



A nutritional and sports education program for diabetics and its effect on some biochemical and physiological variables.

Researcher/ Abdul Gwad Abdel Moneim Ali Muhammad ⁽¹⁾, Prof. Dr/ Abdel Moneim Bdeir Alqasir ⁽²⁾, Prof. Dr/ Elsayed Soliman Hammad ⁽³⁾

(1) Researcher, Department of Biological Sciences and Sports Health - Faculty of Physical Education for boys- Alexandria University.

(2) Professor of Sport Physiology Department of Biological and Health Sciences Sports- Faculty of Physical Education for men Alexandria University.

(3) Professor of Sports Health, Department of Biological and Health Sciences Sports- Faculty of Physical Education for men Alexandria University

Abstract

The aim of the research is to design a nutritional and sports education program for people with type 2 diabetes and know its impact on:

Biochemical variants of type II diabetics. -

Functional variants of type II diabetics. -

Blood sugar level for type 2 diabetics. -

The researchers used the experimental approach, using three experimental groups, and a (pre-post) measurement of the variables under study was performed. The research sample was deliberately chosen from men with diabetes of the second type and the sample size was 20 individuals of the age of (45-55) years divided by the three experimental groups.

Results:

The effect of the nutritional and sports education program had a positive effect on the improvement of all biochemical and physiological variables in type II diabetes patients, the improvement of blood sugar in type II diabetics, and the improvement of the health and psychological status in general of the research sample under study.

Recommendations:

Applying the nutritional and sports education program because of its effectiveness in improving the biochemical and physiological variables of type 2 diabetes patients.

Keywords : (Nutritional education; Athlete; Diabetics)

Introduction and research problem:

Nutrition education is considered one of the important programs in the national plans for the prevention and control of nutritional problems. Countries need deliberate educational programs to raise the level of nutritional and health awareness of community members. (22)

Sport in general, and aerobic exercise in particular, are given great benefits to those who practice it, as it increases the flexibility of the body, improves blood circulation, stimulates it, reduces psychological burdens, and protects against many diseases, and it was found that diabetics who exercise regularly, are less likely to suffer complications Drunkenness was better for others who would not be exercising. (5:41)

Today, physical education is no longer limited to educational and sports sciences that are concerned with teaching and training in sport activities only. Rather, it has a prominent and effective role in prevention, rehabilitation, and treatment, as a result of the increase in sports and health awareness, and the spread among all groups of society and in the various age stages in a way that led to the population pyramid reverses from a young base in which the proportion of young people rises to a broad peak that includes an increase in the elderly. (11:11)

The practice of aerobic exercise has a direct impact on the general health of the individual, as it increases the efficiency of the work of the various vital organs of the

individual, and also leads to the prevention of obesity, which is one of the most important causes of human infection with many diseases of the age, and perhaps the most famous of them is diabetes Also, the exercise of aerobic exercise works to raise the level of physical fitness of the individual by developing its various elements; And improve the functioning of the functional organs in the body, increase the growth processes, and the mental, psychological, and social aspects, and thus raise the level of the health status of the individual, To become a good citizen, increase his efficiency in his work, increase his production and reduce his chances of being infected by increasing his natural immunity, and preventing him from diseases, and the practice of aerobic exercise is an essential pillar of the treatment of diabetes, by activating the various cells and systems of the body, and working to burn excess body fat Thus, we find that the practice of aerobic exercise is no longer a secondary matter for a person, but rather has become a basic and necessary matter, so a person must practice sports activity daily to maintain his physical, organic, and psychological health. (2:39)

Medical treatment mainly aims to correct the deficiencies that afflicted the devices, by using drug therapy, while exercises use the movement of the body itself to upgrade all its vital organs, through rehabilitative therapeutic exercises, according to the capabilities of people with diseases and the degree of their injury. (19:35)

The danger of diabetes is represented in its many complications that can affect all organs and tissues of the body, directly or indirectly, so it is called diabetes (complications disease), considering that its risk is in the occurrence of complications, and the reason for the occurrence of diabetes is due to the presence of a defect in Hormonal System The hormonal system is considered one of the most important devices that regulate the rates of chemical activity of different cells and tissues of the body, and the hormonal system consists of endocrine glands that secrete hormones in the blood. (6:90)

By observing the researchers and visiting one of the centers and hospitals, as well as seeing the researchers about the references and research that were available, the researchers found a high percentage of diabetics, especially the second type, and they also found the dependence of diabetics on treatment by taking drugs, and from here the researchers see the importance of aerobic exercise And nutritional education for diabetics in accordance with the condition of each patient, as sport and food are two basic ribs of the treatment triangle, and the patient may dispense with medication on the condition that he follows an athletic and dietary regimen commensurate with his disease, where the deterioration of the condition of type II diabetes can be controlled And his passage to normal life, away from diabetes complications, Therefore, the researchers undertook this study under research entitled a nutritional and sports education program for diabetics and its effect on some biochemical and physiological variables.

Importance and need for research:

1. The proposed sports and nutritional education program help in improving the biochemical and physiological variables of individuals suffering from type 2 diabetes.
2. Improving the sugar level of people with type 2 diabetes.
3. A change in the daily lifestyle of a type 2 diabetic patient to a better life.

research aims:

The research aims to design an exercise program and nutritional education for people with type 2 diabetes and to know its impact on:

1. Biochemical variants of type II diabetics.
2. Physiological variables for type II diabetics.
3. Blood sugar level for type 2 diabetics.

Research hypotheses:

1. There are statistically significant differences between the pre-measurement and the post-measurement of the first experimental group in some biochemical and physiological variables and the blood sugar level of type II diabetics and the total axes of the nutritional education questionnaire.
2. There are statistically significant differences between the pre-measurement and the post-measurement of the second experimental group in some biochemical and physiological variables and the blood sugar level of type II diabetics and the total axes of the nutritional education questionnaire.
3. There are statistically significant differences between the pre-measurement and the post-measurement of the third experimental group in some biochemical and

physiological variables and the blood sugar level of type II diabetics and the total axes of the nutritional education questionnaire.

4. There are statistically significant differences in the telemetry between the three experimental groups in some biochemical, physiological and blood sugar variables for type II diabetics and the total axes of the nutritional education questionnaire.

Search terms:

the program: -

It is a group of structured experiences, set for a specific goal, and working to achieve it, linked to a specific time, and specific capabilities. (17:16)

Nutritional education: -

It is the process of helping community members to obtain the information and expertise necessary for them to make the appropriate choice of their food in order to maintain their health throughout their lives. (22)

Aerobic exercise: -

Aerobic exercise is the muscular work that depends mainly on oxygen, in the production of energy, and the source of energy is oxygen, so the muscular work is in the limits of low intensity that calls for oxygen necessary to complete and recover from a physical activity, without the presence of an oxygen debt. (1: 207)

Diabetes Mellitus: -

It is the body's inability to produce enough insulin to efficiently represent starches, fats, proteins, and nutrients. (13:9)

Search procedures:

Research Methodology:

The researcher used the experimental method due to its relevance to the nature of the research by means of pre and post measurement on three experimental groups.

Research areas:

Time domain:

- The exploratory study was conducted during the period from 11/15/2019 to 11/29/2019.
- The basic study was conducted during the period from 1/12/2019 to 1/3/2020.

Spatial domain:

The research was applied at Al-Mualla Youth Center and a lecture hall at Al-Mualla Preparatory School and Al-Mumtaz Laboratory for medical analysis in Al-Mualla, Luxor Governorate.

The human domain:

The research was carried out on a group of males with type 2 diabetes non-practicing sports in Luxor Governorate.

Research community:

The study population represents type 2 diabetes patients who are not practicing sports in Luxor Governorate.

Find a sample:

The research sample was deliberately chosen from men with type II diabetes, where the juveniles appear from (45: 55) years in terms of size (20) individuals divided into three groups (10) individuals of a first experimental group (sports program and nutritional education) and (5) Members of a second experimental group (a nutritional education program) and (5) members of a third experimental group

(an exercise program) in exchange for the guidance of the treating physician.

The homogeneity of the sample members:

*Table (1)
shows the relative distribution of the research sample from the total number of the research sample. N = 20*

the sample	Statistical connotations	the number	percentage
First experimental group (sports program and nutritional education)		10	%
Second experimental group (nutritional education program)		5	50%
Third experimental group (sports program)		5	25%
Total		20	25%

Scientific transactions (consistency - honesty) for the nutritional education form:

First: - Stability

*Table (2)
shows the total Alpha Cronbach factor and the Spearman Brown factor for the nutritional education questionnaire. N = 20*

The axes	Alpha Cronbach coefficient for the axis	Spearman Brown's Laboratories
The form as a whole	0.850 *	0.765 *

The value of (R) in the direction and limit of significance at the level of 0.05 = 0.369. Table (2) of the Alpha Cronbach coefficient and the Spearman Brown coefficient of the food education questionnaire indicate that the values of the Alpha Cronbach coefficient reached 0.850, and the Spearman Brown value was 0.765, and these values are greater than the value of the correlation coefficient The tabular level is at 0.05 (0.369). This indicates the stability of the questionnaire.

Second: honesty

-Validity coefficients by the terminal comparison method for the sum of the axes and the total sum of the questionnaire

*Table (3)
shows the terminal comparison between the upper and lower quadrants in the sum of the axes and the grand total for the nutritional education form under investigation. N = 20*

Statistical connotations The axes	The top quadrants N = 5		Minimum quadrant N = 5		The difference between the medians	Value (T)	Factor of honesty
	S	p ±	s	p ±			
<i>The first axis: food culture</i>	10.00	0.00	4.60	0.89	5.40	*13.50	0.98
<i>The second axis: food habits</i>	9.40	0.55	5.20	0.45	4.20	*13.28	0.98
<i>The total number of the form</i>	19.20	0.45	9.80	1.30	9.40	*15.25	0.98

*Significant at (0.05) = (2.31)

It is clear from Table (3) for the differences between the upper and lower quadrants in the sum of the axes and the total sum of the food education questionnaire under investigation to find the validity coefficient of the form, that there are statistically significant differences where the calculated value of (t) ranged between (13.28 to 15.25) and these values Greater than the tabular value of (t) at the level of (0.05) = (2.31), while the values of the validity coefficient in it reached (0.98), which confirms the validity of the whole axes of the questionnaire and the total of the nutritional education questionnaire under discussion.

Devices, methods, and tools used to collect data:

- 1- Expert opinion survey form on used aerobic exercise and food education program.
- 2- An expert opinion survey form to determine the axes of the aerobic exercise program.
- 3- Sample data collection form.
- 4- Food education forms.
- 5- A medical scale to measure weight in kilograms.
- 6- A stopwatch for calculating time.
- 7- The Rasta meter to measure the length.
- 8- Test tubes to analyze the blood sample.
- 9- Plastic syringes size 3 cm for single use.
- 10- White alcohol for disinfection + medical cotton.
- 11- Montor device to measure respiratory rate and pulse rate.
- 12- Gluco Star Blood Glucose Meter.
- 13-Measuring body mass index.
- A pressure device to measure systolic and diastolic pressure.
- 15-Computer and screen display.

Basic experience:

The researchers conducted the proposed aerobic exercise program and nutritional education on people with type 2 diabetes in the period from 1/12/2019 to 1/3/2020 at the Mualla Youth Center in Luxor Governorate, and the researcher trained himself and assisted the assistants after training them on the proposed program. To assist in conducting exercises, educational lectures, and measurements specified for the study, and the measurement of sugar levels during the implementation of the program was followed up by the specialist doctor.

Steps of basic study procedures:

Pre-measurements: The researchers performed pre-measurements of the variables under investigation from 1/12/2019 to 2/12/2019 for the experimental group in question.

Dimensional measurements: Dimensional measurements were made after the end of the week (12) of the application of the program in the period from 2/28/2020 AD to 1/3/2020 AD, and all measurements were applied as was done in the pre-measurement of the variables under consideration and in the same manner.

Statistical processors: The statistical processors were found using the SPSS version 20 program, as follows:

- SMA. Mean.
- Standard Deviation.
- Mediator. Median.
- coefficient of torsion. Skewness.
- Flattening coefficient. Kurtosis.
- Test (T) the differences for the pre-dimensional measurements. Paired Samples T test.
- One-way Anova variance.
- Percentage.
- Change rate %.
- The equation of the percentage change% = (post measurement - premeasurement) ÷ pretest x 100.

Display results:

Analysis of the discrepancy between the first, second and third experimental groups in the anthropometric, physiological, and biochemical measurements and the total axes of the Nutritional Education Questionnaire.

Table (4)
shows the significance of the differences between the three groups (experimental first - experimental second experimental third) In anthropometric measurements in telemetry. N = 20

Statistical connotations	The source of the contrast	sum Squares	Degree Of freedom	Average Squares	Values (V)	Indication level
Measurements	Between groups	137.81	2	68.91	0.84	0.45
	Within groups	1391.93	17	81.88		
	Total	1529.74	19			
Body mass index	Between groups	6.41	2	3.21	0.52	0.61
	Within groups	105.30	17	6.19		
	Total	111.71	19			

*Significance at 0.05 = (3.59)

It is evident from Table (4) that there are no statistically significant differences at the level of 0.05 between the three groups in the anthropometric measurements under study, as the value of (V) calculated in them was (0.84, 0.52) and these values are less than the tabular (V) value is at 0.05 (3.59) and the significance level value is greater than 0.05.

Table (5)
shows the significance of the differences between the three groups (experimental first - experimental second - experimental third) In biochemical measurements, in telemetry. N = 20

Statistical connotations	The source of the contrast	sum Squares	Degree Of Freedom	Average Squares	Values (V)	Indication level	
Measurements							
	The proportion of fasting sugar is lower from 100 mg / dL	Between groups	3598.95	2	1799.48	1.17	0.33
		Within groups	26163.60	17	1539.04		
	Total	29762.55	19				
The proportion of sugar after eating is less from 140 mg / dL	Between groups	1293.60	2	646.80	0,19	0.83	
	Within groups	58949.20	17	3467.60			
	Total	60242.80	19				
Total cholesterol Less than 200 mg / dL	Between groups	41.80	2	20.90	0.15	0.86	
	Within groups	2412.40	17	141.91			
	Total	2454.20	19				
Cholesterol More dense From 40 mg / dL	Between groups	26.80	2	13.40	1.01	0.39	
	Within groups	226.00	17	13.29			
	Total	252.80	19				
Cholesterol Less low density from 130 mg /dl	Between groups	41.62	2	20.81	0.10	0.90	
	Within groups	3469.86	17	204.11			
	Total	3511.48	19				
The percentage of triglycerides Less than 150 mg / dL	Between groups	8.55	2	4.27	0.06	0.94	
	Within	1178.40	17	69.32			
	Total	1186.95	19				

*Significance at the level of 0.05 = (3.59)

It is evident from Table (5) that there are no statistically significant differences at the level of 0.05 between the three groups in the biochemical measurements under investigation, where the calculated value of (P) ranged between (0.06 to 1.17) and these values are less than the value of (Q) The tabular is at 0.05 (3.59) and the significance level value is greater than 0.05.

Table (6)
shows the significance of the differences between the three groups (first experimental - second experimental - third experimental) In physiological measurements, in telemetry. N = 20

Statistical connotations	The source of the contrast	sum Squares	Degree Of Freedom	Average Squares	Values (V)	Indication level	
Measurements							
	Systolic blood pressure	Between groups	1.65	2	0.83	1.24	0.31
		Within groups	11.30	17	0.66		
Total		12.95	19				
Diastolic blood pressure	Between groups	0.85	2	0.43	1.18	0.33	
	Within groups	6.10	17	0.36			
	Total	6.95	19				
Pulse rate	Between groups	46.95	2	23.48	*7.98	0.00	
	Within groups	50.00	17	2.94			
	Total	96.95	19				
Respiratory rate	Between groups	4.45	2	2.23	*4.45	0.03	
	Within groups	8.50	17	0.50			
	Total	12.95	19				

*Significance at 0.05 = (3.59)

It is evident from Table (6) that there are statistically significant differences at the level of 0.05 between the three groups in the physiological measurements (pulse rate - respiratory rate) under consideration, as the value of (q) calculated (7.98 to 4.45) and these values are greater than the value of (q) tabular At the level of 0.05 (3.59) and the value of the significance

level is less than 0.05. , While there are no statistically significant differences in the rest of the physiological measurements under investigation, as the calculated (P) values were less than the tabular (P) value at the level of (0.05) = 3.59, and the value of the level of significance was greater than (0.05).

Table (7)
shows the significance of the differences between the three groups (experimental first - experimental second - experimental third) in the total axes of the dietary education questionnaire in the post measurement. N = 20

Statistical connotations The axes	The source of the contrast	sum Squares	Degree Of Freedom	Average Squares	Values (V)	Indication level
The first axis: food culture	Between groups	81.80	2	40.90	*86.91	0.00
	Within groups	8.00	17	0.47		
	Total	89.80	19			
The second axis: food habits	Between groups	45.10	2	22.55	*27.19	0.00
	Within groups	14.10	17	0.83		
	Total	59.20	19			
The total number of the form	Between groups	248.10	2	124.05	*76.13	0.00
	Within groups	27.70	17	1.63		
	Total	275.80	19			

*Significance at 0.05 = (3.59)

It is evident from Table (7) that there are statistically significant differences at the level of 0.05 between the three groups in the total axes of the food education questionnaire under investigation, where the value of (q) calculated ranged between (27.19 to 86.91) and these values are greater than the value of (q) table at the level of 0.05 (3.59) The significance value is less than 0.05.

Discussing the results:

Discussion of the discrepancy between the first, second and third experimental groups in the anthropometric, physiological, and biochemical parameters, and the total subjects of the Nutritional Education Questionnaire.

A) Discussion of the significance of the differences between the three groups (first experimental – second experimental - third experimental) in anthropometric measurements in telemetry:

It is evident from Table (4) that there were no statistically significant differences between the three groups in the anthropometric measurements under study.

- 1- About body weight (kg): There were no significant differences in the measurements between the three experimental groups.
- 2- About body mass index (BMI) kg / m²: there were no significant differences in the measurements between the three experimental groups.

The researchers attribute these results to the positive effect of the sports program and the nutritional education program on weight and body mass index, as the practice of aerobic exercise in general is a call for the continuation of public health, weight loss and physical fitness gain and maintenance, and the pursuit of improving it . (4: 5)

B) Discussion of the significance of the differences between the three groups (experimental first – experimental second - experimental third) in biochemical measurements in telemetry:

It is evident from Table (5) that there are no statistically significant differences between the three groups in the biochemical measurements under investigation.

- 1- About the proportion of Fasting sugar: There were no significant differences in the measurements between the three experimental groups.
- 2- About the proportion of sugar after eating: There were no significant differences in the measurements between the three experimental groups.

In terms of the positive effect of sports activity on the level of blood sugar, these results are consistent with the findings of Muhammad Ahmad Abdu (1995) (15), Mustafa Muhammad Nour (1995) (18), Khaled Jabir Abdul Hamid (1998) (8) ,Salwa Abdel Hadi Shakib(1997)(10),Taha al-Sayyid Nasreddin (2001) (12), Ammar Hamza Hadi al-Husseini (2009)(14), Muhammad Abd al-Wahhab Muhammad Hassan (2013) (16), Baghdadi Syed Hassan Ahmad (2014) (4).

C) Discussion of the significance of the differences between the three groups (first experimental – second experimental - third experimental) in the physiological measurements in the telemetry:

Table (6) shows that there are statistically significant differences between the three groups in the physiological measurements (pulse rate - respiratory rate) under consideration, while there are no statistically significant

differences in the rest of the physiological measurements (systolic pressure - diastolic pressure) under study.

1- About pulse rate: There are significant differences in telemetry in favor of the first experimental group.

The researchers attribute these differences to the positive effect of the sports program and nutritional education on the pulse rate more than the satisfied program and more than the nutritional education program.

The pulse rate reflects the amount of heart work that must be worked out to meet the increasing demands of the body during the exercise of physical exertion, and the average pulse rate during rest ranges from (60) to (80) beats per minute in the average age of a healthy adult individual, and this rate may increase in some individuals Lovers of rest and sitting, and a little movement, as it reaches about (100) beats / minute, and if this person is trained on endurance exercises per week for a period of (12) weeks, we notice that the heart rate will decrease by about one pulse / minute every week, and this means that continuous moderate endurance training will Helps lower pulse rate (9: 78)

2- Regarding respiratory rate: there are significant differences in telemetry in favor of the first experimental group.

During physical exertion, breathing increases in depth, in the frequency of the respiratory rate, and thus in the volume of ventilation, and when the individual stops exerting physical exertion, breathing rates return to normal. (7: 17) The researchers explain that the resulting change in respiration rate between measurements in favor of the first experimental group is a result of adaptation of the respiratory circulatory system to increase the demand for oxygen,

i.e., when performing a physical load that requires energy production, and that the respiratory rate is related to pulmonary ventilation, which in turn increases to ensure oxygen access to the lungs.

3- As for systolic pressure: There were no significant differences in the post measurement between the three experimental groups.

4- About diastolic pressure: There were no significant differences in the telemetry between the three experimental groups.

The researchers conclude that these changes are the result of the impact of sports activity on the respiratory circulatory system to fulfill its requirements for the various body systems, the increase in the need for the skin and other tissues for blood to maintain the temperature and the completion of metabolic processes, and that the high temperature of the air affects the volume of fluids in the body, which leads to no Ventricular fullness and this factor in turn affects cardiac impulse and blood pressure.

D) Discussion of the significance of the differences between the three groups (first experimental - second experimental - third experimental) in the total axes of the nutritional education questionnaire in the telemetry:

Table (7) shows that there are statistically significant differences between the three groups in the total axes of the food education questionnaire under investigation.

1- About the first axis (food culture): there are significant differences in favor of the second experimental group.

The researchers attribute these differences in results to the application of the nutritional education program, which resulted in an increase in health awareness, nutritional education, identification of the elements of food and their importance to the human body in general, and the identification of prohibited and permissible foods for type 2 diabetes under study.

It is well known the importance of the effect of food on health, and attention should be paid to nutritional education and the spread of food culture among members of society, with a focus on girls and women, given that they are responsible for preparing family food and managing its affairs in general, and women's awareness of safe food leads to improving the health level of the family and society. (22)

2- About the second axis (food habits): there are significant differences in favor of the first experimental group.

The researcher attributes these differences in results to the application of the sports program and nutritional education, which resulted in an increase in health awareness and nutritional education, identifying the elements of food and their importance to the human body in general, and identifying the forbidden and permissible of food for type 2 diabetes under study.

Nutrition education is one of the most important topics that we must pay great attention to spread nutritional health awareness, and for food education to be effective, it must be based on the latest discoveries in nutrition sciences, and food education programs need to consider developments in our understanding of nutrition and behavioral changes. These programs must include several basic points, including the definition of the importance of good nutrition, the quantities of food that we must eat and sufficient for our activity, the preparation of good family meals, and the preservation of food safe and clean. (22)

3- About the total number of the questionnaire: There are significant differences in favor of the second experimental group.

Nutrition education is the process of helping community members to obtain the information and expertise necessary for them to make the appropriate choice of their food to maintain their health throughout their lives.

Enjoying good health and thus their ability to work and develop society in all fields. (22)

Conclusions:

Based on what the research results showed and considering the objectives and assumptions of the research, the methodology and the measurements used and within the limits of the research sample and its characteristics, and depending on the results of statistical treatments of the data extracted from the experiment, the researchers reached the following conclusions:

The effect of the nutritional and sports education program has a positive effect on developing and improving the biochemical and physiological variables of type 2 diabetes patients, as this research showed improvement in the following variables: -

Anthropometric variables:

Where the results showed a percentage of improvement by decreasing both (weight - body mass index) among the subjects of the research sample, and the percentage ranged between (6.57%, 6.69%) as a result of applying the sports program and nutritional education on type II diabetics.

Bio-chemical variants:

Where the results showed an improvement rate with a decrease in (fasting blood sugar - fatty sugar - total cholesterol

- low density cholesterol - triglyceride percentage) and an increase in (high density cholesterol) among the subjects of the research sample, and the percentage ranges between (6.39%) , 20.33%) as a result of applying the sports program and nutritional education to type 2 diabetics.

Physiological variables:

Where the results showed a percentage of improvement in (systolic blood pressure - diastolic blood pressure - pulse rate - respiratory rate) among the subjects of the research sample, and the ratio ranged between (1.30%, 15.89%) as a result of applying the sports program and nutritional education on type II diabetics.

Variables of the total axes of the nutritional education questionnaire:

Where the results showed a rate of improvement and change for the better in (the first axis: food culture - the

second axis: the nutritional habits) of the individuals of the research sample and the percentage ranges between (168.75%, 235.71%) as a result of applying the nutritional education program on the second experimental group of type II diabetes patients.

Recommendations:

In light of the research results and within the limits of the research sample and its procedures, the researchers recommend the following :-

- The application of the sports program and nutritional education for its effectiveness in improving the anthropometric, physiological and biochemical variables of type II diabetes patients.
- Spreading awareness among community members about diabetes, its causes and methods of prevention, with clarification of the role of sports practice and nutritional education as one of the means of preventing various diseases, including diabetes and various heart diseases.
- The need to conduct more studies to contribute to treating or delaying the onset of complications for diabetics.
- Conducting more research and studies on other dental stages.

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