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The importance of school games for the development of healthy eating habits in children and adolescents in a school setting: an integrative review.

The importance of school games for the development of healthy eating habits in children and adolescents in a school setting: an integrative review

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Summary

Introduction: School games, guided physical activities, and playful practices developed in the school environment have been recognized as effective pedagogical strategies to promote the integral development of children and adolescents, including the formation of healthy eating habits. Given the increasing prevalence of overweight and obesity at early ages, it becomes relevant to understand how interventions that integrate body movement and nutritional education can contribute to the promotion of healthy behaviors. **Objective:** To analyze, through an integrative literature review, how in-person school games and other structured body practices influence the adoption of healthy eating behaviors among children and adolescents. **Methodology:** The search for articles was conducted in the PubMed, SciELO, and BVS databases, considering primary studies published between 2021 and 2025, in Portuguese and English. Studies addressing school interventions involving games, body movement, or playful practices associated with nutritional education were included. In total, five studies met the inclusion criteria and comprised the review. **Results:** The analyzed studies indicate that multicomponent school interventions, combining body movement, play activities, and educational actions in nutrition, promote significant improvements in eating behaviors. These improvements include increased consumption of fruits, vegetables, and dairy products, reduction of ultra-processed foods, increased regularity of meals, and expansion of nutritional literacy. It was observed that behavioral changes occur more rapidly than anthropometric changes, highlighting the importance of continuous and longer-term programs. The central role of the teacher and trained professionals in mediating the practices is also emphasized, favoring student engagement, understanding, and motivation. The literature presents limitations, such as variation in age ranges, short duration of interventions, and absence of Brazilian studies, especially in Bahia.

Conclusion: It is concluded that in-person school games constitute an effective strategy for promoting healthy eating habits and should be systematically incorporated into the pedagogical practices of schools. Further studies, including Brazilian research, are recommended to broaden the understanding of the effectiveness of these interventions.
Keywords: teenagers; healthy eating; physical activity; children; school games.

Abstract

introduction: School games, guided physical activities, and playful practices developed in the school environment have been recognized as effective pedagogical strategies to promote the integral development of children and adolescents, including the formation of healthy eating habits. Given the increasing prevalence of overweight and obesity at early ages, it becomes relevant to understand how interventions that integrate bodily movement and nutrition education can contribute to the promotion of healthy behaviors. **Objective:** To analyze, through an integrative literature review, how in-person school games and other structured physical practices influence the adoption of healthy eating behaviors among children and adolescents. **Methodology:** The search for articles was conducted in the PubMed, SciELO, and VHL databases, considering primary studies published between 2021 and 2025 in Portuguese and English. Studies addressing school-based interventions involving games, bodily movement, or playful practices associated with nutrition education were included. In total, five studies met the inclusion criteria and were incorporated into the review. **Results:** The analyzed studies indicate that multicomponent school interventions—combining bodily movement, playful activities, and educational actions in nutrition —promote significant improvements in eating behaviors. These improvements include increased consumption of fruits, vegetables, and dairy products; reduced intake

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of ultra-processed foods; greater regularity of meals; and enhanced nutritional literacy. Behavioral changes were observed to occur more rapidly than anthropometric changes, highlighting the need for continuous and longer-term programs. The central role of teachers and trained professionals in mediating these practices was also emphasized, as they enhance student engagement, understanding, and motivation. The literature presents limitations, such as variations in participants' ages, short intervention durations, and a lack of Brazilian studies, particularly in the state of Bahia. **Conclusion:** It is concluded that in-person school games constitute an effective strategy for promoting healthy eating habits and should be systematically incorporated into schools' pedagogical practices. Further studies, including Brazilian research, are recommended to expand understanding of the effectiveness of such interventions.

Keywords: adolescents; healthy eating; physical activity; children; school games.

Introduction

Childhood is a crucial period for the formation of related behaviors.
to health, such as regular physical activity and the adoption of proper eating habits.
(Eddolls *et al.,* 2020). Considering the literature on human development, childhood encompasses
approximately until the age of 12, including the school years from 6 to 12 years old, at which point...
These behaviors are more easily consolidated. Such practices are acquired early on.
They tend to persist throughout life and directly influence the prevention of chronic diseases.
Non-communicable diseases (NCDs), since low levels of physical activity are associated with
increase in childhood overweight and obesity (Cé *et* al., 2023).

Adolescence, defined by the World Health Organization as the period between 10 and
19 years old represents a phase marked by intense biological and psychosocial changes that also
impacts the adoption of healthy habits. In this context, the school environment presents itself as a
a privileged space for implementing actions that simultaneously promote movement.
Physical activity, playfulness, and nutritional education, benefiting both children and adolescents.
(Vasconcelos. MR *et al.,* 2022).

In-person school sports, such as soccer, running, dodgeball, motor skills circuits and...
Traditional games are configured as pedagogical tools capable of stimulating the
motor, cognitive and social development of children (Oliveira Júnior, Martins, Silveira and Sá,
2017). In addition, they reinforce values such as discipline, respect, cooperation, and self-care.
contributing to the student's holistic development (Dias *et al.,* 2021). The integration between sport,
Playfulness and food education promote the engagement of children and adolescents and the development of new skills.
of more conscious attitudes towards health. Studies show that playful activities aimed at
Healthy eating habits in the school environment are effective tools for promoting knowledge and
Adopting healthy eating habits makes learning more engaging and meaningful.
for children (Almeida *et* al., 2024).

Playful interventions conducted in person within the school context have shown
positive results in promoting healthy eating habits, especially when associated

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continuous and accessible pedagogical approaches (Almeida *et al* 2024). Participation in games and Organized physical activities encourage children and adolescents to reflect on the importance of A balanced diet is essential for maintaining energy, performance, and well-being, making the process easier. more natural, dynamic and meaningful learning (Vasconcelos *et al.,* 2022).

Epidemiological data indicate that the prevalence of overweight and obesity among children Brazilian rates have remained high in recent decades. According to the Ministry of Health (2023), Approximately 35% of children between the ages of 10 and 14 are overweight, reflecting Trends observed in other countries, such as the United States and the United Kingdom, where obesity Childhood obesity affects approximately 20% to 25% of the population in that age group (Eddolls *et al.,* 2020). This scenario This highlights the need for school interventions that promote healthy eating habits. linking nutritional education to regular physical activity.

Nutritional status in children is classified using growth charts. growth of the World Health Organization (WHO, 2007) or the Brazilian Society of Pediatrics (SBP, 2019), with specific cut-off points for overweight and obesity, such as the body mass index. Body mass index (BMI) for age. These measures allow for the early identification of children at risk. to guide prevention strategies and monitor the effects of educational and nutritional interventions. (Cé *et al.,* 2023).

Figure 1 - Classification of nutritional status by BMI for ages 5 to 19 years

IMC-para-idade:

VALORES CRÍTICOS		DIAGNÓSTICO NUTRICIONAL
< Percentil 0,1	< Escore-z -3	Magreza acentuada
≥ Percentil 0,1 e < Percentil 3	≥ Escore-z -3 e < Escore-z -2	Magreza
≥ Percentil 3 e ≤ Percentil 85	≥ Escore-z -2 e ≤ Escore-z +1	Eutrofia
> Percentil 85 e ≤ Percentil 97	≥ Escore-z +1 e ≤ Escore-z +2	Sobrepeso
> Percentil 97 e ≤ Percentil 99,9	≥ Escore-z +2 e ≤ Escore-z +3	Obesidade
> Percentil 99,9	> Escore-z +3	Obesidade grave

Source: World Health Organization (WHO), 2006.

The nutritionist plays a key role in promoting healthy eating habits. Their work focuses on healthy lifestyles, preventing overweight and obesity, and providing nutritional education in schools. includes guidance on appropriate food choices, implementation of feeding programs. healthy participation in interdisciplinary projects and teacher training to integrate Food practices in the school curriculum (Almeida *et al* 2024).

In schools, school games become important tools to combat the sedentary lifestyles and positively influence eating behavior by promoting experiences that

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They connect movement, body energy, and nutritional choices (Cé *et al.,* 2023). Thus, investigating the The importance of in-person school games for the development of healthy eating habits. This becomes fundamental for guiding pedagogical practices and public policies that link sport, Nutrition and playfulness as pillars of health promotion in the school environment (Almeida *et al.)* 2024). The relevance of this topic is reinforced by the increasing rates of childhood obesity. and due to the need for effective and sustainable educational strategies.

Given the above, the present study aims to analyze, through a review... integrative literature, such as in-person school games, including sports activities, Motor games and playful physical activities contribute to the promotion and development of healthy eating habits in children and adolescents in a school setting.

Methodology

This study consists of an integrative literature review, developed with the objective to identify and analyze studies that investigated how school games, physical activities and In-person play activities can contribute to the development of healthy eating habits. Healthy children and adolescents in a school setting. The review followed systematic steps, including defining the guiding question, establishing inclusion and exclusion criteria, developing the search strategy, selecting studies, extracting and interpreting data, and Presentation of the results.

The study was conducted following the guiding question: "How do games and physical activities..." In-person schooling can help encourage healthy food choices in children and "Adolescents in a school environment?" Primary articles published between 2021 and 2025 were included. available in full in Portuguese, English, or Spanish, that investigated interventions in-person school activities related to healthy eating, physical activity, educational games or Playful activities involving children or adolescents in schools were also considered. Eligible studies included those that addressed nutritional education programs implemented in the school environment. Review studies, theoretical research, and articles related exclusively to games were excluded. *Online* studies that did not involve children or adolescents in schools, productions without methodology. clearly defined, in addition to monographs, editorials, letters to the editor, opinions and duplicate articles.

The search for studies was conducted in the PubMed, SciELO, and Virtual Health Library databases. (BVS). The following keywords were used in English: “healthy eating”, “school games”, “playful activities”, “physical activity”, “nutrition education”, combined with the Boolean operators AND and OR to increase the sensitivity and precision of the search. In addition, searches were performed using The corresponding terms in Portuguese ensure greater scope and inclusion of studies. Published in Portuguese.

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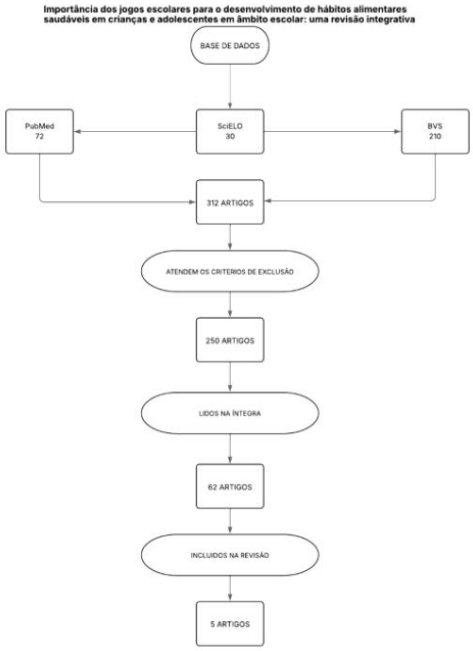
The initial stage of identifying studies resulted in 312 publications, considering all The databases used in this review. After applying the exclusion criteria, 250 studies were found. were discarded for not meeting the established requirements. Then, 62 articles were... Selected for full reading, of which 5 are primary articles published between 2021 and 2025. These studies fully met the inclusion criteria and were used in the final review. These included interventions with educational games, sports activities such as soccer, and programs. multicomponent approaches involving physical activity and nutritional education, as well as studies Observations on eating habits and physical activity at school.

For each selected article, information was extracted regarding authors, year of publication, Country of origin, methodological design, sample characteristics, description of interventions. duration of activities and main results related to eating habits and practices School physical education. The data analysis considered the type of intervention (playful, sports, multicomponent), the results on eating habits and physical activity level, the clarity methodological and the relevance of the interventions, allowing the construction of a critical synthesis of findings and an integrative narrative on the influence of school physical activity on development of healthy eating habits.

Figure 2 - Flowchart of the selection of articles chosen for the current research.



Source: developed by the authors, 2025.

The data analysis was descriptive, allowing for a synthesis of the evidence regarding... The influence of physical activities, school games, and recreational activities in promoting healthy eating habits. healthy relationships among children and adolescents in a school environment. Thematic categorization made it possible to identify points of convergence between studies, as well as existing gaps, contributing to a broader understanding of the role of bodily practices in the development of behaviors

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food.

The results were organized in the table below, which presents a characterization.
A detailed overview of the five studies included in the review. The table compiles information regarding...
methodological design, number of participants, objectives of each intervention and
main strategies used, including face-to-face educational games, sports practices
structured, multi-component programs and nutritional education actions. Furthermore, it synthesizes the...
main findings, allowing for a comparative view of how different types of interventions
influenced nutritional knowledge, school engagement, food choices, and the
Increased consumption of fruits, vegetables, and other healthy foods among participants.
An organized presentation of these elements facilitates the identification of specific contributions of each study, as well as the general trends observed in the school interventions analyzed.

Table 1 - Summary of articles analyzed in this review

Art go	Author, Year of study Publication , place of study	Outline nto, type of study and N	Objectives of	Methodology	Key findings
1	Barnes *et al.* (2021) Australia	Clinical trial randomization do in cluster; N = 742 children aged 9–12; 12 Catholic primary schools;	To evaluate the impact of school-based physical activity and nutrition interventions on weight status and quality of life.	A nine-month intervention was conducted with four groups: physical activity, nutrition, combination, or control; anthropometric assessments were performed at baseline, and post-intervention assessments were conducted nine months later. Data were collected for comparison with baseline to measure the impact of the different interventions.	The nutrition group showed a greater chance of maintaining a healthy weight; the physical activity group showed a reduction in waist circumference; there was no significant effect on BMI.
2	Morgado *et al.* (2023) Portugal	Intervention study the one with three groups; N = 67 children aged 7–10 years;	Investigate the effects of The *"Football and Nutrition for Health"* program focuses on body composition, physical fitness, food intake, and nutritional knowledge.	A 14-week intervention with two weekly soccer sessions; the combined group received additional nutritional education sessions. Pre- and post-intervention assessments.	Improved BMI-z, increased physical fitness, higher levels of physical activity, improved psychosocial well-being, and increased fruit consumption and nutritional knowledge.
3	ÿugowska *et al.* (2024) Poland	Study Experiment such; N = 213 adolescent 13 years old; 6 schools;	To assess Eating behavior and BMI in adolescents exposed to different physical education loads	Anthropometry; BMI by percentiles; dietary questionnaire; extracurricular physical activity questionnaire	Adolescents with a higher workload of physical activity at school showed a lower prevalence of obesity, better BMI, greater physical activity in their free time, and a slight improvement in eating behavior.

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4	Grams *et al.* (2022) Spain/ Germany	Comparative study o; N = 334 children, with 182 from Spain and 152 from Germany.	To compare adherence to the Mediterranean diet among children and assess the influence of gender, overweight, and blood pressure.	Questionnaires on diet and physical activity; descriptive and inferential statistical analysis.	Differences between countries in adherence to the Mediterranean diet; greater adherence associated with physical activity and lower prevalence of overweight.
5	Kolanowski *et al.* (2025) Poland	Study quantitative the; N = 278 children aged 10–12 years;	Assess the impact of the increase in Physical activity organized at school on eating behavior and physical activity during leisure time over 2 years.	Questionnaires administered at 3 different times (2017–2019) on eating habits and forms of AF; comparison between groups with standard AF (4h/week) and increased AF (10h/week)	Increased consumption of fruits, vegetables, dairy products, and breakfast; greater frequency of physical activity during leisure time; greater nutritional awareness; the standard group showed a gradual worsening of habits.

Source: developed by the authors, 2025

Results and discussion

The study by Barnes *et al.* (2021), which assessed 742 Australian children using a A randomized clinical trial showed that combined interventions of physical activity and nutrition... They increase the likelihood of maintaining a healthy weight and reduce waist circumference. Although BMI did not change significantly, the study showed that interventions Multi-component systems, with educational and practical elements, increase adherence to behaviors. healthy, which directly relates to the proposal of school games as tools for engagement.

Furthermore, the study also highlights that strategies involving active participation (such as Motor circuits, playful challenges, and hands-on activities related to food promote the This engages children and makes the learning process more meaningful. This dynamic is similar to what happens in school games, which utilize healthy competition, social interaction and Body movement as a stimulus to modify behavior.

In the study by Barnes *et al.* (2021), the combination of theoretical content and experiences The practices allowed students to better understand the consequences of their choices. They would develop the autonomy to choose healthier food alternatives and develop the capacity to do so. This is closer to... The role of school games in the educational environment: by transforming learning into a Active and fun experiences increase motivation and strengthen the internalization of behaviors. nutritionally adequate and promote sustainable changes in daily life. Thus, the evidence presented by Barnes *et al.* (2021) reinforces that pedagogical practices based on movement, Playfulness and interaction are effective in promoting healthy eating habits in children and teenagers.

Similar results were observed by Morgado *et al.* (2023), conducted with children. from primary education in public schools in Portugal, in which a program was implemented that

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The intervention combined recreational soccer with nutritional education over 12 weeks.
It occurred in a school setting, involving students aged approximately between 8 and 12 years old, who
They participated in weekly sessions consisting of playful soccer training and activities.
Educational sessions on nutrition. The authors identified a significant improvement in BMI-z, an increase in
Cardiorespiratory fitness and increased consumption of fruits and fish demonstrate that integration
Incorporating physical activity with nutritional content can promote healthy behaviors.

The study highlights that the playful, cooperative, and inclusive nature of recreational soccer played a role.
as a powerful facilitator of children's engagement. The intervention was structured in a way that went beyond
Regarding sports practice: nutritional content was addressed through practical challenges.
guided conversations, weekly goals, educational games, and activities that directly related to
Sports performance is linked to food choices. This approach allowed children
internalized the concepts of healthy eating in a concrete way, perceiving in practice how
Certain foods influence energy, well-being, and physical performance.

This dynamic is similar to the principles of school games, which utilize movement,
Cooperation, accessible rules, and social interaction enhance learning. Thus, the study of
Morgado *et al.* (2023) reinforces that strategies based on structured body activities and practices
Playful activities not only promote increased physical activity, but also the adoption and maintenance of healthy habits.
Healthy eating habits. By integrating sports practice and nutritional education in the same program.
In this context, the authors demonstrate that interactive approaches make the educational process more...
Effective, accessible, and enjoyable, contributing to lasting behavioral changes.

The findings of Lugowska *et al* (2024) reinforce this trend. When comparing adolescents
exposed to different workloads of physical education classes (4 hours versus 10 hours per week), it was found that
More time spent on physical activity at school is associated with a lower prevalence of obesity, better
BMI indices and healthier eating behavior. The study demonstrates that the increase
The systematic approach of school movement promotes positive food choices, indicating that the
Playfulness can further enhance these effects.

Kolanowski, Lugowska and Trafialek (2025), in a longitudinal study with 278 pre-
adolescents, studies showed that students exposed to greater physical activity at school exhibited
a significant increase in the consumption of fruits, vegetables, and whole grains, in addition to greater frequency.
of physical activity during leisure time. It is observed again that interventions that encourage engagement
Active activities, including school games, influence not only eating behavior but also...
Continuing physical activity outside of school.

The two studies, both conducted by research groups led by Kolanowski,
Lugowska and Trafialek demonstrate important methodological consistency: they analyze different
Intensities and contexts of physical activity at school to understand how the educational environment

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It directly influences eating behavior. While the 2024 study compares groups with
With varying loads of physical education, the 2025 study follows students longitudinally.
allowing us to observe behavioral changes over time. This combination of
The findings strengthen the evidence that it is not only the amount of physical activity, but also
Its quality, consistency, and ability to engage students produce lasting effects.
Regarding food.

Both studies reveal that the greater the stimulus to movement within the
In a school environment, the greater the tendency for students to adopt healthier eating patterns.
such as increased consumption of fruits, vegetables, and natural foods. Its results are: strategies
that generate greater involvement, enjoyment, and active participation (as occurs in school games) tend
to enhance the observed benefits. This is because physical activity ceases to be just a
a curricular requirement, it is now perceived as a positive, cooperative, and motivating experience.
which increases openness to behavioral changes, including food choices.

Furthermore, the study conducted in 2025 demonstrates that these effects extend beyond the limits.
from school. Students who were more physically engaged showed a greater propensity to participate in physical activity.
Physical activity during leisure time indicates the internalization of healthy behavior. This continuity reinforces that
Playful interventions, such as school games, can not only improve eating behavior
not only in the school environment, but also influencing the overall lifestyle of children and adolescents.
Thus, both studies contribute consistently to the understanding that the movement
Associated with pleasure, interaction, and playfulness, it represents a powerful way to promote healthy habits.
healthy eating

The study by Grams *et al.* (2022), with a sample of 334 children, 182 from Spain and 152
A study from Germany demonstrated that students who engaged in a higher volume of physical activity, both in
In both school and leisure settings, they showed greater adherence to the Mediterranean diet. This adherence
It included increased consumption of fruits, vegetables, legumes, and olive oil, and lower intake of...
ultra-processed foods. The study used validated questionnaires to assess dietary quality and
measured levels of physical activity through structured self-report, allowing for the identification of
Consistent patterns between movement and healthy eating. These findings reinforce that environments
Schools that encourage active participation, frequent movement, and playful activities promote...
More balanced eating habits, directly related to the games' proposal.
Schoolchildren as catalysts for engagement and behavioral change.

The set of studies analyzed demonstrates that interventions that combine activity
Physical activity, play-based elements, and nutritional education are more effective than isolated actions. The literature
This demonstrates that the integration between movement and learning promotes a practical understanding of...
concepts, broadens student participation and facilitates the internalization of behaviors.

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healthy foods.

This pattern can be observed in both the findings of Barnes *et al.* (2021) and those of Morgado *et al.* (2023), who demonstrate that multicomponent programs produce more results. consistent adoption of appropriate habits. Another important point is that changes in Changes in eating behaviors tend to occur more rapidly than changes in indicators. anthropometric.

Studies such as those by Barnes *et al.* (2021) and Tugowska, Kolanowski and Trafialek (2024) Studies show that the consumption of fruits, vegetables, and whole grains increases at an early age. whereas BMI and body composition require longer intervention periods to show results. significant changes. This reinforces the idea that interventions focused on active learning and games can... to have an immediate impact on food choices, even if the effect on weight is more gradual.

Furthermore, the motivation and engagement promoted by school games emerge as Key elements in transforming behaviors. Structured recreational activities, Sports presented in a playful format and dynamic physical activities make the educational process more engaging. reducing resistance and increasing student adherence to nutritional recommendations. The study de Morgado *et al.* (2023) illustrates this mechanism by showing that recreational football increased both the Involve children in adopting healthier food choices. In a way In addition, the findings of Grams *et al.* (2022) reinforce that more physically active students They demonstrate greater adherence to balanced dietary patterns, suggesting that engagement by The medium of movement in the school environment is an essential mediator for the development of habits. healthy.

The analysis of the five selected studies demonstrates that in-person school interventions that utilize games, playful activities, structured sports practices, and educational strategies Nutritional factors exert positive and consistent effects on the eating behavior of children and adolescents. Evidence reveals that programs that integrate body movement and Active learning promotes changes in eating habits and greater nutritional awareness. and, in some cases, improvements in anthropometric indicators.

The studies have limitations, such as methodological heterogeneity and different durations. interventions, variation in assessment instruments, and lack of long-term follow-up. in some cases. Still, the body of evidence indicates that school-based interventions In games, recreational activities and systematized sports practices exert a positive influence on the Eating behavior and nutritional awareness in children and adolescents.

Conclusion

The analysis of the studies showed that in-person school games and physical activities

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Structured activities and playful actions developed in the school environment have significant potential.
to promote healthier eating habits in children and adolescents. The five studies
The analyses showed that multicomponent interventions, which combine body movement,
Playfulness and nutritional education promote consistent changes in behavior.
Dietary changes, such as increased consumption of fruits, vegetables, and dairy products, and reduction of other foods.
Ultra-processed foods and more regular meal times.

These behavioral changes demonstrate a faster response when
compared to changes in anthropometric indicators, which reinforces the importance of programs.
Continuous and longer-lasting interventions to generate solid impacts on health and nutritional status. In addition
In addition, the participation of qualified teachers and professionals plays a central role in
mediation of these practices, contributing to improved engagement, understanding, and motivation.
of the students during the proposed activities.

Studies also indicate that playful and educational interventions promote a
A more comprehensive education, by stimulating awareness of the relationship between physical effort and expenditure.
Energy and food choices. This type of approach promotes the development of autonomy and
Critical thinking regarding food is an essential element in preventing overweight and obesity.
Obesity in early life stages.

Despite the promising results, there are still important limitations in the literature: the
The number of studies is small, there is great variation in the age ranges investigated, and most of them...
The interventions are short-term, which makes it difficult to assess sustained effects over time.
In the Brazilian context, especially in Bahia, the scarcity of primary research on the subject highlights the scarcity of primary research on the subject.
a significant gap that needs to be filled by future research. Longitudinal studies, with
Greater population diversity and more standardized methodologies would be essential for further study.
Understanding the long-term effects of physical practices integrated with nutritional education.

Given the body of evidence, it can be concluded that in-person school interventions that
Integrating educational games, physical activities, and nutritional education constitutes effective strategies.
to promote healthy eating habits, encourage protective behaviors, and strengthen the
The autonomy of children and adolescents in their food choices is recommended. Implementation is recommended.
of continuous and multi-component programs in schools, accompanied by teacher training and
The integration of sport, playfulness, and nutritional education, in order to consolidate a culture of health.
and well-being among students.

Finally, it is important to highlight the need for schools and educational policies to expand the use of...
These innovative strategies ensure their continuity and adaptation to local realities.
Maintaining these practices throughout the school year can contribute to the consolidation of habits.
healthier diets and for the prevention of nutritional problems during childhood and

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