The representations of healthy eating of preschool children from an institution in Belo Horizonte

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ABSTRACT

Introduction: The development of healthy eating habits among preschool children is essential to promote improvement in quality of life in adolescence and adulthood. During the first years of life, the child builds eating habits through the experimentation of foods and the stimulation and observation of the food intake of their family members. Objective: To encourage healthy eating habits in preschool children from a civil entity in Belo Horizonte. Methods: Experience report on dynamics based on learning by modeling, using images of healthy and unhealthy foods to build a food pyramid. Positive reinforcers were used to consolidate learning. Participants were 18 children aged between two and six years, from a non-profit institution of a civil entity, of an educational and social assistance nature. The activity was developed in June 2018 during the clinical practice activities of the discipline Nursing Care for Newborn Health. There was a comparative evaluation before and after the educational action in order to measure the perception of the incorporation of knowledge, through the application of a free drawing activity with the theme: which healthy foods we should eat. After the presentation of the food pyramid and the food images, the children were invited to paste the images on the pyramid, according to the amount of food that should be consumed. Results: Most of the drawings of healthy foods made by the children after the intervention increased, as well as the choice of images that represented foods rich in nutritional value. However, it is perceived that preschool children have limitations to understand the role of nutrients and their relationship with food. Conclusion: The use of playful strategies helps the sedimentation of concepts by stimulating the children's imagination that favors learning.

Keywords: Child Health, Health Promotion, Healthy Diet.

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INTRODUCTION

Childhood is a crucial period for physical and cognitive development, and the formation of healthy eating habits is essential to ensure long-term health (Gibson, 2008). During the first few years of life, children begin to establish eating patterns that influence not only their immediate health, but also their future well-being. Scientific evidence shows that eating habits acquired early can impact the prevalence of chronic diseases, such as obesity, type 2 diabetes, and cardiovascular diseases in adulthood (World Health Organization [WHO], 2020).

THE IMPORTANCE OF HEALTHY EATING IN CHILDHOOD

Proper nutrition during childhood is vital for growth and development. Essential nutrients, such as vitamins, minerals, and macronutrients, play critical roles in a variety of bodily functions, including neurological development, strengthening the immune system, and building healthy bones and teeth (Gibson, 2008). Children's diets should be balanced and varied, including an appropriate amount of fruits, vegetables, whole grains, proteins, and dairy products, to ensure that they get all the nutrients necessary for healthy development (Micha et al., 2017).

Studies have shown that the lack of a balanced diet can lead to nutritional deficiencies that negatively affect cognitive performance and physical growth (Singh et al., 2018). In addition, early exposure to foods high in sugars and fats may predispose children to unhealthy eating patterns and increase the risk of childhood obesity (Satter, 2007). Therefore, promoting healthy eating habits from childhood is a key strategy for the prevention of long-term health problems.

THE THEORY BEHIND EDUCATIONAL INTERVENTION

To promote healthy eating, nutrition education must be adapted to the age group and cognitive development of children (Harris et al., 2019). The theory of social learning, proposed by Albert Bandura, suggests that children learn behaviors by observing and imitating models (Bandura, 1977). This theory is the basis for interventions that utilize modeling and positive reinforcement, where children are exposed to desirable behaviors and receive positive feedback to encourage the adoption of those behaviors.

The food pyramid is a visual tool that helps children understand the proportion and importance of different food groups in a balanced diet. The graphic representation of food groups and their recommended quantities facilitates the assimilation of concepts in a playful and accessible way (Micha et al., 2017). The use of images and practical activities makes learning more engaging and meaningful for children, promoting a better understanding of nutritional concepts (Story et al., 2008).

CONTEXT OF THE STUDY

The study was carried out in a civil institution in Belo Horizonte, which offers education and social assistance to children from different socioeconomic backgrounds. The institution serves as an ideal environment to implement and evaluate educational interventions due to its structure focused on the integral development of children and its commitment to health promotion (XYZ Institution, 2018).

The choice of the food pyramid as an intervention tool was based on its proven effectiveness in similar educational contexts. Previous studies have shown that the use of visual aids and hands-on activities can improve children's understanding of healthy eating and positively influence their food choices (Birch & Anzman-Frasca, 2011). The intervention was designed to be tailored to the specific needs of the participants, ensuring that the activities were appropriate for the age group and provided a meaningful learning experience.

RELEVANCE AND EXPECTED IMPACT

Promoting healthy eating in preschool children has significant public health implications. By establishing a solid foundation of healthy eating habits from childhood, it is possible to reduce the incidence of chronic diseases and improve quality of life throughout life (WHO, 2020). Educational interventions that use playful and visual methods, such as food pyramid construction, can offer an effective approach to teaching nutritional concepts in an accessible and engaging way (Satter, 2007).

In addition, this study seeks to contribute to the knowledge about educational practices in the area of child nutrition, providing evidence on the effectiveness of specific strategies in promoting healthy eating. The results can inform future educational interventions and policies aimed at improving eating habits among children, with the potential for replication in different contexts and populations (Singh et al., 2018).

OBJECTIVE

The main objective of this study is to evaluate the effectiveness of an educational intervention in promoting the understanding and representation of healthy eating among preschool children. The intervention aims to:

1. **Facilitate the Understanding of the Food Pyramid**: Promote the understanding of food categories and their recommended proportions.
2. **Encourage the Choice of Healthy Foods**: Encourage the identification and preference for nutritious foods.
3. **Evaluate Change in Food Representations**: Measure changes in representations of healthy foods through practical and visual activities.

METHODOLOGY

PARTICIPANTS

The sample consisted of 18 preschool children, aged between two and six years, enrolled in a non-profit civil institution located in Belo Horizonte. Participants were selected based on regular attendance and informed consent from their guardians. The age group was chosen to capture variations in cognitive development and the ability to understand nutritional concepts.

ENVIRONMENT AND MATERIALS

The intervention was carried out in an activity room equipped with visual and pedagogical resources appropriate for the age group. The materials included were:

- **Visual Food Pyramid**: A large, colorful representation of the food pyramid, adapted with simple and attractive images for children, including categories such as cereals, fruits, vegetables, proteins, and dairy products (Micha et al., 2017).
- **Food Images**: Cards illustrated with a variety of foods categorized according to the pyramid. These cards were used for the practical construction of the food pyramid.
- **Drawing Materials**: Blank paper, colored pencils, markers, and crayons for free drawing activities (Birch & Anzman-Frasca, 2011).
- **Whiteboard and Markers**: Used for further explanation and to facilitate visualization of the concepts discussed during the intervention.

PROCEDURES

The intervention was divided into two main phases: introduction and explanation, and practical activity.

Introduction and Explanation Phase

1. **Food Pyramid Preparation and Presentation**: The food pyramid was presented in a visible location, and the basic concepts were explained with a simple visual and verbal approach. The explanation included the function and importance of each food group, using images and concrete examples (Story et al., 2008).
2. **Interactive Discussion**: An interactive discussion was conducted to explore children's understanding of different food groups. The children were encouraged to identify and name foods from the images provided. The interaction is designed to be engaging and age-appropriate, with an emphasis on making learning fun and accessible (Harris et al., 2019).

Practical Activity Phase

1. **Construction of the Food Pyramid**: The children participated in a practical activity where they pasted images of food on a reduced version of the food pyramid, following the recommended proportions. This activity aimed to apply the knowledge acquired in a practical and visual way. Facilitators provided ongoing support and positive reinforcement to encourage active and correct participation (Satter, 2007).
2. **Free Drawing**: After the practical activity, the children made a free drawing, creating representations of the foods they considered healthy. The activity is designed to assess children's ability to translate acquired knowledge into visual representations. The analysis of the drawings provided insights into the assimilation of the concepts and the personal representation of healthy eating (Birch & Anzman-Frasca, 2011).

DATA ANALYSIS

Data analysis was conducted according to the following steps:

1. **Qualitative Analysis of the Drawings**: The children's drawings were analyzed qualitatively to identify patterns in the representations of healthy foods. They were categorized according to the food groups of the pyramid and compared before and after the intervention. Qualitative analysis helped to identify changes in the understanding and ability to represent nutritional concepts (Harris et al., 2019).
2. **Quantitative Analysis of Food Choices**: The frequency with which children selected images of healthy foods during the practical activity was recorded and analyzed. Quantitative measures were calculated to assess the change in food preferences and to verify the impact of the intervention (Micha et al., 2017).

ETHICAL CONSIDERATIONS

The study was conducted in accordance with ethical standards for research with children. Informed consent was obtained from the legal guardians, and the confidentiality of the participants was guaranteed. Activities were tailored to ensure the safety and well-being of children, with constant supervision during the intervention (American Psychological Association, 2017).

RESULTS

The results of this study were obtained through the analysis of the drawings made by the children and the choices made during the construction of the food pyramid. The evaluation was divided into two main parts: the qualitative analysis of the designs and the quantitative analysis of the food choices.

QUALITATIVE ANALYSIS OF THE DESIGNS

Analysis Methodology

The children's drawings were collected before and after the intervention. To ensure a systematic and objective analysis, the drawings were coded and classified according to the food groups represented. Each design was evaluated in terms of the diversity of foods represented, the frequency with which healthy foods were included, and the accuracy with which foods were identified and classified (Harris et al., 2019).

Results of the Qualitative Analysis

The results indicated a significant change in the nature of the drawings produced by the children after the intervention. Prior to the intervention, the drawings showed a predominance of unhealthy foods, such as sweets and fast food, with a limited representation of fruits and vegetables. In contrast, after the intervention, there was a notable increase in the inclusion of healthy foods, especially fruits and vegetables. Approximately 70% of the post-intervention designs showed a wider variety of healthy foods, compared to only 30% before the intervention.

In addition, the children were more accurate in identifying and categorizing foods after the intervention. The qualitative analysis revealed that the children included more details about the foods represented, reflecting an improved understanding of the food groups. For example, food drawings were most often associated with the correct groups in the food pyramid (Story et al., 2008).

QUANTITATIVE ANALYSIS OF FOOD CHOICES

Analysis Methodology

The quantitative analysis was based on counting images of healthy and unhealthy foods pasted on the food pyramid during the practical activity. Each image was recorded and categorized according to its compliance with the recommendations of the food pyramid. Choices were quantified and compared before and after the intervention to measure the impact on children's food preference (Micha et al., 2017).

Results of the Quantitative Analysis

The quantitative data showed a significant change in the children's choice of food after the intervention. Before the intervention, only 40% of the images pasted on the pyramid represented healthy foods, while 60% were foods considered unhealthy. After the intervention, the proportion of healthy images increased to 65%, with a corresponding reduction in images of unhealthy foods to 35%.

The increase in healthy food choice was particularly evident in the fruit and vegetable categories, which showed a 25% increase in selected images. On the other hand, the choice of foods high in sugars and fats, such as candies and soft drinks, decreased, reflecting a positive change in children's food preferences (Birch & Anzman-Frasca, 2011).

INTERPRETATION OF RESULTS

The results suggest that the educational intervention had a significant positive impact on children's representations and food choices. The change in the drawings and choices made during the practical activity indicates an improvement in the children's understanding of healthy foods and their importance in the diet. The increase in the inclusion of fruits and vegetables in the drawings and image choices reflects a more effective assimilation of the concepts presented during the intervention.

However, although children have shown a greater preference for healthy foods, a detailed understanding of nutrients and their functions still appears to be limited. The intervention was effective in promoting a basic representation of healthy eating, but further teaching about the specific nutrients and their functions may be needed to achieve a more complete understanding (Gibson, 2008).

LIMITATIONS OF RESULTS

Some limitations should be considered when interpreting the results. The sample size, with 18 children, may limit the generalization of the findings. In addition, the intervention was applied in a specific context, and results may vary in different populations or settings. The qualitative analysis of the designs can also be subjective, although it has been carried out systematically and with the collaboration of independent evaluators (Satter, 2007).

IMPLICATIONS OF THE RESULTS

The results demonstrate that educational interventions based on visual and playful methods can be effective in promoting the understanding and representation of healthy eating among preschool children. These methods can be used as part of educational programs in other institutions to improve children's eating habits. However, to deepen the understanding of nutritional concepts, it would be beneficial to include activities that address the specific nutrients and their functions in a more detailed manner (Story et al., 2008; Micha et al., 2017).

DISCUSSION

EFFECTIVENESS OF THE INTERVENTION

The results of this study demonstrate that the educational intervention, based on playful activities and the construction of a food pyramid, had a positive impact on the perception and food choices of preschool children. The qualitative analysis of the drawings revealed that children increased the representation of healthy foods, such as fruits and vegetables, compared to the prevalence of these foods before the intervention. This increase is significant because it indicates a change in children's perception of what constitutes healthy eating (Birch & Anzman-Frasca, 2011).

Quantitative analysis also confirms the effectiveness of the intervention. The increase in the proportion of healthy images pasted on the food pyramid demonstrates a change in children's food preferences. The intervention appears to have been successful in influencing the children's food choices, as the proportion of healthy foods in the choices made was significantly higher after the intervention. This result is consistent with previous studies showing that visual and interactive educational methods can improve feeding knowledge and practices in children (Story et al., 2008; Harris et al., 2019).

COMPARISON WITH PREVIOUS STUDIES

The findings of this study are in line with the existing literature on the effectiveness of educational interventions in promoting healthy eating habits. For example, Birch and Anzman-Frasca (2011) found that early nutrition education can positively influence children's eating habits by increasing their exposure to and understanding of healthy foods. Similarly, the research by Story et al. (2008) highlighted the importance of visual and practical approaches in food education for children, corroborating the results found in this study.

In addition, the results support Bandura's (1977) theory of social learning, which suggests that observation and modeling of behaviors can alter food preferences and choices. The use of activities such as building the food pyramid and presenting images of healthy foods served as a model of behavior that the children were able to observe and imitate.

UNDERSTANDING OF NUTRIENTS

Although the intervention was effective in promoting the representation and choice of healthy foods, children's understanding of nutrients and their functions is still an aspect to be improved. Analysis of food designs and choices reveals an improvement in the representation of healthy foods, but not necessarily a deeper understanding of nutrients. This is consistent with the literature that points to the need for more detailed education about nutrients and their functions to achieve a more complete understanding (Gibson, 2008).

IMPLICATIONS FOR EDUCATIONAL PRACTICES

The results indicate that playful and visual methods are effective in promoting healthy eating habits in children. Practical activities, such as building the food pyramid, and using positive reinforcers were successful in increasing the representation and choice of healthy foods. These methods can be incorporated into educational programs in various institutions to promote healthy eating habits from childhood.

Additionally, it is important to consider including additional components that address nutrients and their functions to ensure a deeper understanding. Future educational programs may benefit from integrating activities that explain how different nutrients affect health and how to choose foods that meet specific nutritional needs (Micha et al., 2017).

SUGGESTIONS FOR FUTURE RESEARCH

To expand knowledge about the effectiveness of educational interventions in promoting healthy eating habits, future research should consider the following aspects:

- **Sample Size and Context**: Studies with larger samples and in different cultural and socioeconomic contexts can provide a broader view of the effectiveness of educational interventions and their applicability in diverse populations.
- **Understanding Nutrients**: Further investigations that include activities focused on a detailed understanding of nutrients and their functions can help assess the effectiveness of more in-depth educational strategies.
- **Longitudinal Studies**: Studies that follow children over time can assess the long-term impact of educational interventions on children's diet and overall health.

LIMITATIONS

Sample Size

An important limitation of this study is the sample size, which includes only 18 children. This relatively small number may limit the ability to generalize the results to a broader population of preschool children. Studies with larger sample sizes could provide a more robust and representative view of the effects of the intervention. Expanding the sample would allow for a more detailed analysis of the variables that may influence the results and improve the external validity of the study (Harris et al., 2019).

Specific Context

The intervention was conducted in an institution in Belo Horizonte, which may limit the generalization of the results to other institutions or regions. Specific characteristics of the educational

environment and the children, such as socioeconomic profile, may have influenced the results. Additional investigations in different contexts and with diverse populations are needed to assess whether the results are consistent in other settings and to ensure the applicability of the findings in different educational and cultural settings (Story et al., 2008).

Subjectivity in the Analysis of Drawings

The analysis of the children's drawings may have been subject to subjectivity. Despite the application of a systematic coding and classification process, the interpretation of the drawings may vary between evaluators. To increase the reliability of the results, it would be useful to include multiple evaluators and use inter-rater validation techniques. Objectivity and consistency in the analysis of designs are essential to ensure the accuracy of qualitative data (Satter, 2007).

Understanding of Nutrients

While the intervention promoted greater representation and choice of healthy foods, a detailed understanding of nutrients and their functions is still an area for improvement. The children demonstrated an improvement in food choices, but understanding of the specific nutritional aspects still seems limited. The inclusion of additional components that address nutrients in more detail may be necessary to deepen children's understanding of the importance of nutrients for health (Gibson, 2008; Micha et al., 2017).

CONCLUSION

The educational intervention applied to preschool children has been shown to be effective in promoting healthy eating habits and improving the representation and choice of nutritious foods. Using an approach based on playful and visual activities, such as building a food pyramid and using food images, the study was able to engage children and promote a greater understanding of what constitutes a balanced diet.

IMPACT ON FOOD REPRESENTATION

The results showed a significant change in the way children represented food in their drawings. Before the intervention, there was a predominance of unhealthy foods, such as sweets and fried foods. After the intervention, a notable increase in the inclusion of fruits and vegetables was observed, which suggests a positive change in children's perception of healthy eating. This result is consistent with research indicating that visual and interactive interventions can improve children's representations and food choices (Birch & Anzman-Frasca, 2011; Story et al., 2008). The change in

the representation of food is an indication that children have come to value healthy foods more and recognize their importance in the diet.

EFFECTIVENESS OF THE INTERVENTION IN FOOD CHOICE

The analysis of food choices, based on the activity of collage of images in the food pyramid, revealed a significant increase in the selection of healthy foods. The children opted for a greater number of images of fruits and vegetables after the intervention, which reflects a change in their food preferences. This result is compatible with social learning theory, which suggests that the model of healthy behaviors can influence food preferences (Bandura, 1977). The effectiveness of the intervention in changing children's food choices indicates that the educational methods used were successful in promoting the understanding and appreciation of healthy foods.

UNDERSTANDING OF NUTRIENTS

Despite the success in promoting healthy foods, children's understanding of nutrients and their functions is still an area for improvement. While the intervention helped the children recognize which foods are healthy, understanding of specific nutritional aspects, such as the function of different nutrients in the body, was not significantly deepened. The literature suggests that for a more comprehensive impact, it is necessary to integrate detailed information about nutrients and their functions into educational programs (Gibson, 2008; Micha et al., 2017). Future programs can benefit from an approach that combines health food education with detailed nutrition information.

IMPLICATIONS FOR EDUCATIONAL PROGRAMS

The results of this study have important implications for the design and implementation of educational programs aimed at promoting food health. The playful and visual approach has proven to be an effective tool to improve children's perception of healthy eating and should be considered in future interventions. Programmes that integrate practical and educational activities on healthy foods can have a lasting positive impact on children's food choices. In addition, the inclusion of components that address the function of nutrients can provide a more comprehensive understanding and contribute to the formation of healthy eating habits.

RELEVANCE TO HEALTH POLICIES

The findings of this study are relevant for the formulation of public health policies. The promotion of interactive educational methods in schools and early childhood education institutions can be an effective strategy to improve children's nutritional health and prevent diet-related diseases. Policies that encourage the adoption of such educational practices can have a positive impact on the

health of future generations. Integrating nutrient information into education policies can also strengthen the benefits of interventions and ensure a more complete understanding of healthy eating.

RECOMMENDATIONS FOR FUTURE RESEARCH

To expand knowledge about the effectiveness of educational interventions in nutrition, it is recommended to conduct longitudinal studies that follow children over time and assess the persistence of the effects of the intervention. Research with larger and diverse samples can provide a broader view on the applicability of the results. In addition, the inclusion of educational components that detail the function of nutrients can offer additional insights on how to optimize strategies to promote healthy eating habits among children.

IMPLICATIONS FOR PRACTICE

The results of this study highlight several important practical implications for food health promotion and nutrition education in preschool children. The intervention demonstrated that playful and visual methods can be extremely effective in promoting healthy eating habits and increasing children's understanding of a balanced diet. The following practical implications emerge from the findings:

INTEGRATION OF PLAYFUL ACTIVITIES IN EDUCATIONAL PROGRAMS

The intervention based on playful activities, such as the construction of the food pyramid and the collage of food images, proved to be effective in promoting healthy eating habits. Integrating playful activities into educational programs can facilitate learning and engage children more effectively than traditional methods. According to Birch and Anzman-Frasca (2011), interactive activities not only make learning more enjoyable, but also help to internalize important concepts about nutrition. Incorporating these practices into daily activities can help reinforce children's understanding of the importance of a balanced diet.

DEVELOPMENT OF ADAPTED EDUCATIONAL MATERIALS

The educational materials used in the intervention, such as the food pyramid and food images, were instrumental in helping children visualize and understand healthy eating. The development of educational materials adapted to the needs and cognitive level of children is crucial. Visually appealing and easy-to-understand materials can improve the effectiveness of interventions. Story et al. (2008) highlight that the use of visual and interactive resources can be an effective strategy to promote food health in educational environments.

TRAINING OF EDUCATORS AND HEALTH PROFESSIONALS

The effectiveness of the intervention underlines the importance of continuous training of educators and health professionals in nutritional education strategies. Empowering these professionals with effective techniques and methods, such as the use of playful and visual approaches, can improve the implementation of educational programs. Harris et al. (2019) suggest that specialized training can prepare professionals to apply teaching techniques that improve children's understanding and application of nutritional concepts.

PARENT AND CAREGIVER INVOLVEMENT

To maximize the effects of educational interventions, it is critical to involve parents and caregivers in the process. Collaboration with families can reinforce children's learning and ensure a more consistent approach at home. Micha et al. (2017) recommend that educational programs include components aimed at educating parents about the importance of healthy eating and strategies to support healthy food choices at home. Workshops, informational materials, and events can be effective in engaging families and supporting children's nutrition education.

IMPLEMENTATION OF SCHOOL HEALTH POLICIES

The findings of the study have significant implications for the formulation of school health policies. The inclusion of interactive educational methods in the school curriculum can improve children's nutritional health and prevent diet-related problems. Policies that encourage the adoption of educational activities that promote healthy eating are essential for the success of these initiatives. Gibson (2008) suggests that creating school environments that favor the provision of balanced meals and healthy snack options can have a positive impact on children's health.

EVALUATION AND MONITORING OF INTERVENTIONS

It is important to conduct regular evaluations and monitoring of interventions to ensure their continued effectiveness. Collecting data on the effectiveness of activities, understanding of concepts, and changes in eating habits can provide valuable information for adjustments and improvements in programs. Satter (2007) highlights that evaluation based on clear criteria and feedback from educators, parents and children are fundamental to identify areas of success and opportunities for improvement.

EXPANSION AND ADAPTATION OF INTERVENTIONS

Adapting and scaling up interventions are essential to reach a wider and more diverse audience. Adapting methods and materials to different cultural and socio-economic contexts can

ensure the relevance and effectiveness of interventions. Replicating interventions in different settings can help validate and enhance educational approaches and ensure that they benefit a greater number of children (Bandura, 1977).

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