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A Proposed Training Program for Developing Healthy Food Awareness among Kindergarten Children

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Abstract

This study investigates the effectiveness of a proposed training program on enhancing awareness of healthy food choices among kindergarten children. The program focused on educating children about diverse food groups, selecting balanced meals, and adopting healthy snacking habits. Utilizing an experimental methodology, the study was conducted on a sample of 50 children aged 5–6 years (second-level kindergarten) at Al Hussein Ibn Ali School in Sibrbay, Tanta, Gharbia Governorate, Egypt. The sample was divided into an experimental group (n = 25) and a control group (n = 25). A pre-test scale measuring children's awareness of healthy food concepts was administered to both groups. The training program was subsequently implemented exclusively for the experimental group. A post-test scale was then administered to both groups to assess changes in awareness. The findings revealed a statistically significant difference ($p < .05$) in the mean scores of the experimental group compared to the control group, indicating the program's effectiveness in enhancing children's understanding of healthy nutrition.

Keywords: Training Program, Healthy Food, Kindergarten, Nutrition Education, Child Development

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Introduction

The kindergarten stage is widely recognized as a critical period in human development, as it lays the foundation for physical, cognitive, and social growth. Health during this stage significantly influences a child's future well-being, shaped by behavioral and cultural factors acquired through interactions with family, society, and the environment. Proper nutrition is a cornerstone of healthy development, necessitating the provision of adequate quantities and varieties of food containing essential nutrients. Early education on nutrition is vital to instill lifelong healthy eating habits and prevent malnutrition-related disorders (Kabous, 2023, p. 42).

Kindergarten and Healthy Food

Kindergarten represents an optimal stage for introducing children to the principles of healthy eating and nutrition.According to (Kabous, 2023, p. 42),this period is ideal for fostering positive dietary habits that support physical and mental development while mitigating risks associated with malnutrition, immune deficiencies, and developmental delays. Research by Ibrahim (2023) underscores the limited ability of kindergarten children to independently select nutritious foods, highlighting the need for structured nutrition

education. Such education enables children to recognize the importance of diverse food groups and make informed dietary choices.

The Food and Agriculture Organization (FAO) has emphasized widespread societal ignorance regarding appropriate food selection and balanced meal preparation. Many individuals lack awareness of the nutritional components of food and their physiological benefits (Amari, 2022, p. 90). This underscores the necessity of nutrition education across all societal strata, including kindergarten-aged children. Early intervention can cultivate healthy dietary habits, contributing to long-term health outcomes.

Kindergarten is a pivotal educational stage, distinct in its focus on holistic child development. It employs a unique educational philosophy aimed at fostering psychological, physical, and social growth. This stage emphasizes the importance of nurturing healthy habits; ensuring children develop a foundation for lifelong well-being (Harriet & Vnnda, 2024, p. 43)

The importance of food for kindergarten child Right growth:

Food plays a pivotal role in the growth and development of kindergarten-aged children, providing the energy required for both internal physiological processes and external physical activities. The human body necessitates a comprehensive array of nutrients to support rapid growth across all developmental stages. Proper nutrition ensures the body receives balanced, healthful meals, enabling it to perform vital functions effectively (Marwan, 2023, p. 81). This assertion is supported by the findings of Tali and Belha (2023), who emphasized the critical role of meals in fostering healthy nutritional habits during the kindergarten years. Their study highlighted the necessity of structured meal periods to instill lifelong dietary practices that promote optimal growth and development.

Psychological Need for Food

The child's relationship with food is deeply intertwined with psychological factors, including taste preferences, food preparation methods, and the emotional context of

mealtime. Food must not only meet nutritional requirements but also align with the child's psychological needs, such as the desire to please parents or seek affection. The psychological state of the child significantly influences food choices, with mothers playing a central role in shaping these preferences through meal preparation (Abo Gaafer, 2022, p. 111). This perspective is corroborated by Alkandary (2024), who investigated the relationship between maternal nutritional behavior and the dietary habits of kindergarten children in Kuwait. The study, conducted on a sample of 30 children and their mothers, revealed a statistically significant correlation ($p < .05$) between mothers' nutritional practices and their children's healthy eating habits. These findings underscore the importance of parental influence in establishing early nutritional behaviors.

Social Need for Food

The social environment surrounding a child profoundly impacts their nutritional needs and behaviors. Key factors include parental nutritional knowledge, the child's position within the family hierarchy, and the presence of role models. Parents who maintain close proximity to their children exert a substantial influence on their dietary awareness and behaviors (Michle, 2023, p. 88). This aligns with the study by (Abu Bakr 2024), which explored the development of nutritional awareness concepts using Wetly's problem-based teaching Model. The study demonstrated the efficacy of this approach in enhancing kindergarten children's understanding of nutrition, further emphasizing the role of social and educational interventions in shaping dietary habits.

Physical Need for Food

Food is integral to the physical development and maintenance of the human body, serving as a primary source of energy and facilitating the repair and regeneration of damaged cells. Adequate nutrition enhances cognitive focus and supports overall physiological functions. A balanced meal must contain sufficient quantities of essential nutrients to sustain growth and activity levels (Salama, 2020, p. 62).

During childhood and adolescence, food plays a critical role in cellular construction and development. Proteins, in particular, are essential for the formation of new cells, which are vital for growth during these stages. Additionally, food supplies the energy required for metabolic processes, maintaining the body's core temperature at 37°C, and enabling physical movement. This energy is derived from the metabolic breakdown of fats and carbohydrates.

Furthermore, food provides the body with vitality and supports the optimal functioning of various systems, including the endocrine system. Vitamins and minerals are indispensable for maintaining cellular balance and ensuring the proper operation of bodily functions. These nutrients are crucial for the health of all family members, emphasizing the importance of instilling balanced dietary habits in children. Proper nutrition encourages moderation in food consumption, fostering a healthy relationship with eating (Ben-Joseph, 2023, p. 29).

This perspective is reinforced by the study of Alsaeid (2024), which highlighted the pivotal role of teachers in cultivating a healthy nutritional culture among kindergarten children. The study underscored the necessity of collaborative efforts

between kindergarten institutions and parents to support children's dietary education and promote long-term nutritional awareness.

The Relationship between Nutrition and Health

Nutrition is a cornerstone of proper growth and development throughout the human lifespan. Its influence begins in the earliest stages of life, even before birth, and continues to shape health outcomes across all developmental phases. The significance of nutrition is underscored by several fundamental principles, including the rapid growth rate observed during childhood, particularly during the embryonic stage and the first months and years of life.

During these critical periods, children require essential nutrients such as calcium, iron, proteins, and fats to support growth and bolster immunity against diseases. Nutritional intake during both the prenatal and postnatal stages directly impacts a child's physical and immunological development (Karin, 2023, p. 369). The proverb "a healthy mind in a healthy body" underscores the importance of nutritional awareness, which encompasses understanding the sources, functions, and caloric requirements of various nutrients at different life stages. Nutrition not only prevents disease but also fosters the adoption of healthy dietary habits (Swadenerhp, 2024, p. 131).

The Foundation of Healthy Nutrition for Kindergarten Children

According to (Abd Al Majeed, 2023, p. 129), healthy nutrition is a critical determinant of proper physical development in children. It involves adhering to appropriate food preparation methods to preserve essential nutrients, such as vitamins and minerals. For instance, prolonged soaking or improper cooking can degrade heat-sensitive nutrients like vitamin C. Poor dietary practices can lead to gastrointestinal disorders, as children's digestive systems are often unable to process complex fats, particularly when consumed in excess

(Evelen, 2022, p. 52) states that special attention must be given to the child's breakfast and other meals, ensuring they contain adequate amounts of calcium, iron, protein, and other growth-promoting nutrients. The rapid growth rate during early childhood necessitates a nutrient-dense diet to support development.

Healthy Food

Healthy food is defined as food that meets the daily nutritional requirements essential for optimal bodily function across all age groups. It serves as the foundation for good health and disease prevention (Charles, 2022, p. 70). Strategies to promote healthy eating among children include fostering self-confidence, teaching new dietary habits, and involving children in meal planning and preparation. Similarly, (Anita, 2024, p. 98) states that educational activities that encourage discussions about the nutritional value of foods and participation in cooking can enhance children's understanding of healthy eating

Children should be provided with diverse, nutritious food options that exclude high-fat and high-sugar items. This approach helps children develop the skills to make informed food choices (Abdallah, 2023, p. 40). Along the same lines, (Harris, 2021, p. 102) asserts that parents play a pivotal role in modeling healthy eating behaviors. They should demonstrate positive dietary habits, avoid using food as a punishment

or reward, and create a supportive environment that encourages children to explore new foods without pressure

Parents and caregivers should also introduce new foods alongside familiar favorites, choose appropriate meal times, and avoid punitive reactions when children refuse certain foods. Over time, children are likely to adopt healthier eating habits when exposed to consistent, positive reinforcement and education about the connection between food and health (Erfan, 2024, p. 138).

This perspective is supported by the study of Al Raey (2023), which examined the practices of kindergarten teachers during children's meal times in Tartus nurseries. Using a descriptive methodology, the study found that teachers' practices and their role in promoting nutritional awareness among children were rated as average. These findings highlight the need for enhanced training and support for educators to effectively foster healthy eating habits in kindergarten settings.

The Composition of Integrated Nutritional Meals

A child requires a balanced and varied diet to support natural growth and development. No single food can provide all the essential nutrients needed for optimal health, necessitating daily dietary diversity to ensure the child receives all necessary nutritional elements. A balanced meal typically includes the following components:

1. **Proteins**: Essential for growth and repair, proteins can be sourced from animal products such as meat, chicken, eggs, milk, cheese, and yogurt, as well as plant-based sources like legumes (e.g., beans and lentils).
2. **Vitamins and Minerals**: Found abundantly in vegetables and fruits, particularly those consumed raw, as cooking can degrade heat-sensitive nutrients like vitamin C. These foods are also rich in dietary fiber, which aids digestion and prevents constipation.
3. **Carbohydrates**: Primary sources include bread, pasta, potatoes, and sweet potatoes, which provide energy for daily activities.
4. **Fats**: While not explicitly mentioned here, healthy fats are also crucial for energy and nutrient absorption.

A diet incorporating appropriate portions of these food groups ensures nutritional balance and supports overall health (Fletcher, 2023, p. 87). This principle is visually represented in the nutritional pyramid (Figure 1).

Figure 1: *Nutritional Pyramid*

The Ideal Meals for Kindergarten Children

Kindergarten children require structured meal plans to meet their nutritional needs. The following outlines the main meals and their components:

1. **Breakfast**:
   - **Timing**: Typically between 7:00 and 8:00 AM.
   - **Importance**: Provides energy and activity for the day.
   - **Components**: Light yet nutritious, including bread, jam, cheese, eggs, cooked beans, vegetables, and fruits.
2. **Lunch**:
   - **Timing**: Midday, usually between 12:00 and 1:00 PM.
   - **Importance**: A primary meal supplying carbohydrates and proteins.
   - **Components**: Meat or fish, rice or pasta, vegetables, and fruits. Meat can be substituted with legumes for variety.
3. **Dinner**:
   - **Timing**: Evening, typically between 6:00 and 7:00 PM.
   - **Importance**: A light, easily digestible meal to conclude the day.
   - **Components**: Similar to breakfast, including bread, jam, a cup of milk or yogurt, and optional fruits or vegetables.

Each meal should incorporate all essential nutritional elements to ensure balance and adequacy (Shaw, 2022, p. 62).

Meal Periods

It is recommended to space meals 2–3 hours apart to allow for proper digestion and maintain energy levels throughout the day. A sample timetable for meal periods is as follows:

- **Breakfast**: 7:00–8:00 AM
- **Mid-Morning Snack**: 10:00–10:30 AM
- **Lunch**: 12:00–1:00 PM
- **Afternoon Snack**: 3:00–3:30 PM
- **Dinner**: 6:00–7:00 PM

This schedule ensures consistent energy supply and supports healthy eating habits.

Table 1*Meal Periods for Kindergarten Children*

Meal Period	Meal	Number
8:00–10:00 AM	Breakfast	1
1:00–4:00 PM	Lunch	2
7:00 PM	Dinner	3

Note. Adapted from *Nutritional Guidelines for Early Childhood*, by Brian, 2023, p. 32.

Explanation of Meal Periods

The meal schedule for kindergarten children is designed to ensure consistent energy levels and support healthy eating habits. The table above outlines the recommended timing for the three main meals:

1. **Breakfast**: Served between 8:00 and 10:00 AM, this meal provides the necessary energy to start the day.

2. **Lunch**: Served between 1:00 and 4:00 PM, this meal supplies essential nutrients to sustain activity and growth throughout the afternoon.
3. **Dinner**: Served at 7:00 PM, this light meal aids digestion and prepares the child for restful sleep.

This structured approach to meal timing ensures that children receive adequate nutrition at regular intervals, promoting optimal physical and cognitive development (Brian, 2023, p. 32).

Snacks: Importance and Types

Importance of Snacks

Snacks play a vital role in complementing the main meals for kindergarten children. Due to their small stomach capacity and high energy expenditure, children often consume limited quantities of food during main meals and quickly deplete their energy reserves. Snacks help bridge the gap between meals, ensuring a continuous supply of nutrients and energy without overburdening the child's digestive system. They also fulfill a psychological need, providing comfort and satisfaction without being tied to social or emotional cues (Al Kandery, 2022, p. 28).

Types of Snacks

1. **Harmful Snacks**: These include candies, fatty foods, ice cream, chips, and sweets. Such snacks are typically high in sugar and unhealthy fats, which can contribute to various health issues, including obesity, dental problems, and chronic diseases when consumed in excess (Legrand, 2023).
2. **Useful Snacks**: Healthy snack options include fresh fruits (e.g., apples, bananas, grapes), fresh vegetables (e.g.,

cucumbers, carrots), fresh juices, and dairy products like milk or yogurt. Children aged 4–6 years require three main meals supplemented by 2–3 small snacks daily. It is essential to avoid preserved fruits, canned juices, and carbonated beverages like cola, as these often contain added sugars and lack nutritional value (Moustafa, 2022, p. 48).

The Snack Scale

Effective snacks for children should meet the following criteria:

- **Appealing and Tasty**: Snacks should be visually attractive and palatable to encourage consumption.
- **Nutritious but Not Filling**: Snacks should provide essential nutrients without causing satiety, ensuring the child remains hungry for main meals.
- **Variety**: Snacks should vary daily to maintain interest and provide a range of nutrients.
- **Growth Support**: Snacks contribute significantly to a child's nutrition, supporting rapid growth and development during early childhood (Gootman, 2022, p. 73).

Methodology of the study

Statement of the Problem

The need to address the research problem emerged from an exploratory study conducted on the dietary habits of children in the preschool stage. The study

revealed that over 50% of the foods consumed by children are typical family meals prepared at home, many of which lack nutritional balance. Additionally, shifts in family and child nutrition patterns, particularly in recent years, have led to a decline in the preparation of meals tailored to meet the nutritional needs of children. This has been accompanied by an increased reliance on chips, sweets, and unhealthy snacks, contributing to a rise in malnutrition-related diseases. These findings underscore the necessity of educating children about the concept of healthy food and the importance of balanced meals to prevent malnutrition and promote proper growth.

In light of these observations, the following main question was formulated: **"What is the effectiveness of the proposed training program in developing concepts of healthy food among kindergarten children?"**

This primary question gives rise to the following sub-questions:

1. What is the effectiveness of teaching children the concept of food groups?
2. What is the effectiveness of teaching children the concept of balanced meals and healthy food?
3. What is the effectiveness of teaching children the concept of healthy nutritional meals and snacks?

Aims of the study

This research attempts to achieve the following objectives:

1. To evaluate the effectiveness of a proposed training program in developing concepts of healthy food among kindergarten children.
2. To help children identify and understand different food groups.
3. To assist children in selecting balanced meals and healthy food options.
4. To encourage children to adopt healthy snacking habits.

Significance of the study

The significance of this study is evident in the following aspects:

1. **Educating Mothers**: Providing mothers with information about unhealthy foods that children commonly prefer, which can lead to malnutrition and related diseases.
2. **Empowering Children**: Teaching children how to make informed food choices, understand the benefits of various food groups, and adopt healthy snacking habits to achieve a balanced diet.

This study contributes to addressing the growing concern of malnutrition among children by promoting early education on healthy eating practices, thereby fostering long-term health and well-being.

Hypotheses of the study

To address the research questions, the following hypotheses were formulated, tested at a significance level of ($\alpha = 0.05$):

1. **Hypothesis 1**: There is a statistically significant difference between the mean scores of the study sample on the scale of children's awareness of healthy food concepts before and after the administration of the training program (information).
2. **Hypothesis 2**: There is a statistically significant difference between the mean scores of the research sample on the scale of children's awareness of healthy

food concepts before and after the administration of the training program (behavior).

Research Limits

The study was conducted within specific temporal, spatial, and human limits, as outlined in Table 2.

Table 2: *Research Limits*

Limits	Details
Time Limits	The study was conducted from September 22 to December 18, 2022.
Spatial Limits	The research was carried out at Al Hussein Bin Ali Kindergarten in Sibrbay.
Human Limits	The sample consisted of 25 kindergarten children (aged 4–6 years), both male and female.

Procedures of the study

The research procedures included the following steps:

1. **Administration of the Awareness Scale**:
   - A scale measuring children's awareness of healthy food concepts was administered to the same group of children before and after the implementation of the training program.
2. **Implementation of Activities**:
   - Technical, cognitive, and narrative activities were conducted with the children to reinforce the concepts of healthy food.
3. **Development of the Training Program**:
   - A suggested training program was designed to teach children key concepts of healthy food, including food groups, balanced meals, and healthy snacking habits.

The Training Program

The training program is defined as a series of structured sessions designed and organized according to specific procedures. These sessions employ content-based activities and diverse training methods to teach children the concepts of healthy food (Burley, 2023, p. 80). Below are the key aspects of the program:

Program Title

The Effectiveness of a Proposed Training Program oon Developing Concepts of Healthy Food among Kindergarten Children

Program Objectives

The program aims to evaluate the effectiveness of a training intervention in teaching kindergarten children key concepts of healthy food. This is achieved through the following objectives:

1. **Cognitive Objectives**:
   - To help children identify different food groups and understand the composition of a balanced meal.
   - To provide children with accurate information about healthy foods, snacks, and their benefits.

2. **Skills Objectives**:
    - To enable children to differentiate between healthy and unhealthy food types.
    - To teach children the essential elements of a balanced nutritional meal.
3. **Emotional Objectives**:
    - To foster an appreciation for the importance of healthy nutrition.
    - To improve children's attitudes toward consuming healthy foods and understanding their significance.

Timetable of the Study

After the completion of the training program's preparation, it was implemented on the experimental sample between **September 22 and December 17, 2022**.

Target Group of the Program

The program was applied to a sample of kindergarten children aged 4–6 years in Al Hussein Bin Ali Kindergarten, Sibrbay, Tanta, Gharbia Governorate. The selection of this sample was based on the administration of a scale designed to assess children's awareness of food groups, balanced meals, and healthy snacks. This preliminary assessment aimed to determine the baseline level of children's understanding of healthy food concepts.

Program Content

Table 3: *Activities and Their Content*

The program included a series of activities designed to teach children key concepts of healthy food. These activities are outlined below:

Number	Activity Name	Activity Content
1	Narrative and cognitive activities	Types of food groups (construction, energy, and presentation)
2	Narrative and cognitive activities	The composition of a whole nutritional meal and the choice of healthy food
3	Cognitive and narrative activities	Recognizing harmful snacks and their dangers

Program Tools Evaluation

The tools used in the program were evaluated and refined based on a review of educational and public health research, as well as feedback from specialists in the field. Unsuitable phrases were removed, and effective activities were finalized to ensure appropriateness for the target age group.

Program Outputs

The program achieved the following outcomes:

1. **Increased Knowledge**: Children demonstrated improved understanding of food groups, balanced meals, healthy food choices, and the benefits of healthy snacks.
2. **Behavioral Change**: Children exhibited positive changes in their attitudes and behaviors toward selecting healthy foods and balanced meals.

3. **Development of a Measurement Tool**: A scale was created to assess children's awareness of healthy food concepts and the effectiveness of the training program.

Scale Objectives

The scale was designed to:

1. Measure the baseline level of children's knowledge about healthy food concepts.
2. Evaluate the success and effectiveness of the training program in teaching these concepts.
3. Compare the results of the experimental group before and after the program's implementation.

Formulating the Vocabulary of the Scale

The scale's vocabulary was carefully formulated to ensure clarity and comfort for the children, facilitating their understanding and engagement. The wording was tailored to align with the research objectives and the sample's developmental level.

Calculating the Validity and Reliability of the Scale

A: Validity

The scale's validity was assessed to ensure it accurately measured children's awareness of healthy food concepts.

B: Reliability

The reliability of the scale was tested by administering it twice to an exploratory sample of 15 children at Al Hussein Bin Ali Kindergarten in Sibrbay, Tanta, Gharbia Governorate. The two administrations were spaced two weeks apart to verify consistency and stability in the results

Reliability and Validity of the Scale

Reliability

The reliability of the study was assessed by reapplying the scale after a two-week interval using the test-retest method. The correlation coefficient between the two applications was calculated using SPSS. The results were as follows:

- **Children's Information Hub**: The correlation coefficient was **0.93**, indicating a highly significant value at the **0.01 level**. This demonstrates the stability of the scale in measuring children's knowledge.
- **Children's Behavior Hub**: The correlation coefficient was **0.92**, also a highly significant value at the **0.01 level**. This further confirms the scale's stability and reliability.

These high correlation coefficients indicate that the scale is consistent and reliable for measuring children's awareness of healthy food concepts.

Validity

Validity refers to the extent to which a scale measures what it is intended to measure. The validity of the scale was evaluated through the following steps:

1. **Arbitrators' (Jurors') Evaluation**:
   The scale was reviewed by a panel of arbitrators specializing in public health, social and preventive medicine, and education. Their feedback ensured the scientific accuracy of the scale's content. Corrections were made to improve

language clarity, remove unsuitable questions, and refine the scale's structure.

2. **Construct Validity**:
   Construct validity assesses whether the scale accurately measures the theoretical construct it is designed to evaluate. This was determined by calculating the correlation coefficient between each item and the overall scale score.
   - **Children's Information Hub**: The correlation coefficient was **0.79**, which is statistically significant at the **0.05 level**.
   - **Children's Behavior Hub**: The correlation coefficient was **0.83**, also statistically significant at the **0.05 level**.

These high and significant values confirm that the scale is valid for measuring children's awareness of healthy food concepts and their related behaviors.

Summary

- **Reliability**: The scale demonstrated high reliability, with correlation coefficients of **0.93** (information) and **0.92** (behavior) at the **0.01 significance level**.
- **Validity**: The scale showed strong construct validity, with correlation coefficients of **0.79** (information) and **0.83** (behavior) at the **0.05 significance level**.

These results confirm that the scale is both reliable and valid for assessing children's awareness of healthy food concepts and their behavioral changes.

Scale Instructions

The scale is divided into two main hubs, focusing on the cognitive and behavioral levels:

1. **First Hub: Cognitive Level**
   - Contains **22 phrases** related to information about healthy food concepts and proper nutrition.
   - Each phrase is designed to assess the child's understanding of food groups, balanced meals, and healthy snacks.
2. **Second Hub: Behavioral Level**
   - Contains **10 phrases** related to the child's behavior concerning healthy food choices and nutrition.
   - These phrases evaluate the child's practical application of healthy eating habits.

Marking the Scale

The scale is marked as follows:

- For each phrase, the respondent indicates agreement or disagreement by marking (**t**) in the corresponding box.
  - **Agree**: Scores **1 mark**.
  - **Disagree**: Scores **0 marks**.

Final Scale Structure

The final scale consists of the following components:

1. **Cover Page**: Includes the name of the scale's preparer.

2. **Instructions**: Provides the scale's objectives, formation, and guidelines for responding. An example of a scale phrase and the method of answering is included for clarity.
3. **Questions**:
    - **4 general phrases** about healthy food concepts.
    - **13 phrases** about food groups.
    - **5 phrases** about balanced meals and healthy food choices.
    - **10 phrases** about snacks (information).
    - **10 phrases** about behavior related to healthy food.

Table 4: ***Description of the Scale***
Scale of Children's Awareness of Healthy Food Concepts and Nutrition

Phrase Type	Phrases Number	Correction Method	Total Phrases
Positive Phrases (Information)	1-2-3-4-5-6-7-8-9-10-11-…1–22	Agree: 1 Mark; Disagree: 0 Marks	22
Positive Phrases (Behavior)	1, 2, 6, 7, 8, 10	Agree: 3 Marks; Neutral: 2 Marks; Disagree: 1 Mark	6
Negative Phrases (Behavior)	3, 4, 5, 9	Agree: 1 Mark; Neutral: 2 Marks; Disagree: 3 Marks	4

Design of the Study

The study employed an experimental design. The study sample was randomly selected and divided into two groups:

- **Experimental Group**: 25 children.
- **Control Group**: 25 children.

The scale was administered as a pre-test and post-test, and the training program was implemented exclusively for the experimental group.

Conducting the Experiment

1. **Pre-Test Administration**:
    - The scale was administered to the study sample between **September 22 and September 16, 2022**, to establish baseline data on children's awareness of healthy food concepts.
    - The sample consisted of 25 children from Al Hussein Bin Ali Kindergarten in Sibrbay, Tanta, Gharbia Governorate.
    - Responses were recorded, corrected, and scored to determine initial levels of awareness.
2. **Administration of the Training Program**:
    - The training program was applied to the experimental group between **September 22 and December 17, 2022**.
    - Activities were conducted during regular kindergarten hours at Al Hussein Bin Ali Kindergarten.
3. **Post-Test Administration**:
    - The scale was re-administered to the research sample (25 children) between **December 18 and December 19, 2022**.

- Children's responses were recorded in writing for subsequent statistical analysis.

Pre- Administration of study Tools and Results

The pre-test results were analyzed to compare the experimental and control groups. The following table summarizes the findings:

Table 5: ***Averages, Standard Deviations, and "t" Values for Pre-Test Scores on the Scale of Children's Awareness of Healthy Food Concepts***

Dimension	Group	Number	Mean	Standard Deviation	DF	T-Value	Significance Level	Significance At 0.05
Cognitive Level	Experimental	25	2.68	1.37	48	1.59	0.11	Not Significant
	Control	25	3.32	1.46				
Behavior	Experimental	25	11.20	1.08	48	1.43	0.15	Not Significant
	Control	25	11.68	1.28				

Interpretation of Pre-Test Results

Table (5) reveals the following:

- **Cognitive Level**: No statistically significant differences were found between the experimental and control groups ($t = 1.59$, $p = 0.11$).
- **Behavior**: No statistically significant differences were found between the experimental and control groups ($t = 1.43$, $p = 0.15$).

These results confirm that the two groups were equivalent in terms of baseline awareness and behavior related to healthy food concepts before the intervention.

Statistical Methods Used

The researcher employed the following statistical methods to validate the research hypotheses using SPSS Version 21:

1. **Means and Standard Deviations**: To summarize and describe the data.
2. **Pearson's Correlation Coefficient**: To assess the relationship between variables.
3. **Independent Samples t-Test**: To compare the means of the experimental and control groups.

Results of the study

The results of the study are divided into two parts, focusing on children's performance on the scale of awareness of healthy food concepts and nutrition after the intervention.

Testing the First Hypothesis

Hypothesis: There is no statistically significant difference between the mean scores of the experimental and control groups on the post-test scale of children's information about healthy food concepts.

To test this hypothesis, an independent samples t-test was conducted. The results are presented in Table 6.

Table 6: ***Independent Samples t-Test Comparing Post-Test Scores of Experimental and Control Groups (Information Hub)***

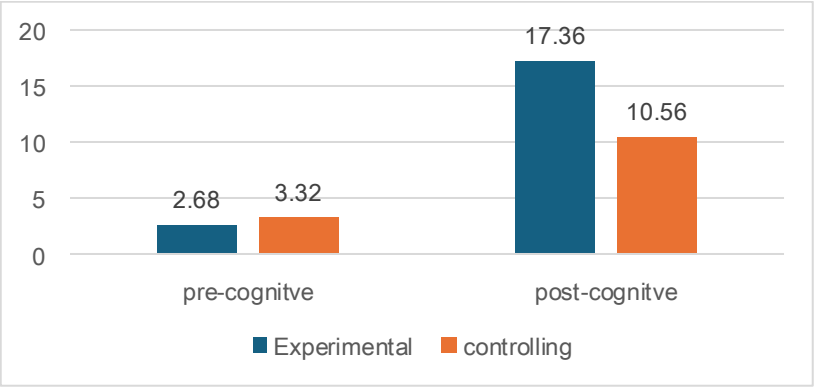
Dimension	Group	Number	Mean	Standard Deviation	df	T-value	Significance Level	Significance at 0.05
Cognitive Level	Experimental	25	17.36	1.57	48	13.98	0.01	Significant
	Control	25	10.56	1.85				

Interpretation of Results

- The t-value of **13.98** is statistically significant at the **0.01 level**, indicating a significant difference between the experimental and control groups.
- The experimental group showed a higher mean score (**17.36**) compared to the control group (**10.56**).
- **Conclusion**: The first hypothesis is rejected, and the alternative hypothesis is accepted: **There is a significant difference between the average scores of the experimental and control groups on the post-test scale of children's information about healthy food concepts, in favor of the experimental group.**

A diagram illustrating the comparison of pre-test and post-test averages for the experimental and control groups (information hub) is provided below.

Diagram (1)



Figure(1) the comparison of pre-test and post-test averages for the experimental and control groups

These findings align with the study of (Khaled, 2024) which emphasized the importance of kindergarten curricula in promoting healthy nutritional awareness among children. Also, the results align with the study of (Abed Al Jawad, 2023) which highlighted the effectiveness of using songs to develop nutritional culture in kindergarten children

Results of Children's Performance on the Behavior Scale

The second part of the results focuses on children's performance on the scale of awareness of healthy food concepts and nutrition (behavior) after the intervention.

Testing the Second Hypothesis

Hypothesis: There is no statistically significant difference between the mean scores of the experimental and control groups on the post-test scale of children's behavior related to healthy food concepts.

To test this hypothesis, an independent samples t-test was conducted. The results are presented in Table 7.

Table 7: ***Independent Samples t-Test Comparing Post-Test Scores of Experimental and Control Groups (Behavior Hub)***

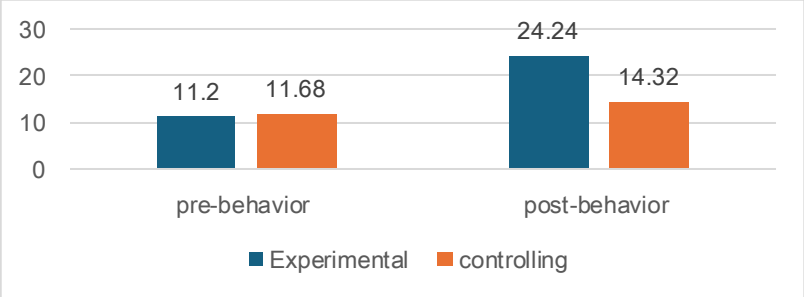
Dimension	Group	Number	Mean	Standard Deviation	DF	T-Value	Significance Level	Significance At 0.05
Behavior Level	Experimental	25	24.24	2.01	48	17.18	0.01	Significant
	Control	25	14.32	2.07				

Interpretation of Results

- The t-value of **17.18** is statistically significant at the **0.01 level**, indicating a significant difference between the experimental and control groups.
- The experimental group showed a higher mean score (**24.24**) compared to the control group (**14.32**).
- **Conclusion**: The second hypothesis is rejected, and the alternative hypothesis is accepted: **There is a significant difference between the mean scores of the experimental and control groups on the post-test scale of children's behavior related to healthy food concepts, in favor of the experimental group.**

A diagram illustrating the comparison of pre-test and post-test averages for the experimental and control groups (behavior hub) is provided below.

Diagram (2)



These findings align with (Elmaydani 2024) which compared nutritional habits of kindergarten children in Syria and Iraq, highlighting the impact of family size and other factors on children's nutritional intake. The findings also align with (Aloraby 2023) which developed an educational guide to enhance the nutritional culture of parents of kindergarten children in Al Menofiya Governorate, emphasizing the importance of parental awareness in meeting children's nutritional needs.

Discussion of the Results

The results of the study demonstrate a significant improvement in the performance of the experimental group compared to the control group in both the ***information*** and ***behavior*** dimensions after the implementation of the training program.

1. **Information Dimension**:
   The experimental group showed enhanced awareness of healthy food concepts, such as the importance of balanced meals, the risks of malnutrition, and the role of fats and carbohydrates in the diet. This improvement can be attributed to the program's focus on educating children about food groups, the composition of balanced meals, and the dangers of unhealthy eating habits.
2. **Behavior Dimension**:
   The experimental group exhibited positive changes in behavior, such as adopting healthier eating habits, reducing the consumption of unhealthy snacks, and avoiding eating in front of the television. These changes were likely influenced by the program's interactive activities, which emphasized the importance of daily milk consumption, the dangers of malnutrition-causing foods, and the benefits of mindful eating practices.

The findings align with previous studies, such as (Khaled, 2024), which highlighted the role of kindergarten curricula in promoting healthy nutritional awareness, and (Aloraby, 2023), which emphasized the importance of parental education in shaping children's dietary habits.

Conclusion

This study successfully achieved its objectives by demonstrating the effectiveness of the proposed training program in developing healthy food concepts among kindergarten children. The program significantly improved children's knowledge of food groups, their ability to choose balanced meals, and their adoption of healthy snacking habits. These outcomes were statistically validated using the **t-test**, which confirmed significant differences between the experimental and control groups.

Ethical Approval Declaration

Ethics approval and consent to participate
Not applicable.

Funding- :
This study did not receive any external funding.

Data availability-:

The datasets generated and analysed during the current study will be available from the author upon reasonable request.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests

References

- Abd Allah, A. (2023). *Pattern of nutritional deficiency of the preschool children*. Cairo: Faculty of Home Economics.
- Abd Al Hamid, M., & Khalaf, A. (2020). Using a computer program to teach kindergarten children some habits of healthy nutrition and developing the social concepts connected with it. Assiut University, Faculty of Education.

- Abd Al Mageed, M. (2023). Food and nutrition. World Health Organization. Available at: http://www.who.com.
- Abo Gafer, M. (2022). Developmental psychology. Saudi Arabia: Om El Kura University.
- Abd Al Gawad, S. I. (2023). A program based on using songs for developing nutritional culture of kindergarten children. Assiut University, Faculty of Early Childhood, The Magazine of Studies in Early Childhood, 20(5), 81–127.
- Abu Bakr, A. G. (2024). The effectiveness of a program based on Wetly on learning based on a problem of developing the nutritional awareness concepts of kindergarten children. The Magazine of Research Horizons for Social and Human Science, 65(4).
- Alkandary, M. I. (2024). Mothers' nutritional behaviors and their relation to their children's healthy nutritional habits. Assiut University, Faculty of Education, 29(2).
- Alkandary, M. I. (2022). Nutritional practices for mothers. College of Basic Education, Public Authority for Applied Education and Training, Kuwait.
- Aloraby, M. N. (2023). Developing nutritional culture of parents of kindergarten children in Al Menofiya Governorate. Menofiya University, Faculty of Education Magazine, 37(1), 261–341.
- Al Raey, S. (2023). Techniques of supporting nutritional culture in kindergarten children. University Magazine for Scientific Research and Studies, Arts and Humanities Series, 4(2), 319–341.
- Alsaeid, M. I. A. (2024). The teachers' role in developing the concepts of healthy culture with children in kindergarten. Saudi Arabia: King Feisal University, 24(6), 435–466.
- Amari, H. (2022). Perception of teachers on health education and nutrition for kindergarten students in Kuwait. College Student Journal, 46(3), 543–549.
- Anita, B. (2024). The complete guide to sports nutrition (3rd ed.). London: A&C Black.
- Bakhit, M., Abd Al Hamid, M., & Khalaf, A. (2020). Using a computer program to teach kindergarten children some habits of healthy nutrition and developing social concepts connected with it. Assiut University, Faculty of Early Childhood, Scientific Magazine, Research Administration and Scientific Publishing, 14.
- Ben-Joseph, E. P. (2023). Healthy habits for TV, video games, and the internet. Retrieved from http://kidshealth.org/parent/positive/family/tv-habits.html
- Brian, K. (2023). Balanced diet. USA: www.healthline.com.
- Burley, K. (2023). Four characteristics of an effective training program that allows employees to learn best. USA: Chrom. Retrieved 5–6.
- Charles, S. (2022). What does healthy eating mean? Breast Cancer, USA.
- Elmaydani, S. F. (2024). The relationship between healthy nutritional culture of kindergarten mothers and developing healthy habits: A comparative study between Syrian and Iraqi families. Syria: Faculty of Physical Education and Sporting Science.

- Erfan, M. (2024). Healthy nutrition: A healthy guide. Giza: Dar Al Huda for Publishing and Distribution.
- Evelin, K. (2022). Nutrition of age categories (1st ed.). Cairo: Arabic Nile Group.
- Fletcher, J. (2023). Preschool education. Available at http://preschooleducation.com/articles
- Gootman, A. J. (2022). Food marketing to children and youth. USA: Authoring Organization.
- Harriet, T., & Vnnda, M. (2024). Child food poverty: Nutrition deprivation in early childhood. UNICEF Programme Group.
- Harris, K. (2021). Teaching nutrition concepts to preschoolers. USA: Authoring Organization.
- Ibrahim, I. Y. (2023). Forming a scale of choosing illustrated healthy food for kindergarten children. Baghdad: Faculty of Education, Al Mostanserian Magazine for Human Science, 54(2), 127–136.
- Karin, N. (2023). Food and health: Individual, cultural, or scientific matters. USA: National Library of Medicine.
- Kabous, W. (2023). The characteristics of kindergarten growth (1st ed.). Saudi Arabia: Khwarithm for Publishing and Distribution.
- Khaled, A. (2024). The role of kindergarten curriculum in supporting healthy nutritional awareness of the child from the point of kindergarten teachers. Field study in Allazequiah, Iraq, 76(6), 65–86.
- Legrand, W., & Sloan, P. (2023). Customers' preferences to healthy meals. In Advances in Hospitality and Leisure (pp. 265–273). Emerald Group Publishing Limited.
- Marwan, M. (2023). Sport, health, and nutrition in training of team sports (1st ed.). Alexandria University, Faculty of Education.
- Micle, C. (2023). Nutrition for kids: Guidelines for a healthy diet. USA: Mayo Clinic.
- Moustafa, R. (2022). The importance of healthy food. Cairo: The Modern Book Publisher.
- Salama, A. S. (2020). Your child's nutrition from birth to the age of 12 years. Cairo: Body Foundation.
- Shaw, G. (2022). Child development stages. USA: California Department of Education.
- Swadenerhp, L. (2024). Nutrition for kids. USA: Authoring Organization.
- Tali, G., & Belha, D. (2023). Child rights (1st ed.). USA: Authoring Organization.