Scientific Research Publishing

Open Journal of Social Sciences, 2025, 13(12), 482-498
https://www.scirp.org/journal/jss
ISSN Online: 2327-5960
ISSN Print: 2327-5952

Institutional Barriers and Promotors for Healthy Eating and Physical Activity in Costa Rican Educational Centers: A Multiple Case Study

Natalia Campos-Saborío[1*], Ileana Holst-Schumacher[2], Hilda Patricia Núñez-Rivas[3]

[1]Independent Researcher, San José, Costa Rica
[2]Faculty of Microbiology, Research Center in Hematology and Related Diseases (CIHATA), University of Costa Rica, San José, Costa Rica
[3]Costa Rican Institute for Research and Education in Nutrition and Health (INCIENSA), Tres Rios, Costa Rica
Email: *ileana.holst@ucr.ac.cr

How to cite this paper: Campos-Saborío, N., Holst-Schumacher, I., & Núñez-Rivas, H. P. (2025). Institutional Barriers and Promotors for Healthy Eating and Physical Activity in Costa Rican Educational Centers: A Multiple Case Study. *Open Journal of Social Sciences, 13,* 482-498.
https://doi.org/10.4236/jss.2025.1312036

Received: November 26, 2025
Accepted: December 27, 2025
Published: December 30, 2025

Abstract

This study aimed to identify institutional barriers and facilitators influencing the promotion of healthy eating, physical activity, and school management practices in three Costa Rican educational centers. A multiple case study using an action research approach was conducted between 2018 and 2019, involving 432 participants. Diagnostic and intervention workshops were carried out to identify determinants shaping health behaviors within school communities. Nutritional status was assessed using Body Mass Index in accordance with World Health Organization standards. Half of the students exhibited malnutrition (30% overweight/obesity, 20% underweight). Key barriers to healthy eating included economic constraints, high consumption of ultra-processed foods, and the availability of unhealthy items in school cafeterias. Physical activity was hindered by limited infrastructure and the prioritization of academic subjects over physical education. Institutional management emerged as a critical cross-cutting determinant shaping the feasibility and sustainability of health promotion efforts. Findings underscore the need for comprehensive, context-sensitive strategies to strengthen school-based health promotion.

Keywords

Healthy Eating, Physical Activity, Institutional Management, Child Malnutrition, Costa Rica

1. Introduction

Educational centers constitute privileged environments for promoting healthy habits among school-aged populations due to their wide coverage and the significant amount of time students spend in these settings (Andrades et al., 2022). This strategic relevance is supported by robust evidence demonstrating that children spend approximately 6 - 8 hours daily in school environments, making these institutions critical spaces for shaping long-term health behaviors (Aragón et al., 2025).

International scientific evidence shows that factors such as the type of food offered in cafeterias and institutional policies exert a decisive influence on dietary and physical activity behaviors among children and adolescents (Aychiluhm et al., 2025; Braun et al., 2019). Child malnutrition in school contexts has reached alarming global dimensions. According to the World Health Organization (WHO), approximately 340 million school-aged children and adolescents are overweight or obese, while 149 million experience stunting due to chronic undernutrition (Cassar et al., 2019).

In Costa Rica, as in other Latin American countries, child malnutrition constitutes a public health problem requiring comprehensive approaches (Cinar et al., 2023). National epidemiological data reveal a nutritional transition characterized by the coexistence of multiple forms of malnutrition, known as the "double nutritional burden" (Craig et al., 2024). The coexistence of overweight, obesity, and undernutrition in school populations highlights the need for context-specific interventions that consider socioeconomic and geographic differences.

The ecological model of health determinants provides a suitable conceptual framework for understanding how different levels of the environment (microsystem, mesosystem, exosystem, and macrosystem) influence student health behaviors. This model has been widely validated in school health research and helps explain complex interactions among individual, family, school, and community factors (Creswell & Creswell, 2023). Within this framework, institutional management emerges as a mesosystem factor that can facilitate or hinder the adoption of healthy habits.

International literature identifies educational leadership as a critical determinant of the success of school health interventions (Di Liegro et al., 2019). School health promotion is defined as a political and social process involving actions aimed at strengthening individual skills and improving social and environmental conditions (Dinu & Martini, 2023). This concept has evolved from traditional health education approaches to comprehensive models that recognize the school as a complex system where multiple factors interact to influence student health (Andrades et al., 2022). This comprehensive approach requires commitment and leadership from educational authorities to generate sustainable cultural change.

Scientific evidence suggests that the most effective interventions are those that address multiple components simultaneously, including school food policies, ed-

ucational programs, physical environment modifications, and community participation (Driessen et al., 2025). Consequently, this study therefore pursued two central objectives, to identify the barriers and promotors for the promotion of healthy eating (HE), physical activity (PA), and institutional management (IM) in Costa Rican educational centers through a multiple case study; and to contribute to the adoption of healthy practices within the educational communities of the selected schools.

2. Methods

A multiple case study using an action research methodology was conducted in two stages: a diagnostic stage and an intervention stage. This design is appropriate for understanding complex phenomena in natural settings and generating changes in institutional practices, maximizing the practical impact of the findings (Durand et al., 2011; Ewald et al., 2023; FAO et al., 2023).

2.1. Study Sites

The research was conducted between 2018 and 2019 in three Costa Rican educational centers intentionally selected to represent diverse socioeconomic and geographic contexts:

Case 1: Urban-public school in a marginalized area of the province of Cartago.

A vulnerable population with 50% Nicaraguan students, located in a high-risk social environment. Families face socioeconomic vulnerability, food insecurity, and limited access to health services. The migrant context adds cultural and integration barriers (Guerra et al., 2024).

Case 2: Urban-private educational center in the province of Heredia.

Religiously oriented institution serving a middle-upper socioeconomic population, representative of the Costa Rican private education sector with greater resources and developed infrastructure (Harris et al., 2025).

Case 3: Rural-semi-private school in the province of Puntarenas.

A subsidized Catholic institution serving a rural population with mixed socioeconomic characteristics and challenges related to geographic accessibility and resource availability in the Pacific Coast (Hernández et al., 2020).

Selection criteria included the presence of a school cafeteria ("soda") and dining hall, availability of physical education classes, and diversity in socioeconomic conditions and geographic locations. Institutional willingness to participate was also required.

2.2. Sample Size and Participants

The total sample consisted of 432 individuals: students (grades 1 - 6), teachers, administrative staff, and parents. In the diagnostic stage, 209 people participated, while in the intervention stage, 223 people were involved, allowing the evaluation of both baseline conditions and changes implemented during the research process. Distribution by group ensured adequate representativeness: students (60%),

parents (25%), teachers (12%), and administrative staff (3%). This reflects the centrality of the student perspective while integrating all relevant school actors, acknowledging the need for whole-community involvement in health promotion (Ho et al., 2021).

2.3. Instruments and Data Collection

The validated instrument "Health Traffic Light" (25 items, Cronbach's $\alpha = 0.884$) was applied pre- and post-intervention to identify barriers and facilitators for HE, PA, and IM, using a color scale: red (high risk), yellow (moderate risk), and green (no risk) and the intentions for change on these issues. The "Health Traffic Light" instrument was developed and validated in a prior study made by the researchers (Núñez et al., 2012). The prior validation of the instrument included confirmatory factor analysis and construct validation in a similar population. For students in grades 1 - 3, data were collected via researcher-guided interviews; older students (grades 4 - 6) and adults completed self-administered forms. Qualitative methods were also used, including semi-structured interviews with key actors, focus groups with students, teachers and parents, participant observation of institutional dynamics and document analysis of institutional policies and procedures. Patterns, discrepancies, differences and gaps were analyzed to identify barriers and facilitators of HE, PA and IM.

2.4. Nutritional Assessment

Body Mass Index (BMI) (kg/m^2) was measured using a Tanita SC-331 S scale and a SECA 217 stadiometer. Equipment calibration followed WHO standards to ensure accuracy in measurements. Classification used WHO age- and sex-specific percentiles, underweight: $<5^{th}$ percentil; normal: $\geq 5^{th}$ and $<85^{th}$ percentil; overweight: $\geq 85^{th}$ and $<95^{th}$ percentil and obesity: $\geq 95^{th}$ percentil (INEC, 2023). The measurements were performed by trained personnel following standardized protocols. All measurements were taken by duplicate, using the mean when the difference between measurements was less than 0.1 kg for weight and 0.5 cm for height.

2.5. Data Analysis

Methodological triangulation integrated quantitative and qualitative approaches (Langford et al., 2014; Käss et al., 2024). Quantitative data were analyzed using descriptive statistics with SPSS v 20.0. The analysis included measures of central tendency, dispersion, and frequencies for anthropometric variables and sample characteristics. Chi-square tests were used to examine associations between categorical variables, and ANOVA was used to compare means between groups. Qualitative data followed Braun et al. (2019) thematic analysis model using Atlas.ti. The process included: data familiarization; identification of emerging themes; development of an analytical framework; indexing and mapping; and interpretation and synthesis.

2.6. Ethical Procedures

The study was approved by the Scientific Ethics Committee of INCIENSA (session #27, October 2010; IC-2010-05). Informed consent and assent were obtained from participants, and procedures complied with the Declaration of Helsinki. Those young people who did not sign the informed assent were not forced to participate in the research.

3. Results

3.1. Nutritional Status of the Participants

Anthropometric assessment revealed that 50% of the student population had a normal nutritional status, while the remaining 50% exhibited some degree of malnutrition: 30% were classified as overweight or obese, while 20% were underweight according to WHO criteria (Table 1). A higher prevalence of obesity was observed among mothers participating in Case 1 (urban-marginal area), while low weight was more frequent among students in Case 2 (urban-private). Teachers and administrative staff showed a 30% overweight or obesity rate, with the majority maintaining a normal nutritional status. These results confirm the presence of the double burden of malnutrition in Costa Rican school environments.

Table 1. Characteristics of participating educational centers, Costa Rica, 2018-2019.

Characteristics	Case 1 (Urban-public marginal)	Case 2 (Urban-private)	Case 3 (Rural-semiprivate)
Location	Cartago	Heredia	Puntarenas
Management type	Public	Private	Semiprivate
Student population	50% Nicaraguan	Upper-middle class	Mixed rural
Socioeconomic characteristics	Social vulnerability	High Socioeconomic level	Middle socioeconomic level
Available services	Mobile cafetería, dining room	Institutional cafeteria	Cafeteria, dining room

Source: Own elaboration.

3.2. Intervention Stage

Various workshops on healthy eating were organized for children and their parents. Participants also constructed mock daily menus (breakfast, lunch, and dinner) where they planned their meals or snacks using food samples. Their efforts were then reviewed and discussed with nutrition professionals to help them design the best healthy eating options.

Barriers for Healthy Eating (HE)

The main barriers identified were multidimensional and varied according to socioeconomic context (Table 2).

1) **Economical:** In Case 1, mothers expressed economic constraints on acquiring nutritionally adequate food, reflecting how food insecurity disproportionately affects vulnerable populations. Price was a decisive factor that restricted access to fruits, vegetables, and protein-rich foods, while cheaper, ultra-processed items re-

mained widely consumed. In Cases 2 and 3, the fast pace of life led to the consumption of fast food and unhealthy options, illustrating how different socioeconomic strata face distinct, but equally problematic, barriers to HE.

Table 2. Main Barriers and promoters identified by "Healthy Eating" dimension and case, Costa Rica, 2018-2019.

Barriers	Case 1 (Urban-public-marginal school)	Case 2 (Urban-private school)	Case 3 (Rural-semiprivate school)
Economical	Economic limitations in acquiring healthy food. Lack of family resources to purchase nutritious food.	High prices for healthy products in school cafeterias. Healthy products with inaccessible prices.	High food costs at the cafeteria. Student complaints about high prices
School environment	Street vendors sell high-fat and high-salt/sodium products at very low prices. Availability of unhealthy foods.	Healthy products included, but with inaccessible prices. The owner of the cafeteria is family of the director.	Spoiled fruit (inadequate organoleptic characteristics). Quality problems in products offered.
Sociocultural	High consumption of ultra-processed products. Influence of the media.	Peer pressure: "If a guy eats healthy, they call him 'individuals with other gender orientations'". Social rejection of healthy food consumption	A pace of life that drives fast food consumption. Conformity and social complacency.
Family	Maternal economic constraints on access to quality food. High poverty rate.	Stress and a desire for convenience leading to increased consumption of canned goods and soft drinks. Fast-paced lifestyle.	Family patterns: "If everyone at home only eats fats, then all I'm going to eat is fats." Lack of reflection on changing habits.
	Promotors		
Knowledge	Students, teachers, and administrative staff expressed knowledge about healthy eating habits. Desire to implement better practices.	Conceptual knowledge about healthy eating. Adequate theoretical understanding.	Understanding the importance of healthy eating. Awareness of nutritional benefits.
Institutional management	Director's commitment to eliminate street cafeteria vendors. Support for the Health and Nutrition Committee. Continuous improvement plan.	Prior incorporation of healthy products (with limitations). Financial resources available for improvements.	Improved presentation of fruit in cafeteria. Guaranteed fresh fruit. Commitment to quality and price monitoring.

Source: Own elaboration.

2) **Environmental:** The high consumption of ultra-processed products influ-

enced by the media constitutes a significant barrier, where 70% of adolescents identified television as the main influence on food choices. Students commonly brought snacks and beverages high in sugars, fats, and sodium.

3) **Institutional:** The cafeteria services presented more barriers than facilitators. Case 1 had a mobile cafeteria with high-fat and high-salt products at low prices; Case 3 offered spoiled fruit; and Case 2 included healthy products, but at high and inaccessible prices. Despite the existing regulations in the country, this situation demonstrates how the school food environment can hinder the promotion of healthy habits.

4) **Social:** Peer influence was decisive, especially among adolescents, as illustrated by the following testimony: "If you go out with your friends, it's a lie that you eat salads… only fast food… if a friend ('mae') eats healthy, then they call him 'individuals with other gender orientations'." This social barrier reflects how adolescents can perceive HE as socially undesirable, associating it with negative stereotypes. Parents in vulnerable contexts indicated limited understanding of balanced diets and food labeling. Cultural food practices also influenced unhealthy choices.

Promotors for Healthy Eating (HE)

All institutions had school dining programs that provided balanced meals and educators in all three cases expressed willingness to integrate nutritional education into curricular and extracurricular activities.

Barriers for Physical Activity (PA)

Multiple limitations were identified that hinder the practice of PA in the school environment, reflecting the complexity of factors that influence this health behavior (Table 3).

1) **Insufficient Infrastructure and Space:** The lack of adequate physical spaces for PA represents a fundamental limitation. This restriction is particularly problematic considering that the availability of appropriate facilities is a significant predictor of PA levels in school settings.

2) **Academic prioritization over Physical Education:** The prioritization of academic subjects over physical education reflects a fragmented view of education that fails to recognize the contribution of PA to holistic development. As members of the School Board stated: "Most of the time is dedicated to subjects like math, science, and social studies, and not to physical education."

3) **Motivational factors:** Lack of family support is a significant obstacle, as students stated: "If there's no motivation at home, you get bored and watch TV." Parental support is a consistent predictor of PA in children and adolescents, influencing them through behavior modeling, providing opportunities, and positive reinforcement. The absence of this support can result in sedentary patterns that persist in adulthood. Sometimes neighborhood insecurity limits the feasibility of outdoor activities and field trips.

4) **Programmatic:** The limited diversity of physical activities generates monotony and disinterest, as expressed by students: "I suggested doing cheerleading... but it has never been possible because, always only soccer and soccer."

Promotors for Physical Activity (PA)

Across all cases, teachers responsible for PA showed strong engagement and creativity in adapting exercises to existing spaces. Additionally, sports were culturally significant in all communities, facilitating student motivation.

Table 3. Main Barriers and promotors identified by "Physical Activity" dimension and case, Costa Rica, 2018-2019.

Barriers	Case 1 (Urban-public-marginal school)	Case 2 (Urban-private school)	Case 3 (Rural-semiprivate school)
Spaces and infrastructure	Insufficient and adequate spaces por PA. Institutional and physical limitations.	Limited physical space. Inadequate infrastructure for diverse activities	Limited space for physical activity. Need for space allocation.
Programmatic	Limited variety of activities. Limited time allocated to physical education.	Prioritizing languages and technology over physical education. Monotony: "always just soccer and soccer".	Insufficient time for varied physical activities. Lack of diversification in programs.
Sociocultural	Prioritization of subjects in exact and social sciences. Lack of holistic education.	Greater emphasis on cognitive subjects than motor skills. Limited concept of holistic education.	Lack of family motivation: "If there's no motivation at home, you get bored and start watching TV." Absence of parental support in sports.
		Promotors	
Student motivation	Desire for more time for physical activity. Recognition of learning benefits.	Interest in diversifying activities: "I suggested cheerleading". Request for more variety in the different sports.	Recognizing the benefits: "You feel good about yourself". Awareness of mental well-being.
Family support	Raising awareness about low-cost activities (dancing, walking). Adaptation to available resources.	Request for parental accompaniment: "I would like my mom or dad to come with me to exercise." Desire for family activities.	Family motivation as a key factor. Importance of parental example in sports.
Institutional Management	Continuous Improvement Action Plan. Management Commitment to make a Change.	Request for more Physical Education hours. Initial interest in improvements.	Supervision of recreational activities during recess. Organized distribution of spaces and schedules.

Source: Own elaboration.

Institutional management (IM) according to each case

Institutional management showed significant differences between cases, emerging as a determining factor for the success of the interventions (Table 4).

Table 4. Main Barriers and promotors identified by "Institutional Management" dimension and case, Costa Rica, 2018-2019.

Barriers	Case 1 (Urban-public-marginal school)	Case 2 (Urban-private school)	Case 3 (Rural-semiprivate school)
Leadership	Socioeconomic problems in the surrounding area (drug addiction, crime). Context of high social vulnerability.	Role conflict between principal and academic director. Support withdrawal after results were released. Threat perception versus opportunities for improvement. Lack of shared vision and clear objectives.	Limited economic resources for implementation of changes. Institutional budget constraints.
Participation	High poverty rate limiting participation. Family socioeconomic barriers.	Disbelief due to lack of commitment leadership. Inconsistency in institutional management	Need for continuous quality supervision. Dependence on external monitoring.
		Promotors	
Positive Leadership	Prompt and timely communication from the principal. Key role of sociologist on the interdisciplinary team in communication, advising and formulating strategies to improve decision-making with director and team. Positive management during the investigation.	Initial interest in the research project. Support from the academic principal in the initial stage.	Institutional openness from the principal, teachers, and parents. Collaborative attitude of the management team.
Community participation	Open and collaborative attitude of the educational community. Commitment to the continuous improvement plan. Support from the Health and Nutrition Committee	Initial commitment from the academic principal. Parents' interest in health improvements.	Commitment to quality and price monitoring in cafeteria. Active participation of the educational community
Sustainability	Support from the Ministry of Education as a priority center of attention. Interdisciplinary team to address social risk Special status to prevent dropout.	Available financial resources for health improvements. Institutional financial capacity.	Educational tradition was established in 1957. Catholic religious foundation. Historical commitment to holistic education.

Source: Own elaboration.

Case 1 (Positive Management): This case was characterized by efficient communication and support from the director and sociologist on the interdisciplinary team. Achievements included the elimination of street vending near the school, strengthening of the Health and Nutrition Committee, and commitment with a continuous improvement plan. This case illustrates how committed leadership can overcome resource limitations and generate significant institutional transformations, demonstrating that political will and managerial commitment are more decisive than scarce financial resources.

Case 2 (Problematic Management): Conflict was observed between the director and the academic director, along with a partial withdrawal of support following the presentation of results that highlighted areas for improvement, and a lack of shared vision and clear objectives. This fragmentation limits the effectiveness of health initiatives. Resistance to change and a lack of institutional preparedness for self-evaluation processes can hinder interventions, even when financial resources are available. The perception of threats to improvement opportunities illustrates the importance of institutional culture.

Case 3 (Collaborative Management): This case demonstrated institutional openness, improvements in the quality of cafeteria fruit, price monitoring, and the allocation of spaces for PA during recess. It represents an intermediate model where collaboration and institutional openness facilitate gradual and sustainable improvements, demonstrating the importance of community participation in institutional change processes. Regulations regarding school cafeterias and PA hours were inconsistently applied across the different institutions.

Promotors for Institutional Management (IM)

Community engagement, parent associations, well-being committees and parish involvement in school activities provide platforms for planning and implementing health interventions.

4. Discussion

The 50% prevalence of malnutrition found reflects the nutritional epidemiological transition that Costa Rica is experiencing (Craig et al., 2024). This pattern of double burden of malnutrition, characterized by the coexistence of overweight/obesity and underweight, highlights the need for differentiated approaches according to specific socioeconomic contexts. These findings are consistent with Latin American regional trends documented by the WHO, where approximately one in three children presents some degree of malnutrition. Contemporary research on structural responses to the obesity epidemic in Latin America indicates that food and physical activity policies require integrated approaches that consider the complex interactions between socioeconomic, environmental, and cultural factors that characterize the region. This differential distribution of nutritional status according to socioeconomic context reflects internationally documented epidemiological patterns, where obesity is frequently associated with conditions of socioeconomic vulnerability due to limited access to nutritionally adequate food and de-

pendence on ultra-processed, high-energy-density products. Conversely, the higher prevalence of underweight in urban-private settings could be associated with aesthetic and social pressures inherent in these environments, as well as with potentially restrictive dietary patterns influenced by body image ideals (Núñez et al., 2019).

Recent neuroscience research on physical activity and academic performance demonstrates that high-intensity exercise can be particularly effective in improving cognitive function in school-aged children. Functional neuroimaging studies have identified that even sporadic sessions of moderate to vigorous physical activity significantly improve executive function, working memory, and processing speed in children and adolescents (Latino & Tafuri, 2023; Melo et al., 2023). One of the identified barriers associated with PA in this investigation was "academic prioritization over physical education". Implementing structured physical activity programs could simultaneously benefit nutritional and academic performance issues, establishing synergies that amplify the benefits of the interventions and the schools' academic goals.

The higher prevalence of obesity in mothers in Case 1 suggests the influence of a marginalized socioeconomic environment, where economic limitations, stress, and family time constraints can lead to the consumption of foods high in energy density and low in nutritional value. This association between poverty and maternal obesity is consistent with evidence documenting how economic constraints favor the consumption of ultra-processed foods and fast food due to their lower relative cost, greater availability, and palatability (Ministerio de Salud de Costa Rica, 2019). These products not only contribute to the development of obesity but are also associated with micronutrient deficiencies, systemic inflammation, and an increased risk of metabolic diseases in children (Ministerio de Salud de Costa Rica, 2019). Food advertising aimed at children has significant effects on food preferences and consumption, with exposure to ultra-processed food marketing increasing the likelihood of consuming these products by 40% (Moore et al., 2021). Contemporary digital marketing techniques have proven particularly effective in shaping food preferences among young people, especially in socioeconomically vulnerable contexts where media literacy may be limited (Moore et al., 2021; Murphy et al., 2021).

The most recent meta-analysis on family interventions for pediatric obesity indicates that the most effective programs are those that acknowledge families' contextual limitations and offer flexible, culturally appropriate strategies, rather than rigid prescriptions that can lead to guilt and dropout (National Academies of Sciences, Engineering, and Medicine et al., 2019). School health interventions should consider these complex family dynamics and offer strategies that are realistic and sustainable across different socioeconomic contexts.

The high prevalence of overweight among adults in the school environment (30%) is also relevant, considering that teachers serve as role models for students, and their nutritional status can influence the dietary perceptions and practices of the school community. Evidence suggests that school health promotion programs

are more effective when they include educational staff as an integral part of the interventions.

The identified sociocultural barriers, particularly peer pressure, reflect complex dynamics of adolescent development. Research on contemporary adolescent development indicates that identity formation during this period is particularly vulnerable to social influences, where group conformity can prevail over considerations of individual health. Neuroscience studies on adolescent brain development demonstrate that the late maturation of the prefrontal cortex, responsible for executive control and decision-making, explains why adolescents are particularly susceptible to peer influence and may prioritize social acceptance over healthy behaviors (OECD, 2024). This evidence underscores the importance of designing interventions that specifically recognize and address social pressures as barriers for adopting healthy habits.

The student demand for greater diversity in physical activities is consistent with recent studies demonstrating that targeted family support for different types of physical activity is a stronger predictor of sustained participation than general support. Research indicates that when families provide differentiated support based on children's individual preferences, adherence to physical activity increases significantly and is maintained over time (Patton, 2015). This evidence suggests that school programs should diversify their offerings and actively involve families in selecting and supporting specific activities, recognizing that personalization is key to sustainability. More inclusive programs are needed that consider the diverse interests, abilities, and preferences of young people, prioritizing participation and enjoyment over traditional competition.

The findings regarding limited physical activity are particularly concerning given recent neuroscience evidence demonstrating specific effects of exercise on brain white matter integrity and cognitive function. Research using neuroimaging technologies has shown that even short periods of structured physical activity significantly improve executive function and academic performance in children. More recent studies on exercise-induced neuroplasticity indicate that regular physical activity not only improves current cognitive function but also provides neuroprotective effects that may prevent future cognitive decline (Suwankhong & Liamputtong, 2025).

Prioritizing academic subjects over physical education reflects a fragmented view of education that fails to recognize the contribution of physical activity to holistic development. Contemporary neuroscience research demonstrates that physical activity improves neuroplasticity, working memory, and executive functions, suggesting that reducing time dedicated to physical education may be counterproductive to the academic achievement it aims to promote. Functional magnetic resonance imaging studies have documented that regular physical activity increases hippocampal volume and improves connectivity between brain regions associated with learning, academic performance, memory, and mental health (Patton, 2024).

The characteristics of the school physical environment emerge as critical deter-

minants of participation in physical activity. Research on outdoor school environments demonstrates that features such as the availability of green spaces and appropriate sports equipment are significantly associated with higher levels of student physical activity (Popkin et al., 2020). More recent studies on promoting comprehensive physical activity in US schools have identified that the most successful interventions are those that combine modifications to the physical environment with changes in institutional policies and the development of teacher capacity (Aragón et al., 2025; Potts et al., 2025).

The identified patterns of physical inactivity are particularly concerning, given that habits established during school years are significant predictors of physical activity levels in adulthood, with important implications for the prevention of chronic diseases throughout the lifespan (Rosenqvist et al., 2024). School-based interventions represent a critical opportunity to disrupt these patterns and establish lifelong physical activity habits.

On the other hand, institutional management is also a determining factor for the success of school health promotion interventions. The contrasts observed between cases illustrate fundamental principles of transformational leadership. The resistance to change observed in Case 2 is consistent with contemporary theories on change management and organizational leadership, which identify institutional preparedness and adaptive learning capacity as more robust predictors of success than the availability of economic resources (Leithwood et al., 2019; Masson et al., 2024). Successful educational organizations are those that develop continuous learning and contextual adaptation capacities, rather than those that simply implement prescriptive interventions (Sallis & Owen, 2015). The success of Case 1 demonstrates that institutions with limited resources can achieve significant transformations when there is genuine leadership commitment and community involvement. This finding is consistent with the literature on transformational leadership in educational contexts, where leadership commitment to a shared vision and community involvement emerge as predictors of success. The most recent research on effective educational leadership identifies successful principals as those who develop distributive leadership skills, involving multiple actors in decision-making and the construction of shared visions (Shelton & Lee, 2019).

Evidence on the mediating role of institutional management suggests that school health policies should prioritize the development of educational leadership capacities. Training programs for school leaders should include specific competencies in change management, community engagement, and leadership for health promotion. The transdisciplinary complex adaptive systems approach developed in Wales demonstrates that when school leaders develop specific competencies in health promotion, institutions can create sustainable prevention cultures that transcend isolated interventions (Su et al., 2022).

Evidence on multicomponent interventions in schools suggests that the most effective programs are those that combine nutrition education with modifications to the school food environment, physical activity, socio-emotional skills, environmental modifications, family involvement, and institutional policies (Braun et al.,

2019; Weir & Jan, 2023). Likewise, findings on the influence of body image, particularly in urban-private contexts, suggest the need to specifically address aspects of body dissatisfaction in health promotion programs aimed at adolescents. These aspects require specific and differentiated attention based on gender, educational level, and sociocultural context. The most recent studies demonstrate that body dissatisfaction in adolescence predicts eating disorders, depression, and risky behaviors in adulthood, especially in contexts where there are intense aesthetic pressures (Yin, 2018).

5. Conclusions

This study has inherent limitations in its multiple-case design, including limited statistical generalization. Furthermore, the lack of longitudinal follow-up limits the assessment of the sustainability of implemented changes. This limitation is particularly relevant considering that sustainability is one of the main challenges in school health interventions, where promising initial changes may not be maintained over time without continued institutional support. In addition, the limited sample size per case may have restricted the detection of statistically significant differences between specific subgroups. Future research should consider designs that allow larger samples while maintaining the analytical depth characteristic of the multiple-case approach.

Finally, at national level, it is necessary to strengthen the implementation of Decree No. 36910-MEP-S by allocating sufficient resources for the supervision and effective enforcement of regulations regarding the products offered in school cafeterias. Furthermore, it is essential to develop national standards for leadership training in educational initiatives promoting school health, especially since the research findings confirm the critical role of institutional management.

At institutional level, it is crucial to implement training programs for school leaders in participatory and transparent management, develop community participation protocols that include families as partners in the development of school health policies, and integrate nutrition education across the curriculum. Evidence indicates that cross-curricular integration is more effective than isolated subjects in achieving sustainable behavioral changes.

At community level, it is necessary to establish nutritional education programs specifically aimed at families, promote public-private partnerships to improve access to healthy food in vulnerable communities, and create community spaces for physical activity that complement the school offerings.

Conflicts of Interest

The authors declare no conflicts of interest related to this research.

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