The effect of a recreational sports program on some biochemical variables and the quality of life of patients with type II diabetes

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Research Summary

This research aimed to develop a recreational sports program for diabetics of the second type and to know the impact of this on the level of blood glucose and cumulative blood sugar and cholesterol and dimensions of quality of life for diabetics of the second type aged (37- 45) years, and the researcher used the experimental approach on a sample of (15) diabetics of the second type, and research tools: Biochemical measurements - quality of life scale for type II diabetics - The proposed sports recreational program.

Among the most important results:

1- The proposed sports recreational program has a positive statistical impact on some biochemical variables (blood glucose level "random sugar" - cumulative blood sugar - blood cholesterol (good) "HDL" - blood cholesterol (bad) "LDL") for diabetics of The second type is aged (37-45) years.

2- The proposed sports recreational program has a positive impact statistically on the level of dimensions of quality of life (public health - family life - married life - professional life - religious life - social life - personal life life satisfaction - mental health) for diabetics of the second type aged (37-45) years.

3- There are improvement rates for the dimensional measurement of the tribal members of the basic research sample in the biochemical variables under research ranged between (13.19% - 22.69%).

4-There are improvement rates for the dimensional measurement of the tribal members of the basic research sample in the dimensions of the quality of life under research ranged between (13.22% - 21.71%).

Introduction and research problem:

Recreational sports have become integral to educational and social systems worldwide. They offer various physical, mental, and social benefits, enhancing overall well-being and productivity. By providing opportunities for individuals to engage in sports according to their interests and abilities, society promotes inclusivity and personal development.

Recreational sports, as described **by Huda Hassan Mahmoud (2010)**, involve a range of physical activities and sports programs, significantly affecting the physical and physiological aspects of individuals participating in these activities.

Kamal Darwish and Mohammed Al-Hamahmi (2007) emphasize that recreational activities are integral to social structures and individual behavior, helping achieve work-life balance and contributing to personal happiness. They serve as solutions to contemporary life challenges and promote balanced personal growth, societal stability, and

enriched lives in line with modern times. (7:16)

According to **Nadia Nehad Hamed (2014)**, participating in physical sports activities not only benefits the body but also positively impacts the psychological aspect of individuals by diminishing aggressive and emotional tendencies. (21:53)

Diabetes is highly prevalent today and poses a serious threat to individuals due to its systemic impact on the body, potentially resulting in organ failure without adequate care and attention.(20:75)

Mustafa Mohammed Nour (2015) emphasizes that diabetes is a lifelong condition necessitating ongoing treatment and medical supervision. Unlike typical diseases, it affects every part of the body negatively, from the skin to the bones, impacting various organs, including the heart, blood vessels, nerves, and muscles. (20:81)

The World Health Organization has confirmed that diabetes is on the rise, spreading globally. Statistics anticipate an increase from 171 million to 336 million affected individuals between 2000 and 2030. (11:33)

Diabetes comes in various forms, such as type I and type II. Type II diabetes, as highlighted by the World Health Organization, has witnessed significant global spread. In 2000, approximately 175 million people were affected, with projections indicating this number will surpass 300 million by 2025. This prevalence is expected to exceed 300 million in various countries by the same year. (27:85)

According to **Nadia Nehad Hamed (2014)**, diabetic patients need both proper nutrition and suitable exercise to manage their condition effectively and achieve optimal health. Exercise is considered as important as dietary control, often referred to as "unprescribed insulin" due to its similar effects. (21:66)

Quality of life has become a crucial aspect for achieving mental well-being in modern times. This concept gained significant scientific recognition during the last two decades of the previous century, as noted by **God (2010)**. (31:42)

Lynda (2015) and Gerber (2018) agree that quality of life involves social relationships, physical and mental health, cognitive abilities, and emotional expression within cultural and economic contexts. It's a subjective concept varying from person to person based on their psychological, spiritual, mental, and physical requirements. (32:43)(29:165)

The concept of quality of life, as defined by **Frank (2010)** and **Ring (2017)**, encompasses seven dimensions: emotional balance, physical health, professional and familial stability, social interaction, economic stability, and sexual compatibility. These aspects reflect various aspects of an individual's well-being and satisfaction in life. (28:48)(34:178)

Despite extensive scientific studies on diabetes, including those by **Samira Mohammed oraby, Heba Hassan Aldamiri, Asmaa Yehya Ezzat, Belabas Ben Keroua Manal, Habiba Daif Allah, Solimani Rahma,**

Kahli Kamal, Ahmed Rashad Tawfik, Nasser Mustafa Al-Suwaify, and others, there's a notable gap regarding the impact of recreational sports programs on type II diabetes patients' biochemical variables and quality of life.

The researcher's practical experience highlights that outpatient clinics often overlook the importance of recreational sports activities in managing diabetes, focusing more on medication and diet. This neglect has adversely affected patients' health and happiness, underscoring the need for specialized recreational sports programs for type II diabetes patients to improve their quality of life.

The researcher's experience in recreational sports and sports for all, coupled with visits to outpatient clinics in Cairo hospitals, highlights a significant oversight in patient care. Clinics primarily focus on medication schedules and dietary habits for type II diabetes patients, neglecting the therapeutic benefits of engaging in recreational sports activities. This disregard has contributed to declining health and diminished quality of life among patients, leading to decreased happiness. The absence of specialized recreational sports programs tailored for type II diabetes patients, incorporating movement, enjoyment, and interaction through games and simple exercises, exacerbates this issue.

Recognizing the vital role of recreational sports programs and the broader implications of the current research problem, which extends beyond type II diabetes patients to the wider community, the researcher conducted this study to explore the effects of a recreational sports program on biochemical variables and quality of life among type II diabetes patients aged 37 to 45 years.

Research Objectives:

The goals of this study involve devising a suggested recreational sports program comprising diverse recreational activities and assessing its effects on:

1- Blood glucose and glycated hemoglobin levels in type II diabetes patients aged between 37 and 45 years.

2- Blood cholesterol levels in type II diabetes patients aged between 37 and 45 years. 3- Aspects of quality of life in type II diabetes patients aged between 37 and 45 years.

Research hypotheses:

1- There are significant statistical variances between traditional and dimensional measurements in the core research sample for specific biochemical variables (blood glucose level, glycated hemoglobin level, HDL cholesterol, LDL cholesterol), with dimensional measurements being favored.

2- Significant statistical differences are found between traditional and dimensional measurements in the core research sample across multiple dimensions of life quality (including general health, family, marital, professional, religious, social, personal satisfaction, and mental health), favoring dimensional measurements.

3- Improvement trends are evident in dimensional measurements compared to traditional ones within the core research sample concerning both

biochemical variables and dimensions of life quality.

Research Terminology:-

Recreation:

Recreation refers to engaging in constructive activities during free time without expecting financial gain, aiming to acquire mental, social, physical, and health benefits to achieve balance and integration in individuals, preparing them for their overall lives.(19: 64)

Recreation Program:

A recreation program comprises recreational activities selected by participants and supervisors, conducted either in an organized or spontaneous manner at a specified time and place, typically during leisure hours. The program aims to achieve the objectives of recreation and recreational education through the participation of individuals. (12: 52)

Quality of Life:

Quality of life refers to an individual's satisfaction with life, including feelings of happiness, optimism, and overall well-being in physical, psychological, environmental, and temporal aspects, resulting in a life filled with positive experiences. (28:48)

Diabetes:

Diabetes is characterized by metabolic disturbances causing the body's inability to properly utilize glucose in the blood, leading to high blood sugar levels. This can result from either a complete or partial lack of insulin produced by the pancreas or the ineffectiveness of insulin on the body's cells. (4:8)

Type II Diabetes:

Type II diabetes is characterized by reduced insulin effectiveness on cells, frequently accompanying weight gain. Initially, there's a substantial release of insulin by the pancreas, followed by a decline, posing a risk of high blood sugar levels. (24:59)

Cholesterol:

Cholesterol is a form of fat generated either from the breakdown of vitamin D in food or synthesized from bile in the liver. (35:95)

Reference Studies:

Samira Mohammed Oraby and Heba Hassan Al-Dameeri (2014) (11) conducted a study in Jordan focusing on the effects of aquatic exercises on physiological variables and blood sugar levels in women with type II diabetes. Their experimental approach involved a sample of 16 women diagnosed with type II diabetes. The study found that aquatic exercises had a positive impact on both physiological variables and blood sugar levels in these women.

Asmaa Yehya Ezzat (2021) conducted (3) study on the impact of a recreational sports program on psychological happiness and social adaptation among orphanage children in the Eastern Province. Using an experimental approach, the study involved 12 orphan children aged 9 to 11 years. The findings revealed that the proposed sports program significantly enhanced the children's psychological happiness and social adaptation.

Balabbas Ben Keroua Manal (2021) conducted (6) study to assess the effectiveness of a recreational

sports program on psychological health variables and life satisfaction among the elderly. Using an experimental approach, the researcher studied 30 participants, dividing them equally into experimental and control groups. The study found that the recreational sports program significantly improved certain psychological health aspects and life satisfaction among the elderly participants.

Habiba Dhaif Allah (2021) conducted (9) study to investigate the effect of a proposed therapeutic exercise program on enhancing the psychological health of type II diabetes patients. Using an experimental approach with a sample of 20 diabetic patients, dividing them equally into experimental and control groups, the study found that the proposed program had a positive impact on improving the psychological health of type II diabetes patients.

Solimani Rahma and Kahli Kamal (2022) conducted (11) study to investigate the effects of a proposed recreational sports program on alleviating depression among seniors aged 50-60. They employed an experimental approach, dividing a sample of 60 elderly men equally into two groups: an experimental and a control group. Their findings highlighted that engaging in recreational sports activities resulted in a reduction in depression levels among the elderly participants.

Ahmed Rashad Tawfik (2022) conducted (2) study aimed at investigating the effect of a recreational sports program on the quality of life among sitting volleyball players. The researcher employed an experimental approach, with a sample consisting of 20 volleyball players. Among the key findings was that the recreational sports program had a positive impact on the quality of life among sitting volleyball players.

Nasser Mustafa Al-Suwaifi and others (2022) conducted (22) research aimed at examining the impact of an aerobic exercise regimen and dietary advice on blood lipid levels in type II diabetes patients aged 50-55 years. Employing an experimental methodology, the study involved a sample of 30 individuals diagnosed with type II diabetes. The findings revealed significant differences between the initial and final measurements of blood lipids in the experimental group, favoring the final measurements.

Research Procedures:-
Research Methodology:

The researcher utilized the experimental method due to its suitability for the nature of the study, employing a single-group experimental design using pretest-posttest measurements.

Research Population: The research population comprised type II diabetes patients attending the specialized Al Marwa Hospital in Cairo in the year 2021/2022, totaling 120 patients aged between 37 and 45 years.

Research Sample: The researcher selected the research sample purposively from type II diabetes patients attending Al Marwa Hospital in Cairo in 2021/2022, resulting in 25 patients aged between 37 and 45 years

who agreed to participate in the research experiment. Ten patients were excluded as they were part of the survey study sample, leaving the primary research sample consisting of 15 type II diabetes patients, representing 12.50% of the total population. Table 1 illustrates the classification of the research sample.

Table (1)
Classification of Research Sample

research community	research sample	survey sample	Basic sample	percentage
120	25	10	15	12.50%

The researcher evaluated the balance in distributing individuals within the primary research sample across various variables that could impact the experimental variable, including age, height, weight, patient age, blood glucose level, glycated hemoglobin level, blood cholesterol level, and quality of life for type II diabetes patients. This assessment was conducted using scientifically validated procedures for measuring quality of life. The findings are presented in Tables (2), (3), and (4).

Schedule (2)
Moderation in distributing individuals within the primary research sample in (age, height, weight, patient age) n = 15

Variables	Unit of measurement	Average	Deviation	Mediator	Skewness
Age	Year	41.50	3.71	40.00	1.21
Height	CM	175.80	7.96	172.00	1.43
the weight	Kg	89.25	5.64	87.00	1.19
Sick age	Year	6.10	2.81	5.00	1.17

The table number (2) shows that all values of the skewness coefficients for variables (age, height, weight, patient age) ranged between (1.17 : 1.43), indicating that they are within the range of (±3), which indicates the normal distribution of individuals in the core research sample in these variables.

Table (3)
Moderation in distributing individuals in the core research sample in the biochemical variables under investigation n = 15

Variables	Unit of measurement	Average	Deviation	Mediator	Skewness
Biochemical variables: Blood glucose level (random sugar)	mg/dL	240.41	21.39	234.00	0.90
Accumulated blood sugar level	%	8.15	1.12	7.80	0.94

Follow Table (3)
Moderation in distributing individuals in the core research sample in the biochemical variables under investigation n = 15

Variables	Unit of measurement	Average	Deviation	Mediator	Skewness
Cholesterol in the blood(good) (HDL)	mg/dL	38.17	5.46	36.75	0.78
Cholesterol in the blood(harmful) (LDL)	mg/dL	142.92	29.73	133.18	0.98

It is evident from Table (3) that all values of the skewness coefficients for the biochemical variables under investigation ranged between (0.78 : 0.98), indicating that they were confined within (±3), suggesting the balance in the distribution of individuals in the core research sample in these variables.

Table (4)
Moderation in distributing individuals within the primary research sample in the dimensions of quality of life under investigation n = 15

Variables	Unit of measurement	Average	Deviation	Mediator	Skewness
Quality the health the public	Class	27.47	4.62	26.00	0.95
Quality life Family	Class	20.20	3.25	19.00	1.11
Quality life Marital	Class	29.00	3.47	28.00	0.86
Quality life Professional	Class	12.53	2.24	12.00	0.71
Religious life Quality	Class	23.67	2.81	23.00	0.72
Social life Quality	Class	17.00	3.12	16.00	0.96
Quality life Personal	Class	21.00	3.39	20.00	0.88
the satisfaction on life	Class	12.80	2.24	12.00	1.07
Quality the health Mental	Class	20.27	3.48	19.00	1.09
The scale as a whole	Class	183.94	28.62	175.00	0.94

It is evident from Table 4 that all values of skewness coefficients for the dimensions of quality of life ranged between 0.71 and 1.11, which indicates that they were within the range of ±3, indicating the normal distribution of individuals in the primary research sample in these variables.

Data collection tools:

It is divided into the following:

First: Biochemical Measurements Under Study:

The biochemical variables (blood glucose level "random sugar" - glycated hemoglobin level - blood cholesterol "HDL" - blood cholesterol "LDL") were measured by drawing blood samples (5 ml) from individuals in the primary research sample, conducted by a specialized physician in medical analysis. These samples were then immediately transferred to the medical analysis laboratory at Al Marwa Specialized Hospital in Cairo.

Secondly: Quality of Life Scale Under Study: Appendix (1)

The researcher reviewed numerous specialized scientific references and studies related to the research topic to identify a quality of life scale for diabetic patients (2), (3), (6), (9), (14). Through this scientific procedure, the researcher arrived at a quality of life scale prepared by Gonass Ismail (2021) (14), which included 55 statements distributed across 9 dimensions. The first dimension is General Health Quality, consisting of 9 statements. The second dimension is Family Life Quality, consisting of 6 statements. The third dimension is Marital Life Quality, consisting of 9 statements. The fourth dimension is Professional Life Quality, consisting of 4 statements. The fifth dimension is Religious Life Quality, consisting of 6 statements. The sixth dimension is Social Life Quality, consisting of 5 statements. The seventh dimension is Personal Life Quality, consisting of 6 statements. The eighth dimension is Life Satisfaction, consisting of 4 statements. The ninth dimension is Mental Health Quality, consisting of 6 statements.

Respondents rate themselves on the scale according to a five-point Likert scale (1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). Thus, the maximum score on the scale is 275, and the minimum is 55. The higher the score, the higher the level of quality of life. Quality of life levels are categorized as follows: scores between 50-140 indicate a low level, scores between 141-201 indicate a moderate level, and scores above 202-275 indicate a high level.

Thirdly: Devices and tools used in the research:

- Stadiometer for measuring total body height.
- Calibrated medical scale for weight measurement.
- Centrifuge machine to separate blood components with a speed of up to (5000) revolutions per minute.
- Single-use syringes.
- Icebox for preserving blood samples.
- Heparin as an anticoagulant.
- Disinfectants, cotton, and bandages.
- Stickers to write the names of research participants on test tubes.
- Adequate number of test tubes for collecting and storing blood samples.
- Swedish benches.   - Stopwatch.
- Footballs, basketballs, and handballs.
- Table tennis set.   - Colored leather balls of different sizes.
- Colored training cones.

Scientific transactions (honesty–Reliability) of the quality of life scale:-

Firstly: honesty Coefficient:

The researcher calculated the validity coefficient of the Quality of Life scale using logical validity. This

was achieved by presenting the content of the scale under research to (3) professors of general psychology and psychological measurement at Helwan University (Appendix 2) to assess the extent of agreement and logical consistency of the scale's statements with its intended purpose. The results showed a consensus among the experts at a rate of 100%, indicating the logical validity of the Quality of Life scale.
Secondly: Reliability Coefficient:

For determining the reliability coefficient, the researcher employed the test-retest method. This involved administering the Quality of Life scale to a group of 10 patients from both within and outside the primary sample. After a 10-day interval, the same scale was reapplied to the same group. The researcher then computed the simple correlation coefficient between the results of the initial and subsequent administrations, as illustrated in Table (5).

Schedule(5)
Factor Consistency Quality of life scale N= 10

Scale dimensions	Unit of measuring	first application		Second application		value "R"
		M	A	M	A	
Quality the health the public	Class	27.00	4.29	27.50	3.66	0.795*
Quality life Family	Class	19.80	3.03	20.00	2.91	0.818*
Quality life Marital	Class	28.50	3.17	28.80	3.25	0.803*
Quality life Professional	Class	12.30	2.25	12.50	2.38	0.811*
Religious life Quality	Class	23.40	2.69	23.60	2.51	0.817*
Social life Quality	Class	16.90	3.01	17.00	3.17	0.829*
Quality life Personal	Class	20.70	3.15	21.00	3.04	0.798*
the satisfaction on life	Class	12.50	2.26	12.70	2.49	0.814*
Quality the health Mental	Class	20.00	3.19	20.40	3.15	0.802*
The scale as a whole	Class	181.10	27.04	183.50	26.56	0.620*

The tabulated "R" value at the 0.05 level = 0.632. *Indicates at the 0.05 level.

From Table 5, it is evident that there is a statistically significant correlation at the 0.05 level between the first and second applications of the dimensions of the quality of life scale, indicating the stability of the scale under investigation.

The proposed recreational sports program-:
Firstly, the program objectives:
1-To reduce blood glucose levels and glycated hemoglobin levels in type II

diabetes patients through engaging in various recreational sports activities within the proposed recreational sports program.
2-To reduce harmful blood cholesterol levels and improve beneficial blood cholesterol levels in type II diabetes patients.
3-To enhance the quality of life for type II diabetes patients.
4-To provide opportunities for diabetes patients to engage in recreational

sports activities that align with their physical, health, and psychological capabilities.

Secondly: Principles of Developing the Proposed Recreational Sports Program:

1- Recreational sports activities should not be complex and should be characterized by diversity.

2- The program should be engaging and attractive to encourage patients to participate, allowing them to release their latent energy.

3- Utilize various recreational sports games based on cooperation and social interaction among diabetes patients.

4- Incorporate simple physical exercises and provide rest periods when fatigue is observed in diabetes patients.

5- Consider the factor of safety and security in the designated area for implementing the program and the tools used.

Thirdly: Content of the Proposed Recreational Sports Program:

To develop the proposed recreational sports program, the researcher reviewed specialized scientific references in the field of recreation and recreational programs, as well as various studies related to the research topic. After determining the program content, it was presented to a group of recreation professors at the faculties of physical education. Some exercises were modified and simplified to suit the nature of diabetes patients, while some activities and exercises were removed due to their difficulty.

Experts recommended that the duration of each session of the program should range from 30 to 40 minutes,

with a continuous duration of 10 weeks.

Fourthly: Daily Recreational Unit:

The daily recreational unit is divided into three parts:

A. Preliminary Part (Warm-up):

This part includes a variety of simple exercises such as walking, running, jumping, and small games. Its aim is to prepare the body for the main part of the program, and it takes approximately 10 minutes to complete.

B. Main Part:

This part consists of organized physical exercises, individual and group sports activities, and some small games. Various colorful tools suitable for the research sample were used. This part takes about 17 to 27 minutes to complete.

C. Concluding Part:

This part includes some relaxation exercises and takes approximately 3 minutes to complete.

The exploratory study:

The researcher conducted an exploratory study on a sample of (10) diabetic patients from the research community, outside the primary sample, from May 22, 2022, to May 26, 2022, with the aim of identifying the following:

• The suitability of the proposed program content for the research sample individuals.

• The appropriateness of the tools used and their ease of use during program application.

• Potential challenges that the researcher might encounter during implementation.

The exploratory study identified potential implementation challenges.

However, results showed that the content of the proposed recreational sports program was suitable for application, and the tools were deemed appropriate. Thus, the proposed program was deemed suitable for implementation on the primary research sample. (Appendix 4)

Pre-measurements :

The researcher conducted pre-measurements on individuals from the primary research sample in biochemical variables (random blood glucose level, hemoglobin A1c percentage, HDL cholesterol, and LDL cholesterol), as well as dimensions of quality of life, on May 29, 2022.

Implementation of the Proposed Recreational Sports Program: The content of the proposed recreational sp

Post-intervention measurements:

The researcher conducted post-intervention measurements for the individuals in the primary research

sample in the biochemical variables and dimensions of quality of life under investigation, on Sunday, August 7, 2022, under the same conditions and procedures applied in the pre-measurements.

Statistical methods under investigation:

The researcher utilized the statistical software (SPSS) to statistically process the data and employed the following statistical methods:

- Mean.   - Standard deviation.
- Median.   - Skewness coefficient.
- Pearson correlation coefficient.
- T-test.

Presentation and discussion of results:

First: Display the results:

Schedule(6)

indication Differences between Pre and post measurements for individuals in the research sample the basic In the biochemical variables under investigation, n = 15

Variables	measuring unit	Pre-measurement		Dimensional measurement		T value
		M	A	M	A	
Blood glucose level (random sugar)	mg/dL	240.41	21.39	205.00	14.82	5.67*
Accumulated blood sugar level	%	8.15	1.12	7.20	0.77	2.94*
Cholesterol in the blood(good) (HDL)	mg/dL	38.17	5.46	46.83	3.94	4.71*
Cholesterol in the blood(harmful) (LDL)	mg/dL	142.92	29.73	120.25	18.62	2.83*

The tabulated (t) value at the 0.05 level of significance is 2.145.

The table (Table 6) indicates statistically significant differences at the 0.05 level between the pretest and posttest measurements for the

individuals in the primary research sample in the biochemical variables (random blood glucose level, glycosylated hemoglobin percentage,

high-density lipoprotein "HDL" cholesterol, and low-density lipoprotein "LDL" cholesterol) in favor of the posttest measurements.
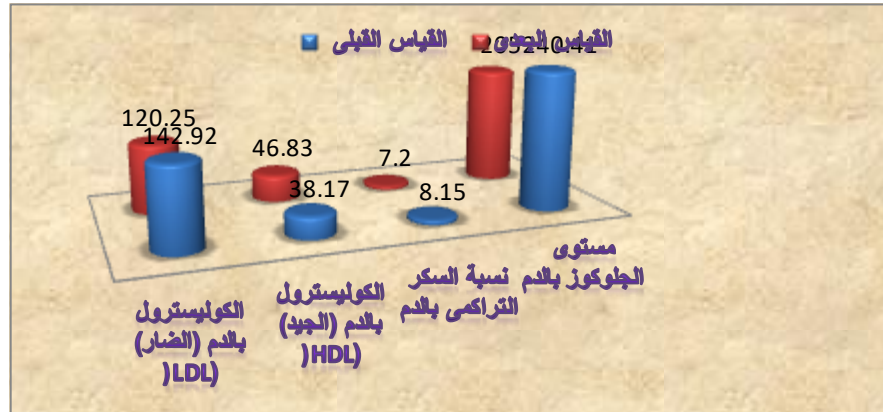

Figure no(1)
Indication Differences between Pre and post measurements for individuals in the research sample the basic In the biochemical variables under investigation
Table (7)
Rates of improvement in the post-test and pre-test measurements for individuals in the research sample the basic In the biochemical variables under investigation

Variables	measuring unit	One group n = 15		
		Tribal	after me	Improvement rates
Blood glucose level (random sugar)	mg/dL	240.41	205.00	17.27%
Accumulated blood sugar level	%	8.15	7.20	13.19%
Cholesterol in the blood(good) (HDL)	mg/dL	38.17	46.83	22.69%
Cholesterol in the blood(harmful) (LDL)	mg/dL	142.92	120.25	18.85%

Table (7) shows improvement percentages for the posttest compared to the pretest for individuals in the primary research sample in the biochemical variables under study, ranging from 13.19% to 22.69%.

Schedule(8)
Indication Differences between Pre and post measurements for individuals in the primary research sample in the dimensions of quality of life under study   n = 15

Variables	measuring unit	Pre-measurement		Dimensional measurement		T value
		M	A	M	A	
Quality the health the public	Class	27.47	4.62	33.20	3.15	4.02*
Quality life Family	Class	20.20	3.25	23.87	2.61	3.59*
Quality life Marital	Class	29.00	3.47	34.53	2.79	4.86*

Follow Schedule(8)

Indication Differences between Pre and post measurements for individuals in the primary research sample in the dimensions of quality of life under study   n = 15

Variables	measuring unit	Pre-measurement		Dimensional measurement		T value
		M	**A**	**M**	**A**	
Quality life Professional	Class	12.53	2.24	14.47	1.56	2.72*
Religious life Quality	Class	23.67	2.81	26.80	2.03	3.51*
Social life Quality	Class	17.00	3.12	20.60	2.48	3.49*
Quality life Personal	Class	21.00	3.39	24.87	2.66	3.35*
the satisfaction on life	Class	12.80	2.24	15.40	1.49	4.01*
Quality the health Mental	Class	20.27	3.48	24.67	2.73	3.96*
The scale as a whole	Class	183.94	28.62	218.41	21.50	3.73*

(t) value at the 0.05 level is 2.145, indicating significance at the 0.05 lev

Table (8) reveals statistically significant variances at the 0.05 significance level between the pre-test and post-test measurements for individuals in the primary research sample in various dimensions of quality of life, favoring the post-test measurements.
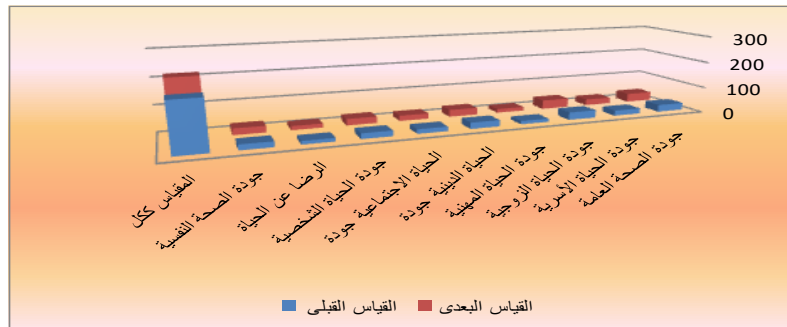

Figure no(2)

Indication differences between Pre and post measurements for the members of the basic research sample in the dimensions of the quality of life under research

Table (9)

The improvement percentage of the post-test measurements over the pre-test for individuals in the primary research sample in the dimensions of quality of life under investigation

Variables	measuring unit	One group n = 15		
		Tribal	**after me**	**Improvement rates**
Quality the health the public	Class	27.47	33.20	20.86%
Quality life Family	Class	20.20	23.87	18.17%
Quality life Marital	Class	29.00	34.53	19.07%

Follow Table (9)
The improvement percentage of the post-test measurements over the pre-test for individuals in the primary research sample in the dimensions of quality of life under investigation

Variables	measuring unit	One group n = 15		
		Tribal	after me	Improvement rates
Quality life Professional	Class	12.53	14.47	15.48%
Religious life Quality	Class	23.67	26.80	13.22%
Social life Quality	Class	17.00	20.60	21.18%
Quality life Personal	Class	21.00	24.87	18.43%
the satisfaction on life	Class	12.80	15.40	20.31%
Quality the health Mental	Class	20.27	24.67	21.71%
The scale as a whole	Class	183.94	218.41	18.74%

The table number (9) shows improvement percentages for the post-test measurements over the pre-test for individuals in the primary research sample in the dimensions of quality of life under investigation, ranging from 13.22% to 21.71%.

Discussion of Results:

A-   Discussion of Results for the First Hypothesis:

The results from Table 6 and Figure 1 reveal statistically significant differences at the 0.05 level between pre-test and post-test measurements for individuals in the primary research sample in various biochemical variables, including blood glucose level (random sugar), glycated hemoglobin level, and cholesterol levels (HDL and LDL).

The suggested recreational sports program led to notable enhancements in biochemical factors among type II diabetes patients. It featured enjoyable activities such as small games, adding to patients' joy. Simple physical exercises further boosted health and fitness, while team sports and table tennis improved functional aspects. Consequently, there were reductions in random sugar, glycated hemoglobin, and harmful cholesterol levels, alongside an elevation in beneficial cholesterol levels. This underscores the significance of tailored sports programs in managing diabetes, aligning with Tahani Abdel Salam's research on the benefits of recreational sports in enhancing physical fitness and overall well-being.

The results align with previous research by **oraby and Al-Dameri (2014) and Al-Suweifi et al. (2022)**, highlighting the significance of recreational sports programs in enhancing functional aspects and managing blood sugar and fat levels in type II diabetes patients. Furthermore. **Bazzar Ali (2017)** emphasizes that although diabetes is chronic, proper management through medical advice adherence and regular exercise enables patients to lead a normal life without complications.

Kamal Darwish and Mohammed Al-Hamahami (2007) highlight the positive impact of recreational programs on fulfilling human needs and improving overall health and well-being, including physical, emotional, and mental aspects. They also emphasize how these programs help individuals cope with modern life pressures, leading to happier and more stable personal and family lives.

Thus, the validity of the first hypothesis of the research is confirmed, which states: "There are statistically significant differences between the pre-test and post-test means for individuals in the primary research sample in some biochemical variables (blood glucose level "random sugar" – glycated hemoglobin level – cholesterol in the blood (good) "HDL" - cholesterol in the blood (harmful) "LDL" in favor of the post-test measurements.

B - Discussion of Results for the Second Hypothesis:

The results in Table 8 and Figure 2 show statistically significant differences at the 0.05 level between the pre-test and post-test measurements for individuals in the primary research sample in dimensions of quality of life (general health - family life - marital life - professional life - religious life - social life - personal life satisfaction - mental health) in favor of the post-test measurements.

The study attributes the enhanced quality of life dimensions among type II diabetes patients to the effectiveness of a recreational sports program. This program involved simple physical exercises, individual and team sports activities, and stimulating tools, fostering joy and happiness. Recreational sports serve as an outlet for releasing energy and managing various pressures, enabling individuals to express emotions, build confidence, and achieve happiness and life satisfaction. These findings align with previous research, highlighting the significance of recreational sports in promoting physical and psychological well-being, irrespective of gender, by facilitating personal development and fostering enjoyable experiences while encouraging socially desirable behavior.

This result is consistent with the findings of studies by Asmaa Yahya Ezzat (2021), Belabbas Ben Kerara Manal (2021), Habiba Dhaif Allah (2021), Slimani Rahma and Kahli Kamal (2022), and Ahmed Rashad Tawfik (2022), emphasizing the importance of recreational sports programs in improving the psychological and social aspects of community members.

This finding corresponds with the views expressed by **Gayle Kassing (2006), Egendeelidt (2007), and Virou (2008)**, who suggest that recreational activities offer solutions to various psychological issues encountered by community members, such as anxiety, psychological stress, depression, and lack of emotional well-being. This is attributed to the ease of engaging in recreational programs and their alignment with the preferences and needs of participants, overseen by competent recreational supervisors capable of ensuring that these

programs meet their intended objectives.

Abdulrahman Essa (2015) further suggests that as the environment becomes more appealing and less stressful, individuals tend to cultivate positive social behaviours, attitudes, and values. This achievement is attributed to participation in recreational programs.

Consequently, the validity of the second hypothesis of the research is upheld, asserting that there are statistically significant distinctions between the initial and subsequent measurements among individuals in the primary research sample across various dimensions of life quality (including general health, family life, marital life, professional life, religious life, social life, personal life satisfaction, and mental health), favouring the subsequent measurements.

The third hypothesis discussion:

The discussion of the third hypothesis shows that the findings from Table 7 indicate an enhancement in the post-test measurements compared to the pre-test measurements for individuals in the primary research sample regarding the biochemical variables being studied, with improvements ranging between 13.19% and 22.69%.

The researcher credits the enhancement in biochemical factors among individuals with type II diabetes to the beneficial influence of a recreational sports regimen. This regimen involved diverse activities such as entertaining games and simple physical exercises, leading to

reductions in sugar and harmful cholesterol levels while increasing beneficial cholesterol. These results align with Mustafa Mohammed Noor's assertion (2015) (20) that physical activity enhances insulin absorption, maintaining optimal sugar levels without medication. The aerobic nature of the program induces physiological improvements, fostering fitness without the need for equipment and catering to the needs of type II diabetes patients.

Bazar Ali, in his 2017 (5) study, underscores the importance of integrating physical activity, particularly recreational sports, into the lives of individuals in the primary research sample (those with type II diabetes). This can be achieved by promoting activities like daily walks lasting between 30 to 45 minutes, which do not necessitate any equipment. Engaging in exercises such as walking and jogging can strengthen muscles and, with regular practice, contribute to muscle strength improvement and overall health maintenance in patients.

The findings from Table 9 indicate that there were varying degrees of improvement observed in the dimensions of life quality among the primary research sample, ranging between 13.22% and 21.71% for the post-test measurements compared to the pre-test measurements.

The enhancement in life quality dimensions among the primary research participants is attributed to the effective implementation of the recreational sports program. This program included a variety of

enjoyable recreational activities such as ball games, general body exercises, and small games, which brought about feelings of joy and happiness. These collective activities not only relieved psychological and familial stresses but also contributed to a sense of happiness and life satisfaction through improved physical health. Additionally, they facilitated the improvement of social bonds among the participants, encouraging acquaintanceship and friendly interactions during recreational sports engagements. These findings resonate with previous research by **Brener Michele (2004) and Nadia Nehad Hamed (2014)**, highlighting the role of recreational sports activities in developing social skills, communication abilities, and positive character traits, thereby fostering happiness and enjoyment in life.

Therefore, the validity of the third hypothesis of the study is established, which states: "Improvements exist in the secondary measurements compared to the baseline for individuals in the primary research sample in the biochemical variables and dimensions of life quality being studied.

Recommendations :

In line with the research aims and outcomes, the researcher has deduced the following:

1. The suggested recreational sports regimen significantly impacts certain biochemical parameters (blood glucose level, glycated hemoglobin level, HDL cholesterol, LDL cholesterol) among type II diabetes patients aged 37 to 45 years.

2. The proposed recreational sports regimen also significantly influences various aspects of life quality (physical, familial, marital, professional, religious, social, personal satisfaction, mental health) for type II diabetes patients aged 37 to 45 years.

3. There are observable improvements in secondary measurements compared to baseline among individuals in the primary research sample in the studied biochemical variables, ranging from 13.19% to 22.69%.

4. Similarly, there are observable improvements in secondary measurements compared to baseline among individuals in the primary research sample in the studied dimensions of life quality, ranging from 13.22% to 21.71%.

Recommendations:

Based on the research outcomes, the researcher offers the following suggestions:

1. Implement the proposed recreational sports regimen due to its positive impact on enhancing select biochemical markers and overall life quality for individuals aged 37 to 45 suffering from type II diabetes.

2. Integrate recreational sports initiatives into therapeutic approaches for type II diabetes management.

3. Design therapeutic recreational sports programs tailored for type 1 diabetes patients (insulin-dependent).

4. Educate diabetes patients, particularly the youth, on the advantages of engaging in recreational sports activities to improve their quality of life and alleviate feelings of anxiety and depression.

5. Engage specialists in recreational therapy and leverage media platforms to promote the efficacy of recreational sports programs in managing diabetes.

6. Conduct similar investigations focusing on type 1 diabetes patients (insulin-dependent).

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