

# The Effectiveness of a Program on International Health Standards for Developing the Concepts of Health Education for Kindergarten Children

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## ABSTRACT

The research aimed to identify the effectiveness of a program on international health standards and investigate its impact on developing health concepts for kindergarten children. To achieve this objective, the quasi-experimental design of two groups: control and experimental was used. The main research sample consisted of (60) boys and girls. They were randomly divided into two groups, the experimental group (30) and the control group (30). The homogeneity of the two groups was verified in the main variables. Then, the test of health concepts was applied after calculating the factors of difficulty, discrimination, and indications of validity and reliability. In addition, the program was applied to the experimental group, which consisted of (49) activities. The results of the research showed statistically significant differences at (0.05) between the means of the scores of the control group and the experimental group in the post-test of the test of health concepts in favor of the experimental group. This indicates the program's effectiveness in developing health concepts. The study also showed no statistically significant differences at (0.05) between the means of the male and female scores of the experimental group in acquiring the health concepts presented to them through the program. The research suggested several recommendations, the most important of which is the inclusion of international health standards in the self-learning curriculum for kindergarten.

**Keywords:** health education standards, health concepts, health education, kindergarten

## INTRODUCTION

Health education is one of the most important fields of modern public health. It is considered an essential part of any public health program. It is no longer an improvisational process. Rather, it has become a process to have foundations and educational principles. Health education here means modifying the behavior, attitudes and habits of individuals concerning the health aspect of their lives. This can be done by providing them with the information necessary to follow modern health methods, and educating them about wrong habits and behaviors, which negatively affect public health.

School health education is defined as a procedural process of transferring knowledge to students. The general classification for it and its uses in public health education and school health education. Health education is a concept linked to student-health promotion curricula. The focus of health education is the change to healthy behavior to achieve "good health" over the long term. Therefore, it is necessary to bring health education to positive behavior modification to obtain a method for implementing the health policy. The basic idea of healthy behavior is to improve the quality of life for the individual and society. Although the quality of life for a person may not be the same for another (National Work Committee for Training and Qualification for Health Education, 1985).

Good health is fundamental to sustainable development. The third goal of sustainable development states "good health and well-being". In other words, it aims at ensuring

a healthy life and promoting well-being for all of all ages, an indispensable component of sustainable development. This is what the United Nations Development Program provides in Arab countries. It seeks to achieve universal health coverage, which works to achieve equal access to health care services for all (United Nations, 2015).

The importance of health awareness and education in the Kingdom's vision 2020 has emerged in enhancing the lifestyle and behavior of members of society and focusing on combating infectious diseases rather than treating them. The Ministry of Health has continued to implement several programs and activities in this aspect such as health education campaigns and health promotion campaigns. It covered several important

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health topics such as diabetes campaigns, breast-cancer detection campaigns, colon cancer, malaria, influenza, kidney, tuberculosis and heart and arthritis, osteoporosis, antibiotics, AIDS, etc. (National Transformation Program, 2018-2020).

The 2030 plan of the Kingdom of Saudi Arabia also focuses on the intensive care of citizens' health. The Kingdom's regulations guarantee the right to health care as stated in Article 31 of the Basic Law of Governance "the state is concerned with public health and provides health care to every citizen and his family in case of emergency, illness, disability and old age." Royal Decree No. M/11 dated 1423 AH was also issued to the health system. It is included in Article (2) that the system aims to ensure the provision of comprehensive and integrated health care to all the population in a fair and accessible manner. Its organization has taken several measures that aim at raising awareness of the right to health (National Transformation Program, 2018-2020).

The Council of Economic and Development Affairs has identified (12) programs of strategic importance to the Kingdom to achieve the goals of Vision 2030. Among these twelve programs is the Quality of Life Program 2020, which is concerned with developing the lifestyle of individuals. It seeks to develop four main areas including reducing the incidence of lifestyle-related diseases such as obesity, facilitating access to health care, education and raising awareness about primary care and home care (Quality of Life Program, 2020). The Ministry of Education also announced several strategic programs announced including setting eight general and basic goals to advance Saudi education in general and its relationship to the National Vision 2030. These goals, included in the National Transformation Program in Education 2020, are closely related to the student's abilities and health capabilities in the body and mind and the extent of the modification in his values, attitudes and behaviors (Ministry of Education, 2019).

The early years are crucial in several ways including how they put us on paths to/or away from good health. Health education for children focuses on their well-being from pregnancy through adolescence. It is concerned with all aspects of their growth and development and with the unique opportunities; each child has to achieve their full potential as a healthy adult. Growth is an important indicator of health over an individual's life. This means finding all the ways that enable us to integrate health education into the practices of the school day, not just the curriculum. The school community, children, families and society, in general, understand the relationship between health and learning. Health is a priority, which means that keeping our children as healthy as possible is a guiding principle behind everything that happens in kindergarten.

### Statement of Problem

The research problem stems from the importance of early health education. It is considered one of the most important

aspects that shape the personality of the child. This is due to its prominent role in building his capabilities and its close connection with the culture of the family and society on the other hand. Health education remains the first and indispensable step for educating the other aspects that make up the child's personality cognitively, emotionally, skillfully and socially. If a healthy body is found, it will facilitate the development of other aspects. Hence, the importance of the environment in which the child grows rapidly emerges. Kindergarten with its various programs and activities helps children grow properly, expand their awareness, refine their skills, satisfy their needs and prepare them for the elementary stage.

Kindergartens are considered one of the educational institutions that raise the child. They are an environment in which he moves directly after home. It begins to affect his various habits, behaviors and activities including health concepts. Therefore, we should pay attention to this age stage (Sobhi, 2014).

Learning and training the child on health concepts is very important, especially in the kindergarten stage, in which the first seeds of personality are laid. Because the child wants to try things on his own, he sometimes randomly adopts some wrong health behaviors. This causes him to have several problems that he faces during daily life due to a lack of concepts of healthy behaviors. Haykal (2021) recommended using the proposed health and movement education program in developing preventive awareness to raise the level of preventive awareness among children to preserve their health as well as the health of their families. Mortada (2018) also recommended the necessity of implementing health care programs in the kindergarten stage. In addition, Al-Shehri (2018) recommended that science curricula include more health standards, which focus on the functional aspect rather than scientific information. Ali et al. (2020) indicated the need to conduct scientific research aimed at developing programs to improve the health education of pre-school children. Further, Diab (2015) also recommended providing nutritional training for teachers on healthy nutrition for preschool children and integrating nutritional education courses into the pre-school curriculum in kindergartens to learn good eating habits and practices included preventing the purchase of any foods such as candy, soft drinks or chips in Kindergarten. It is evident from the recommendations of previous studies the importance of developing the health concepts of the kindergarten child using specific and purposeful scientific programs. Ali (2020) found that the number of procedural goals related to health education standards and indicators amounted to (127) out of a total of (1184) goals for educational units in the self-learning curriculum for kindergartens in the Kingdom of Saudi Arabia at (10.73%). That is, the concepts of health are not sufficiently available. Hence, it becomes clear the need to build a program

for developing health concepts based on international health standards and investigate the effectiveness of using the program. Based on the foregoing, the current research problem is summarized in the following questions:

1. What is the effectiveness of a health education program on international health standards in developing the health concepts of the kindergarten child?
1. Are there statistically significant differences between male and female kindergarten children in the experimental group in acquiring the health concepts presented to them through the program?

### Hypotheses of the Study

1. There are statistically significant differences at (0.05) between the means scores of children in the experimental group and the control group in the posttest of health concepts in favor of the experimental group.
2. There are no statistically significant differences between the means scores of males and females for the children in the experimental group in the post-test for developing health concepts.

### OBJECTIVES OF THE STUDY

#### The study aims to:

- Verify the effectiveness of a health education program on international health standards in developing the health concepts of the kindergarten child.
- Determine the differences between the acquisition of health concepts by male and female children.

### Significance of the Study

- The scarcity of local studies that addressed the development of health education concepts within a program on international health standards.
- Officials, decision-makers, and curriculum developers may benefit from the proposed program for developing the health concepts of kindergarten children in curriculum development and professional development for teachers.
- The study may present teachers with a proposed program to develop the health concepts of the kindergarten child based on international health standards as a guide to contribute to supporting the curriculum.

Providing researchers with a test of the health concepts of the kindergarten child to facilitate and pave the way for further studies on the health concepts of the kindergarten child.

### Delimitations of the Study

- **Topic:** Identifying the effectiveness of a program based on international health standards in developing the health concepts of the kindergarten child.

- **Human:** Third-stage kindergarten children aged between (5-6) years.
- **Place:** The application was carried out in the third level kindergarten in Al-Hofuf in the Kingdom of Saudi Arabia.
- **Time:** The second semester of the year 1442-1443 AH.

### Key terms of the Study

**Health Education:** An educational process that aims to raise the level of health awareness by using all possible methods to provide individuals with healthy behaviors and trends according to sound and applicable scientific foundations to achieve the concept of health in its various aspects (physical, mental, psychological, and social) at the individual and community level (Sobhi, 2014).

**Health Education Standards:** The statements that accurately define the topics of health education that should be presented to learners at a specific age. They also determine the level of performance and the required degree of mastery of these topics and other various related skills and the activities and performance provided by students that demonstrate the achievement of that standard (Al-Jundi, 2019).

Kindergarten child health concepts: a mental conclusion reached by the child when he extracts the common characteristics or elements of a number of facts related to a healthy purity. This conclusion gives a name, a term, or a word to express it (Mohammed, 2010, p. 165).

### THEORETICAL BACKGROUND

This part presents international health standards, their importance and objectives, health concepts, and the role of kindergarten in developing health concepts.

#### First: International health standards

The National Association for the Education of young children (NAEYC, 10 standards) has set standards for early childhood programs. It can help families make the right decision when they are looking for a childcare center or kindergarten. Standards and measures are the foundation of NAEYC's Young Child Accreditation System for Early Childhood Programs. To receive accreditation, programs must meet all 10 standards. Standard (5), the health standard, the focus of the current study, enhances children's nutrition and health and protects children and staff from illness and injury. Children must be healthy and safe to learn and grow. The programs should be healthy and safe to support the healthy development of children.

#### Fields of standard (5)

The health standard consists of three fields:

- Promotion and protection of children's health and combating infectious diseases: it addresses health

promotion and protection practices for children and staff in the program including plans and policies for immunization, infectious disease, cardiopulmonary resuscitation, and first aid training as well as standards for hand washing, feeding and dispensing medicines and the use of health professionals.

- Ensuring the nutritional well-being of children: it addresses children's nutrition including catering practices, menus, health requirements, refrigeration requirements and allergies.
- Maintaining a healthy environment: it addresses issues related to maintaining an environment that supports the health of children and employees (NAEYC, 2015.103).

Several studies have addressed the areas of health. Atman (2016) included six areas: personal hygiene, healthy nutrition, accident prevention and first aid, environmental health, consumer health, and diseases and ways of prevention. Hassan et al. (2020) aimed to determine the availability of health education standards in the self-learning curriculum for kindergarten. Al-Jundi (2008) addressed the development of health awareness for pre-school children in identifying the standards of health education agreed upon in kindergartens. Al-Shehri (2018) revealed the degree of observance of health education standards included in the science curriculum content for the first grade at the intermediate stage in the Kingdom of Saudi Arabia. The number of standards that were taken into account in the content of the science curriculum for the first intermediate grade was (13) of the total (64) standards of health education that were prepared. Some areas of health education standards were not fully included such as mental health, sexual health, diseases and their prevention, medicines, bad habits, safety and first aid.

According to previous studies and NAEYC standards, and standard (5) Health (NAEYC, 2015) seven main standards were derived (nutritional education, personal health, safety and injury prevention, development and development, physical activity, health and disease prevention, environmental and consumer health). Under each standard are sub-indicators, which were used to build the activities of the current research program.

## **Second: The importance of health concepts for the kindergarten child**

In order for health education to become meaningful, acquiring concepts is a necessary step to achieve the goals of health education, especially, when we face a huge amount of knowledge and information that is difficult to deal with. Concepts also form the backbone of organized knowledge and the main domain around which several kindergarten curricula revolve (Abu Shqair, 2006).

Health education is a continuous and cumulative process. It is not as easy as some think. The process of health education is

like a triangle: knowledge, which aims to acquire information and the direction, intended to inculcate values associated with the acquired information. The last aspect is behavior, which aims to apply the acquired information. Health education facilitates behavioral change. It also raises the value of the sense of responsibility toward health among individuals. Therefore, it is one of the most important components of health care. The concepts of health education have been upgraded in recent years. It became an existing science of knowledge; it uses behavioral and educational theories. It also uses different communication methods and teaching methods, in addition to the principles of media (Abu Shqair 2006; Kandil & Shalaby, 2006).

According to Al-Ghanimi (2012) and Al-Khudari (2018), the importance of health education is as follows:

- Improving health at the level of individuals and societies.
- Building sound health trends.
- Assisting individuals in identifying and solving the health problems they face using available resources.
- Inculcating and consolidating the values of healthy behavior and changing wrong behaviors.
- Spreading sound health concepts among members of society to improve their quality of life.
- Reducing diseases.

Mortada (2018) aimed to identify the importance of acquiring the kindergarten children health concepts from the point of view of the principals and teachers of kindergarten in Tartus city. The results concluded that the importance of acquiring the children of kindergarten health concepts from the point of view of the principals and teachers of kindergarten in Tartus came to a medium degree. It also recommended paying attention to health concepts, whether at kindergarten or the home and the necessity of implementing health care programs in the kindergarten stage. Muhammad et al. (2020) aimed to build and standardize the health culture scale for pre-school children to identify the level of health education for pre-school children and the differences in the level of health education between government school children and pre-school children. The results showed that the level of health culture such as personal health culture, sports culture, nutritional culture, social aspects, mental health and culture for preschool children was low. The researchers recommended relying on the current scale as a tool to detect the health education of pre-school children, in addition to the necessity of conducting scientific research aimed at developing programs to improve the health education of pre-school children. Blinkhorn et al. (2012) confirmed the possibility of reducing dental caries in young children. It focused on reducing caries by 20%, which will have an impact on the quality of life for families. The study also pointed to the need for evidence-based strategies to improve the oral health of families under their care. It also



emphasized the urgent need for effective prevention programs to reduce the burden of oral disease.

### Third: The role of kindergarten in developing health concepts

Kindergartens have an effective impact on the child's learning of healthy concepts through a specialized teacher who guides, teaches and nurtures him in this aspect. The role of kindergarten in the past is no longer limited to transferring knowledge to children through memorization. Rather, kindergartens today have multiple roles in society. At the forefront of which is raising children's awareness of the concepts of health culture and positive attitudes towards maintaining human health and safety (Atman, 2016, p. 16). Accordingly, the UNESCO Office (2006) presented a set of topics for the activities of the developed curriculum in kindergartens including health and safety care through teaching children personal safety and self-care, personal hygiene, maintaining safety at the home and kindergarten, and eating healthy meals. A specialized kindergarten teacher should carry out the application so that she can contribute positively to increasing the child's health awareness.

The role of the kindergarten is to provide the child with the following health concepts:

- Providing the child with health information through his integration into the activities of the kindergarten and its daily programs, and transferring this information to his extended environment.
- Discussing the health information that the child acquires from his external environment, highlighting the positive information, and developing and employing it in activities to learn from it.
- Linking health concepts to the child's daily experiences and healthy behaviors through the activities and programs provided to them in the kindergarten (Atman, 2016).

Diab (2015) concluded that nutritional guidelines improve kindergarten teachers' knowledge and practices. The effect was positive on the physical development of the pre-school child as it prevented malnutrition in childhood. Healthy physical development was promoted. The study recommended providing nutrition training for teachers on healthy nutrition for pre-school children and integrating food education courses into the pre-school curriculum in kindergartens to learn good eating habits. According to Blinkhorn et al. (2012), healthy behavior and lifestyle patterns that are inculcated in childhood yielded positive results and were built rather than trying to change daily health care habits. Parents and caregivers have a significant influence on children's behavior. However, it is often not taken into account in early intervention activities. Eid (2019) focused in his study on the obstacles and factors that contribute to the successful implementation of child

nutrition programs in kindergarten gardens in the Kingdom of Saudi Arabia. Respondents showed positive attitudes towards developing children's nutrition programs through the following activities: nutrition education for children, training, workshops for teachers and parents and planning healthy meals at home. The biggest obstacles to providing nutrition programs to educational institutions were lack of awareness, cost coverage and high resistance and hesitation. Lynch's (2014) study revealed the disparity in healthy eating ways in Canada. Several healthy eating curricula developed for kindergarten programs across Canada were designed to help teachers promote healthy lifelong children's behaviors. The findings illustrated knowledge gaps in the healthy food curriculum for kindergartens across Canada. The study recommended the development of kindergarten curricula regarding the development of healthy eating behaviors for children in the long term.

## METHODS

This part presents the methodology, the research population and sample, instruments and procedures.

### Research Design

The current research applied the quasi-experimental design based on the pre and post-measurement of the research variables with two groups: the experimental and the control group because it is the appropriate method to identify the effectiveness of the program in developing the health concepts of the kindergarten child.

### Population of the Study

The research population consisted of children of the third level in kindergarten, aged ranged between (5-6) years during the academic year 1442-1443 AH in Al-Hofuf, Kingdom of Saudi Arabia.

### Sample of the Study

The research included two samples: exploratory and main. The exploratory sample consisted of (20) male and female children, who have the characteristics included in the main research sample. It aimed to calculate the psychometric properties of the test of health concepts. The main research sample included (60) boys and girls (30 males and 30 females), whose ages ranged between (5-6) years and who were enrolled in the third level of the third kindergarten in Al-Hofuf. The sample was randomly divided into two groups, experimental and control. The experimental group consisted of 30 children (15 males and 15 females). The program based on international health standards was applied to the experimental group to develop health concepts. The control group consisted of 30 children (15 males and 15 females).

## Instruments of the study

### First: The Health Concepts Program based on international health standards:

- The program was built after reviewing the theoretical framework related to the health concepts of the kindergarten child. Then, health education standards were determined based on the content of international health programs for preschool children, provided by the International Association for Childhood Education International and the National Association for the Education of Young Children (NAEYC), and the Organization of Children under Six Years and Health and Safety Standards in the State of New Jersey 2006 (California State Board of Education, 2008) and the standards of the Palestinian Authority Academy for Health and Safety. It included standards for health education for a preschool child. Also, International Research Council standards and early developmental learning standards for ages (3-6) years in the Kingdom of Saudi Arabia 2015 benefited from the program. Indicators of these standards have been defined. In light of the indicators, a health education program based on international health standards has been prepared to develop health concepts. Table 1 displays these standards.

### About the proposed program:

The program was built according to the following steps:

#### 1. Introduction to the program:

The health education program is a means that helps protect and develop children. Therefore, teachers should be keen to be aware of public health information, work to follow sound health education methods with children, participate with doctors and health education specialists, work on knowledge of preventive health practices, and implement them in the learning environment, and not live in isolation from them. Hence, they are daily practices and not just learning activities, which contribute to the success of health education for children.

2. The general goal of the program is to study the effectiveness of a program based on international health standards to develop health concepts for the kindergarten child.
3. The procedural goals of the program: From the general goal of the program, a set of procedural goals emerged that were described in detail in the program's activities (No. 49). They are related to health education standards. The activities were built according to the indicators from the standards shown in Table 2.

#### 4. Program Activities Instructions:

- Reading the objectives of the activities.
- Preparing the necessary tools in advance.

- Choosing the appropriate environment in the kindergarten to implement the activities.
- Providing a rich learning environment that helps them express their ideas freely and safely.
- Enhancing children's knowledge and correcting errors in a simple and sound language.
- Enhancing children's behavior through actual practice in kindergarten facilities (washing hands, preparing meals, practicing motor activities).
- Implementing a variety of group activities that include movement, singing, story, theater, drawing and coloring.
- Inviting parents to participate in activities, to emphasize concepts and promote healthy behavior of children at home.

### Tools used in implementing the program

Stories, theaters, videos, drawing and coloring tools, models, picture cards and computers.

### Strategies used in the program

Role-playing, learning by playing, direct experience, hands-on performance, dialogue and discussion, modeling, self-learning, cooperative learning and brainstorming.

Forty-nine activities were built according to the program standards and indicators as shown in Table 2. Each activity includes procedural goals, time and place, strategies, activity progress, and assessment methods.

### Assessment methods

The pre-assessment begins with each activity, then the interim assessment throughout the activity, and then the final assessment. It also relied on direct observation of the child's health practices in each activity.

### Validity of the program

The program was presented to (7) experts in the field of kindergarten, curricula and teaching methods to judge the validity of the content of the program and the appropriateness of strategies and assessment tools. Their opinions were used in the development of the program.

### Second: The test of the health concepts of the kindergarten child

After reviewing the theoretical framework and previous studies related to health concepts such as the study of Muhammad et al. (2020), which built and codified measures of health concepts. The health concepts test was built according to the following steps:

- Preparing the initial version of the test of health concepts. It consisted of (30) items divided into six domains. The first domain includes personal health (5 items). The second

**Table 1.** The main standards and indicators for health education

<i>Personal health</i>	<i>Nutrition education</i>	<i>Safety and injury prevention</i>	<i>Physical activity and behavioral habits</i>	<i>Development and growth</i>	<i>Health promotion and disease prevention</i>	<i>Environmental health and consumer health</i>
1-Oral and dental health	10- Healthy food	20- Home accidents (electricity - sharp tools) and how to deal with them.	29-Benefits of physical activity	39-Knowing the meaning of growth	48-Obesity diseases	58-Specifications of a healthy environment.
2- Hand and nail hygiene	11-Basic Food Elements	21- Kindergarten accidents and how to deal with them.	30 -The importance of participating in active play and physical activities on an ongoing basis.	40-Identifying and classifying the different parts of the body.	49-Infectious diseases.	59-Causes of air pollution in the environment
3- Body hygiene	12-Types of food	22 - Traffic safety and methods of preventing traffic accidents.	31- The importance of preserving food from extravagance.	41-Knowing the functions of the body parts	50-Eye diseases	60-Causes of water pollution in the environment
4- Hair hygiene	13-Food Groups	23- First aid for burn accidents	32-The importance of eating breakfast	42- Knowing the five senses.	51-Respiratory diseases	6- Unhealthy foods
5- Nose hygiene	14- The importance of food groups	24- Knowing the early warning signs	33-Practice healthy eating habits	43- Learn about the functions of the five senses	52-Oral and dental diseases	62- Spoiled foods
6- Ears hygiene	15- Malnutrition	25- First aid kit	34-Distinguishing between right and wrong behaviors towards food	44-Knowing human organs	53-Methods of transmission of diseases.	63 -Healthy way to get rid of waste.
7-Clothes hygiene	16- Food contamination	26- The harms of using medicines in the wrong way.	35-Practicing behaviors that preserve water, air and food from pollution.	45-Means of maintaining the organs of the body.	54-Pathogens.	64-Recycling of environmental materials
8- Personal tools	17- Food preservation	27 - The dangers of approaching poisonous animals and insects.	36-Practicing non-excessive behaviors in the use of water	46.The ability to understand and perform healthy activities	55-Symptoms of diseases	65-Street Vendors
9- General appearance	18- Preparing and cooking foods	28- Safe and appropriate behavior when dealing with strangers	37-Covering the nose with a tissue when sneezing or coughing and disposing it properly.	47-The ability to separate from the family and the desire for independence.	56-Methods of preventing the spread of diseases such as immunizations	66-Knowing safe and unsafe products
	19-Food Habits		38-The benefits of sleep and rest and their importance for proper growth		57-Isolation	67-Foods of unknown source

**Table 2.** Outline the goals and activities of the health education program

Standards	Goals	Health education activities										
Nutrition Education	Introducing children to different types of food.	Vegetables	Fruits	Types of legumes	Types of meat	Cereal group	The food chain	Guess which food group I'm from	A visit to my grandfather's farm	Let's have a healthy meal	Food preservation methods	Food preparation
Personal hygiene.	Enabling children to practice personal hygiene.	My teeth are clean	I keep my hands and nails clean	Help me wash my hands	let's color	I keep my eyes clean	My hair is beautiful and tidy	I keep my nose and bottom clean	Personal hygiene tools	Toiletry bag	I'm clean	Promoting positive behaviors
Safety and injury prevention	Practicing safety rules at home, street and kindergarten	safety at home	What happened in the kindergarten?	safety on the street	First aid	Dangers of approaching pets and poisonous insects	Disadvantages of using medicines incorrectly					
Growth and development	Introducing children to the parts of the body.	My body parts	Cut and paste body parts	Color my clothes	Parts of my face	My friend is my mirror	My five senses					
Physical activity	Doing physical activity to maintain health.	The story of the lazy bear	Active fox	Do not overeat	Sameeh and breakfast	Healthy and unhealthy food	How do we conserve drinking water?	The importance of sleep and the need for rest				
Health and disease prevention	Introducing children to pathogens.	I'm fit	Microbe's story	The ophthalmologist visits the kindergarten	A visit to the dentist	Let's color	Learn about the respiratory system	How do I protect myself from viruses and germs?	Going to the vaccination center	-		



domain is nutritional education (5 items). The third domain, safety and prevention of injury (5 items). The fourth domain is physical activity and behavioral habits (4 items). The fifth domain is evolution and development (6 items). The sixth domain is health promotion and disease prevention (5 items). A correction key has been developed and the instructions are formulated.

- Presenting the initial version of the test to the experts, whose directions in developing the test were taken.
- The application was carried out on an exploratory sample of (20) children, and then the re-application after (15) days to verify the reliability of the test.
- The latest version of the test consisted of two parts. The first part is concerned with the basic data of the child: the child's name, gender, date of birth, date of application for the test, and instructions. The second part includes questions distributed on the main standards of the health concepts in question. Under each question, there are three pictures for the child to choose from the picture that answers the correct answer to the question.
- Correcting the test by giving one point if the answer is correct, and zero if the answer is wrong.

### Psychometric properties of the test of health concepts:

The test was applied to the exploratory sample to analyze the test items statistically in terms of difficulty and discrimination coefficients, as well as to extract the indications of validity and reliability as follows:

#### First: Difficulty and discrimination coefficients for the test of health concepts.

##### *Difficulty coefficients:*

To measure the difficulty coefficient of the test questions, it was calculated as shown in Table 3.

It is evident from Table 3, the values of the difficulty coefficients for the test items ranged between (0.35-0.65). The mean test difficulty as a whole was calculated. The general mean of test difficulty was (0.47). This percentage means that the test is of medium difficulty.

### B. Discrimination coefficients:

The discrimination coefficients were extracted for the test items as shown in Table 4.

Table 4 shows that the values of discrimination coefficients for test items ranged between (0.20-0.8). According to Awdah (2005, p. 257), any item whose discrimination coefficient is (0.20) or higher is considered an acceptable item. From the foregoing, the items of the test of health concepts for kindergarten children are valid in terms of indications of difficulty and discrimination.

### C. Internal consistency

Pearson correlation coefficient was used to measure the relationship between the score of each item with the total score of the domain by applying the test of health concepts to the exploratory sample as depicted in Table 5.

According to Table 5, the values of the Pearson correlation coefficients to measure the relationship between the items of the test of health concepts with the total degree of the domain to which it belongs were statistically significant at (0.01) or (0.05). The correlation coefficients ranged between (0.547\* - 0.920\*\*). This confirms that the test has a degree of validity.

### D. Test reliability

To calculate the values of the test reliability coefficient on the domains and the total test score, the test of health concepts was applied to an exploratory sample. The reliability coefficient values were calculated using Couder Richardson (20) as displayed in Table 6.

It is evident from Table 6 that the results of calculating the reliability coefficient of the overall test were high (0.91). The reliability coefficients on the test domain ranged between (0.76 - 0.87). These coefficients are high-reliability coefficients and indicate the reliability of the test.

### Statistical processing

The following statistical methods were used:

1. T-test for independent samples to show the significance of the differences between the means between the members

**Table 3.** Difficulty coefficients for the items of the test of health concepts

Item	Difficulty	Item	Difficulty	Item	Difficulty	Item	Difficulty	Item	Difficulty
1	0.40	7	0.50	13	0.50	19	0.45	25	0.45
2	0.45	8	0.40	14	0.60	20	0.55	26	0.35
3	0.45	9	0.35	15	0.40	21	0.45	27	0.35
4	0.40	10	0.55	16	0.65	22	0.40	28	0.55
5	0.55	11	0.50	17	0.65	23	0.55	29	0.40
6	0.45	12	0.40	18	0.55	24	0.35	30	0.50

**Table 4.** Discrimination coefficients for the items of the test of health concepts.

Item	Discrimination	Item	Discrimination	Item	Discrimination	Item	Discrimination	Item	Discrimination
1	0.80	7	0.40	13	0.40	19	0.80	25	0.40
2	0.50	8	0.80	14	0.60	20	0.50	26	0.50
3	0.70	9	0.50	15	0.80	21	0.70	27	0.50
4	0.60	10	0.70	16	0.50	22	0.60	28	0.30
5	0.50	11	0.60	17	0.70	23	0.70	29	0.60
6	0.70	12	0.60	18	0.50	24	0.80	30	0.20

**Table 5:** Pearson's correlation coefficients between the items of the test of health concepts

Item	Pearson	Item	Pearson	Item	Pearson	Item	Pearson	Item	Pearson
1	.844**	7	.776**	13	.547*	19	.832**	25	.623**
2	.651**	8	.920**	14	.681**	20	.716**	26	.685**
3	.762**	9	.748**	15	.827**	21	.693**	27	.777**
4	.675**	10	.667**	16	.712**	22	.739**	28	.749**
5	.734**	11	.821**	17	.783**	23	.807**	29	.795**
6	.944**	12	.827**	18	.723**	24	.794**	30	.870**

\*Significant at (0.05), \*\* Significant at (0.01)

**Table 6:** Coefficients of reliability of the domains of the test of health concepts and the total score of the test

N	Domain	No. of items	reliability coefficient
1	Personal health	5	0.78
2	Nutrition education	5	0.87
3	safety and prevention	5	0.80
4	Physical activity and behavioral habits	4	0.76
5	Growth and development	6	0.82
6	Health promotion and disease prevention	5	0.83
	Overall	30	0.91

of the control and experimental groups on the pre and post-tests of the test.

2. Black earning rate to determine the effectiveness of the program.
3. Pearson correlation coefficient to verify the validity of the test.
4. Couder-Richardson reliability coefficient - 20 to calculate the reliability of the test.
5. Eta Square effect size.

## RESULTS AND DISCUSSION

The results of the first hypothesis: There are statistically significant differences at (0.05) between the means scores of children in the experimental group and the control group in the posttest of health concepts in favor of the experimental group.

To verify the equivalence of the groups (control and experimental) on the pretest of the test of health concepts,

a t-test was calculated to show the significance of the differences between the means of the scores of the control and experimental groups on the pretest as shown in Table 7.

Table (7) shows that there were no statistically significant differences at (0.05) between the means of the scores of the control and experimental groups in the pretest of the test of health concepts. This indicates the equivalence of the groups before the application of the program.

To demonstrate the effectiveness of the program based on international health standards for the development of health concepts, a t-test was used to show the significance of the differences between the means in the test domains and the total degree and the effect size through the ETA square for statistically significant differences. Table 8 shows the results.

Table 8 shows that there were statistically significant differences at (0.05) between the means of the scores of the control and experimental groups in the post-test of the test of health concepts in all domains and the total score. The results came in favor of the experimental group. The level of significance for the domain and the total score was (0.00). It is less than (0.05), which indicates the effectiveness of the program. This is evident by the impact of the strategy. It reached a total score of (0.983) with a high effect. The effect size of the domains ranged between (0.672 - 0.900) with a high effect.

This result is attributed to the program's reliance on international health standards, such as the standards of the World Organization for the Learning of Young Children, and others. The results are also due to the diversity in the strategies used and loved by children in implementing the activities of the program, the clarity of the instructions in the program and the practical application of healthy practices

**Table 7.** T-test to show the significance of the differences between the means of the scores of the control and experimental groups in the pretest

Domain	Group	No.	Means	Standard deviation	t	df	Sig (2-tailed)
Personal health	Control	30	1.60	.724	.367	58	.715
	Experimental	30	1.53	.681			
Nutrition education	Control	30	1.43	.898	-1.180-	58	.243
	Experimental	30	1.67	.606			
safety and prevention	Control	30	1.20	.761	-.779-	58	.439
	Experimental	30	1.33	.547			
Physical activity and behavioral habits	Control	30	1.43	.728	1.400	58	.167
	Experimental	30	1.20	.551			
Growth and development	Control	30	1.60	.724	.813	58	.420
	Experimental	30	1.43	.858			
Health promotion and disease prevention	Control	30	1.23	.817	-1.774-	58	.081
	Experimental	30	1.57	.626			
Overall	Control	30	8.50	1.333	-.754-	58	.454
	Experimental	30	8.73	1.048			

**Table 8.** T-test to show the significance of the differences between the means of the scores of the control and experimental groups in the posttest and the Eta-square (effect size)

Domain	Group	No.	Means	Standard deviation	t	df	Sig (2-tailed)	effect size (Eta-squared)	Effect size
Personal health	Control	30	1.53	.571	-20.848-	58	.000	.882	High
	Experimental	30	4.43	.504					
Nutrition education	Control	30	1.13	.571	-17.621-	58	.000	.843	High
	Experimental	30	3.87	.629					
safety and prevention	Control	30	1.17	.461	-13.657-	58	.000	.763	High
	Experimental	30	3.77	.935					
Physical activity and behavioral habits	Control	30	1.27	.521	-10.910-	58	.000	.672	High
	Experimental	30	3.10	.759					
Growth and development	Control	30	1.20	.805	-22.875-	58	.000	.900	High
	Experimental	30	5.47	.629					
Health promotion and disease prevention	Control	30	.93	.521	-22.458-	58	.000	.897	High
	Experimental	30	4.17	.592					
Overall	Control	30	7.23	1.135	57.870-	58	.000	.983	High
	Experimental	30	24.80	1.215					

such as washing hands and brushing teeth. They increased the motivation and excitement of children. The result of the current research agrees with the result of Al-Jundi's (2008) study, which found that there were statistically significant differences between the mean scores of the children of the experimental and control groups in the posttest of the health awareness test for pre-school children in favor of the children in the experimental group. Also, the current results are in line with that of Haykal's (2021), which found an improvement in the level of preventive awareness among children by using

the proposed health and movement education program in developing preventive awareness.

**The results of the second hypothesis:** There are no statistically significant differences between the means scores of males and females for the children in the experimental group in the posttest for developing health concepts.

The t-test was used to show the significance of the differences between the means of the scores of males and females for the experimental group members as depicted in Table 9.

**Table 9:** T-test to show the significance of the differences between the mean scores of males and females of the experimental group.

Domain	Gender	No.	Means	Standard deviation	t	df	Sig (2-tailed)
Personal health	Male	15	4.60	.507	1.890	28	.069
	Female	15	4.27	.458			
Nutrition education	Male	15	3.93	.594	.574	28	.571
	Female	15	3.80	.676			
safety and prevention	Male	15	3.73	.884	-.192-	28	.849
	Female	15	3.80	1.014			
Physical activity and behavioral habits	Male	15	3.13	.743	.237	28	.815
	Female	15	3.07	.799			
Growth and development	Male	15	5.20	.941	.907	28	.372
	Female	15	5.47	.640			
Health promotion and disease prevention	Male	15	4.13	.516	-.303-	28	.764
	Female	15	4.20	.676			
Overall	Male	15	24.73	1.280	.277	28	.784
	Female	15	24.60	1.352			

Table 9 shows that there were no statistically significant differences at (0.05) between the means of male and female scores for the experimental group members. This result is attributed to the fact that the program had a positive impact on developing health concepts among children of both genders: males and females. In addition, male and female children demand the same motivation and interaction and their eagerness to practice practical activities in the program. According to the cognitive theory, the gender factor does not affect acquiring knowledge in the kindergarten stage. The child undergoes developmental changes that appear because of the experiences he is exposed to, whether male or female. The child shows the characteristics of the pre-operative stage without sexual discrimination as their needs and interests are similar at this age. The result of this study agrees with that result of Muhammad's (2020), which concluded that there were no statistically significant differences between the mean scores of males and females for the experimental group in testing health concepts after applying educational games.

## RECOMMENDATIONS

In light of the results of the current research, the following recommendations were reached:

- Inclusion of international health standards in the self-learning curriculum for kindergarten.
- Training teachers to provide activities on healthy concepts and behaviors and educating them about the importance of introducing them to children through exciting learning tools and strategies.
- Providing a stimulating environment and educational facilities that promote healthy concepts and behaviors for kindergarten children.

- - Awareness of the family and society about the active role played by health education programs for children at an early age and its positive impact on the health of children and society in the future.

## Suggestions for future research:

It is proposed to conduct a number of studies to complement the efforts in this field, as follows:

- The effectiveness of a proposed program for developing health concepts through pop-up stories.
- Designing a proposed program based on international health standards for the first grades.

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