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The potential of participatory approaches in school-based prevention of non-communicable diseases in Mexico

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Abstract

The rise of non-communicable diseases (NCDs) represents a major global health challenge of the 21st century. To promote more sustainable healthy diets to achieve the UN Sustainable Development Goals, novel strategies are required. Given the important role adolescents play in advancing public health nutrition, schools are a key setting to implement health-related interventions for NCD prevention. Mexico as an upper-middle-income country is a prominent example of a country facing a high double burden of malnutrition, with persisting undernutrition and a growing number of diseases related to overnutrition. At the same time, many innovative efforts have already been undertaken to improve food environments and health literacy among young people. However, interventions like policies and programs are traditionally designed using a top-down approach, rather than a bottom-up approach. This paper examines how participatory and co-design approaches can inform the design of more meaningful and context-specific interventions for multifaceted health challenges. This represents a way to empower youth to take action on their own well-being and to increase awareness of the importance of healthy lifestyle choices from a young age. The literature review included 24 papers from different countries around the world addressing school-based participatory NCD prevention, by analyzing possible design methods and assessing feasibility and effectiveness where available. Comparing the different approaches will serve to evaluate the transferability and research gaps of school-based participatory approaches in NCD prevention. These findings provide insights to inform similar design processes in future interventions in Mexico, following the objective of motivating healthy lifestyle and nutrition habits as well as adapting the surrounding food environments to facilitate and sustain these changes in future generations.

Keywords: Adolescents, bottom-up approach, children, co-design, Mexico, non-communicable diseases, participatory research, public health nutrition, school food environment, school-based

Introduction and background

From a global perspective, Mexico is currently facing one of the highest rates of type 2 diabetes and obesity**,** placing a growing burden on the health system (1). The state has already made significant efforts to improve the country's nutritional situation (Fig.1) (2–7). In recent years these efforts have shifted from undernutrition programs towards prevention of overnutrition (2,3). An important school-based program, active since 2025, is the *Estrategia Nacional Vida Saludable*, developed by the Ministry of Public Education (*Secretaría de Educación Pública*, SEP) in collaboration with other main institutions and supported by UNICEF (8). Implemented across the entire basic education system, its aim is to improve the main health issues, particularly NCDs in Mexican children (9). However, the majority of NCD prevention interventions are rather top-down, while evidence suggests that effective interventions often include participatory approaches (10) as well as a whole-school approach, which aligns school policies, the physical and social environment, and community engagement with health promotion efforts (11). An example of a highly participatory approach is co-design (Fig. 2), which is a method of project design and delivery that involves sharing responsibility and giving each group equal power in participation and decision-making, constituting a more bottom-up approach (12). The benefits of co-design include increased engagement, belonging, mutual learning, and appreciation of diverse knowledge (13). Within the school context, stakeholders could, amongst others, be students, teachers, or community leaders (14). Nevertheless, most adolescent participation occurs in high-income countries (HICs), underscoring the importance of investing further in research on adolescent participation in low- and middle-income countries (LMICs) and culturally and ethnically diverse groups. Especially in those countries with complex health challenges, adolescents' voices should be considered to ensure that policies and interventions meet their needs (15). The Mexican school system is highly centralized, with the main responsibility for the formulation and implementation of educational policies being held by the governmental body SEP. Furthermore, the majority of students study at public schools which are often deprived of funds to cover all their needs, as school funding is very complex and non-transparent, leading to persistent inequalities and constraints in educational development (16,17). Apart from that, school staff in Mexico appear to have fewer responsibilities than in other OECD countries (18). In order to increase parental and societal engagement in education, in 2019, Mexico reactivated the Social Participation Councils (*Consejos de Participación Social en la Educación*) which are built by actors such as parents, school principals, teachers, union representatives, former students, and community members (19), even though research has previously criticized their effectiveness (20). Given the above, the aim of this research is to assess the potential of highly participatory approaches, such as co-design, to develop school-based nutrition interventions for NCD prevention in the Mexican context.

Year	Policy
Since 1997	Cash transfer, undernutrition programs (Oportunidades/Progresa)
2014	Food taxation policy on sugary non-alcoholic drinks
2020	Law for front-of-pack warning labels
2021	Ban of cartoon characters on packages
2024	Prohibition of junkfood sale in schools
2024	General Law on Adequate and Sustainable Nutrition
2025	Estrategia Nacional Vida Saludable

Figure 1: Overview of the Mexican policy environment

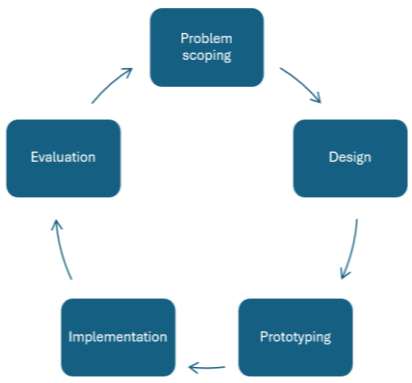


Figure 2: Typical phases of co-design

Material and Methods

This study is based on an international literature review; no primary empirical data were collected. Two different search queries were used to search on PubMed and Scopus. Included were interventions no older than 10 years, targeting children/adolescents at school age, with schools as the main intervention settings, a high level of participation and relevance to NCD prevention. The final collection consisted of 24 papers (Fig. 3), including study protocols and intervention studies that applied different highly participatory approaches. Co-design was used as an overarching concept in this review. The sample diversity was very high, with a strong representation of HICs, while Latin America (LA) was markedly underrepresented (21–44).

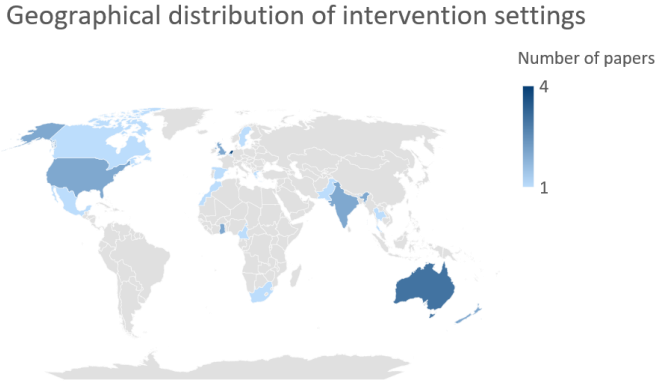


Figure 3: Overview of papers

Results and Discussion

Common focus of interventions, stakeholders and ways of participation

All the studies had a focus on NCD prevention even though different strategies were applied. Common areas addressed were food- and nutrition literacy, physical education, cultural- and indigenous interventions, mHealth, food environment interventions, and policies. The most common stakeholders were students, families, communities and authorities, teachers and school staff, and experts and researchers. Participation occurred mostly through in-depth interviews, workshops, focus groups, surveys, and questionnaires. The most common participatory approach across the studies was participatory action research (PAR).

Effectiveness

The intervention studies showed mixed effectiveness (23,28,30,33), while the pilot studies had mostly positive results (25,26,32,35–37,42). However, the literature sample was relatively small and included many study protocols. While some of them assessed feasibility, only a small number of papers evaluated intervention effectiveness. Therefore, more long-term and quantitative data are needed.

Common barriers & facilitators

One common barrier was the difficulty to generalize and transfer co-design interventions as they are highly iterative (27,34,36,44). Furthermore, questions about reach, engagement, and drop-out rates were raised (23,27,32,33,35,36). Missing health literacy skills (22,42) and the coordination of a high number of stakeholders (34) were mentioned as well. The school and home food environment, as well as the socioeconomic status (SES) can also be a barrier to interventions

(25,28,43,44). No details on funding were provided but the need of more research on cost-effectiveness was mentioned across various studies (27,30,35,43). A common facilitator was the implementation into already existing structures, applying a whole-school approach, and a flexibility in timelines (23,25,26,33,36,42,44). Involvement of communities and families, student mentors and cooperation with dietitians and education professionals were also seen as valuable. (23,37,42) Finally, the collection of local health data, as well as the adaptation to local contexts and cultures, was seen as crucial to developing co-designed interventions (24–26,35,37,38,41).

Transferability to Mexico

A key consideration for future interventions is whether limited health literacy is a problem in Mexico or whether the issue is primarily one of awareness (43). In this context, it is also important to consider whether empowerment, as frequently used in NCD prevention interventions, is sufficient to motivate real behavioral changes (28). Nutrition and health knowledge is currently not mandatory in the curriculum (45), which has been a starting point for interventions in other settings (37). Apart from that, mental health and individual well-being are other factors generally influencing lifestyle choices among people of all ages and should be considered as well (29). *Vida Saludable* has mental health components directed at higher education which could be further developed and integrated into schools to accompany the NCD prevention (7). Furthermore, none of the studies addressed the double burden of malnutrition (DBM). Instead, most focused primarily on overnutrition. Nevertheless, co-design may be particularly well-suited for addressing the complexity of malnutrition. Cultural diversity is another important factor in this setting. Regarding the DBM, a part of society that is under particular risk for it is the indigenous community (3). At the same time Mexico is a country with rich diversity of traditional and local foods and cultivation methods, like the Milpa system (46), which could potentially be incorporated into interventions. Strengthening food traditions is already part of the strategy of *Vida Saludable* (7). Power dynamics (47) could also be a barrier when it comes to including stakeholders like teachers or school authorities, which could be solved by recruiting older youth peers to mentor like it was done in some of the discussed interventions (22,31). Other points of discussion would include the choice of addressed age groups, school type, degree of centralization, as well as challenges due to funding, engagement and time constraints, particularly due to the persisting inequalities in the country (16). Combining top-down with bottom-up interventions, one potential funding opportunity could be to reinvest revenues from the sugar tax into the development of co-designed school interventions. On the other hand, co-design could also be used as a research tool to inform and refine current and future policies. Additionally, participatory elements could be integrated into already existing programs like *Vida Saludable*. It even already involves health data collection through the so-called School Health Days (*Jornadas de Salud Escolar*) and the Health Fair (*Feria de Salud*) as well as communication campaigns to raise public awareness and reach families and communities, which could be a good basis for further development (7).

Conclusions and Outlook

To conclude, as co-design methods need to be adapted to the local contexts, this can be viewed simultaneously as a challenge as well as an advantage. Due to the Mexican top-down education system, the high inequalities, and the power structures, its success in Mexico would thereby depend on its integration into the existing system and the adaptation to local, social, cultural, and institutional realities. At the same time, this might be an opportunity to complement existing approaches of NCD prevention and be particularly suitable for addressing the inequalities in both health challenges and resources within the country. From a policy perspective, combining already existing top-down policy measures with bottom-up participatory strategies may offer a promising

pathway. Apart from that, refining and further developing existing structures such as the Social Participation Councils, programs like *Vida Saludable*, or the already implemented policies could be a good starting point to increase the participation of stakeholders. As evidence on effectiveness and feasibility is still lacking, particularly in LA, future research should prioritize generating context-specific evidence in Mexico and other LMICs, with a particular focus on long-term outcomes, scalability, and integration into the education system, especially when testing novel approaches like combining top-down with bottom-up measures. Examples of relevant research are currently being conducted in other LMICs, mostly in Sub-Saharan Africa, like the ongoing Changemaker project (Karolinska Institutet) which even addresses the DBM (48) and programs by the Africa Academy for Public Health (AAPH) such as MEGA 2.0 or COMPASS (49). In LA, there currently is a research gap. Only one Mexican study was included in this review. However, according to the authors themselves, if the results are positive, they could be used as a basis for designing similar interventions in the future and for scaling them up at the national level (39). Once the results are published, studies like this could thereby provide some essential first insights into the topic and how co-design could be applied to NCD prevention within the Mexican education system.

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