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Addressing the needs for cultural adaptation of DARE-keepin' it REAL among Brazilian students: strategies to improve implementation

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Abstract

Background The widely implemented prevention program in Brazil, PROERD (a translated version of the DARE-kiR program), showed no evidence of effect in preventing drug use in a recent trial. The lack of cultural adaptation and instructors' deviations from the curriculum were identified as potential reasons for its ineffectiveness. This study aims to identify points of inadequacy of the PROERD program for the Brazilian culture, suggesting strategies for revising the curriculum to improve implementation.

Methods We triangulated data obtained from three different groups of study participants: semi-structured interviews with the law enforcement officer who implemented the program, focus groups with students who participated in the program, and questionnaires completed by external experts in the prevention field who evaluated the program's manuals. Data was analyzed using thematic analysis based on the Ecological Validity Model theory, which encompasses three main axes: methodology, content, and language to identify the main points for cultural adaptation.

Results Regarding the program's methodology, there is an excess of activities with little interactivity involving literacy skills that do not match Brazilian students' cognitive development and require equipment unavailable in Brazilian public schools. Regarding content, activities were considered appropriate for evidence-based prevention; however, there were some contradictions related to the drug content. The language presented in the program's manuals was considered inappropriate for the culture of Brazilian youth (vocabulary, examples, and images).

Conclusions In conclusion, this study strongly recommends revising the PROERD curriculum *Caindo na Real*, ensuring it will align with the international prevention standards and Brazilian Culture.

Keywords Cultural adaptation, Substance use, Prevention program, Adolescents

Introduction

The discussion about preventing adolescent substance use has gained attention driven by the well-established evidence of associated harms found in the literature [1, 2].

Even though 34.6% of adolescents had started drinking in Brazil before the age of 14 [3], there is no established tradition of implementing evidence-based drug prevention programs. Most of the preventive interventions implemented in Brazilian schools are not based on scientific evidence and have never been subjected to an evaluation [4]. In the last decade, some initiatives have tried to change this scenario by bringing school-based prevention programs with proven effectiveness in other contexts and evaluating their effects on the Brazilian population [5].

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The currently most widely implemented prevention program in the country is The Drug and Violence Resistance Educational Program (*Programa Educacional de Resistência às Drogas e à Violência [PROERD]*), which has been applied as a public policy by Brazilian Military Police in schools for almost three decades [4]. The current curriculum of PROERD started to be implemented in 2014 when the Brazilian Police adopted a translation version of the North American DARE-Keepin'it REAL (DARE- kiR) program [6], renamed in Brazil as "PROERD-Caindo na Real. DARE-kiR is disseminated in the United States by Drug Abuse Resistance Education (D.A.R.E.) and is an adapted version of the evidence-based prevention program keepin' it REAL (kiR) curriculum [7]. PROERD and DARE-kiR share the same theoretical model of their original version (kiR program). The main difference between the program is that teachers implement kiR versus Law Enforcement Officer (LEO), implementing DARE-kiR and PROERD.

kiR is an evidence-based universal drug use prevention program that teaches communication skills, social skills, and drug resistance strategies to enhance anti-drug norms through culturally oriented prevention messages [7]. A systematic review that synthesized the evidence of the effect of the kiR curriculum found favorable evidence in drug use prevention for the 7th-grade curriculum [8] in the United States [7], where it was initially designed, and also in adapted versions such as in Guatemala [9], Mexico [10], and Spain [11]. However, there is a lack of evaluations for the 5th-grade kiR curriculum, and the only published study showed an increased prevalence of substance use [12].

Regarding the DARE-kiR version of the program among North American students (the same version that PROERD implements), we only found one study that evaluated the effectiveness of DARE-kiR on drug use conducted among fifth graders, suggesting improvements in deterring the onset of 30-day alcohol use, drunkenness, and vaping. However, this study has several limitations since it used a non-randomized design using virtual controls [13]. In Brazil, a recent cluster randomized controlled trial (RCT) showed no evidence of the effect of the Brazilian-translated version of DARE-kiR (PROERD) on drug use prevention [14]. The process evaluation of the program implementation raised one hypothesis to understand the null results of the program in Brazil, which is related to the lack of cultural adaptation of the program once the DARE-kiR program was only translated to Portuguese before implementation in Brazilian schools [15]. Instructors reported that some activities do not work when implemented as they were proposed by the program's manuals, and to make PROERD feasible to implement, instructors often do not follow the curriculum and

change the program in an unstructured way [16]. In this context, there is an urgent need for a study to provide clear guidance for the cultural adaptation of the widest prevention program in Brazil, suggesting strategies for the revision of the curriculum based on different sources of information, such as students, prevention program experts, and LEOs who implement the program.

In the science of prevention, robust evidence points to the importance of conducting a rigorous cultural adaptation process before implementing evidence-based interventions in contexts other than those in which they were originally developed [17]. Cultural adaptation refers to the process of modifying program elements to better align with the cultural context of the target population. This often includes adjustments in language, incorporating culturally relevant examples, addressing local norms, values, and behaviors. This process ensures that the intervention resonates with the participants' experiences and norms, making it more accessible and effective [18]. Evidence-based prevention programs usually do not achieve their expected effect when exported from high-income nations to low- and middle-income countries due to a lack of cultural adaptation [19].

When looking at the kiR curriculum, cultural adaptation is even more important since one of its main theoretical principles suggests that prevention messages should be cultural grounding [20]. Previous kiR studies corroborate the importance of cultural adaptation for the program to achieve the expected effects, showing that an adapted version of the curriculum tends to be more effective than the original one [21–24]. For example, a study on the cultural adaptation of kiR for rural U.S. communities found that the adapted rural version was more effective in reducing cigarette use among adolescents compared to the non-adapted urban version [21]. Similarly, *Living in 2 Worlds*, a culturally adapted version for urban American Indian middle school students, was more effective in reducing cigarette use and maintaining connections to cultural traditions compared to the non-adapted curriculum [24]. Additionally, a study found that only the culturally adapted version for Mexico (Mantente REAL) significantly reduced alcohol, cigarette, marijuana, and inhalant use [11]. Finally, Pettigrew and Castillo's work in Nicaragua underscores the importance of adapting kiR to fit the local cultural context, incorporating local dialects, expressions, and culturally relevant examples to align the curriculum with the realities of Nicaraguan youth [25]. All these studies highlight the value of tailoring prevention programs to the specific cultural and contextual needs of target populations. This is particularly relevant to our findings, as the lack of cultural adaptation in PROERD may have impacted its effectiveness. We emphasize the importance of considering

cultural and contextual factors in program implementation to achieve better outcomes.

Considering the null effects of the PROERD program (translated version of the DARE-kiR program), the results from process evaluation, and the solid knowledge of prevention science related to cultural adaptation, this study serves as a continuation in a series of research endeavors focused on assessing the effectiveness and implementation processes of Brazil's most prevalent public policy to prevent drug use in Brazilian schools: PROERD. This study aims to identify points of inadequacy of the PROERD-Caindo na Real program for the Brazilian culture, creating directions for the revision of the curriculum.

Methods

To comprehensively understand the Brazilian version of the program, we used a triangulation approach by collecting data from three distinct sources and integrating them into the analysis. Our sources included (1) semi-structured interviews with the LEOs who implemented the program, (2) focus groups with students who received the program, and (3) questionnaires completed by external experts in the field of prevention to evaluate the program's manuals. Combining multiple data sources and methods, based on Patton's (2002) triangulation approach, allowed a comprehensive and holistic analysis.

The data collection (interviews, focus groups, and questionnaires) was guided by the Ecological Validity Model (EVM). This model recommends evaluating several aspects of a program's content to assess its cultural validity, including language, people, metaphors, objectives, methods, content, concepts, and context. Table 1 shows the questions proposed to access the respective

EVM domains. The EVM has been used as a framework to guide the cultural adaptation of interventions for new population groups [26]. This model has previously been used for the cultural adaptation of keepin' it REAL for the Mexican population [27].

All procedures complied with institutional and national research committee ethical standards, the 1964 Declaration of Helsinki, and subsequent amendments or comparable ethical standards. The study protocol was approved by the Research Ethics Committee of the Federal University of São Paulo (nº: 1327/2018 and 1292/2020). Informed consent was obtained from all participants.

Data collection

External expert evaluation of the program's manuals

A documental analysis was conducted to evaluate the manuals (instructors' and students' books) that guide the implementation of PROERD. Seventeen experts (two psychologists, two child psychiatrists, an anthropologist, an undergraduate student in Speech-Language Pathology, six elementary school teachers, a public health policy manager in the field of drug prevention, and four academic researchers specialized in the area of school-based drug prevention programs) agreed to fill out the two questionnaires developed to evaluate the PROERD's manuals, one questionnaire for each grade (5th and 7th-grade curricula). The main idea was that experts from different areas of prevention in schools evaluate the activities proposed by the manuals, focusing on the necessity of cultural adaptation for the reality of Brazilian schools and students according to three EVM dimensions: methodology, content, and language.

Table 1 Description of the questions used in the questionnaires/focal groups and interviews to evaluate the cultural adaptation needs of DARE-Keepin'it REAL among Brazilian students, according to the Ecological Validity Model

Assumptions ^a	Domain	Content
1. The lesson uses appropriate methodology for the cognitive development of this age group? The activities are presented clearly and understandably for this age group	Methodology: Methods and Objectives/Goals	It concerns the procedures/activities/techniques to be followed by the participants to fulfill the program's objectives, understanding that the procedures must be congruent with the culture and cognitive development of the target population
2. The content of this lesson is relevant to a drug use prevention program	Content: Content and Context	It refers to the topics covered in the drug use prevention program's lessons and the extent to which they are in accordance with scientific evidence in the area and consider the target population's culture
3. The language, expressions, images, and metaphors provided suit Brazilian culture. The examples provided reflect the customs and habits of the daily life of young Brazilians	Language: Language and Metaphors	It concerns the language, dialect, mannerisms, symbols, proverbs, idiomatic expressions, metaphors used in the program, and the customs and values of the local culture. It also encompasses the images and illustrated representations contained in the manuals

^a In the questionnaire, each of the three statements was repeated for each program lesson. The questions were adapted for the target audience (students, experts, and LEOs)

For data collection, experts were contacted via email and text messages to check their availability to complete the questionnaires. The first expert contacts indicated another expert they thought had the ability, experience, and capacity to contribute to the research. Experts were selected using the non-probabilistic 'snowball' sampling technique, which employs reference chains to build its sample. Initially, four experts were contacted, and they, in turn, indicated the remaining members of the sample. This technique is helpful for studying sensitive issues requiring specific knowledge, such as evaluating PRO-ERD manuals (Sedgwick, 2013).

The questionnaires describe the ten lessons of the program, both from the instructor's and the student's book (mixing images and texts). At the end of the description of each of the lessons, three statements were presented for the experts to assess whether the lesson was appropriate for Brazilian schools and students based on the MVE dimensions (methodology, content, and language). The answer options were "agree," "disagree," and "do not know." In addition, two open questions were asked regarding each lesson so that experts could write what they found inappropriate, suggest cultural adaptations, and express their general impressions about each lesson. Thus, each questionnaire comprised 30 statements and 20 open questions. Table 1 illustrates how the MVE dimensions were grouped and the statements used to measure them. In the Supplementary file (S1) is attached the description of the aim of each one of the program's lessons (5th and 7th-grade curriculum).

The questionnaires were sent through Google Forms by e-mail to the experts who consented to participate in the study. Data collection took place between February and April 2022. The average time to complete each of the questionnaires was three hours. Seventeen experts answered the two questionnaires (5th and 7th-grade curriculum), resulting in 34 completed questionnaires. To identify anonymity, an alphanumeric code was generated by combining the letter "E" (expert) and a random number assigned according to the order of completing the questionnaires (01, 02, 03...).

Semi-structured Interviews with LEOs

The first author conducted thirteen interviews with LEOs (PROERD instructors) who implemented the program in schools in São Paulo to collect information on program implementation, focusing on aspects that might be inappropriate from a cultural perspective, that may involve elements of a program that may not be well-suited or appropriate for a specific cultural context, compromising the program's effectiveness and acceptance within the community. The LEOs were selected through a drawing made from a list (provided by the program coordination)

that had 55 names of PROERD instructors with at least five years of experience in implementing the program. This criterion ensured the LEOs interviewed had sufficient experience implementing the program's lessons. The draw was stratified by the eight Metropolitan Area Policing Commands of São Paulo, located in different city regions.

LEOs were invited to participate in the study through contact by email and smartphone text message. The interviews were conducted from July to September 2021 through a digital platform (Google Meet), with an average duration of 40 min. All the LEOs who were contacted agreed to participate in the interview. They followed a semi-structured guide (described in Supplementary file S2) since most questions were previously defined, but the interviewer could add others if necessary. All interviews were recorded with the prior consent of the interviewees, transcribed, and identified by an alphanumeric code generated by combining the letter "P" (LEO) and a random number assigned according to the order of the interview (01, 02, 03...).

Focus groups with students

The students who participated in the focus groups were from schools in the city of São Paulo that implemented PROERD in the past year. The first author and other research team members conducted focus groups with fifth-grade students to assess their impressions of the program, focusing on aspects that might be inappropriate from a cultural perspective.

All the schools ($n=30$) that participated in the RCT that evaluated the effectiveness of the PROERD program were invited to participate in the study; however, only two schools implemented the program in the last year and agreed to participate. We invited two more schools to participate to reach the planned sample size. In schools, directors and teachers select the students to participate based on the student's gender, academic scores, and general classroom demeanor. The overall goal was to ensure that the focus groups represented diverse students. A total of 80 students from four schools participated in eight focus groups. The number of students in each focus group ranged from eight to twelve. Most of the students in the focus groups were girls (65%), all 5th-grade students, ranging in age from 10 to 13 years old.

Due to the COVID-19 pandemic, the program was not implemented in 2021, so the focus groups were conducted in the second half of 2022 and at the beginning of 2023. Focus groups lasted an average of 50 min. Facilitators used a semi-structured guide (described in Supplementary file S3) to pose questions to the students following the approach employed with the LEOs and experts, focusing questions on three dimensions of the

EVM model (methodology, content, and language). All focus groups were audio-recorded and verbatim transcribed by the research team, considering the anonymity of the participants. To identify the participants, an alphanumeric code was generated by combining the letter “S” (students) and a random number assigned according to the order in which they started to talk in the focus group (01, 02, 03...).

Data analysis

Qualitative data from LEOs’ interviews, open questions from expert questionnaires, and focus groups with students were analyzed using thematic analysis through a hybrid approach of inductive and deductive coding, which integrates data-driven and theory-driven codes [28]. The theory-driven categories were previously created based on the EVM theory, with its domains grouped into three main themes: methodology, content, and language. We opted not to separate the findings concerning the 5th and 7th-grade curriculum, as the data obtained from interviews, focus groups, and questionnaires did not exhibit significant differences across most of the themes and categories analyzed. However, we emphasized this distinction in our results for specific categories identified in the speeches that were directly related to either the 5th or 7th-grade curriculum.

Coding was initially performed by the first author (JV). After the information underwent its first coding version, it was subjected to interpretive triangulation, in which the other authors (RG and TP) analyzed the data in parallel. Later, the senior author (ZS) interpreted the data. Disagreements were discussed and resolved by a second review of the interview transcripts. The findings presented in this study resulted from a consensus among researchers.

Thematic analysis was oriented by Patton’s [29] triangulation approach for multiple methods (qualitative-quantitative: interviews, focus groups, and documental analysis) and multiple sources (students, LEOs, and experts). By employing triangulation across these dimensions, researchers aim to increase the trustworthiness of their qualitative findings, as the convergence of evidence from multiple sources and methods enhances the overall rigor of the study.

The quantitative data from the questionnaires filled out by the experts were summarized through descriptive analysis regarding the percentage of experts who considered the lessons in program manuals inadequate for the Brazilian culture. Descriptive analyses were carried out considering the percentage of experts who evaluated each of the ten lessons culturally inappropriate according to the three domains (methodology, content, and

language) and in general (a score constructed from the sum of “agree” responses from the three domains).

Results

Qualitative results

The findings derived from interviews with LEOs, questionnaires for experts, and student focus groups were triangulated and classified into three main themes based on the EVM theory: 1. Program’s Methodology, 2. Content, and 3. Language. Table 2 displays the corresponding key quotes from each theme and category reported in the results section.

Program’s methodology

This theme reflects the information collected regarding specific inadequacies of the program’s methodology (procedures and techniques employed in the activities), considering the characteristics of the local culture and the cognitive development of the target population. The codes analyzed were: excess of activities in each lesson; activities with little interactivity and playfulness; activities that require equipment unavailable in the Brazilian public schools; and activities involving literacy skills that do not align with the cognitive development of Brazilian students.

Excess of activities in each lesson The experts considered the program’s activities excessive, considering the time designated for each of the ten program’s lessons (45-minute class period). They observed that executing all activities takes longer than the duration specified in the manual. The manual provides guidelines on the suggested duration for each activity. They also report the fear that this excess of activities will lead to the need to exclude activities or even an inappropriate application. This perception is corroborated by interviews with LEOs who report that they can not implement all activities proposed by the program’s manuals in ten lessons of 50 minutes each, as planned by the developers. The reasons are the excessive number of students in Brazilian public school classrooms (around 40) and the students’ difficulty finishing activities within the expected time. Due to the challenges of implementation, instructors are often unable to complete all the activities proposed in the manual within the 10 lessons. As a result, they frequently extend the program to 13 or 15 lessons in order to cover the regular content. Students also reported needing more time than expected to complete curriculum activities.

Activities with little interactivity and playfulness The experts mention that the program’s manuals have many activities with a traditional reading and writing format, making the lesson uninteresting for the students. They

Table 2 The main results of analyzing the points of inadequacy of the PROERD current curriculum for Brazilian reality via triangulation of three data sources (LEOs, students, and external experts in the prevention field)

LEOs	Experts	Students
Program's methodology		
Excess of activities in each lesson	"Sometimes, I can't complete certain lessons within 50 minutes. To go through the entire PROERD manual, I need at least 13 to 15 lessons, depending on the class. The activity described in the manual that are expected for me to do in 3 minutes is impossible for 33/45 students to finish in 3 minutes. We end up using time far beyond what the manual predicts. (P12)."	"My biggest concern is that there is little time to carry out each proposed activity. This probably leads to rushed activities, with no real-time for explaining and carrying out the activities, or activities not planned in all classes." (E2)
Activities with little interactivity and playfulness	"Some classrooms are not possible to apply the lesson of this curriculum. I sometimes have to reformulate it completely, do a theater, create a different dynamic, and get them to participate. Nowadays, children do not want to write (P2)." "I think this curriculum had to be more dynamic (...) it had to be more attractive. Because it is repetitive, it will always fall into that: we are going to read a situation, and you will define, analyze, and evaluate what the positive and negative consequences are. This ends up getting boring (P10)."	"For a 10-year-old child, reading a text and filling in the gaps can be exhausting and reduce interest in the topic. Some more experiential activities on the topic would be more interesting. (E4)" "In all classes, there are large demands for writing and little interaction between children. (E10)" "I would not include many written activities that were not practical. I would add simulations that allow students to practice strategies learned in the classroom." (E4)
Activities that require equipment unavailable in Brazilian public schools	"There is no way I can show the videos. Sometimes, the video room is far from the classroom, and until I take the child out of the classroom and take them to the video room, that is 25 minutes of class. I would waste much time" (P2). "Most of the time, 99% of the classes, we read the texts and tell the stories that had to be shown on video. We read what is written in the booklet (P12)."	"All classes require the use of multimedia equipment to show slides and present videos. However, Brazilian public schools do not have this equipment available in classrooms." (E1)
Literacy activities do not match Brazilian students' cognitive development	"They do not know how to read, write, and interpret a text. You ask them to describe a problem; they do not know how to describe it. (...) At the end of our course, we always give them a text production, right? I suggest that they make a drawing, and from their drawing, I will know if they learned it or not."	"The activities are very theoretical, with a lot to read and write, which makes it difficult to apply in classrooms with children who do not even know how to write (E17)."
Program's content		
Activities with appropriate content considering evidence-based prevention practices	AGREE "Communication skills, managing emotions, dealing with peer pressure, and developing decision-making skills are important in prevention programs for this age group (E1)."	
Activities addressing drug content	NOT SUPPORTIVE "When you start talking about marijuana, when you start talking about crack, it creates a curiosity. In children, you do not have to arouse curiosity, especially ten years old. They already know what marijuana, crack, and cigarettes are. (...) You do not need to know more. (P2)	NOT SUPPORTIVE "It is noteworthy (5th-grade manual) that there are two classes with predominant content about drugs (information and resistance strategies), and in addition, throughout the other lessons, there are several situations that mention drug use by children/adolescents. However, what is known is that in this age group, it is not recommended to work on drug use directly, but rather through mediators (E1)."
		NOT SUPPORTIVE "He (LEO) showed videos of the effect of cocaine and K9. He showed videos of some actors and celebrities in the United States who used drugs and the consequences of using them before and after. (...) I found it annoying because we are still children. It was not a nice experience. This before and after, the after is very ugly! I did not like to see it (S26)."

Table 2 (continued)

LEOs	Experts	Students
	<p>SUPPORTIVE "I personally disagree with them saying that talking about the consequences of drugs will influence them to want to know what it's like. I think the more you talk about how bad that specific substance is, what it can do, and what it cannot do, they begin to assimilate and understanding that it is bad choice. I think it was a mistake to remove it. It should have remained. (P12)""This new curriculum addresses only legal drugs, which are alcoholic beverages and cigarettes, but marijuana, cocaine, and crack, are missing from the manual. However, it's a part of their reality and they are curious about it. So, I make some exceptions and explain a little about marijuana, cocaine, and crack... (5th grade curriculum) (P13)."</p>	<p>SUPPORTIVE "I liked when they put the video about people who used drugs and were going to prison. (...) It was about a homeless person who got involved in drugs and was trying to get out. (S50)""Alcohol and drugs can also lead to death, so we cannot use them. This is what PROERD is for, explaining to students about drugs so that when they are in the future, they will understand (S3)."</p>
<p>Program's language</p> <p>Inappropriate vocabulary for the culture of Brazilian youth</p>	<p>"One activity of the manual that says, 'You are at the mall with your mom, and then some friends who are popular at school arrive and invite you to hang out with them. This situation is very unlikely to happen here in Brazil. So, we give this example by replacing the mall with the street. For example, you are on the street, and a classmate asks you to go to a certain place without telling your mom. This is much more realistic for us, right? (P4).'"There [in the United States], it is a reality; some things happen, of course, people will come and offer drugs, but how they are approached to offer them is different here. For example, we do not talk about gangs here in Brazil, we usually talk about groups (P4).""In the bullying class that discusses children taking the school bus, I would read and try to modify it to vans, which is our Brazilian reality (P11)."</p>	<p>"Too many difficult words that can be replaced; I cannot understand the insistence on using terms that need to be defined if we have identical terms that do not need to be defined (e.g., to report = to feel)" (E10)"The terms need to be updated: mp3 is a little outdated, and instant messaging is quite strange. (E4)""In lesson 6, in an example the word "doped" (dopado) is used related to the use of marijuana. This is not the best option for the situation. Get high (chapado) is more used in Brazil to refer to someone that is under the effect of marijuana (E15)."</p>
<p>Examples and situations that are inappropriate for the culture of Brazilian youth</p>	<p>"The language, the way of talking, does not show their reality. I think it had to be adapted because the program came from the United States, and here in Brazil, the culture is different, the reality is different. You can't just bring everything from there and throw it here and expect it to work. As Proerd instructors, we can't convey one hundred percent of what's in the manual. We emphasize the concept more through our experiences, with police incidents we have here in the military police, always providing these adapted examples" (P3).""The examples in the manual are more geared towards middle-class habits. So, in peripheral schools, I usually bring examples from our professional daily life because there they deal quite a bit with drugs. Many of them are even corrupted to stay in the drug trade. So, I usually emphasize this a lot; I include it in the lessons examples of young people getting involved in trafficking (P9)."</p>	<p>"I do not care much for that (cultural adaptation) For me, if it is in Portuguese, that is fine. Even if everything looks like it was made for American students. The only thing I will find wrong is if it does not have a translation into Portuguese (S43)."</p>
<p>Images inappropriate for the culture of Brazilian youth</p>	<p>"The examples related to sport do not reflect the reality in Brazil. In Brazil young play football not basketball or baseball" (E8).""Some situations where alcohol and drugs are offered more explicitly may be difficult to experience for most children of this age. There is an example in lesson 4 (5th-grade curriculum) where an example is given of some girls drinking wine during a game. This is completely outside the reality of Brazilian 5th grade students (E3)."</p> <p>"The image does not seem to make sense for our culture or today's young people. It appears quite old (which may make it difficult for young people to identify with it). A girl is wearing baseball gear, a sport not played in Brazil. (E2)""There is an image of a cheerleader and two children playing basketball. This is completely out of Brazilian culture (E6)"</p>	<p>"I think instead of examples of kids playing baseball, we could talk about playing football. We also do not have a cheerleader in Brazil (S2)."</p> <p>"These characters here seem to be more like the United States. I thought that some scenarios look more American, the uniform looks like the US, the school looks like it too (S11)."</p>

suggest that the program should have more interactive activities. LEOs also add that these limitations make them adapt the techniques used in the program's lessons to promote students' engagement and facilitate implementation. Some students also corroborated these speeches, suggesting that it would be more interesting if the program had fewer writing activities and more activities involving discussion and games.

Activities that require equipment unavailable in Brazilian public schools Experts reported that the program's manuals require multimedia equipment, such as projection devices and video equipment, to carry out activities incompatible with Brazilian public schools' infrastructure. Most Brazilian public schools do not have this equipment available. The interviews with the police corroborate these experts' impressions. In addition, they reported that this lack of equipment in schools directly impacts the fidelity of the program's implementation since they need to adapt all the activities that include slideshows and videos. The instructors employ various strategies to overcome challenges in presenting videos. These strategies involve showing them on personal computers or mobile phones, offering only the audio part via speakers, playing all the videos together at the end of the program, providing video links for home viewing, and orally narrating stories from the videos. Some students tell us that their classrooms were equipped with television, which allowed videos to be shown; however, on some occasions, the equipment did not work very well, and the instructor could not display the video and describe its content (reading the description of the video provided by the manual). Other students reported that the LEOs showed no video during the program.

Activities involving literacy skills do not align with the cognitive development of Brazilian students Experts and LEOs report that although the DARE-kiR manual is based on an interactive approach, almost all lessons have activities that require students to read texts, interpret and fill gaps in the manual by writing sentences. This posed a challenge in the Brazilian context, where public schools have many students with a deficit in learning these skills. All instructors noted that many 5th-grade students (even 7th-graders) have difficulties with activities involving literacy skills, which was identified as a significant barrier to the program's implementation. Since many of the activities in this curriculum are based on reading, text interpretation, and writing, LEOs have to adapt these activities to enable curriculum implementation. The LEOs mention various examples of adaptations made by instructors, such as having students work in pairs, asking them to draw instead of write, providing individual

assistance, registering on the board for them to copy, and transforming written activities into oral exercises. The students also reported that the activities had to be adapted to deal with the students who did not know how to read or write.

Program's content

This theme encompasses the information collected regarding the suitability of the activities content for an evidence-based drug use prevention program, considering the group's age and the local culture. The codes analyzed were activities with appropriate content considering evidence-based prevention practices and activities addressing drug content.

Activities with appropriate content considering evidence-based prevention practices

This category emerges only from the speeches of the experts. Most experts agree that the program's lessons have adequate content for evidence-based drug prevention since the lessons are based on social-emotional learning, considered one of the most effective approach for school-based drug prevention programs [30]. While the decision-making content of keepin' it REAL is valued as part of the drug prevention curriculum, experts suggested that the methodology might benefit from adaptation, such as incorporating role-playing, games, and discussions, to better align with the cognitive development level of Brazilian 5th-grade students.

Activities addressing drug content This was the most controversial category, with considerable divergence between the sources and within them (LEOs, experts, and students).

There were LEOs, experts, and students who did not support the idea of incorporating more activities addressing drug content in the program's curriculum; on the contrary, some noted that the program excessively emphasizes drug-resistance strategies, providing too many examples featuring young people using drugs and excessive drug-related content. Regarding the 5th-grade curriculum, the experts highlighted that directly addressing drug use content is not advisable for students at this age. Instead, it is recommended to approach the topic through mediators such as risk and protection factors. Along the same line, some instructors (the minority) reported that they realized that talking about drugs with children can sharpen their curiosity about the topic and lead to an increase in consumption. Some students mentioned feeling uncomfortable with certain drug-related content shown by LEOs, particularly regarding the consequences of drug use. It appears that some officers

employ a fear-based approach, displaying images of devastating outcomes associated with drug use.

On the other hand, some LEOs and students supported the idea of incorporating more activities addressing drug content in the program's curriculum. The majority of LEOs reported that the curriculum should contain more classes that specifically address the topic of drugs, particularly illicit drugs, in both curriculums. They believe that talking about drugs and providing information makes adolescents use less. Most students highlighted how they enjoy speaking about drugs with LEOs, suggesting that it is crucial to discuss the negative consequences of drug use to prevent its future occurrence.

The results regarding 'Activities addressing drug content' should be interpreted with caution, as they refer to the version of the program implemented by PROERD, which includes additional drug-related content beyond what is proposed in the original DARE-kiR curriculum.

Program's language

This theme brings together the information collected regarding the adequacy of the language used by the program manual, specifically the symbols, proverbs, and idiomatic expressions. This theme also assesses whether the images and examples utilized in the program's activities reflect young Brazilians' cultural practices and habits. The codes analyzed were vocabulary, examples/situations, and images.

Inappropriate vocabulary for the culture of Brazilian youth The experts who evaluated the program manuals understand that vocabulary is very formal and sometimes complex for young people to comprehend. For example, the title of lesson 8 of the 5th-grade curriculum is "Five Questions to report (relatar) bullying." In Brazil, this word report is very formal, and children are not used to that. They also mention that some terms/expressions are outdated (e.g., mp3 or instant messages) and inappropriate terms for the Brazilian culture (e.g., doped due to the use of marijuana). The instructors corroborate these reports by saying that they sometimes need to adapt the language used in the manual to reflect the local culture better. As shown in Table 1, they report replacing school buses with vans, shopping malls with streets, and gangs with groups. The students believe that the vocabulary is unsuitable for the Brazilian reality; however, it does not seem to be a significant issue for them when receiving the program, as they are accustomed to consuming cultural products from the United States.

Example and situations that are inappropriate for the culture of Brazilian youth Experts and instructors believe that the examples provided in the program's manuals need to be urgently adapted to the local reality, as they may not accurately depict the daily lives of young Brazilians, especially those in the poorest areas (the target audience of the program). The scenarios related to sports situations and drug offer are cited as examples that need to be adapted. The LEOs also mention that they already make these adaptations during delivery, substituting the examples provided in the manual with others, some drawn from their own experiences as LEOs, particularly situations related to young people getting involved in trafficking. Students also reported that the situations and the examples from the manual are unsuitable for Brazilian Culture and could be replaced by others more familiar to them. For example, they suggest replacing the situations where kids play basketball for football.

Images inappropriate for the culture of Brazilian youth The experts who evaluated the manuals considered that the images used to illustrate the program's lessons are unsuitable for the culture of young Brazilians, not representing the reality they experienced. The manual's images show adolescents playing sports that are not frequent in Brazil, such as baseball, basketball, and hockey. In addition, there are images of cheerleaders and students wearing uniforms that are not similar to those used in Brazil. In general, the LEOs did not reference anything directly related to the images in the manual. Again, this topic does not seem too relevant for the students; however, some of them reported that the pictures in the manual do not reflect Brazilian children and locations.

Quantitative results

Most experts consider that the program manuals in both curricula (5th and 7th grade) are inadequate in at least one of the three domains evaluated. The 5th year manuals were considered inadequate by a slightly higher percentage of experts (74%) than the 7th year manuals (71%). Language domain (63.5% and 57.6%, respectively) followed by methodology (51.2% and 51.2%, respectively) were considered the most accurately adapted in the 5th and 7th-year manuals (Table 3).

When we considered each of the program's lessons individually, in the 5th-grade curriculum, the introductory lesson that talks about the decision-making model was considered, on average, as the most inappropriate. In the 7th grade curriculum, the first three lessons, which deal with refusal strategies, information about drugs,

Table 3 Descriptive data of prevention experts evaluation of the inadequacy of the ten lessons proposed in the PROERD 5th and 7th-grade curriculum manuals for the Brazilian reality, considering the domains of content, methodology, and language

	5th grade						7th grade					
	Methodology % ^a	Content % ^a	Language % ^a	Any domain % ^b	Total Mean ^c		Methodology % ^a	Content % ^a	Language % ^a	Any domain % ^b	Total Mean ^c	
Lesson 1	58,8	23,5	41,29	58,8	1,2		58,8	17,6	70,6	82,3	1,5	
Lesson 2	64,7	58,8	58,8	76,5	0,6		58,8	41,2	58,8	82,3	1,6	
Lesson 3	47,03	47,0	52,9	70,6	0,5		64,7	23,5	76,5	76,5	1,6	
Lesson 4	52,97	47,0	82,3	82,0	0,6		47,1	17,6	64,7	76,5	1,3	
Lesson 5	52,9	29,4	70,6	82,3	0,5		41,2	11,8	35,3	52,9	0,9	
Lesson 6	41,17	35,3	82,3	82,3	0,5		47,1	29,4	58,8	75	1,3	
Lesson 7	52,9	29,4	64,7	76,5	0,5		35,3	29,4	47,1	56,2	1,1	
Lesson 8	52,9	29,4	64,7	82,3	0,5		47,1	29,4	64,7	75	1,4	
Lesson 9	41,2	41,2	70,6	70,6	0,5		52,9	5,9	47,1	62,5	1,0	
Lesson 10	35,3	23,5	47,0	58,8	0,3		58,8	23,5	52,9	68,7	1,3	
Total	50,0	36,5	63,5	74,1			51,2	22,9	57,6	70,8		

^a Percentage of experts who considered the lessons in the PROERD manuals inadequate

^b Percentage of experts who consider the lessons in the PROERD manuals to be inadequate in at least one of the domains (methodology, content, and language)

^c Average resulting from the sum of the points from the three domains

and decision-making skills, were considered the most inadequate.

Discussion

This study was conducted to provide directions for cultural adaptation of the most prevalent prevention program in Brazilian schools, PROERD, a Brazilian-translated version of the DARE-kiR curriculum. Considering that the program did not achieve the expected preventive effect, this study's main purpose is to identify inadequacies of the program's curriculum that point to the need for revision. Our results from the triangulation of three data sources (LEOs, students, and experts) and methods (qualitative-quantitative) identify the need to make in-depth adaptations in the three main areas of the program: methodology, content, and language. The necessity for these revisions is due to the cultural reality of Brazilian students and schools, which are different from those presented in the manual of the translated version of the DARE-kiR program (implemented by PROERD), and to ensure that the programs meet the recommendations of the International Standards for Drug Prevention [31].

Regarding the methodology, our results highlighted an excessive number of activities in each program lesson, considering the number of students in the Brazilian schools. Consequently, the instructor cannot implement the program in the number of lessons planned. In this case, it is essential to provide LEOs with recommendations on how to divide each one of the lessons over the days of the program. Otherwise, the LEO might exclude some of the activities or lessons that might be a core element for the program's effectiveness. Therefore, optimizing the distribution of program elements over the intended timeframe is crucial for maximizing the results. The need for this kind of adaptation has already been reported in previous studies that evaluated school-based prevention programs in Brazil [32] and other Latino-American countries [27]. Another point regarding the program's methodology was the necessity to include more activities with interactivity and playfulness, which do not require as much of students' writing skills. These findings are corroborated by the International Standards on Drug Use Prevention, which showed that prevention programs are most effective when they employ interactive techniques, such as peer discussion groups and role-playing [31]. In addition, Brazilian students' poor literacy and writing proficiency [33] also points to the need for fewer activities that involve text-reading examples and writing to ensure the students understand the activities and that the LEO will not need to modify them, compromising fidelity. Another concern is the lack

of equipment to show the program's videos to Brazilian public schools, especially once the developers consider videos essential for the program's effects [34]. A potential strategy to address the lack of equipment for showing videos in schools is to replace the videos with comic books. These comic books were created by the Keepin' It REAL developers to be used in the lessons when playing videos are not feasible, which could be a solution for schools facing this challenge.

Even though most activities in the fifth-grade curriculum were considered to provide appropriate content aligned with evidence-based prevention practices, experts noted an excess of activities in the program's manual addressing specific drug content. While direct discussions of substances such as alcohol and cigarettes are limited to Lesson 2, subsequent lessons frequently present scenarios involving substance use, such as individuals in social contexts where smoking or drinking occurs. These scenarios aim to provide realistic contexts for teaching decision-making and resistance skills but cumulatively contribute to a stronger focus on drug-related content. Although the International Standards on Drug Use Prevention recommend that personal and social skills education for middle childhood (6 to 12 years) should primarily focus on developmental skills rather than specific substance information, exceptions are noted for communities where children have early exposure to substances (e.g., inhalants) [35]. This context might hold particular relevance for our study, considering that some Brazilian children in certain regions may experience early exposure to substance use. However, we found a very low prevalence of substance use among Brazilian children at this age, suggesting that a focus on resistance skills and specific drug information might raise unnecessary awareness of substances or curiosity to experiment [12, 36]. In addition, LEOs and students reported that, beyond the substance use content in the program's manual, LEOs often add videos, information, and discussions about additional substances. While the original DARE keepin' it REAL curriculum avoids fear appeals, our findings indicate that PROERD instructors introduced fear-based elements during program delivery, highlighting significant fidelity issues. Previous evaluations corroborate our findings that indicate challenges with program fidelity, especially regarding drug content, with LEOs sometimes including direct drug information and fear-based messages [15]. Thus, it is crucial that LEOs receive updated training in evidence-based practices to avoid iatrogenic approaches, such as overemphasizing information on specific substances and employing fear-arousal strategies, highlighting the importance of fidelity monitoring and support to maintain alignment with the program's evidence-based design [37].

Regarding the language topic encompassing vocabulary, examples, situations, and images of the program's manual, the three data sources unanimously stated that the program needs to be adapted to Brazilian culture. Cultural adaptation is already an established topic in prevention science and is a key procedure in implementing evidence-based interventions in new contexts [17]. So, it isn't easy to accept that Brazil's most prevalent prevention program is not culturally adapted, only translated into Portuguese. This situation is even more crucial when dealing with a culturally grounded program like DARE-kiR, which suggests that all the program prevention messages should be based on examples from local cultures [38]. Moreover, the evidence for kiR programs suggests that the adapted versions are more effective than the original ones [8]. One example is the paper that describes the cultural adaptation process of keepin' it REAL for rural schools, including changes to language, narratives, and role-playing activities to better reflect rural realities. While the original prevention strategies were maintained, both surface elements (such as language) and deep structures (such as values and beliefs) were modified to ensure the content was culturally appropriate. These adaptations were essential in enhancing the program's effectiveness in rural communities [21]. The LEO interviewers showed that the absence of a culturally adapted program means that the LEO has to modify the program when implementing it to make implementation feasible; however, it compromises fidelity [16].

The implications of our findings can be summarized in the following orientations: 1. Preventive experts should guide LEOs on how to divide activities to implement the program in a more significant number of lessons (preventing core elements activities from being excluded). 2. Strengthen instructor's training in peer group interactive activities (to prevent their exclusion and replacement by reading and writing activities) and regarding drug content (to ensure they do not include extra drug-related content and refrain and that prevention practices are more in line with what international drug use prevention standards recommend). 3. A group of prevention experts, LEOs and students should guide a cultural adaptation of the program, focusing mainly on two points: adapting activities to a more playful and interactive approach (incorporating group discussions, games, and theater) and reviewing the examples, vocabulary, and images in the program manual. 4. To ensure the delivery of the videos, the program coordination needs to consider making equipment available or exploring options to adapt the program, eliminating the necessity of the videos.

The first limitation of this study is that we only have data from fifth-grade students. However, we must say that the fifth-grade curriculum is the most prevalent one

implemented in São Paulo, which was one of the reasons we had difficulty finding schools that apply the seventh-grade curriculum. In addition, the data from LEOs and experts covered the two curriculums (5th and 7th grade). Another limitation is that our findings are not generalized for all the PROERDs curricula implemented in all Brazilian states since we only collected data from the city of São Paulo. Another limitation is related to the student's point of view. It was difficult to precisely evaluate some points of the EVM model since it is impossible to know the program's characteristics each school received due to all the modifications that LEOs make in their day-to-day implementation. Moreover, while we had access to the original DARE-kiR materials and could distinguish between translated and adapted activities, this differentiation relied on self-reports and observations, which may not fully capture all modifications made during implementation. Another limitation of the study is that although the experts were provided with the instructor's and student's manuals, they did not receive specific training on the program's core concepts and prevention strategies, which may have limited their evaluation. It is important to note that previous studies have indicated that the PROERD program is implemented with low levels of fidelity [15, 16], which might have influenced the outcomes reported.

In conclusion, this study provides solid recommendations for revising the PROERD curriculum *Caindo na Real*, considering the identified program's inadequacies in methodology, content, and language. Assuming all the studies that were conducted in the last five years related to the PROERD program, the Brazilian military police should consider incorporating these scientific findings to improve the program, ensuring that it will be more in line with the international standards of prevention.

Abbreviations

PROERD	Programa Educacional de Resistência às Drogas e à Violência - Drug and Violence Resistance Educational Program
DARE-kiR	DARE-keepin' it REAL
D.A.R.E	Drug abuse resistance education
kiR	keepin' it REAL
LEO	Law enforcement officer
RCT	Randomized controlled trial
EVM	Ecological validity model

Supplementary Information

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Supplementary Material 1.

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Authors' contributions

Valente was responsible for conducting the semi-structured interviews and focus groups, qualitative analysis, and writing the first draft of the manuscript. Franciosi was responsible for data collection and analysis of the questionnaires completed by external experts in the prevention field. Pietrobon and Garcia-Cerde analyzed the content of the semi-structured interviews and focus groups and reviewed the manuscript. Sanchez was responsible for the manuscript's final revision and supervision and contributed to analyzing and interpreting the content of the qualitative analysis.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

All procedures complied with institutional and national research committee ethical standards, the 1964 Declaration of Helsinki, and subsequent amendments or comparable ethical standards. The study protocol was approved by the Research Ethics Committee of the Federal University of São Paulo (nº: 1327/2018 and 1292/2020). Informed consent was obtained from all participants.

Consent for publication

Consent for publication was obtained from all participants.

Competing interests

The authors declare no competing interests.

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