one or more program models. In this regard, evidence shows that programs that combine various prevention models were considerably more effective than those based on only one model[23,33].

Although the majority of schools included models suggested by the literature, 45% still used scare tactics models, which have been shown to be ineffective in preventing drug use in adolescents[10]. Around 40% of the schools reported the use of presentations by former drug users. Given that research has shown that this technique is ineffective and in some cases can result in negative outcomes, this finding suggests that these schools are not adopting evidence-based prevention practices[12,27].

The findings also show that the majority of schools used presentations by invited guests, school assignments, films about drugs, and group activities, provided educational material, and held special events. However, it is not clear whether these actions were isolated one-of activities or integrated into the programs. School programs based on good prevention practices provide participants with practical experiences, in contrast to those that offer only information and discussion, enabling students to develop and practice new skills through interactive activities[8].

The average number of prevention principles reported by the respondents was 8.3. The programs addressed risk and protective factors, provided information on the main types of drugs, focused on skills training for elementary school children, and employed interactive techniques. However, more than 60% of the programs were not adapted from research-based interventions, did not involve teacher training, and did not

reinforce the program at key transition points, suggesting failings in important aspects of good prevention practices[12].

The number of prevention principles tended to be greater in private schools, which may be due to the greater availability of financial resources for training and the purchase of materials. In this regard, a study of factors associated with the implementation of drug prevention programs involving 263 principals from schools in São Paulo reported that lack of resources was a major obstacle to the implementation of effective drug prevention programs in public schools[16].

Finally, our results show that programs delivered by school staff, health institutions, and departments of education are more likely to apply more prevention principles. This finding highlights the importance of involving school staff and departments of education for the development of activities based on the prevention principles outlined in this study. Thus, it is evident that the expansion of the PSE[34] could help speed up progress in the adoption of evidence-based drug prevention practices in Brazilian schools.

Study limitations include the fact that it was not possible to contact 25% of the schools in the sample, thus hindering the generalization of our findings. Another limitation is the use of a self-administered questionnaire with closed-ended questions, which prevented a more detailed investigation of the programs and the respondents' exact understanding of the questions. Ideally, we should have visited the schools to observe the prevention programs in practice; however, these methods were outside the scope of this study. Despite these limitations, it is important to stress that, to the best of our knowledge, this is the first attempt to assess the characteristics of drug prevention programs using a random national sample of Brazilian schools.

Conclusion

Efforts are needed to improve drug prevention practice in Brazilian schools. Our findings show that, overall, the activities developed in school-based prevention programs in Brazil do not apply the NIDA prevention principles. It is vital that those responsible for delivering school-based prevention programs are guided by evidence-based good practices. The provision of adequate training to prevention practitioners, development of national good prevention practice guidelines, and the formulation and implementation of evidence-based policies are just some of the actions needed to ensure the implementation of effective school-based drug use prevention programs and the integration of these interventions into school education plans. Future research should evaluate the efficiency and effectiveness of school-based programs in order to help school managers decide on the adoption cost-effective programs.

Collaborations

APD Pereira participated in study conception, data collection and analysis, and in drafting this article. ZM Sanchez was responsible for study design, the supervision of data analysis, and the revision of this article.

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