Translational Behavioral Medicine, 2026, **16(1)**, ibag026
https://doi.org/10.1093/tbm/ibag026
Original Research

TBM OXFORD

From evidence to practice: stakeholder-driven methods to culturally adapting prevention programs addressing substance use and mental health

Claudia Corpus-Espinosa[1,*], Isotta Mac Fadden[2], Marta Lima-Serrano[1,3]

[1]Faculty of Nursing, Physiotherapy, and Podiatry, Department of Nursing, Universidad de Sevilla, Seville, Spain
[2]Social Sciences Faculty, Department of Sociology, Universidad de Salamanca, Salamanca, Spain
[3]Instituto de Biomedicina de Sevilla, IBiS/Hospital Universitario Virgen del Rocío/CSIC/Universidad de Sevilla, Seville, Spain
*Corresponding author. Department of Nursing, Faculty of Nursing, Physiotherapy, and Podiatry, Universidad de Sevilla, Avenzoar Street, 6, 41009 Seville, Spain. E-mail: clacoresp@alum.us.es

Abstract

Background: **Applying established frameworks for cultural adaptation of evidence-based programs (EBPs) is essential to ensure cost-effectiveness, adoption, and sustainability while advancing health equity. However, adaptation processes often lack systematic approaches, particularly outside academic contexts.**

Purpose: **This study explores how cultural adaptation processes of prevention programs are delivered to address adolescent substance use and common mental health issues, from the perspective of the main stakeholders involved in these processes. In parallel, it aims to empirically refine and specify the 11 stages synthesized in prior work that integrated insights from multiple cultural adaptation processes and frameworks.**

Methods: **A qualitative analysis was conducted using content analysis of 22 semi-structured interviews with stakeholders from the quadruple helix model: 6 *from Academia, 6 from Non-governmental organizations (NGOs), and 10 from Public administration*, selected globally. Stakeholders were identified via brainstorming and purposive-convenience sampling, based on their roles in adapting, implementing, evaluating, or funding prevention programs addressing adolescent substance use and mental health issues. Despite extensive recruitment efforts, no representation from the *Business* helix was achieved, as only one business contact agreed to be interviewed, which was not considered sufficient for inclusion.**

Results: **The qualitative analysis refined and expanded the stages of a cultural adaptation sequence that reflects how cultural adaptation processes are conducted in practice: building synergies, local needs assessment, program selection, initial cultural adaptation, advisory group consultation, staff training, piloting, program refinement and readiness for implementation, implementation, monitoring and evaluation, and dissemination and sustainability. Notably, not all stakeholders followed or applied the steps uniformly. Furthermore, academics were the only group to report using formal cultural adaptation models, while *NGOs* and the *Public administration* relied on experiential and contextual knowledge.**

Conclusions: **Findings underscore the importance of translating scientific knowledge into practice contexts while ensuring continuous evaluation, dissemination, and sustainability of adapted EBPs targeting adolescent substance use and mental health issues. Collaborative efforts and co-creative strategies are crucial to maintaining cultural relevance. This study contributes by offering empirical refinement and operational specification of an 11-step cultural adaptation sequence identified in a prior scoping review. Linking evidence from prior literature with practice provides greater clarity and applicability for implementers seeking to culturally adapt prevention programs across diverse contexts.**

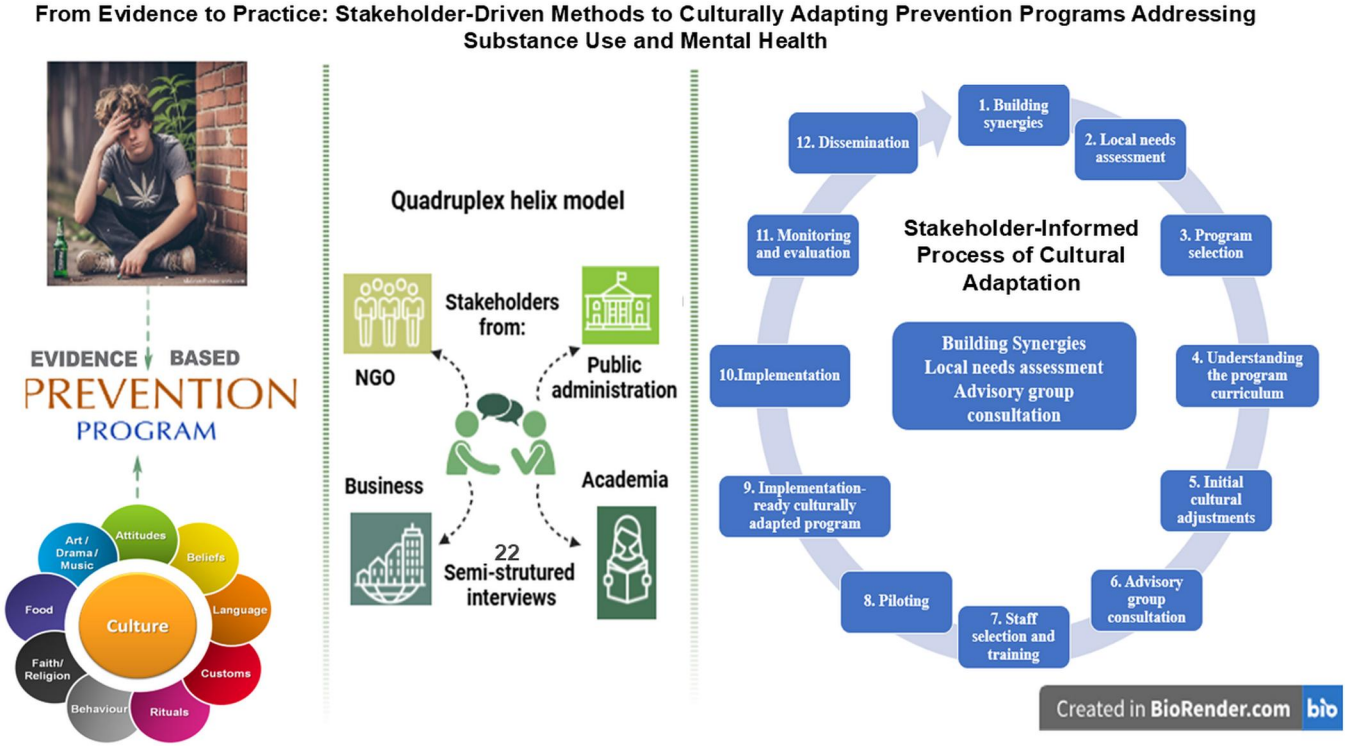
Keywords cultural adaptation, adolescence, evidence-based programs, substance use, mental health

Lay Summary

Evidence-based prevention programs can help adolescents avoid substance use and improve mental health. However, these programs are often designed in different cultural contexts from where they are later used. This study explores how prevention programs are adapted to fit the cultural realities of adolescents in diverse settings.

Drawing on 11 stages identified in a prior review, 22 interviews with individuals from academia, non-governmental organizations, and public institutions were analyzed to explore how these stages are applied in practice. The study refined and expanded the existing sequence into a 12-step integrative process that describes how cultural adaptations unfold—from assessing local needs and selecting programs to adapting content, training staff, and evaluating outcomes. Findings show that these steps are not applied consistently across sectors, and only academics tend to use recognized frameworks for cultural adaptations. This highlights a gap between scientific knowledge and practice. To make prevention programs more effective and sustainable, it is crucial to involve local communities, foster cross-sector collaboration, and apply systematic methods that prioritize cultural relevance. This study lays the groundwork for a more structured, practice-based approach to cultural adaptation.

Graphical abstract



Implications

- **Practice:** Strengthening collaboration across academia, public administration, and NGOs is essential. In our study, limited recruitment from the business sector prevented inclusion of business perspectives in the final analysis, highlighting an area for improvement in future cross-sector cultural adaptation initiatives. In addition, actively engaging the target population in program adaptation can enhance the relevance, adoption, and sustainability of culturally adapted prevention programs addressing adolescent substance use and mental health.
- **Policy:** Policies should support the implementation of culturally adapted evidence-based prevention programs addressing substance use and common mental health issues among adolescents to meet their diverse needs, to ensure their relevance and cost-effectiveness.
- **Research:** Future studies should further examine how existing cultural adaptation frameworks can be refined and operationalized across diverse settings, building on practice-based evidence such as that provided in the present study, linking theoretical guidance with empirical insights.

Introduction

Globally, one in seven adolescents aged 10–19 experiences a mental health problem—most commonly anxiety and depression—accounting for approximately 15% of the global burden of disease in this age group [1]. Anxiety affects an estimated 4.1% of adolescents aged 10–14 and 5.3% of those aged 15–19, while depression affects around 1.3% and 3.4% of these age groups, respectively [1]. Evidence highlights a bidirectional relationship between mental health issues and substance use: mental health conditions can increase vulnerability to substance use, while substance use can exacerbate or precipitate mental health problems [2]. Moreover, shared etiological factors and social determinants of health further reinforce this interconnection [2]. Substance use—particularly of alcohol, tobacco, and cannabis—emerges as a prevalent risk behavior in adolescence with significant health consequences, as early initiation increases the risk of dependence and long-term social and behavioral difficulties [3]. This situation is especially concerning in regions such as Europe and the Americas, which report the highest prevalence of adolescent substance use, with alcohol consumption remaining the most widespread (approximately 13 million adolescents), followed by cannabis use (around 10 million) [4, 5].

Addressing these issues is essential for advancing the Sustainable Development Goals (SDGs), particularly SDG 3 on health and well-being and SDG 10 on reducing inequalities, by promoting equitable and resilient communities [3, 6, 7]. Building on this, several prevention programs have been developed to delay or prevent the onset of substance use and common mental health issues, such as anxiety and depression, during early adolescence [3, 8, 9]. Prominent examples include the Strengthening Families Program, the Keepin' it REAL program, Unplugged, and the LifeSkills Training Program, among others. These evidence-based prevention programs (EBPs) have been adapted and implemented internationally, targeting adolescents and their families through school- and family-based delivery [10].

Despite these efforts, a significant gap remains in the availability and implementation of evidence-based and culturally adapted programs [2]. For example, a study in Spain involving professionals from the Public administration and non-governmental organizations (NGOs) dedicated to addiction prevention, revealed that 40%–60% of prevention and health professionals from diverse disciplines (e.g. nursing, psychology, social work, medicine, sociology, pharmacy, education etc.) were unfamiliar with key scientific evidence portals for substance use prevention, such as the European Prevention Curriculum (EUPC), Cochrane Library, XCHANGE, Blueprints for Healthy Youth Development, the Spanish Portal of Good Practices in Addiction Prevention (BBPP), among others. About 20% of respondents knew of these resources but did not use them, and only 10% engaged with them regularly. Similar gaps were observed in the knowledge and use of internationally recognized quality standards in prevention, including the United Nations Office on Drugs and Crime (UNODC) International Standards on Drug Use Prevention, the European Quality Standards for Drug Prevention, the Spanish quality Standards for drug prevention, etc. These findings highlight the persistent gap in the effective application of evidence-based prevention beyond academic settings [11]. An EBP consists of coordinated activities rigorously evaluated and proven effective in achieving desired outcomes, based on at least quasi-experimental or experimental studies [12]. However, successfully implementing an EBP in a new context often requires cultural adaptation to align with local contexts and specific needs [13]. Therefore, adaptation is a necessary component of implementation and a core focus of implementation science. Recent work in implementation science has also emphasized the importance of incorporating equity constructs and culturally adapting both EBPs and their implementation strategies to reduce health inequities. Accordingly, cultural adaptation and implementation science converge toward a shared goal: ensuring that EBPs are applicable, acceptable, and sustainable across diverse contexts [14–16].

Culturally adapting programs involves systematically modifying a program's cultural aspects (including deletions or additions, changes in manner or intensity, and modifications) to fit and address the cultural beliefs, values, and practices of a specific population, thereby facilitating adoption and acceptability and increasing participant engagement and attendance [17]. Moreover, cultural adaptation addresses underlying etiological factors (e.g. cultural norms, traditions, and social dynamics within peer and family contexts) within specific contexts, increasing the likelihood of meaningful and sustainable outcomes [18] while maintaining the core components that ensure program effectiveness [19]. These core components, also known as active ingredients, include essential skill development such as self-management, decision-making, drug resistance, and stress coping, among others [20]. However, distinguishing between core components and the adaptive periphery remains a critical challenge in implementation science, as these elements are not always clearly defined, making it difficult to determine what can be modified without compromising efficacy or effectiveness [21]. In this regard, the cultural adaptation of EBPs is a growing area of research that may optimize existing effective programs, offering a more efficient and cost-effective alternative to developing new interventions [22]. For example, the culturally adapted web-based Alerta Alcohol program in Spain demonstrated cost-effectiveness and positive health outcomes among adolescents [23]. At the same time, the MREAL adaptation in Mexico was perceived as cost-effective and highly feasible by educators and administrators. In this case, feasibility was closely linked to cost and resource implications, such as the human and material resources required, facilitator training, and ongoing supervision to support implementation [24]. Integrating cultural factors into EBPs may therefore strengthen both contextual fit and efficiency in the prevention of substance use and mental health problems.

Implementation science relies on models and frameworks to guide program design, implementation, and quality assessment [25]. In this context, integrating structured cultural adaptation frameworks into implementation science strengthens program responsiveness and provides a systematic approach to determining which aspects should be adapted [13, 26]. Various models have been proposed to guide the cultural adaptation of EBPs, focusing either on content or process. Content-focused models include the Ecological Validity Model, which identifies eight dimensions of adaptation [27], and the Cultural Sensitivity Model, which distinguishes between surface and deep-structure

adaptations [28]. Process-oriented frameworks include the Heuristic Framework [29] and the ADAPT-ITT model [30], among others. Additionally, frameworks, such as the Framework for Reporting Adaptations and Modifications-Enhanced (FRAME), focus on systematically documenting and reporting adaptations made during the process to support research on the timing, nature, goals, reasons for, and impact of modifications to EBPs, particularly their impacts on implementation and health outcomes [31]. However, while frameworks designed to guide the adaptation process have become more prevalent, there remains a lack of consistency in terms of commonly used concepts and methods, particularly regarding what constitutes an adaptation, how it should be justified, when it should be conducted, and how [22]. Moreover, the literature indicates that detailed reporting of adaptations remains limited, as cultural adaptation methods are frequently underreported [32]. Additionally, despite their valuable contributions, existing frameworks may not fully capture how adaptation processes unfold in diverse settings, especially when led by non-academic stakeholders. Their limitations include insufficient procedural detail on when and how to adapt, the predominance of linear over iterative structures, and a lack of practical examples that connect theoretical guidance to practice-based implementation. Moreover, guidance on stakeholder engagement and contextual decision-making remains limited, which may hinder their usability among non-academic implementers [13, 33]. Without accessible, practical guidance, stakeholders may struggle to translate adaptation frameworks into actionable improvements, thereby slowing progress in public health policy and practice [13, 33].

Considering these limitations, a prior scoping review examined how EBPs targeting adolescent substance use and common mental health issues have been culturally adapted and described in the scientific literature [10]. This review analyzed 43 studies conducted across multiple continents (America, Europe, Africa, and Oceania) that reported adaptation processes, including both those that explicitly referenced cultural adaptation models and those that did not, aiming to synthesize empirical practices. From this analysis, 11 steps commonly reported across adaptation processes were identified (Fig. 1).

Building on this prior scoping review and aligning with recent developments in implementation science that emphasize the need to structure cultural adaptation through formal, theory-informed, and participatory processes [14], the present study explores how cultural adaptation processes of prevention programs addressing adolescent substance use and common mental health issues are delivered in practice, from the perspective of the main stakeholders involved in these processes. Parallelly, it aims to empirically refine and specify the 11-step sequence synthesized in the prior scoping review. In doing so, this study contributes to greater operational clarity, bridging the gap between research and practice in the cultural adaptation of prevention programs targeting adolescent substance use and mental health problems.

Methods

Design

This study has a descriptive design, using qualitative content analysis to understand the process of cultural adaptation of prevention programs addressing substance use and common mental health issues among adolescents. The study adhered to the Consolidated Criteria for Reporting Qualitative Research

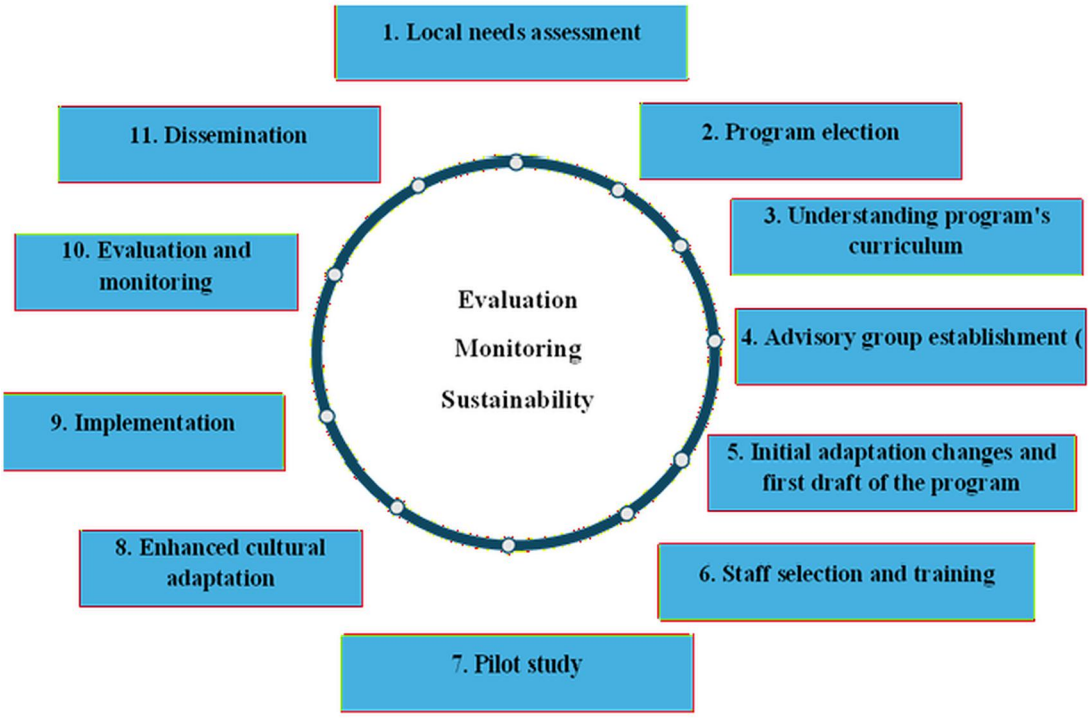


Figure 1 Cultural adaptation steps [10].

(COREQ) guidelines to ensure transparency and rigor in the methodology (Supplementary File S1) [34].

Population and sample

To identify stakeholders involved in the cultural adaptation process of prevention programs addressing adolescent substance use and mental health issues, a multi-phase process outlined by Reed *et al.* was used to systematically identify and engage relevant stakeholders [35]. This process was further complemented by Gilmour and Beilin's structured framework, which guided the research team in generating an initial list of stakeholders through brainstorming sessions [36].

The selection process followed a contextual approach, expanding from local (city-level) to regional (Andalusia), national (Spain), and international stakeholders. The goal of this gradual expansion was to capture a range of perspectives while maintaining the focus on the Spanish context, where most participants were based. Prioritizing national stakeholders enabled in-depth exploration of adaptation processes, while the international component provided complementary insights into broader adaptation practices. Although the sample included some international stakeholders (Table 1), the analytical focus was not on cross-country comparisons. Their inclusion served solely to broaden the perspective on cultural adaptation processes. Contextual and structural differences were acknowledged as background factors that might have shaped how participants described specific adaptation steps, but they were not treated as analytical categories.

Stakeholders were selected based on their direct involvement in the adaptation, implementation, evaluation, or funding of prevention programs targeting adolescent substance use and mental health issues. Their experience spanned community, family, and school-based settings and included both evidence-based and practice-based programs. This inclusive approach enabled us to capture a broad range of experiences of how cultural adaptation processes are enacted across diverse settings. The identified stakeholders were classified using a quadruple helix model, which integrates stakeholders from four sectors: *Public administration*, *NGOs*, *Academia*, and the *Business* sector (See Supplementary File S2) [37]. These sectors were evaluated based on their potential influence or interest in the cultural adaptation process. *Public administration* was included for its regulatory role and capacity to fund or implement programs; NGOs for their connections to the population; Academia for its expertise in evidence-based practices; and the *Business* sector for its potential to fund or implement interventions.

Once the initial list was created, we employed purposive-convenience and snowball sampling to further expand the pool of interviewees. This sampling approach allowed a comprehensive and inclusive mapping of relevant stakeholders across diverse geographical contexts.

A total of 23 semi-structured interviews were conducted with individuals with experience across a range of areas, including working with adolescents and their families in substance use prevention and treatment, and mental health promotion services, as well as funding programs focused on these issues. However, only 22 interviews were included in the analysis. During snowball recruitment, one interviewee referred to one company involved in prevention-related programs. A representative was interviewed and provided two additional business contacts; however, one declined participation, and the other did not respond. Due to the limited representation from this sector, the business interview was excluded from the final analysis, as it was insufficient to capture the diversity of perspectives within this helix.

Ten interviews were conducted in person, while thirteen were held online to accommodate participants' geographic locations, with only the interviewer and interviewee present. All interviewees were initially contacted via email, and their characteristics are presented in Table 1. Participants were involved in prevention programs focused on adolescent substance use and mental health issues, including both internationally recognized EBPs and practice-based programs. Although participants represented diverse professional backgrounds, all had direct responsibilities in adolescent substance use and/or mental health prevention work. Some professionals from disciplines outside the substance use or mental health fields (e.g. veterinary science, history, or dentistry) were included because they held adaptation, implementation, evaluation, funding, coordination, or policy roles in substance use and/or mental health programs.

Table 1 Interviewees' characteristics ($N = 22$).

Demographics	Number of interviewees
Biological sex	
Male	9
Female	13
Geographical location	
Brazil	1
Chile	1
Mexico	3
Peru	2
Spain	14
United States of America	1
Years of experience	
5–10 years	2
11–20 years	9
21–30 years	11
Quadruple helix model classification	
Academia	6
Public administration	10
Society (non-governmental organizations)	6
Bachelor's degree	
Dentist	1
Physician	3
Economist	1
Environmental science and health	1
Historian	1
Nurse	5
Psychologist	7
Social educator	1
Sociologist	1
Veterinarian	1

Consistent with the typology proposed by Saunders *et al.* [38], this study applied a combined approach to saturation. Data saturation was reached when no new relevant information emerged across interviews, and a priori thematic saturation was achieved when each of the 11 predefined steps from the previous scoping review was sufficiently described and exemplified by participants' accounts. This ensured both the completeness of data collection and the comprehensive exploration of all predefined adaptation stages.

Instruments and data collection procedures

Semi-structured interviews were conducted for the first author between June and December 2024 across five countries: Brazil, Chile, Mexico, Peru, Spain, and the United States of America. Two distinct interview guides were derived from the prior scoping review that identified 11 steps in the literature for culturally adapting EBPs targeting adolescent substance use and common mental health issues [10]: one guide designed for individuals involved in the adaptation, implementation, and evaluation of prevention programs addressing adolescent substance use and mental health issues, and the other for those responsible for funding these programs. Open-ended questions encouraged interviewees to freely express their perspectives, with content tailored to each discussion. At the start of each interview, the first author provided a brief self-introduction and outlined the study objectives to ensure participants clearly understood its purpose. The interviewer had no prior relationship with the participants.

The guides were initially drafted by the first author and iteratively reviewed by the research team, composed of experts in prevention and public health, cultural adaptation, substance use, mental health, and health sciences. Multiple rounds of discussion were held to refine wording and ensure conceptual clarity and alignment with the study aims. The instruments were piloted with four professionals representing 3 sectors of the quadruple helix: one from *Academia*, one from an *NGO*, and two from *Public administration*, one of whom was involved in program funding. Following the pilot, the research team assessed the relevance and completeness of the collected data and determined that the pilot interviews provided valuable insights consistent with the study objectives; therefore, they were included in the final analysis. The interview scripts are provided in Supplementary File S3.

Each interview lasted 40–120 min, totaling 28:16:45 (hh:mm:ss). All sessions were recorded using the voice recording app on an iPhone 11, with prior consent from the interviewees. Audio files were securely stored, and notes, including non-verbal language, were taken during the interviews to assist with transcription.

Data analysis

First, the interview recordings were transcribed, and then content analysis was conducted. The categories were identified through a combination of inductive and deductive coding [39–41]. The inductive process involved a thorough reading of the transcripts to identify emerging categories and patterns. Simultaneously, a set of preliminary categories, derived from the scoping review of cultural adaptation processes, was used as a framework to examine whether these elements were reflected in practice [10]. Combining these two analyses provided a means to jointly leverage their respective strengths, allowing for the identification of both anticipated and novel themes within the data [39, 40].

Interviewees' codes followed the format Category—Biological sex—Experience range—Degree. The category was coded as ACA (Academia), NGO (non-governmental organization), or PA (Public administration); Biological sex was indicated as F (female) or M (male). The experience range referred to the number of years working in the prevention of adolescent substance use and mental health issues. The degree denoted the participants' bachelor's degree, which could differ from their current occupational role. An "F" was appended only for participants identified as funders. To protect anonymity and at participants' request, program names, university names, and the countries or cities of adaptation and program origin were replaced with bracketed placeholders (e.g. "[country/city where the adaptation took place]", "[country/city of the program's origin]", "[program name]", and "[university's name]").

To ensure methodological rigor, one researcher (CACE) coded the transcripts, while two others (MLS and IMF) independently reviewed them. Discrepancies were resolved through discussion and consensus. After identifying the categories, the number of interviewees contributing to each category was calculated to assess the relative importance of each category within the stakeholder group. CACE is a female PhD student in health sciences with prior experience in qualitative research; IMF is a female sociologist and social researcher with expertise in qualitative methods; and MLS is a female nurse and anthropologist with previous experience in qualitative studies.

Ethics

The study adhered to the ethical standards outlined in the Declaration of Helsinki [42]. Interviewees were informed that their interviews would be recorded and that only the first author would have access to the audio recordings, with all personal identifiers kept confidential. The interviewees were informed of their right to withdraw from the study at any time without consequences, and their consent was obtained through signed informed consent forms before participation. The study was approved by the Research Ethics Committee of Universidad de Sevilla under code 2024-0373 on February 21, 2024 (Minute 02/24).

Results

The qualitative analysis resulted in 12 categories that reflect how stakeholders describe and enact the steps involved in the cultural adaptation process. Detailed descriptions of each step, based on interviewees' reports, are in Supplementary File S4. In contrast, the 12 steps and the number of interviewees who reported each step, categorized by sector (*Academia, NGOs, Public administration*), are presented in Table 2. In Table 3, a comparative overview is presented of how the adaptation steps

Table 2 Mapping cultural adaptation steps by helix.

		Academia (n/N in category)[a]	NGO (n/N in category)[a]	Public administration (n/N in category)[a]
1. Building synergies		(6/6)	(6/6)	(10/10)
2. Local needs assessment		(6/6)	(6/6)	(10/10)
3. Program selection		(6/6)	(6/6)	(10/10)
4. Understanding the program curriculum		(6/6)	(0/6)	(0/10)
5. Initial cultural adjustments		(6/6)	(0/6)	(0/10)
6. Advisory group consultation		(6/6)		
7. Staff selection and training		(6/6)	(6/6)	(10/10)
8. Piloting		(5/6)	(6/6)	(10/10)
9. Program refinement and readiness for implementation		(6/6)	(2/6)	(2/10)
10. Implementation		(5/6)	(6/6)	(10/10)
11. Monitoring and evaluation and	Monitoring	(6/6)	(6/6)	(10/10)
	Evaluation	(6/6)	(6/6)	(10/10) (0/10)
12. Dissemination and sustainability		(6/6)	(1/6)	
		(3/6)	(4/6)	(6/10)

NGO, non-governmental organization.
[a]The numbers below the ticks correspond to the number of interviewees who reported each step out of the total number of interviewees in each helix.

are addressed by each helix, highlighting sectoral differences in their approaches. Verbatim from the interviewees are provided in Table 4. In the text, each verbatim will be referenced by "V" followed by a number.

Characteristics and geographic context of adapted programs

Adapted programs were implemented in three main contexts: schools, families, and communities, with schools being the most frequent setting. The majority of adaptations occurred within the same country, where programs initially designed for a specific population were adjusted for another within the same territory. These adaptations involved transferring programs from urban to rural areas, northern to southern regions, or within the same city to target specific ethnic groups. Interviewees from *NGO* and *Public administration* helices explained that their programs were often developed or adapted locally, drawing on their previous experience with prevention programs addressing adolescent substance use and mental health issues, and on community feedback collected through participatory

Table 3 Stakeholder sector comparison across the twelve steps of the adaptation process.

Step	Academia	NGOs	Public administration
1. Building synergies	Collaborates primarily within its own sector. Interaction with NGOs, Public administration, and businesses is limited.	Collaboration mainly with other NGOs through networks known as Federations, as well as with the Public administration and Academia.	Partnerships mainly with NGOs and other state entities within the Public administration.
2. Local needs assessment	Literature review, mixed-methods fieldwork with adolescents and families, complemented by the analysis of health system records.	Mixed-methods fieldwork with youth and key stakeholders in the community.	Literature reviews and mixed-methods fieldwork with local stakeholders.
3. Program selection	EBPs registries (RCTs or quasi-experimental designs), alignment with local needs, and potential for collaboration with original developers to maintain the core components.	Based on local needs, from a list of existing NGO programs or in-house development.	Based on identified needs, from a list of existing programs within the Public administration.
4. Understanding the program curriculum	In-depth analysis of the prevention program with original developers.	Not implemented.	Not implemented.
5. Initial cultural adjustments	Preliminary modifications (superficial adaptation, specifically translation of materials).	Not implemented.	Not implemented.
6. Advisory group consultation	Consultation involved the target population and or experts in the field of adolescent substance use and mental health.	Consultation involved the target population and members of their institution who are experts in the field of adolescent substance use and mental health.	Consultation involved the target population and members of their institution who are experts in the field of adolescent substance use and mental health.
7. Staff selection and training	In-depth training, led by original developers or with a train-the-trainers approach.	In-depth training, led by original developers or program coordinators.	In-depth training led by Public administration staff.
8. Piloting	Process and outcome evaluation. to justify deeper adaptation.	Process evaluation of the program.	Process evaluation of the program.
9. Program refinement and readiness for implementation	Superficial and deep adaptations to the program. Recommend collaborating with original developers to preserve core components and systematically document changes.	Primarily superficial adaptations such as changes in language, images, timelines, delivery formats, etc.	Primarily superficial adaptations such as changes in language, images, timelines, delivery formats, etc.
10. Implementation	Fidelity monitoring is key; the FRAME framework is recommended. Includes proactive and reactive adaptations.	Fidelity monitoring is key. Includes proactive and reactive adaptations.	Fidelity monitoring is key. Includes proactive and reactive adaptations.
11. Monitoring and evaluation	Process evaluation (e.g. social acceptability, fidelity) and outcome evaluation (RCTs, quasi-experiments, and cost-effectiveness analysis).	Process evaluation (e.g. social acceptability, fidelity).	Process evaluation (e.g. social acceptability, fidelity).
12. Dissemination and sustainability	Dissemination occurs mainly through collaboration with other academic institutions.	Dissemination is achieved through collaboration with Public administrations and	Dissemination is carried out through NGO collaboration and the expansion of programs

(continued)

Table 3 (continued)

Step	Academia	NGOs	Public administration
	Sustainability remains limited, as programs often end after initial implementation. Efforts focus on integrating the program into broader systems, such as school curricula or healthcare settings.	other NGOs. Sustainability relies on building partnerships with Public institutions and fostering community ownership by aligning the program with beneficiaries' needs and embedding it into school curricula.	into schools and communities. Sustainability is tried to be achieved through the ongoing implementation of their existing programs.

NGO, non-governmental organization; EBPs, evidence-based prevention programs.
"EBP" and "prevention program" refer to programs addressing adolescent substance use and common mental health issues.

consultations. Only one *NGO* and two *Public administration* interviewees described a cultural adaptation process of a prevention program targeting adolescent substance use and common mental health issues developed in a high-income country, the former to a low- or middle-income country, and the latter to another high-income country.

In contrast, *Academia*-led programs were predominantly cross-country adaptations of established EBPs developed in high-income settings. Among these, four involved transfers from high-income to low- or middle-income countries, and two from high-income to other high-income contexts. These processes commonly followed structured frameworks; when such frameworks were not formally applied, adaptations were guided by researchers' prior experience designing or implementing prevention programs.

Across these varied adaptation contexts, participants described a broadly similar set of procedural cultural adaptation activities. These patterns informed the 12-step sequence presented in the following subsection, suggesting a process-oriented structure that may be relevant across different contexts.

Cultural adaptation frameworks in prevention programs

Among all 22 interviewees, only three from the *Academia* helix reported using a cultural adaptation model or framework in their respective adaptation processes. The models used were ADAPT-ITT, the Ecological Validity Model, and the Cultural Sensitivity Model, with the latter being applied in two of the three adaptation processes described by academic participants. The models were selected based on interviewees' perceptions of their contextual relevance and practical utility in guiding the adaptation process: "*Yes, we used ADAPT-ITT. I think we chose it because, at the time, it seemed like a good fit—the steps were logical, it had worked well in middle- and low-income country settings, and it had proven to be quite efficient and suitable for rural contexts in these countries. So, if it had worked that way, it meant that it wasn't overly complex.*" (ACA-M-11_20-Dentistry-USA). In this case, ADAPT-ITT was valued for its clear, sequential structure and proven applicability in middle- and low-income country contexts, particularly in rural areas where program implementation tends to be more resource-constrained.

Cultural adaptation process

Building synergies

This step involves establishing partnerships across sectors, including NGOs, Businesses, Academia, and Public administration institutions, to facilitate the cultural adaptation of the program and support its dissemination, sustainability, and funding. All helices participate in this process; however, differences exist in how they collaborate. The *Academia* helix primarily operates within its sector, engaging to a lesser extent with the other helices (V:1). In contrast, the *NGO* and *Public administration* helices typically form alliances within their sectors and between each other, while their collaboration with the *Academia* helix is more limited (V:2). However, maintaining communication and long-term commitment among stakeholders has been a persistent challenge across all helices, particularly in cross-sector collaborations.

Local needs assessment

Needs assessment involves a literature review, health system analysis, and fieldwork to examine contextual characteristics, risk and protective factors for substance use and common mental health issues (anxiety and depression), access and availability of relevant resources, and culturally relevant aspects for adaptation (i.e. gender-related aspects, important values, consumption patterns, attitudes and beliefs toward substance use.) (V:3). Risk and protective factors are identified using a biopsychosocial model, with *Academia* also applying a behavior change model (V:4). The fieldwork involves quantitative and qualitative techniques, such as interviews, focus groups, and surveys, as reported by all interviewees (Table 2).

The main difference between the helices lies in their approach. (Table 3) Interviewees from the *Academia* helix primarily focus on the target population, adolescents, and may also involve their families. In contrast, *NGOs* and *Public administration* tend to extend the assessment to include a broader range of local actors, especially *NGOs* that actively engage key stakeholders from the local community, such as community leaders, parents, youths, neighborhood associations, and community centers—together with Public administration staff and local activists, to gain a deeper understanding of the needs and issues to be addressed (V:5).

Table 4 Verbatim by adaptation step identified in the cultural adaptation process.

Adaptation step	Verbatims
1. Building synergies	1. "*Well … first, the need to disseminate and raise awareness about this [cultural adaptation], especially the technical, managerial, planning, and practical aspects. Academia should be more open and proactive in offering its services and support. I believe there is a significant role for academia to play directly, in collaboration with Public administration and NGOs. I think that could be a viable path to facilitate it [the cultural adaptation of programs].*" PA-M-21_30-Psychology-F 2. "*This year, we created the Prevention Commission, and as a result of this commission, we formed the Prevention panel, where we invite all public resources from our area of operation, as well as resources from community social services in our region. The District, as a representative of the City Council, schools, and other stakeholders, also attends. In this Prevention panel, we develop action lines.*" NGO-F-11_20-SocialEducation
2. Local needs assessment	3. *"Well … with a literature review … and diagnostic assessments. An evaluation [needs assessment] was conducted in a school, and I was extremely alarmed by the prevalence of drunkenness and excessive alcohol consumption."*ACA-F-21_30-Psychology *4. "We also conducted a quantitative and qualitative study [local needs assessment] using the model [name of the model], which is the model, let's say, on behavior change that we use."* ACA-F-21_30-Nursing 5. "*So … what we're doing is analyzing the reality of the neighborhood when it comes to youth addiction prevention. And what's that analysis based on? Well, on finding out what people in the neighborhood think about the issue, whether they see it as a problem, if they believe there are resources, and what young people are interested in. We've done interviews with people, key stakeholders. These are individuals who have been in the neighborhood for a long time and are familiar with the local scene. They come from different backgrounds—parents, professionals working specifically at the Community Center in the neighborhood, which is a space where different organizations and groups come together. We also talked to the cultural animation specialist, who's been there for 20 years, and activists who take part in local organizations, and so on."* NGO-F-11_20-SocialEducation
3. Program selection	6. "*I work extensively on adapting programs that have been evaluated in international contexts, and when selecting them, one of the most important criteria is that they have at least one or two studies demonstrating effectiveness through an RCT. That is the selection criterion for usability."*ACA-M-11_20-Medicine 7. "Well*, there are other more theoretical elements that are important to us, for example, that a program has a clear theory of change"* ACA-M-11_20-Medicine 8. "*Another key factor in the decision-making process is the ability to collaborate with the original developers. In other words, we have worked directly with the creators of each intervention. It's not just about taking an intervention and seeing how it works, because during the adaptation process, it is crucial not to deviate from its theoretical foundations or from certain elements that may not be immediately apparent within a program but are known only to the original designer or creator."*ACA-M-11_20-Medicine 9. "*When the staff at the NGOs begin the assessment, they start by applying a biopsychosocial model. They evaluate the risk factors that could trigger substance use. Based on that analysis, it's clear that an intervention and prevention approach is needed—that's where the design and adaptation of the programs come in".* NGO-F-21_30-Psychology-SPA
4. Understanding the program curriculum	10. "*Well … understanding the underlying theory of the program and maintaining constant communication with the original program developers. In our case, we worked with the program's Master Trainer, who has over 15 years of experience and served as a consultant on the project. She always reviewed and validated every change we made to the guides, videos, or anything else to ensure that nothing altered the core components … she helped us map those [core components] properly*." ACA-M-11_20-Dentistry
5. Initial Cultural Adjustments	11. *"We used the materials practically as they were, so only superficial adaptation was made at first; the materials were used almost as they were. The manuals underwent a superficial adaptation, meaning they were translated into Spanish, but no major corrections were made. So, there were linguistic errors, things we don't say, like, for example: "Mateo te miró." Here we don't say "te miró", we say "volteó a verte." So, well … it didn't have that adaptation."* ACA-F-21_30-Psychology 12. *"We also want to incorporate other frameworks like FRAME to keep track of the adaptations, mainly to know who made them, how they were made, and to have a bit more follow-up on the things that were done."* ACA-M-11_20-Dentistry

(continued)

Table 4 (continued)

Adaptation step	Verbatims
6. Advisory group consultation	13. *"We presented a one-hour summary of the intervention, showcasing samples of the slides, videos, and manuals to potential participants who met the eligibility criteria. We carried this out with four focus groups. After the presentation, we asked them for recommendations regarding the materials, the activities, and any aspects they believed should be modified to enhance acceptance and increase adoption of the material."* ACA-M-11_20-Dentistry 14. *"Previously, focus groups were conducted to present them [to the adolescents] [the videos]: 'What do you think of this video?' 'What would you change about it?' Then, new videos were recorded with new situations. All these videos came directly from the focus groups, where we asked the kids, 'Tell me, how do they invite you to consume something? Where are you? How do they approach you? What do they say?' So, we recreated scenes."* ACA-F-21_30-Psychology 15. *"We have information boards where people can also see the different activities or programs and can make ongoing proposals to the professionals [NGO staff]. Additionally, in the evaluation tools, there are specific sections where they [target population and the community] can make these proposals. We try to ensure that the channels are broad, incorporating new technologies, but we also acknowledge that there are people who don't have access to these and can make suggestions through other communication channels."* NGO-F-11_20-Economy 16. *"Mmm … this evaluation committee [for the adaptations] is usually composed of some university professor and the staff experts [from the NGO] from various centers [in the country where the adaptation was carried out]. Even though it is an internal evaluation, we need external input."* NGO-F-21_30-Psychology-SPA
7. Staff selection and training	17. *"First, we received training from the Social Prevention Unit of the Provincial Government, went through all the material, then we had online sessions, as well as sessions with the trainers, and by reading all the material and discussing it with those who explained it to us, we were able to resolve any doubts."* PA-F-11_20-Nursing 18. "*All implementers received a three-day training with the work team [the lead researchers], during which the entire program was reviewed. Most sessions were modeled, allowing implementers to learn through this process."* ACA-M-11_20-Medicine 19. "*We have a team of technical professionals responsible for direct intervention, supported by coordination specialists in social integration. Additionally, our team includes a social work professional, administrative staff, as well as volunteers and interns who contribute to the initiatives."* NGO-F-11_20-Economy
8. Piloting	20. "*A pilot study was conducted in a school where what we wanted to assess was whether the program had positive effects, to justify whether it would be worth continuing with an adaptation, or if the program had no effects on this population. We found that the program had significant effects on substance use prevention, particularly among first-year middle school students, not second or third-year students, but first-year students, who were, in a way, before they started using substances."* ACA-F-21_30-Psychology 21. "*During the piloting process, all program content was evaluated, as this was the most important aspect. The evaluation focused on content, acceptability from students, facilitators, and schools, as well as whether the activities were engaging and made sense. This led to some changes. Participant engagement—whether they liked the program—was also a key evaluation criterion. All these elements were assessed during the piloting phase."*ACA-M-11_20-Medicine 22. *"One of the issues with the program evaluations [piloting] is that there are few due to the volume of data. [Program name] was evaluated [piloted] by a colleague who is a professor at [University name], and she did her doctoral thesis on the program. It was evaluated in 3 or 4 primary and secondary schools, and as a result of the evaluation [piloting], the next version [of the program] incorporated all of these results [piloting results]."* NGO-F-21_30-Psychology
9. Program refinement and readiness for implementation	23. "*It all needed to be adapted; it was about adapting it to the level of comprehension [of the target population], then making the activities more engaging, more focused on participation [of the target population], because everything was too heavy, and that was it. After that, we started with the sessions, which I believe were 10."* NGO-M-21_30-Psychology 24. *"If I adapt the intervention to cultural traits, I believe it can be more effective. For example, when we adapted [program name], one of the scenarios had some cultural traits of [country of the program's origin], where the parties were held at nightclubs. However, our adolescents don't go to nightclubs as much; they tend to gather more, for instance, in the streets here in [city where the adaptation took place]. So, based on that, we made this adaptation. We also incorporated more gender-related topics into the content [of the program]."* ACA-F-21_30-Nursing

(continued)

Table 4 (continued)

Adaptation step	Verbatims
10. Implementation	25. *"Cultural adaptation in our case, in most of our programs, is primarily carried out by the person implementing the program. [The implementer] has an understanding of what we are proposing and then makes any necessary adaptations concerning their population. For example, from a wide range of activities, they [implementers] select and choose what they want, and in doing so, they are adapting it."* NGO-M-21_30-Sociology 26. *"When you have to spend time ensuring the activity is understood, because you face a reality with a lower level of education and knowledge, mmm [thinking], there's a lack of time because you have to pause frequently on certain content and don't get to others. This is the main adaptation, and it's made on the fly by the person implementing the program."* PA-M-21_30-Nursing
11. Evaluation and monitoring	27. "*Around 20% of the sessions were randomly observed by [name of the observer], the Master Trainer, and some were observed by the implementers themselves. I'm also certified, so I observed some sessions. For the ones we couldn't attend, we recorded and reviewed the sessions. Additionally, we trained individuals [target population] within the context where the program was implemented to evaluate using a checklist. They [target population] observed the delivery of the program, so we had people from the community, the implementers, and us, all evaluating fidelity with the program's original fidelity tools.* ACA-M-11_20-Dentistry 28. "*We do assess satisfaction, such as what they liked or didn't like, and we usually handle this qualitatively. In my experience, it's typically done at the end of the session, with a round where participants share their thoughts on what they liked, what they learned, and how they felt. There is usually a good response, but I believe evaluations go beyond that, right? Evaluations should also focus on whether it truly led to any changes in behavior or attitude."*PA-F-11_20-Psychology 29. "*Well, we monitor the number of participants joining the program, we track the boys and girls who remain in the program, we observe the continuity they maintain, we assess the level of participation in activities, whether they have more or less acceptance [of the activities], we evaluate the feedback the youth provide us, their satisfaction, and their perception of improvement. This is what indicates whether the actions are having a benefit, and it helps us assess the process."* NGO-F-11_20-Economy 30. *"Many of the evaluations we are presented with are process evaluations, not outcome evaluations. So, we emphasize and specifically value projects that, in the field of evaluation, reflect that they will also conduct an outcome evaluation. For example, let me focus on addiction prevention projects. Typically, the projects set goals: reduce the consumption of a certain substance or behavior in a population, and then at the end, many of the projects[NGOs' projects] presented to us, which are the ones we score the lowest, only report on process evaluation, such as how many activities have been conducted, how many people attended the workshops, but they don't tell us if the group they intervened with had a certain profile before the project was implemented, and whether behaviors or attitudes were modified afterward. Right now, honestly, there are very few projects that include this."* PA-M-21_30-Medicine-F 31. "*Well, everything is evaluated. There was an outcomes evaluation and a process evaluation, and we assessed if we were doing what we needed to do, as well as the results, to see if we were going to achieve what we expected, such as a delay in the initiation of substance use. Social acceptability was also evaluated, but not too much."* NGO-F-21_30-Psychology 32. "Well … t*his is also important, especially the evaluation aspect: how they will conduct the evaluation, what indicators they will assess, and how thoroughly the indicators are developed. It's not the same for them to say, "We're going to evaluate the program," and that's it, as it is for them to provide the correct list of process and outcome indicators, developed with their formulas. So, all of that is highly valued because, in the end, it allows for scientific evidence to be verified later."*PA-M-05_10-Veterinary Medicine-F
12. Dissemination and sustainability	33. *"Well, look, the initiative started here in [city of the program's origin], and it wasn't easy because it's a pioneering initiative, but we've been contacted by other regions to present the program and help develop it. Specifically, right now, we are opening other groups and have started in [city where the adaptation took place] with young people between the ages of 13 and 15, and we have adapted it."* NGO-F-11_20-History 34. "*I believe that some NGOs are working toward having the state take over the program and replicate it continuously at a national level, aiming for the state to assume responsibility for it."* PA-F-11_20-Psychology

(continued)

Table 4 (continued)

Adaptation step	Verbatims
	35. "*We have had several implementations, as I mentioned, since it has already proven its effectiveness. There are schools that are implementing it because, at their core, they want to prevent [substance use]. To support this, we train them and provide the materials, no longer in a research context, but in a context where they can implement the program themselves."*ACA-M-11_20-Medicine 36. "*Well, it is very important for the administrations to get involved because when we talk about sustainability, we also refer to the support from third parties, specifically the support of the administrations to the programs. It is crucial for them to be aware of the work we do, understand its benefits, and remain committed to providing ongoing support. At the same time, there is also the sustainability of the program itself. For it to be truly sustainable, it is essential to ensure the active participation of the very people who benefit from it, to consider their preferences, their needs, and all these aspects that ultimately make the program sustainable in practice."* NGO-F-11_20-History 37. "*We are targeting an X educational level, and in fact, in the past, even, regarding mental health, to give you an example, there was a level one and level two, one for one level of study and then the next, the second part, to continue working with that same group on the topic."* PA-M-21_30-Nursing-SPA 38. "*In my country, there is a large government agency [name of the institution], which is the office for prevention and treatment of substance use-related problems. At the local level, this institution has an office where people work on prevention in schools. So, we saw it as a potential extension, like "okay, this figure already exists, we will test if this figure works," and then we can somehow transfer all that knowledge to the local facilitators. However, this has not yet been achieved because things with the government move very slowly. There is a lot of interest in the program within the government, but nothing concrete has been achieved yet."*ACA-M-11_20-Medicine

Program selection

The *Program selection*, which involves selecting the program to be culturally adapted and implemented, was reported by all interviewees (Table 2). While all interviewees emphasized that this selection should be based on previously identified needs, the key distinction between the helices lies in *Academia's* additional focus on selecting programs with proven effectiveness, typically through randomized controlled trials (RCTs) or quasi-experimental studies (i.e. EBPs) (V:6), which are identified through systematic literature reviews or evidence-based practice portals. Furthermore, interviewees from *Academia* highlighted the importance of a clear behavior change model as a fundamental criterion in the program selection process (V:7). Furthermore, *Academia* emphasizes collaborating with the original program developers to understand better the behavior change model and preserve the program's core components (V:8). In contrast, *NGOs* and *Public administration* base their selection process entirely on local needs assessment findings, prioritizing input from all stakeholders involved (V:9) (Table 3).

NGOs often identify successful initiatives implemented by other organizations—frequently through Federation-led meetings—considering local needs and available resources. When no suitable program is identified, they develop culturally grounded programs tailored to their populations, which may later be adapted to other settings. Conversely, *Public administration* stakeholders generally relied on institutionally developed programs that were subsequently adapted to other contexts.

Understanding the program curriculum

This fourth step, which requires a thorough understanding of the program before making any modifications to identify and preserve its core components to ensure its effectiveness, was exclusively carried out by the *Academia* helix (Tables 2 and 3). This understanding of the program is achieved through meetings between researchers and the original program developers (V:10).

Initial cultural adjustments

Like the previous step, this phase was reported exclusively by *Academia* helix (Tables 2 and 3). At this stage, an initial adaptation of the program is carried out, primarily focusing on language translation and back-translation (V:11), aiming to make the content accessible so that stakeholders, particularly the target population, can later provide meaningful feedback during the *Advisory group consultation.* Likewise, *Academia* helix recommends that this step be completed by systematic documentation of all modifications made to the program, through frameworks like FRAME (V:12). This is one example of participants drawing on established frameworks to structure and document adaptation work.

Advisory group consultation

All interviewers implemented this phase in which materials are presented to various stakeholders (Table 2) (V:13). The main objective is to ensure the program's relevance and cultural appropriateness for the context by incorporating stakeholder feedback. This consultation process varies across helices (Table 3). *Academia* interviewees reported that consultations involved the target population and experts in the field of adolescent substance use and mental health issues, typically through questionnaires and focus groups (V:14). Conversely, *NGOs* and *Public administration* stakeholders often hold consultations through meetings, participatory consultation, and

questionnaires with the target population and members of their institution (V:16). However, two *academic* and five *Public administration* interviewees indicated that consultations were conducted exclusively with experts.

Only two interviewees from the *NGO* and *Public administration* helices mentioned that this advisory group consultation included individuals from the *Academia* helix (V:14). This mixed approach, in which some stakeholders included both target population members and experts while others focused solely on experts, highlights the variability of the consultation process.

Staff selection and training

Another step that nearly all interviewees undertake is the selection of individuals responsible for program implementation and their corresponding training (Table 2). However, one interviewee from the *Academia* helix indicated not performing this step, as their program was implemented online, and the target population completed it independently, without the need for an implementer (V:17).

Program implementer training focuses on familiarizing participants with the manual, including its structure, objectives, activities, essential content to be delivered, and implementation schedule. Some interviewees reported using session modeling to enhance practical application (V:18). The training process was relatively consistent across helices (Table 3), yet implementers' professional backgrounds were diverse. These included healthcare professionals (nurses, physicians, psychologists), social educators, schoolteachers, NGO technical staff, and social workers. In some *NGO*- and *Public administration*-led programs, trained volunteers also contributed to delivery, further diversifying implementer profiles. (V:19).

In the *Academia* helix, training is typically conducted by the original program developers or through a *train-the-trainers* approach. In the *NGO* helix, training is provided either by the original program developers or by program coordinators. In the *Public administration* helix, training is generally carried out by staff members from Public administration institutions.

Piloting

Piloting is conducted to assess whether the program generates similar positive outcomes to the original version, thereby justifying further adaptations. Additionally, it serves as a process evaluation, examining aspects such as program content, participant satisfaction, perceived usefulness, likelihood of recommending the program, session attendance, and understanding of the activities and materials (V:20 and 21). Only two interviewees from the *NGO* helix and two from the *Public administration* helix reported engaging in piloting in collaboration with the *Academia* helix (V:22).

Whereas piloting involves testing the program on a small scale to identify challenges and assess feasibility within the local context, the subsequent refinement phase (step 9) translates these insights into targeted modifications to produce an implementation-ready version.

Program refinement and readiness for implementation

This ninth step was carried out by all interviewees, except one person from the *Academia* helix, who indicated that once the pilot phase was completed, the program was implemented without any further adaptations (Table 2). Following pilot testing, interviewees implement necessary program adaptations. The *Academia* helix, in particular, collaborates with the original developers to ensure the integrity of core components. The *Academia* helix recommends systematically documenting all program modifications using FRAME.

In the case of the *NGO* and *Public administration* helices, program adaptations were based on the results obtained from the "Local needs assessment" and "Advisory group consultation" steps. In instances where piloting took place (Table 2), additional modifications were also incorporated based on the findings from this stage. These adaptations were considered the final version of the program, which was subsequently implemented (V:23).

A notable difference between the helices regarding this step is that the *Academia* helix not only makes superficial adaptations to the program, such as modifications in language, images and videos, but also incorporates deeper adaptations, such as adaptations in gender perspective, values, or customs (V:24). In contrast, *NGOs* and *Public administration* primarily focus on superficial adaptations, particularly in language (terminology and comprehensibility), images, timelines, delivery formats, etc. (Table 3).

Implementation

This step was reported by all interviewees (Table 2). However, the main difference between the helices is that proactive adaptations—anticipating potential challenges and systematically adjusting the program before implementation—are more common in the *Academia* helix, although this sector also engages in reactive adaptations. In contrast, *NGOs* and *Public administration* actors reported both proactive and reactive adaptations. While they often conduct comprehensive needs assessments that inform modifications, many adjustments still arise during implementation (reactive adaptations) in response to unforeseen obstacles such as time constraints, limited resources, or recruitment difficulties, or to better align the program with the emerging needs of the target population (V:26) (Table 3).

A critical component of this phase is fidelity monitoring, ensuring that the program is implemented as intended. Fidelity can be assessed through direct observation of randomly selected sessions, conducted by various stakeholders, including researchers, the target population, program implementers, original developers, or trainers-of-trainers (individuals who are trained to train others). This is essential for providing implementers with ongoing feedback and identifying challenges in program delivery. All helices conducted fidelity assessments, except for two participants from *Academia* and two from *Public administration*. Furthermore, the *Academia* helix recommends systematically documenting all program modifications using the FRAME.

Monitoring and evaluation

Monitoring refers to the continuous collection and analysis of data to assess the program's progress concerning its objectives, that is, process evaluation. This includes assessing program fidelity to provide feedback to the implementers (V:27), identifying obstacles and issues during implementation, and tracking

dropout and retention rates within the target population. Importantly, the monitoring phase overlaps with the implementation phase, allowing for real-time adjustments and the identification of challenges. This phase also includes a social acceptance evaluation to assess participant satisfaction, program acceptability, material usability, perceived usefulness, and knowledge acquisition. Qualitative methods, including focus groups, non-participant observation, and group discussions, are primarily employed, alongside quantitative surveys (V:28). This phase aims to produce information that will inform adjustments in future iterations of program adaptation. All interviewees reported conducting this phase (V:29) (Table 2).

By contrast, evaluation focuses on measuring the program's effectiveness in achieving the expected health outcomes through RCTs or quasi-experimental studies, along with its cost-effectiveness. However, this type of evaluation is conducted mainly by the *Academia* helix (V:30), except for one interviewee from the *NGO* helix who reported conducting a one-time outcomes evaluation focused on the delay in the initiation of substance use (V:31) (Tables 2 and 3), carried out by a university-affiliated individual. It is important to mention that this type of evaluation is highly valued by funders when assessing submitted funding proposals (V:32). While monitoring and evaluation have distinct focuses, they are interconnected and offer a comprehensive view of the program's performance.

Dissemination and sustainability

This phase focuses on the large-scale dissemination and sustainability of the program. It is most frequently carried out by the *NGO* and *Public administration* helices (Table 2). Moreover, these helices acknowledge that cultural adaptation is not a one-time task but a continuous process, requiring ongoing adjustments as programs are implemented and transferred to new contexts (V:33).

Collaboration between the *NGO* and the *Public administration* helix supports implementation and enables the program's expansion to other contexts (V:34). Regarding the *Academia* helix, half of the interviewees reported conducting dissemination efforts through collaboration with other academic institutions (V:35) (Table 3).

Across sectors, participants described sustainability not as a final stage but as a continuous process of refinement and realignment to maintain relevance and feasibility over time. The *NGO* helix suggests that building partnerships with *Public administration* could help ensure the program's long-term viability (V:36) by securing institutionalization and stable funding; however, these have not yet been secured. They also highlighted the importance of community ownership, for example, by embedding initiatives into school curricula.

The *Public administration* helix described sustainability as maintaining and updating institutionally developed programs that are continuously implemented over time (V:37). This approach also involved collaborating with *NGOs*, while progressively incorporating new components—such as digital tools—to align programs with evolving needs and enhance engagement.

In the *Academia* helix, participants acknowledged the need for a stronger focus on sustainability, as programs are often not maintained beyond the initial implementation. Only two interviewees reported working on sustainability through alliances with *Public administration* and *Businesses* (V:38). Academic participants also emphasized institutionalization as a key mechanism for sustainability, particularly through embedding adapted programs into health and education systems to ensure long-term integration.

Although Supplementary File S4 presents the cultural adaptation process as a linear sequence, interviewees described it as an iterative and dynamic process. Steps often overlap, with key stages such as "building synergies", "local needs assessment", and "advisory group consultation" continuously guiding adaptation efforts (Fig. 2).

To illustrate how the 12-step sequence aligns with the adaptation frameworks identified in the scoping review, a conceptual mapping table has been created (see Supplementary Material S5).

Discussion

The present study explored how cultural adaptation processes of prevention programs addressing adolescent substance use and common mental health issues are implemented in practice, from the perspectives of those involved in their design, adaptation, implementation, evaluation, and funding. To this end, the quadruple helix model served as a guiding framework for integrating insights from *Academia*, *Public administration*, and *NGOs*. This multisectoral perspective, an approach that remains underexplored, allowed the refinement and expansion of 11 steps (built on a prior scoping review) into a 12-step integrative sequence that not only aligns with widely recognized elements in the literature, such as needs assessments and consultation with advisory groups [10, 43], but also adds value by illustrating how these 12 steps are implemented in practice.

To date, several theoretical frameworks have been proposed to guide the cultural adaptation of EBPs. While most of these frameworks were originally developed to address adaptation processes broadly rather than for specific domains, many have subsequently been applied to prevention programs targeting adolescent substance use and mental health. However, most existing frameworks present the process in general terms and with limited operational detail. Most of the twelve steps in this study align with existing frameworks such as the *Cultural Adaptation Process for International Transport* [44], the *Heuristic Framework for the Cultural Adaptation of Interventions* [29], and the *ADAPT-IT* framework [30]. In particular, the following steps show strong convergence across these frameworks: the local needs assessment, the selection of the program, the preliminary modifications before final adjustments, the implementer training, the piloting, the final adaptations, the implementation with fidelity, the program evaluation, and the subsequent dissemination and sustainability. Moreover, our findings further support the view, as emphasized in the ADAPT-IT framework, that cultural adaptation is an iterative process [30], in which the adaptation steps may overlap, suggesting that the process departs from a strictly linear process.

Additionally, this study found that the Ecological Validity Model and the Cultural Sensitivity Model were the most frequently cited by interviewees as guiding references for cultural adaptation, which aligns with findings from previous literature

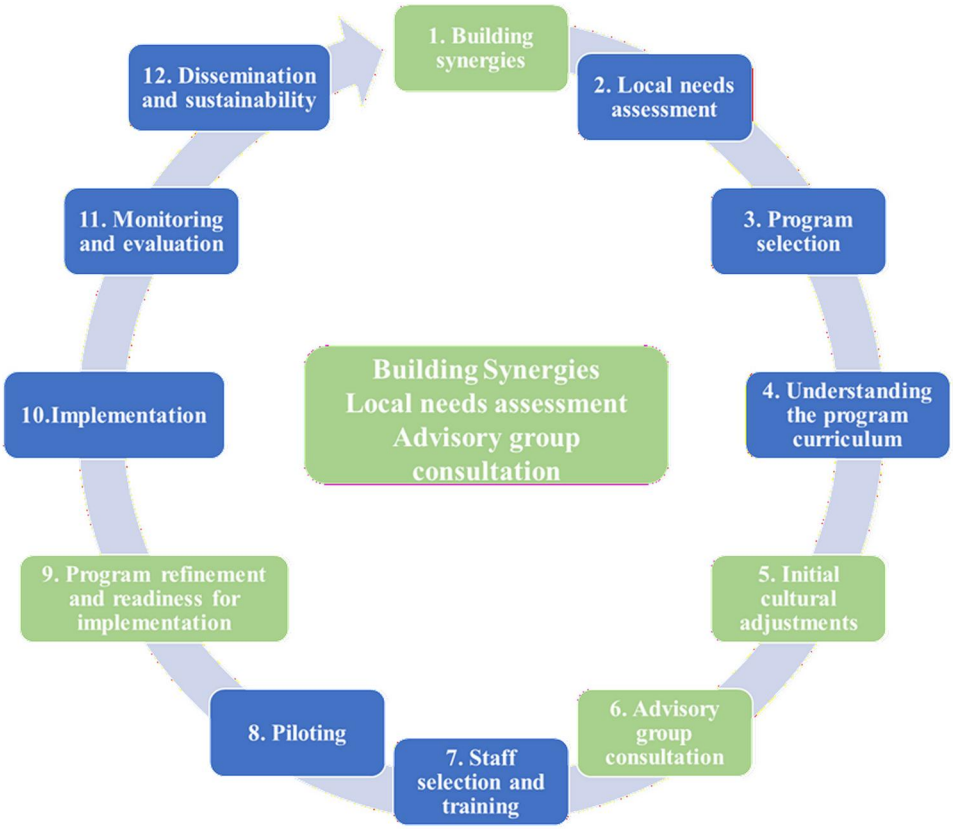


Figure 2 Refined process of cultural adaptation of prevention programs addressing adolescent substance use and common mental health issues, based on insights from stakeholders involved in the process. Steps 2, 3, 4, 7, 8, 10, 11, and 12 show convergence, reflecting their presence and broad alignment across both the prior scoping review (Fig. 1) [10] and the current study's empirical findings (Fig. 2). The remaining steps show divergence, including newly identified steps, reordered steps, or steps with modified descriptions arising from the present data.

[10, 43]. However, their application appears to be predominantly limited to actors within the *Academic* helix. In contrast, stakeholders from *Public administrations* and *NGOs* often rely on adaptation strategies shaped by contextual realities, frequently without reference to established models or frameworks. While the careful selection and systematic application of theoretical models are considered essential to ensuring the successful cultural adaptation of prevention programs [13], the absence of such practices in non-academic settings could affect the adaptation processes. Nevertheless, the context-driven strategies developed by these actors offer valuable insights into the pragmatic dimensions of cultural adaptation and highlight the need for more collaboratively developed guidance to bridge the gap between theory and practice.

This research foregrounds the role of synergy among key stakeholders, not as a peripheral aspect, but as a foundational, cross-cutting element that underlies every phase of the adaptation process. While previous frameworks have not explicitly recognized this synergy as a step in its own right, our findings suggest it is essential. Despite its importance, the findings of our study indicate that these synergies across the helices remain limited, suggesting that intersectoral collaboration continues to pose a challenge rather than constituting an established practice. As previously reported in the literature, recurring challenges arise from distinct organizational cultures. Moreover, high staff turnover and the absence of structural funding further hinder the development of stable partnerships and sustained cross-sector commitments [45]. This disconnection may also reflect a misalignment between academic priorities, such as publishing in high-impact journals, and the effective transfer of evidence-based practices [46]. Collectively, these challenges may undermine the sustainability of EBPs addressing adolescent substance use and common mental health issues and point to a critical gap in the field of implementation science [45]. In response, the literature indicates that intersectoral cooperation improves when shared responsibilities are formalized and collaboration is supported by structural financing. Stronger cross-helix coordination could reduce duplicative efforts, such as developing programs de novo when a relevant EBP already exists and could be culturally adapted [14–16]. Accordingly, next steps may include formalizing stakeholders' responsibilities for prevention (including, where appropriate, legislative mechanisms), establishing sustained funding to support intersectoral networks, and creating incentives for financing agencies to implement EBPs [45].

In relation to sustainability, participants' descriptions of it as an ongoing process of refinement, adjustment, and contextual alignment align with the principles of the Dynamic Sustainability Framework [47]. Rather than viewing sustainability as a fixed endpoint, stakeholders across helices emphasized the need for continuous adaptation to maintain relevance and effectiveness over time. This dynamic understanding of

sustainability underscores that long-term success depends not on static replication but on the program's capacity to evolve and maintain alignment with the practice setting and the ecological system [47].

Furthermore, the coexistence of proactive and reactive adaptations observed across helices could also illustrate this dynamic approach to sustainability in practice. In real-world implementation, reactive adaptations may be needed in response to emerging contextual constraints. While this situation exemplifies adaptive capacity highlighted in the Dynamic Sustainability Framework, it also underscores the need for deliberate organizational learning and evaluation mechanisms to ensure that essential program components are preserved and that adaptations contribute to ongoing optimization rather than unplanned drift [47].

Building on this perspective, strengthening collaboration among helices becomes critical to sustaining prevention programs addressing adolescent substance use and common mental health issues over time. *NGOs* and *Public administrations,* in particular, can play a key role in steps where community participation is essential, such as local needs assessment (e.g. meetings or focus groups organized by community centers), consultation with advisory groups (e.g. inviting local leaders, parents, or youth representatives to decision-making forums), dissemination (e.g. leveraging existing community networks or local media), etc. *NGOs* and *Public administrations'* contextual knowledge and close connection with local communities enable them to identify culturally sensitive priorities and build trust-based partnerships [48, 49].

However, *NGOs* and *Public administrations* face structural challenges, including high staff turnover and the absence of outcome evaluation mechanisms [50], with the latter being conducted exclusively by the academic helix. This gap may reflect the pressures faced by governmental and non-governmental sectors to respond quickly to community demands, even in the absence of robust evidence [50]. Nevertheless, adapting and implementing programs that are not systematically evaluated reduces their likelihood of generating health benefits, as EBPs are nearly three times more likely to produce positive outcomes [50].

Paradoxically, this study revealed that programs with limited or no empirical evaluation are often the most widely disseminated and sustained. *Academic* stakeholders typically demonstrated greater methodological rigor during program adaptation, whereas *NGOs* and *Public administration* actors, while relying less on rigorous assessment designs, displayed stronger capacity for continuity and scaling through established institutional networks and ongoing program delivery. This imbalance underscores the need to leverage cross-sector collaboration to align academic rigor with the implementation capacity and sustainability infrastructure of the public and community sectors. To leverage cross-helix collaboration, the literature suggests moving from ad hoc relationships to structurally supported arrangements—such as policy-enabled regional working groups and regular convening mechanisms to share best practices—especially when these structures align existing ways of working [45].

From a practical standpoint, fostering enduring partnerships among all relevant stakeholders is essential to the lifecycle of prevention programs and to support their sustainable improvement [47]. Incorporating outcome evaluations in adapted prevention programs addressing adolescent substance use and common mental health issues is equally crucial, as it enables evidence-informed decisions regarding their continuation or, when appropriate, de-implementation [51].

Furthermore, to further enhance the effectiveness and sustainability of adapted EBPs addressing adolescent substance use and common mental health issues, incorporating Participatory Action Research (PAR) could be a valuable approach, particularly through co-creation strategies, as it strengthens cultural adaptation by actively involving the community in decision-making processes, an approach also considered in the Dynamic Sustainability Framework [47, 51].

Limitations, strengths, and future directions

Although this study offers valuable insights, certain constraints should be acknowledged. The limited involvement of the business helix restricts a fuller understanding of the potential role of companies in the cultural adaptation of prevention programs addressing adolescent substance use and mental health problems. Additionally, as the data were based on self-reported accounts, responses may have been influenced by social desirability or memory biases. While common steps in adaptation processes were refined, their connection to program effectiveness could not be explored, highlighting a key area for future research.

Furthermore, this study focused exclusively on stakeholders responsible for the adaptation, implementation, evaluation, and funding of prevention programs addressing adolescent substance use and common mental health issues, although it included NGO practitioners who work directly with the target population and could therefore provide practice-based insights into their needs, the study did not include the target population itself. This choice allowed for an in-depth exploration of the organizational and procedural dimensions of cultural adaptation; however, it limits the understanding of end-user perspectives, which could be incorporated in future participatory research. Finally, although the inclusion of international stakeholders enriched the analysis with broader perspectives, contextual diversity across settings may have influenced how some adaptation steps were described or implemented, limiting the extent to which cross-country comparisons or broader transferability can be inferred. However, the analytical focus and saturation assessment were centered on the adaptation steps rather than on national-level differences. Future research should therefore assess how the sequence performs across different origin and target contexts and stakeholder helices, with a focus on usability, feasibility, and transferability. It should also identify the most critical steps—distinguishing those likely required across settings from those that are optional or context-dependent—and examine whether completing specific steps (or combinations) is associated with stronger implementation outcomes (e.g. acceptability, feasibility, fidelity, reach, sustainability) and downstream health outcomes.

Future research should also prioritize the development and validation of practical tools that support the cultural adaptation

of EBPs targeting adolescent substance use and common mental health issues through a cross-sectoral lens. The twelve steps refined in this study offer a foundation for an applied guide that includes concrete recommendations, illustrative examples, and actionable resources for implementation teams working in diverse settings. Although all helices engaged in cultural adaptation, they approached and operationalized the process in context-dependent ways, consistent with variation in institutional mandates, resources, and implementation constraints. A key next step is to systematically examine which barriers and facilitators shape these helix-specific approaches—and how they influence adaptation decisions, documentation, and evaluation practices—to inform future cultural adaptation efforts better. In particular, future research should identify streamlined outcomes evaluation approaches for NGO and Public administration settings that strengthen evaluation capacity while remaining compatible with routine service delivery, given the pressure to respond quickly to community needs. These research directions would help bridge the gap between theory and practice, enhance the cultural relevance of programs, and align with current priorities in implementation science.

A key strength of this study is its intersectoral perspective, enabled by the quadruple helix model. The study also makes a significant empirical contribution by systematizing twelve key steps in the adaptation process, grounded in the experience of stakeholders across sectors. These steps advance existing theoretical models by illustrating how these stages are operationalized in practice. Furthermore, it sheds light on the gap between theory and practice, offering a critical lens that informs implementation science. Finally, the discussion proposes actionable strategies, such as the early integration of PAR and the promotion of strategic synergies between helixes, enhancing the study's practical relevance and transferability.

Conclusions

Building upon 11 steps identified in a prior scoping review, this study refined and expanded them into a 12-step integrative sequence representing how cultural adaptation processes are conducted in practice to adapt prevention programs targeting adolescent substance use and common mental health issues, providing valuable insights into how this process unfolds across diverse settings. While it reaffirms the relevance of elements previously highlighted in literature, it also uncovers persistent gaps, such as limited collaboration among key sectors, and underscores the need to promote strategic alliances between Academia, Public institutions, and NGOs. Advancing toward more participatory, structured, and evidence-informed adaptation processes is essential to ensure the effective implementation, evaluation, dissemination, and sustainability of these adapted programs. Strengthening these aspects would contribute to greater cultural relevance, methodological rigor, and long-term impact.

Supplementary material

Supplementary material is available at *Translational Behavioral Medicine* online.

Funding sources

The first author acknowledges the support of the Secretaría de Ciencia, Humanidades, Tecnología e Innovación (SECIHTI) of Mexico for the scholarship N° CVU 1007341. The funder had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; or decision to submit the manuscript for publication.

Conflicts of interest

Claudia Corpus-Espinosa, Isotta Mac Fadden, and Marta Lima-Serrano declare that they have no conflicts of interest.

Human rights

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Welfare of animals

This article does not contain any studies with animals performed by any of the authors.

Transparency statement

- Study registration: The study was pre-registered at Open Science Framework: https://doi.org/10.17605/OSF.IO/5N37E
- Analytic plan pre-registration: The analysis plan was not formally pre-registered.
- Analytic code availability: There is no analytic code associated with this study.
- Materials availability: All materials employed in this study are available in Supplementary File S3, attached to this article.

Data availability

De-identified data from this study are not available in a public archive. De-identified data from this study will be made available (as allowable according to institutional IRB standards) by emailing the corresponding author.

Artificial intelligence

Artificial intelligence was not used in the development of this manuscript.

References

1. World Health Organization. Mental health of adolescents [Internet]. 2025 [cited 2025 Sep 2]. Available from: https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health
2. National Institute on Mental Health. Finding Help for Co-Occurring Substance Use and Mental Disorders [Internet]. 2024. https://www.nimh.nih.gov/health/topics/substance-use-and-mental-health (16 January 2025, date last accessed).
3. Griffin KW, Botvin GJ. Evidence-based interventions for preventing substance use disorders in adolescents. *Child Adolesc Psychiatr Clin N Am* 2010;**19**:505–26. https://doi.org/10.1016/j.chc.2010.03.005
4. Danpanichkul P, Duangsonk K, Díaz LA *et al.* The burden of alcohol and substance use disorders in adolescents and young adults. *Drug Alcohol Depend* 2025;**266**:112495. https://doi.org/10.1016/j.drugalcdep.2024.112495
5. Institute for Health Metrics and Evaluation. Global Burden of Disease Study 2021 (GBD 2021) Data Resources [Internet]. 2021. https://ghdx.healthdata.org/gbd-2021 (12 August 2025, date last accessed).
6. Newcomb MD, Locke T. Health, social, and psychological consequences of drug use and abuse. In: Z Sloboda (ed.), *Epidemiology of Drug Abuse [Internet]*. Boston, MA: Springer US, 2005, 45–59. https://doi.org/10.1007/0-387-24416-6_4 (16 January 2025, date last accessed).
7. World Health Organization. Publications. Guidelines on mental health promotive and preventive interventions for adolescents [Internet]. 2020. https://www.who.int/publications/i/item/9789240011854 (16 January 2025, date last accessed).
8. Reho K, Agley J, Gassman R *et al.* How do the substance abuse and mental health services administration's technology transfer centers decide what Evidence-Based practices to disseminate and determine how to do so? A cross-sectional study of a national network. *Eval Health Prof* 2024;**47**:167–77. https://doi.org/10.1177/01632787231225653
9. World Health Organization. Depression and Other Common Mental Disorders: Global Health Estimates [Internet]. 2017. https://www.who.int/publications/i/item/depression-global-health-estimates (3 March 2025, date last accessed).
10. Corpus-Espinosa C, Mac Fadden I, Del Carmen Torrejón-Guirado M *et al.* Exploring cultural adaptations: a scoping review on adolescent mental health and substance use prevention programs. *Prev Sci* 2025;**26**:204–21. https://doi.org/10.1007/s11121-025-01779-x
11. Villanueva-Blasco VJ, Amatller O, Isorna M *et al.* Estudio descriptivo sobre la situación demográfica y perfiles formativos de los y las profesionales de prevención de adicciones. Opciones de futuro [Internet]. Madrid: Ministerio de Sanidad. Delegación del Gobierno para el Plan Nacional sobre Drogas; 2024. https://pnsd.sanidad.gob.es/profesionales/publicaciones/catalogo/catalogoPNSD/publicaciones/pdf/2024_Estudio_profesionales_prevencion.pdf (18 March 2025, date last accessed).
12. Mihalic SF, Elliott DS. Evidence-based programs registry: blueprints for healthy youth development. *Eval Program Plann* 2015;**48**:124–31. https://doi.org/10.1016/j.evalprogplan.2014.08.004
13. Yoong SL, Bolsewicz K, Grady A *et al.* Adaptation of public health initiatives: expert views on current guidance and opportunities to advance their application and benefit. *Health Educ Res* 2020;**35**:243–57. https://doi.org/10.1093/her/cyaa014
14. Fehlberg Z, Klaic M, Croy S *et al.* Narrowing the health equity gap. How can implementation science proactively facilitate the cultural adaptation of public health innovations? *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz* 2025;**68**:809–17. https://doi.org/10.1007/s00103-025-04057-x
15. Lau AS, Huey SJ, Baumann AA. Advances in adapting and implementing evidence-based interventions for historically marginalized groups. *Behav Res Ther* 2023;**168**:104377. https://doi.org/10.1016/j.brat.2023.104377
16. Baumann AA, Stirman SW, Cabassa LJ. Adaptation in dissemination and implementation science. In: RC Brownson, GA Colditz, EK Proctor (eds.), *Dissemination and Implementation Research in Health: Translating Science to Practice [Internet]*, 3rd ed. New York: Oxford University Press, 2023 [cited 2025 Oct 25], 172–91. Available from: https://academic.oup.com/book/56173/chapter-abstract/443193829?redirectedFrom=fulltext. https://doi.org/10.1093/oso/9780197660690.003.0008
17. Barrera M, Castro FG, Strycker LA *et al.* Cultural adaptations of behavioral health interventions: a progress report. *J Consult Clin Psychol* 2013;**81**:196–205. https://doi.org/10.1037/a0027085
18. Montero-Zamora P. Translating evidence-based substance use prevention interventions in Latin America and the Caribbean: the key role of cultural adaptation. *J Adolesc Health* 2023;**73**:401–2. https://doi.org/10.1016/j.jadohealth.2023.06.003
19. de Boer J, Longworth GR, Delfmann LR *et al.* Exploring co-adaptation for public health interventions: insights from a rapid review and interviews. *BMC Public Health* 2025;**25**:614. https://doi.org/10.1186/s12889-025-21544-7
20. Botvin GJ, Kantor LW. *Handbook of Drug Abuse Prevention Research, Intervention Strategies, and Practice. [Internet]*. Washington, D.C.: American Psychological Association, 2015, 177–96. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6709746/ (4 March 2025, date last accessed).
21. de Menezes JCL, Murta SG. Cultural adaptation process of the strengthening families program (10–14) around the world: an integrative review. *Trends in Psychol* 2021;**29**:31–50. https://doi.org/10.1007/s43076-020-00053-z
22. Copeland L, Littlecott H, Couturiaux D *et al.* The what, why, and when of adapting interventions for new contexts: a qualitative study of researchers, funders, journal editors and practitioners' understandings. *PLoS One* 2021;**16**:e0254020. https://doi.org/10.1371/journal.pone.0254020
23. Vargas-Martinez AM, Lima-Serrano M, Trapero-Bertran M. Cost-effectiveness and cost-utility analyses of a web-based computer-tailored intervention for prevention of binge

drinking among Spanish adolescents. *Alcohol Clin Exp Res* 2023;**47**:319–35. https://doi.org/10.1111/acer.14990
24. Marsiglia FF, Kulis SS, Cutrín O *et al.* The feasibility, acceptability, and utility of mantente REAL: the culturally adapted version of keepin' it REAL for Mexico. *Prev Sci* 2022; **23**:1483–94.
25. Ridde V, Pérez D, Robert E. Using implementation science theories and frameworks in global health. *BMJ Glob Health* 2020;**5**:e002269. https://doi.org/10.1136/bmjgh-2019-002269
26. Cabassa LJ, Baumann AA. A two-way street: bridging implementation science and cultural adaptations of mental health treatments. *Implement Sci* 2013;**8**:90. https://doi.org/10.1186/1748-5908-8-90
27. Bernal G, Bonilla J, Bellido C. Ecological validity and cultural sensitivity for outcome research: issues for the cultural adaptation and development of psychosocial treatments with Hispanics. *J Abnorm Child Psychol* 1995;**23**:67–82. https://doi.org/10.1007/BF01447045
28. Resnicow K, Baranowski T, Ahluwalia JS *et al.* Cultural sensitivity in public health: defined and demystified. *Ethn Dis* 1999;**9**:10–21.
29. Barrera M, Jr, Castro FG. A heuristic framework for the cultural adaptation of interventions. *Clin Psychol Sci Pract* 2006; **13**:311–6. https://doi.org/10.1111/j.1468-2850.2006.00043.x
30. Montero-Zamora P, St. Fleur RG, Mejía-Trujillo J *et al.* Contextual fit of a family evidence-based intervention for preventing youth alcohol use in Mexico. *J Prim Prev* 2021;**42**: 441–57. https://doi.org/10.1007/s10935-021-00640-5
31. Wiltsey Stirman S, Baumann AA, Miller CJ. The FRAME: an expanded framework for reporting adaptations and modifications to evidence-based interventions. *Implement Sci* 2019; **14**:58. https://doi.org/10.1186/s13012-019-0898-y
32. Shehadeh MH, Heim E, Chowdhary N *et al.* Cultural adaptation of minimally guided interventions for common mental disorders: a systematic review and meta-analysis. *JMIR Ment Health*. 2016;**26**:e5776. https://doi.org/10.2196/mental.
33. Wang Z, Norris SL, Bero L. The advantages and limitations of guideline adaptation frameworks. *Implement Sci* 2018;**13**:72. https://doi.org/10.1186/s13012-018-0763-4
34. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 2007;**19**: 349–57. https://doi.org/10.1093/intqhc/mzm042
35. Reed MS, Graves A, Dandy N *et al.* Who's in and why? a typology of stakeholder analysis methods for natural resource management. *J Environ Manage* 2009;**90**:1933–49. https://doi.org/10.1016/j.jenvman.2009.01.001
36. Gilmour J, Beilin R. *Stakeholder mapping for effective risk assessment and communication* [Internet]. Melbourne: Australian Centre of Excellence for Risk Analysis, 2007 [cited 2023 Dec 2]. Available from: https://cebra.unimelb.edu.au/__data/assets/pdf_file/0006/2220990/gilmour0609.pdf
37. Schütz F, Heidingsfelder ML, Schraudner M. Co-shaping the future in quadruple helix innovation systems: uncovering public preferences toward participatory research and innovation. *She Ji J Des Econ Innovation* 2019;**5**:128–46. https://doi.org/10.1016/j.sheji.2019.04.002
38. Saunders B, Sim J, Kingstone T *et al.* Saturation in qualitative research: exploring its conceptualization and operationalization. *Qual Quant* 2018;**52**:1893–907. https://doi.org/10.1007/s11135-017-0574-8
39. Fereday J, Muir-Cochrane E. Demonstrating rigor using thematic analysis: a hybrid approach of inductive and deductive coding and theme development. *Int J Qual Methods* 2006;**5**: 80–92. https://doi.org/10.1177/160940690600500107
40. Pacheco-Romero M, Kuemmerle T, Levers C *et al.* Integrating inductive and deductive analysis to identify and characterize archetypical social-ecological systems and their changes. *Landsc Urban Plan* 2021;**215**:104199. https://doi.org/10.1016/j.landurbplan.2021.104199
41. Proudfoot K. Inductive/deductive hybrid thematic analysis in mixed methods research. *J Mix Methods Res* 2023;**17**: 308–26. https://doi.org/10.1177/15586898221126816
42. Goodyear MDE, Krleza-Jeric K, Lemmens T. The declaration of Helsinki. *BMJ* 2007;**335**:624–5. https://doi.org/10.1136/bmj
43. Leung J, Sekar S, Madrigal L *et al.* A scoping study of cultural adaptation frameworks. *Health Promot Pract* 2025;**26**: 807–25. https://doi.org/10.1177/15248399241292317
44. Kumpfer K, Pinyuchon M, De Melo A *et al.* Cultural adaptation process for international dissemination of the strengthening families program. *Eval Health Prof* 2008;**31**:226–39. https://doi.org/10.1177/0163278708315926
45. A de B, Reckman P, Kemper P *et al.* Intersectional collaboration and the development of prevention infrastructures: a qualitative study. *Int J Health Gov* 2024;**29**:112–26. https://doi.org/10.1108/IJHG-11-2023-0100
46. Marsiglia FF, Booth JM. Cultural adaptation of interventions in real practice settings. *Res Soc Work Pract* 2015;**25**:423–32. https://doi.org/10.1177/1049731514535989
47. Chambers DA, Glasgow RE, Stange KC. The dynamic sustainability framework: addressing the paradox of sustainment amid ongoing change. *Implement Sci* 2013;**8**:117. https://doi.org/10.1186/1748-5908-8-117
48. Nieman NR, Putoto G, Atzori A. Community engagement: non-governmental and faith-based organizations. In: MCB Raviglione, F Tediosi, S Villa, N Casamitjana, A Plasència (eds.), *Global Health Essentials [Internet]*. Cham: Springer International Publishing, 2023, 315–20. https://doi.org/10.1007/978-3-031-33851-9_48 (20 May 2025, date last accessed).
49. Holzmeyer C. Wider worlds of research for health equity: public health NGOs as stakeholders in open access ecosystems. *J Community Inform* 2018;**14**:1–16.
50. Crane M, Lee K, Wolfenden L *et al.* Real-world public health interventions demonstrate how research evidence informs program scale-up. *Health Promot Int* 2024;**39**:daae111. https://doi.org/10.1093/heapro/daae111
51. Norton WE, Chambers DA. Unpacking the complexities of de-implementing inappropriate health interventions. *Implement Sci* 2020;**15**:2. https://doi.org/10.1186/s13012-019-0960-9