UCV HACER
http://revistas.ucv.edu.pe/index.php/ucv-hacer/index

Universidad César Vallejo

Artículo Original

# Food pyramid for healthy lunch boxes

## *Pirámide alimenticia para loncheras saludables*

Mary Cielo Larios Fiestas[1]
Mercy Elizabeth Ordoñez Velásquez[1]
Maria Pilar Tirabanti Quiroz[1]
Maritza Cristina Figueroa Chambergo[1]

[1] Universidad Cesar Vallejo, Perú

Fecha de recepción: 15.12.2023
Fecha de revisión: 25.01.2024
Fecha de aprobación: 02.02.2024

Como citar: Larios Fiestas, M., Ordoñez Velásquez, M., Tirabanti Quiroz, M. & Figueroa Chambergo, M. (2024). Pirámide alimenticia para loncheras saludables. UCV HACER, 13 (1), e130101. https://doi.org/10.18050/revucvhacer.v13n1a1

**Autor de correspondencia:** Mary Cielo Larios Fiestas

**Abstract**

The fundamental purpose of this research was to use the food pyramid for healthy lunch boxes in three-year-old children of the Nuevo Amanecer Educational Institution, Pomalca 2022. The type of research was applied, descriptive pre-experimental design, quantitative approach, the population consisted of 46 students and the sample, 14. His technique was observation and the instrument, the checklist. The application of reliability was carried out using the Kuder Richardson and counting on content validity according to expert opinion through Aiken's V coefficient. In the results of the application of the pre test: Types of food 50% low level; Healthy diet 50% low level, Hygiene 14% low level in relation to a healthy lunch, after applying the food pyramid program to contribute healthy lunch boxes, the results were 100%, verifying the improvement of a good nutritious lunch box, concluding that the food pyramid is important to lead a healthy life and to be able to know its nutritional value of food when making a school lunch box in three-year-old children of the initial level of the Nuevo Amanecer 2022 educational institution.

**Keywords:** Food pyramid, Healthy lunch box, Food.

**Resumen**

El propósito fundamental de esta investigación fue emplear la pirámide alimenticia para loncheras saludables en niños de tres años de la Institución Educativa Nuevo Amanecer, Pomalca 2022. El tipo de Investigación fue aplicada, diseño pre experimental descriptiva, enfoque cuantitativo, la población estuvo constituida por 46 estudiantes y la muestra, 14. Su técnica fue la observación y el instrumento, la lista de cotejo. La aplicación de la confiabilidad se ejecutó mediante el Kuder Richardson y contando con la validez de contenido a juicio de experto a través del coeficiente V de Aiken. En los resultados de la aplicación del pre test: Tipos de alimentos 50% nivel bajo; Dieta saludable 50% nivel bajo, Higiene 14% nivel bajo en relación a una lonche saludable, después de a ver aplicado el programa de la pirámide alimenticia para contribuir loncheras saludables, los resultados fueron 100%,comprobando la mejora de una buena lonchera nutritiva, dando por concluido que la pirámide alimenticia es importante para llevar una vida saludable y poder saber su valor nutricional de los alimentos al momento de realizar una lonchera escolar en los niños de tres años del nivel inicial de la institución educativa Nuevo Amanecer 2022.

**Palabras clave:** Pirámide alimenticia, Lonchera saludable, Alimentación.

## INTRODUCTION

At present, there is a marked disregard for health-preserving habits in educational institutions, particularly at the pre-school level, especially with regard to the preparation of lunch boxes for children. Parents often opt for processed foods and fast food for their children's snacks, instead of taking the time to prepare nutritious and varied lunch boxes. This trend underscores the need to establish healthy eating habits from an early age, which not only favor good school performance, but also support the integral development of children in the classroom. A healthy lunch box provides essential nutrients for proper growth and promotes an active and balanced lifestyle.

According to the World Health Organization (WHO, 2018), childhood obesity in our country has increased significantly, from 24.4% in 2009-2010 to 32.3% in 2013-2014 in the age range of five to nine years. This situation remains a persistent problem, exacerbated by the consumption of unhealthy foods such as sugary drinks, sweets and fast foods, along with a lack of physical activity. Obesity is related to a lack of knowledge about proper nutrition and excessive intake of high-sugar foods, leading to excess weight and serious health concerns.

The Ministry of Education (MINEDU, 2022) notes that, although malnutrition in pre-school students has decreased in the last two decades, it continues to be a concern. The prevalence of malnutrition has gone from 23.8% in 2009 to 12.1% in 2020, although significant differences persist between rural and urban areas, with a higher incidence in rural areas (24.8%) compared to urban areas (7.2%).

The United Nations Children's Fund (UNICEF, 2018) reports that undernourishment has increased over the past three years, reaching approximately 40 million people. Chronic undernutrition disproportionately affects children in extreme poverty and indigenous populations, who experience more food insecurity compared to non-indigenous and urban populations. In addition, 820,800 people do not receive enough calories for a healthy and active life, underscoring the importance of promoting adequate nutrition to improve academic performance and prevent malnutrition in various regions.

In Colombia, Ramirez *et al.* (2019) investigated regarding food practices related to lunch boxes made for school-age children, focusing on healthy practices through artistic and playful activities to promote good nutrition and the integral development of children. García (2015) developed a nutrition education program to reduce the prevalence of obesity, concluding that school kiosks, which offer processed and unhealthy foods, represent a significant risk to child nutrition. Valero and Lascano (2019) highlighted the lack of nutritional information in school lunch boxes and the absence of parental involvement in the preparation of adequate snacks.

In Ecuador, Montaleza *et al.* (2022) implemented school activities that emphasized food and nutrition education for 4- and 5-year-old children. Morán (2019) also emphasized the importance of providing nutritious school snacks to support the learning process. In Huancayo, Cconislla *et al.* (2019) studied the promotion of healthy lunch boxes to prevent anemia, concluding that community and parent education on nutritious lunch boxes can reduce the incidence of anemia in children.

Anccasi and Agüero (2021), in Lima, investigated the relationship between the quality of snacks and their nutritional value in preschool children, finding that an adequate diet is associated with appropriate height, while unhealthy snacks are linked to overweight and obesity. Chambilla and Condori (2018), in Arequipa, highlighted the need to prepare lunch boxes that include the three fundamental food groups to promote adequate physical and intellectual development. The Regional Health Manager's Office (GERESA, from the Spanish initials) also promotes the training of mothers in the preparation of healthy lunch boxes.

Finally, Garibaldi (2022) highlights that the food pyramid provides an essential guide to a balanced diet, helping parents to select the right foods and portions needed for a nutritious lunch box. The food pyramid is a valuable tool to ensure that school snacks are healthy and contribute to the overall well-being of children.

MINEDU (2018) refers that a nutritional pyramid provides a structured guide for adequate food consumption. Traditionally, the pyramid has categorized foods into six groups, with those of

higher nutritional value at the base, indicated to be consumed regularly, and foods that should be eaten in moderation, at the top. Therefore, the food pyramid is considered fundamental, as it provides guidance on the foods that should be prioritized to maintain a balanced diet and healthy overall development.

Britt (1973) presents a graphic guide to nutrition, in which he emphasizes that the foods located at the base should be consumed daily, since they are essential for our health due to their high nutrient content. However, he clarifies that the higher food groups in the pyramid should not be substituted by other foods, since they are also essential to obtain the necessary nutrients that contribute to a healthy development.

The Spanish Society of Community Nutrition (SENC, 2015) reinforces Britt's postulates by emphasizing that the nutritional pyramid guides the incorporation of food products that provide essential nutrients, such as vitamins, minerals, nutraceuticals and functional foods. Thus, it is essential to consider the food pyramid as a guide to properly select foods that benefit our body by providing the necessary nutrients. According to Ropero (2022a), this pyramid is crucial because it clearly and effectively reflects consumption patterns considering food groups. It is essential to underline that not all foods are included in the pyramid. For example, natural and processed products such as milk derivatives: cheeses, yogurts, sausages, carbohydrate-rich products such as bread and sweets, as well as other common foods such as those consumed at breakfast like cookies, dairy products and other prepared and ready-to-eat products are included in the pyramid. They are classified into two groups: those that are consumed occasionally and those that are eaten out of habit. This means that not all foods provide the necessary nutrients and, in many cases, consumption responds more to habits than to a conscious and responsible diet. Therefore, it is essential that we make informed decisions when choosing food groups that favor healthy development and promote a balanced lifestyle.

The variable is dimensioned as follows: a) Carbohydrates. According to the Mexican Society of Nutrition and Endocrinology (SMNE, 2021), these are nutrients present in most foods, constituting an essential element of the human diet. They are found in common products such as cereals, their derivatives, and tubers, as well as in other foods such as honey and sugar. These nutrients are essential because they provide sufficient energy for the development of daily activities, contributing to a healthy life. b) Fruits and vegetables. The Food and Agriculture Organization of the United Nations (FAO, 2021) states that fruits and vegetables are crucial for children's development, since they provide salts, minerals, as well as antioxidants and fiber, which help eliminate toxins and prevent diseases. Therefore, it is essential that children include fruits and vegetables in their diet to ensure a balanced diet and obtain the nutrients necessary for a healthy growth. c) Proteins. According to González *et al.* (2007), although proteins do not provide as much energy as other nutrients, they are vital in the human diet. They are divided into globular and fibrous proteins, and are essential for the development and repair of muscles and tissues, as well as for the transport of substances such as lipids and minerals in the blood. Proteins are therefore essential elements of a healthy diet, especially for students. d) Fats. Ropero (2022b) points out that fats are divided into saturated and unsaturated fats. Noted for their negative effects on health, fats or lipids are indispensable nutrients. Fats are known for their ability to provide energy through their metabolism, and in children, they are crucial for the absorption of vitamins and insulation of body tissues, contributing to a healthy diet.

Regarding the healthy lunch box, the Ministry of Health (MINSA, 2022a) establishes the following characteristics: easy to prepare, with high nutritional content, fun presentation and balanced, facilitating its consumption without difficulty. It is important, taking into account the age of the children, to consider adequate portions of fruits and liquids to maintain their energy during the school day. It is also essential that lunch boxes contain the necessary nutrients to sustain the child while away from home, presented in an attractive and easy-to-consume manner.

It is important to note that, according to the Peruvian Ministry of Education (MINSA, 2022b), it is recommended that parents be conscious when preparing a healthy lunch box, ensuring that it contains the necessary nutrients and is easy to prepare. A healthy school snack should be nutritious, with an adequate balance of nutritional values, avoiding unhealthy options and foods with high levels of sugar, as these do not benefit the body. The role of parents in

the preparation of these lunch boxes is crucial, as they must ensure that they include foods with an adequate nutritional profile and avoid products with a high sugar content to prevent health problems. The purpose of a school snack is to provide the necessary energy for children to face the school day, including the essential food groups: proteins, vitamins and minerals. This ensures that it provides an effective "engine" that keeps children active until mid-morning. Good nutrition is reflected in better academic results, and providing a healthy lunch box is critical to the optimal growth and development of children throughout their lives. MINSA (2022a), in its postulates, states that parents should be committed to sending their children to school having had their respective breakfasts, but also, together with their respective school snacks. The little ones should come to their educational institutions after eating some food that can keep them full of energy until recess. We suggest some low-sugar food options and some liquids that will help them. Additionally, it points out that a solid breakfast provides energy for children to stay active and suggests food options that they should consume for adequate development. This variable is dimensioned as follows: a) Types of food. According to Martínez and Pedrón (2016), food types are essential for our life, playing a fundamental role in the integration of human beings with their natural environment. The development of an organism depends on the correct acquisition of the nutrients necessary for its survival. The authors emphasize that consuming these types of food is crucial for the proper production and development of the organism, as nutrients are essential for maintaining a robust immune system and good health. b) Healthy diet. Garcia (2015) argues that proper nutrition can only be achieved through a balanced diet, which provides the necessary energy and development. This balanced diet functions as a dietary guide, involving the inclusion of a variety of foods in correct proportions to ensure that the body receives the sufficient amount of energy to develop properly. The diet should include nutritious foods that allow the individual to perform his or her physiological functions optimally. According to Garcia, good healthy eating depends on a balanced diet that contains the right amount of nutrients for an integral development. Finally, c) Healthy hygiene. The United Nations Children's Fund (UNICEF, 2005) emphasizes that, like personal hygiene practices, proper food hygiene is crucial for staying healthy. Improper handling of these foods can lead to infections in the body, such as the proliferation of bacteria. In addition, improper use of chemicals can contaminate food, making it harmful. Therefore, the importance of proper food cleaning and handling is emphasized to avoid illnesses caused by bacteria, fungi or other contaminants due to inadequate practices before consumption.

## METHODOLOGY

The approach of this research is descriptive, since it is intended to represent reality within a specific temporal and spatial context. This approach allows us to identify how the independent and dependent variables interact, thus facilitating the description of situations related to the improvement of healthy lunch boxes in preschool children. The study will also be responsible for collecting and detailing information on healthy lunch boxes and the food pyramid to be used, with the objective of gathering all relevant references.

Likewise, the research has an applicative character, since it seeks to put into practice the knowledge acquired to solve problems that affect community life, with the purpose of identifying specific events. The study, of a descriptive-applicative nature, begins by investigating the proposed topic and explaining the hypothesis, which is presented in the introduction, adjusting the sources related to healthy lunch boxes in three-year-old children. This approach will allow examining and measuring specific variables, as well as determining the method of data collection. Data were collected highlighting the reality of students in the classroom, especially in relation to poor eating habits. The research highlights its descriptive nature through inquiry, adopting an applicative approach by focusing on the use of the food pyramid to improve healthy lunch boxes.

The design used in this research is pre-experimental, as proposed by Chávez *et al.* (2020), who indicate that this type of design is common in field work with a single group. The purpose is oriented to the improvement of healthy lunch boxes using the food pyramid. The pre-experimental approach is based on information gathering and data collection to

identify problems related to students' lunch boxes, and finally, to use the food pyramid to drastically improve its elaboration for the benefit of children.

According to Hernández *et al.* (2013), the research follows a quantitative approach, characterized by data collection that answers the research questions and formulates a specific hypothesis. This approach is based on numerical measurement and statistical analysis to identify patterns of behavior in the community. The authors stress that a quantitative researcher must review previous studies before developing a theoretical framework and formulating a hypothesis, which is verified by structured research methods. In this context, the quantitative approach is applied to examine the problem of healthy eating in three-year-old children and the implementation of the food pyramid as an intervention to improve healthy lunch boxes at the Nuevo Amanecer Educational Institution.

The study population included 46 children, from which 14 three-year-old students were selected as a sample.

In terms of data collection techniques and instruments, Díaz (2011) emphasizes the relevance of observation to ensure the effectiveness of the research process and to collect accurate data. Fabbri (2020) suggests that observation, complemented with a checklist, allows detailed information to be obtained on the variables and dimensions of the study, thus facilitating the evaluation of the dependent variable. Romo (2015) describes the checklist as an efficient tool for evaluation in research, providing clear criteria that are scored using a scale of binary options.

For data analysis, Wynarczyk (2001) emphasizes the need to describe and organize the information in order to draw well-founded conclusions. In this study, the SPSS software will be used to perform descriptive and inferential analyses, using techniques such as standard deviation and the calculation of percentages. The results will be presented using graphs that will emphasize the most relevant information. Veiga *et al.* (2020) argue that statistical inference offers essential tools for the population to be evaluated accurately and systematically, also allowing the evaluation of hypotheses through specific tests.

## RESULTS

Comparison of pre-test and post-test dimensions.

**Table 1.**
*Healthy lunch box*

| | PRE TEST | | POST TEST | |
|---|---|---|---|---|
| **Category** | **N** | **%** | **N** | **%** |
| Low | 3 | 21,43 | 0 | - |
| Medium | 9 | 64,29 | 0 | - |
| High | 2 | 14,29 | 14 | 100 |
| Total | 14 | 100 | 14 | 100 |

Source: Prepared by the authors

The pre-test showed that 21.43% of the children had a low level of nutritional intake. On the contrary, after applying the ''Nutri Lonchera" program, the post-test showed that 100% of the children carried a lunch box with food according to its nutritional content.

**Table 2.**
*Types of food*

| | PRE TEST | | POST TEST | |
|---|---|---|---|---|
| **Category** | **N** | **%** | **N** | **%** |
| Low | 7 | 50,00 | 0 | - |
| Medium | 6 | 42,86 | 0 | - |
| High | 1 | 7,14 | 14 | 100 |
| Total | 14 | 100 | 14 | 100 |

It is evident in relation to the pre-test that 50% of the students are at a low level in relation to the food types dimension. A comparison with the post-test shows a significant improvement, since after 16 workshops applied to the children, 100% are at a high level with respect to knowledge and use of the types of food.

**Table 3.**
*Healthy diet*

| | PRE TEST | | POST TEST | |
|---|---|---|---|---|
| **Category** | **N** | **%** | **N** | **%** |
| Low | 7 | 50,00 | 0 | - |
| Medium | 6 | 42,86 | 0 | - |
| High | 1 | 7,14 | 14 | 100 |
| Total | 14 | 100 | 14 | 100 |

Preliminary results show that 50% of the children who participated in the study were at a low level with respect to a healthy diet, because they did not consume different types of fruits such as fresh or dried fruits, as well as few foods based on vegetables, grains and milk derivatives. However, the post-test shows a strong improvement, since 100% of them have a healthy diet, due to the effectiveness of the workshop developed in 16 sessions.

**Table 4.**
*Hygiene*

| | PRE TEST | | POST TEST | |
|---|---|---|---|---|
| **Category** | **N** | **%** | **N** | **%** |
| Low | 2 | 14,29 | 0 | - |
| Medium | 12 | 85,71 | 0 | - |
| High | 0 | - | 14 | 100 |
| Total | 14 | 100 | 14 | 100 |

The results of the pre-test showed that 14% of the students were at a low level in relation to Hygiene, because the students did not wash their fresh fruits and vegetables. Compared to the post-test, there was a 100% improvement in the Hygiene dimension, because the students obtained significant results throughout all the workshops.

**Table 5.**
*Analysis of the food pyramid relationship for healthy lunch boxes for three-year-old children at the Nuevo Amanecer Educational Institution, Pomalca, 2022.*

| **Paired samples test** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Paired differences** | | | | | | | | | |
| | | | | | **95% confidence interval of the difference** | | | | |
| | | **Mean** | **Desv. Deviation** | **Desv. Average error** | **Inferior** | **Superior** | **t** | **gl** | **Sig. (bilateral)** |
| Par 1 | Pretest - Postest | -9,071 | 2,674 | ,715 | -10,615 | -7,528 | -12,695 | 13 | ,000 |

Considering the significance value (0.000), which was less than $\alpha$=0.05, $H_0$ is rejected.

So, it is established: If we apply a program based on the food pyramid for healthy lunch boxes, then the good nutrition improves through a nutritious lunch box in three-year-old students.

## DISCUSSION

The purpose of this research was to analyze whether the implementation of the food pyramid improves the quality of healthy lunch boxes for three-year-old children at the Nuevo Amanecer Educational Institution, Pomalca, during the year 2022. The study evaluated the lunch boxes in terms of types of food, healthy diet and hygiene. The research highlights the need for workshops because it was observed that many children in the three-year-old classroom had deficiencies in their lunch boxes. The workshops were designed to encourage the inclusion of nutritious foods, with protein and vitamins, and to make lunch boxes attractive and varied. After the initial assessment (pre-test), which showed that many students had low-quality lunch boxes, 16 workshops were conducted. The comparison between pre-test and post-test showed a significant improvement, confirmed by a Student's t-test for related samples, with a p-value = 0.000, indicating that the program based on the food pyramid had a positive impact on the quality of the lunch boxes.

In the first specific objective, the state of healthy lunch boxes in three-year-old children of the Nuevo Amanecer Educational Institution, Pomalca, was evaluated. The results indicated that 14% of the children had lunch boxes at a high level, 64% at a medium level, and 22% at a low level, due to the lack of nutritionally adequate food. These results are consistent with the findings of Chambilla and Condori (2018) and Anccasi and Agüero (2021), who also reported high levels of low-quality lunch boxes and low caloric intake, and align with the recommendations of the Ministry of Health (MINSA, 2022a) for nutritious and balanced school lunch boxes.

For the second specific objective, it was possible to design and validate a program based on the food pyramid to improve healthy lunch boxes. The program, called "Nutri lonchera", included 16 face-to-face workshops that used diverse materials such as stories, musical instruments, and other didactic resources. The validation of the program through expert judgment indicated its feasibility for implementation, in contrast to the study by Ramírez *et al.* (2019), which did not have such an evaluation.

In relation to the third specific objective, the "Nutri lonchera" program was implemented, consisting of 16 activities that stimulated children's participation and creativity, as well as parents' interest. Activities such as the "Good nutrition traffic light" and "Active mothers building the food pyramid" improved the quality of the lunch boxes by providing mothers with valuable information on the preparation of nutritious food. Compared to Valero and Lascano's (2019) program, which also involved the participation of parents and teachers in improving child nutrition, this program proved to be effective in promoting healthy eating habits and preparing nutritious school lunch boxes, contributing to a preventive strategy for food-related diseases.

In relation to the fourth specific objective, a comparison of the level of healthy lunch boxes in terms of various dimensions was carried out, using data obtained from the pre-test and post-test of the food pyramid program implemented in three-year-old children of the Nuevo Amanecer educational institution, Pomalca, 2022. In the pre-test, it was observed that in dimension 1: Types of food, 50% of the students evaluated were at a low level. In dimension 2: Healthy diet, 50% of the students also had a low level, and in dimension 3: Hygiene, 14% of the students had a low level. This indicates a scarce presence of building, regulating and energetic foods and an excess of saturated foods in the students' lunch boxes. After the implementation of the food pyramid program, the post-test results showed a significant improvement in the dimensions evaluated. In dimension 1: Types of food, the low level was reduced to 0%. In dimension 2: Healthy diet, it was also reduced to 0%. According to Cconislla et al. (2019), in their research, the pre-test revealed that 22% of the students had a high level of knowledge about healthy lunch boxes, 24% at medium level and 54% at low level. In contrast, the post-test showed 84% at high level, 16% at medium level and 0% at low level, indicating a marked improvement in knowledge about healthy lunch boxes.

In accordance with the fifth specific objective, a contrast of the results obtained from the implementation of the intervention program was carried out through hypothesis testing of the program based on the food pyramid for healthy lunch boxes in three-year-old children of the Nuevo Amanecer educational institution, Pomalca 2022. For this contrastation, two hypothesis tests were considered. First, a normality test was performed, where the null hypothesis was rejected, since the significance value (0.569) is higher than 0.050. Subsequently, the second test, known as Student's t-test, was carried out, in which a significance value (0.000) lower than $\alpha$=0.05 was obtained, leading to rejecting the null hypothesis and accepting the alternative hypothesis. This suggests that the implementation of a program based on the food pyramid for healthy lunch boxes improved the nutrition of three-year-old students at the Nuevo Amanecer Educational Institution, Pomalca, 2022. This finding is related to that presented by Nuñez (2019), who contrasted his hypothesis using Pearson's correlation coefficient (r), which turned out to be 0.74, indicating a high correlation. In addition, the t-statistic was greater than the one-tailed critical t-statistic ($P \leq 0.05$); that is, 8.66 > 6.37, leading to accept the alternative hypothesis and reject the null hypothesis.

Limitations were identified in this research, especially in the last two workshops conducted with the mothers of 3-year-old students at the Nuevo Amanecer Educational Institution, Pomalca. The mothers did not have the necessary time to complete the activities due to work commitments. It is essential that mothers dedicate adequate time to activities related to their children's health, especially on topics as relevant as children's healthy living.

Montenegro (2020) also proposes to reflect on the quality of healthy lunch boxes for students under 5 years of age in an educational institution. New strategies are suggested that promote the adoption of corrective measures that benefit preschool children, ensuring the quality of the nutrients they receive in their lunch boxes. Furthermore, additional studies linking public health concerns with hemoglobin levels are suggested to contribute to the search for solutions that involve the active participation of parents and teachers in the education about healthy lunch boxes.

In conclusion, it is recommended that the teachers of the Educational Center continue to organize workshops on healthy lunch boxes, using the food pyramid as a tool to promote healthy lifestyle habits in preschool children.

## CONCLUSIONS

Regarding the general objective, it has been concluded that the application of the food pyramid has had a favorable impact on the healthy lunch boxes of three-year-old children at the Nuevo Amanecer Educational Institution. Positive results were evidenced in food variety, diet quality and hygiene practices.

With respect to the specific objective of evaluating the state of the healthy lunch boxes of three-year-old children, an unsatisfactory level was found. To remedy this situation, workshops were implemented to help children's parents prepare healthy lunch boxes with a high nutritional content.

In relation to the objective of designing and validating a food pyramid program to improve healthy lunch boxes in three-year-old children, it is concluded that it is essential to develop 16 activities linked to the food pyramid, as these are essential for proper nutrition. This program was reviewed by specialists, who confirmed its relevance and effectiveness.

Based on the objective of implementing a program based on the food pyramid, it is concluded that the "Nutri lonchera" workshop, carried out with 14 children, was very well received. During the 16 activities, there was a remarkable participation, creativity, imagination, enthusiasm and development on the part of the children. Therefore, it is essential to broaden their knowledge about nutritious foods that they can include in their lunchboxes. Each activity was designed using a variety of resources, including didactic material and practical experiences.

When comparing the results of the pre-test and post-test on the implementation of the "Nutri lonchera" workshop in three-year-old children, a significant improvement was observed in the dimensions evaluated, going from a low level in the pre-test to a high level in the post-test in most

of the students. Thus, it is essential to establish good nutritional practices in infants and to detail, through a food pyramid, the needs of students regarding the foods they should consume to maintain good health.

As for the hypothesis testing, it is concluded that the null hypothesis is rejected, indicating that the application of a program based on the food pyramid for healthy lunch boxes improves children's nutrition.

**Authors' contribution:**

**Mary Cielo Larios Fiestas:** Theoretical elements, analysis, methodology, resources, initial and final writing.

**Mercy Elizabeth Ordoñez Velásquez:** Theoretical elements, analysis, methodology, resources, initial and final writing.

**Maria Pilar Tirabanti Quiroz:** Data curation, analysis, validation and final writing.

**Maritza Cristina Figueroa Chambergo:** Data curation, analysis, methodology, validation and final writing.

**Financiación:** Without financing.

**Conflicto de intereses:** No conflicts of interest.

## REFERENCES

Anccasi, C.y Agüero, C. (2021). *Aporte nutricional de las loncheras y su relación con el estado nutricional en niños preescolares de 3 a años de una Institución Educativa* [Tesis de pregrado, Universidad Peruana Unión]. https://repositorio.upeu.edu.pe/bitstream/handle/20.500.12840/4429/Sara_Tesis_Licenciatura_2021.pdf?sequence=4&isAllowed=y

Britt. (1973). *Pirámide nutricional ¿estrategia o política?* https://www.yahoraquecocino.com/piramide-nutricional-estrategia-o-politica/

Díaz, L. (2011). *La observación. Facultad de psicología*. http://www.psicologia.unam.mx/documentos/pdf/publicaciones/La_observacion_Lidia_Diaz_Sanjuan_Texto_Apoyo_Didactico_Metodo_Clinico_3_Sem.pdf

Fabbri, M. (2020). *Las técnicas de investigación: la observación*. http://institutocienciashumanas.com/wp-content/uploads/2020/03/Las-t%-C3%A9cnicas-de-investigaci%C3%B3n.pdf

FAO. (2021). *Año internacional de las frutas y verduras*. https://www.fao.org/3/cb2395es/cb2395es.pdf

Cconislla, L., Toribio, J., Urbano, J. (2019). *Promoción de loncheras saludables para prevenir la anemia en niños de 3 - 5 años del Centro Estudiantil COMPASSIÓN - Saños Chaupi, Huancayo, 2019*. [Bachiller en Enfermería]. https://repositorio.continental.edu.pe/bitstream/20.500.12394/11428/3/IV_FCS_504_TI_Cconislla_Toribio_Urbano_2019.pdf

Chambilla, J. y Condori, P. (2018). *Influencia de la calidad de las loncheras en el rendimiento escolar de los niños y niñas de la Institución Educativa Inicial Gorriones del Distrito de Cerro Colorado-Arequipa, 2017* [Tesis de pregrado, Universidad Nacional San Agustín - Arequipa]. Repositorio UNAS. http://repositorio.unsa.edu.pe/handle/UNSA/6931

Chávez, S., Esparza, O. y Riovelasco, L. (2020). *Diseños preexperimentales y cuasiexperimentales aplicados a las ciencias sociales y la educación*. Enseñanza e Investigación en Psicología.2(2),167-178. https://revistacneip.org/index.php/cneip/article/view/104

García, A. (2015). *Propuesta de un programa de alimentación saludable y actividad física para la comunidad educativa. estudio realizado en centros educativos privados y públicos, Guatemala, 2015. [Tesis de grado].* http://recursosbiblio.url.edu.gt/tesiseortiz/2015/09/15/Garcia-Andrea.pdf

Garibaldi, I. (2022). *Por qué la pirámide alimentaria que conoces está desfasada y cómo debería ser la verdaderamente saludable*. Revista Objetivo y bienestar https://www.objetivobienestar.com/alimentacion-saludable/por-piramide-alimentaria-conoces-esta-desfasada-como-deberia-ser-verdaderamente-saludable_52468_102/1012754.html

González, L., Téllez, J., Sampedro, J. y Nájera, H. (2007). Las proteínas en la nutrición. *Revista de Salud Pública y Nutrición, 8*(2), 1-7. https://www.medigraphic.com/pdfs/revsalpubnut/spn-2007/spn072g.pdf

Hernández, S., Collado, R. y Baptista, C. (2013). *Metodología de la investigación*. http://metodos-comunicacion.sociales.uba.ar/wpcontent/uploads/sites/219/2014/04/Hernandez-Sampieri-Cap-1.pdf

Martínez, A. y Pedrón, C. (2016). *Conceptos básicos en alimentación. Universitario La Moraleja*. https://www.seghnp.org/sites/default/files/2017-06/conceptos-alimentacion.pdf

MINEDU (2018). *Aprendiendo a alimentarnos sanamente*. https://www.minedu.gob.pe/politicas/docencia/pdf/cartilla-nutricion-2018.pdf

MINEDU. (2022). *Desnutrición crónica afectó al 11,5% de la población menor de cinco años*. https://m.inei.gob.pe/media/MenuRecursivo/noticias/nota-de-prensa-no-075-2022-inei_1.pdf

MINSA. (2022a). *Lonchera escolar saludable contribuye a un buen rendimiento físico e intelectual del niño en tiempos de pandemia*. https://www.gob.pe/institucion/minsa/noticias/587530-minsa-lonchera-escolar-saludable-contribuye-a-un-buen-rendimiento-fisico-e-intelectual-del-nino-en-tiempos-de-pandemia

MINSA. (2022b). *Recomendaciones para preparar una lonchera saludable*. https://andina.pe/agencia/noticia-retorno-a-clases-minsa-ofrece-estas-recomendaciones-para-preparar-una-lonchera-saludable-882246.aspx

Montaleza, D., Torres, M. y Acosta, M. (2022). Educación Alimentaria y Nutricional en infantes de 4 a 5 años paralelo A del "CEI Rita Chávez de Muñoz" Cuenca –Ecuador [Trabajo de Integración Curricular previo a la obtención del título de Licenciado/a en Ciencias de la Educación Inicial, Universidad Nacional de Educación]. http://repositorio.unae.edu.ec/bitstream/56000/2756/1/Educaci%C3%B3n%20Alimentaria%20y%20Nutricional%20en%20infantes%20de%204%20a%205%20a%C3%B1os%20paralelo%20A%20del%20CEI%20Rita%20Ch%C3%A1vez%20de%20Mu%C3%B1oz%20Cuenca%20-Ecuador.pdf

Montenegro, M. (2020). *Estado nutricional de los niños preescolares y la calidad de las loncheras saludables de la I.E. Sagrado Corazón de María n° 10007 del distrito de Chongoyape, 2019*[tesis de pregrado]. https://repositorio.uss.edu.pe/handle/20.500.12802/7762

Morán, L. (2019). *Recomendaciones generales del endocrinólogo para una alimentación saludable*. https://endocrinologia.org.mx/pdf_pacientes/22_Recomendaciones_alimentacion_saludable.pdf

Nuñez, A. (2019). *Conocimientos y la preparación de loncheras saludables en madres de niños de 4 años de Educación Inicial de la institución educativa 079 "Virgen Morena de Guadalupe", la Pradera,2018-2019* [Tesis de pregrado]. https://repositorio.uss.edu.pe/bitstream/handle/20.500.12802/6539/Nu%C3%B1ez%20Vallejos%20Alondra%20Paola.pdf?sequence=1&isAllowed=y

OMS. (2018). *Lonchera saludable para el regreso a clases presenciales*. https://www.laopinion.com.co/salud/lonchera-saludable-para-el-regreso-clases-presenciales

Ramírez, Z., Peñaloza, N. y Díaz, M. (2019). *Identificando hábitos alimenticios saludables a través de las loncheras escolares en los niños y las niñas del grado transición del jardín infantil el clan de patolin* [Tesis de pregrado, Universidad del Tolima]. http://repository.ut.edu.co/handle/001/349/browse?type=author&order=ASC&rpp=40&value=Gil+Pe%C3%B1aloza%2C+Nelly

Romo, J. (2015). La lista de cotejo como herramienta para la lectura crítica de artículos de investigación publicados. *Rev Enferm Inst Mex Seguro Soc*, 23(2), 109-13. https://www.medigraphic.com/pdfs/enfermeriaimss/eim-2015/eim152h.pdf

Ropero, A. (2022a). *Pirámide de la alimentación saludable*, Universidad Miguel Hernández de Elche. http://badali.umh.es/assets/documentos/pdf/artic/piramide.pdf

Ropero, A. (2022b). Grasas (lípidos). *El gran almacén de energía*. Universidad Miguel Hernández de Elche. http://badali.umh.es/assets/documentos/pdf/artic/grasa.pdf

Sociedad Española de Nutrición Comunitaria (2015). *Pirámide de la Alimentación Saludable*. https://www.nutricioncomunitaria.org/es/noticia/piramide-de-la-alimentacion-saludable-senc-2015

Sociedad Mexicana de Nutrición y Endocrinología (2021). *¿Qué son los carbohidratos?* https://endocrinologia.org.mx/pdf_pacientes/22_Recomendaciones_alimentacion_saludable.pdf

UNICEF (2005). *Los hábitos de higiene*. https://www.unicef.org/venezuela/media/1186/file/Los%20h%C3%A1bitos%20de%20higiene.pdf

UNICEF. (2018). *Panorama de la seguridad alimentaria y nutrición*. https://www.unicef.org/lac/media/4261/file/PDF%20Panorama%20de%20la%20seguridad%20alimentaria%20y%20nutricional%202018.pdf

Valero, G.y Lascano, E. (2019). *Calidad de la lonchera escolar y su relación con el estado nutricional en niños preescolares de 3 a 5 años de escuela de Educación básica España, pueblo viejo los ríos, segundo semestre* [Tesis de pregrado, universidad técnica de Babahoyo]. http://dspace.utb.edu.ec/handle/49000/5926

Veiga, N., Otero, L. y Torres, J. (2020). *Reflexiones sobre el uso de la estadística inferencial en investigación didáctica. Investigaciones y experiencias*,7(2),1-10. http://www.scielo.edu.uy/pdf/ic/v7n2/2301-0126-ic-7-02-94.pdf

Wynarczyk, H. (2001). *Orientaciones técnicas, especialmente para niveles de licenciatura y master en áreas de ciencias de la administración y ciencias sociales*. Investigador de sociología de las religiones evangélicas en la Argentina. http://www.cyta.com.ar/ta0102/research.htm