The Effect of Walking Sport on Blood Glucose in Men with Type2 Diabetes

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Abstract:

This study aims to investigate the effect of walking on blood glucose in men with type 2 diabetes, and the experimental method was used on a community of retired men who stay in the home who do not exercise and have type 2 diabetes in M'sila city, and the research sample was selected In the non-probability method and by the accidental method, the number is 20 people. One of the most important results of our study is that the proposed training program with walking exercises has a statistically significant positive effect in reducing blood glucose.

Key words: Diabetes, walking sport.

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1. INTRODUCTION

1. Introduction and Importance of the Research

Any regular muscle exertion that is practiced in a precise period of time and according to fixed principles and standards is called sport. The practice of sport is obligatory for any person who is able to perform his daily needs. It is not only for young people instead all people must practice it depending on their ability. There are different sports that suit everyone's nature and affect positively his/her strength and health. Among the most easily practiced sports is walking, it is considered from the most beneficial sports for the human body. It helps also in tightening the muscles and strengthening the lung and the heart to perform their functions in an excellent and healthy way.

Diabetes is a chronic disease which happens because of the inability of pancreas to produce the sufficient quantity of insulin, or when the body is unable to use this substance effectively. Insulin is a hormone that organizes the level of blood sugar and its increase is among the common effects. By the time, it leads to severe damages in the different parts of the body especially in the nerves and the blood vessels.

2. Research Problem

Diabetes is the fourth cause of death nowadays. Unfortunately, it poses an increasing threat in the Arab world where six Arab countries are among the most affected countries by diabetes. Statistics indicate that approximately 10% of deaths in the Arab world are due to diabetes diseases. In our Algerian society, the percentage of people with diabetes is around 4 million and the number is likely to go up in the coming years because of the lifestyles of the Algerian families.

In Msila, we have 4267 person with type 2 diabetes whereas in the municipality of Msila we have 302 diabetics (174 male and 128 female) according to the directorate of health and the directorate of social security.

After getting these statistics, we decided to find solutions to reduce from this disease or at least to minimize from its complications. As a result, we developed a special training program suitable for the retired people. From here, we can ask the following question:

Does walking sport have an effect on reducing blood glucose in men with type2 diabetes?

2-1 Partial Questions:

1. Are there any statistically significant differences between the pre and the posttests in the cumulative blood sugar for the experimental group?

2. Are there any statistically significant differences between the pre and the posttests in the cumulative blood sugar for the control group?

3. Are there any statistically significant differences between the experimental and the control groups in the cumulative blood sugar in the posttest?

2-3   Research Aims

- **General Aims**

To know the effect of walking sport in reducing blood glucose in men with type2 diabetes.

- **Partial Aims**

1. To find differences between the pre and the post tests of the experimental group in measuring cumulative blood sugar.

2. To find differences between the pre and the post tests of the control group in measuring cumulative blood sugar.

3. To find differences between the experimental and the control group of the posttest in measuring cumulative blood sugar.

2-4   Importance of the Research

Walking exercises have an effective effect in stimulating blood circulation and the muscular system in retired men and those who do notwork or practice any sport activity. This leads the muscles to consume large quantities of glucose in the blood and thus its level decreases. That is why it is important to put a walking training program that anyone can practice taking into account the regularity and the continuity of training.

2-5   Hypotheses

1. There are differences with statistical significance between the pre and the posttests in cumulative blood sugar of the experimental group.
2. There are differences with statistical significance between the pre and the posttests in cumulative blood sugar of the control group.
3. There are differences with statistical significance between the experimental and the control group in cumulative blood sugar in the posttest.

2-6   Review of the Related

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3. Ali Mohamed Khalef, the Historical Development of walking sport, Journal of Research, Faculty of Basic Education, 2013.
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Diabetes, Participation in the International Conference on Women and Health, Tunisia 2016.

3. Key words

3-1   Diabetes

- **The oretical Definition:**

It is the increase in the level of blood sugar for different reasons, it maybe organic or psychological. Or, as a result of eating high amounts of carbohydrates and sometimes it is due to hereditary causes. (Atif Lamadha, 1998, p19)

It is one of the common chronic diseases worldwide usually happens when the body is unable to produce sufficient quantities of insulin hormone or the inability of the body to benefit from insulin which leads to the increase in blood glucose. (Hassan Ben Ali Elzahrani, 2006, p13)

- **Operational Definition**

Diabetes is one of the chronic diseases that leads to the death of many people yearly. It happens due to the lack of insulin hormone in the blood.

3-2   Insulin

- **Theoretical Definition**

It is a hormone made by special cells called 'Beta Cells' among a group of cells spread in the form of islands inside the pancreas. These islands are known as Langerhans according to its discoverer. Insulin is very important for the body to benefit from and use sugar and energy in food. It helps to prevent from the accumulation and the increase of blood sugar. (Gale and Anderson, 2005)

- **Operational Definition**

It is an active hormone in the human body made by beta cells found in Langerhans in the pancreas. Its function is to get glucose into cells.

3-4 Walking Sport

- **Theoretical Definition**

Walking is among the sports that burns oxygen and thus benefits the heart and the lungs and improves blood circulation. In addition to that, it helps maintain fitness, strengthens the muscles and the circulatory system, and reduces the risk of obesity, diabetes, colon cancer, breast cancer and heart diseases. Indeed, walking upright strengthens the bones and the muscles in the legs, belly, back, and minimizes from the risk of osteoporosis.

- **Operational Definition**

It is the easiest sport to practice as it doesn't require complicated tools or methods and anyone can practice it anywhere.

4. RESULTS AND DISCUSSION

4-1 Pilot Study

Since we are going to make a field study, we must do a pilot study as follows:

- Discussion with the headmaster of the state diabetes association and the directory of health to provide us with information about diabetes disease and the number of patients.
- To know everything about what can hinder our work and the different obstacles that we may face.

To identify the sample and to know its tendency to apply the program

4-2 Fields of the Research

Human: men with type2 diabetes in the municipality of Msila
Spatial: from February 2017 to the end of April 2017

4-3 Research Method

We have used the experimental method because it is suitable for the nature of the study

4-4 Population and Sample of the research

The population: retired people and those who do not practice any activity and are suffering from type2 diabetes. Their number according to health directorate is 174 person.

The sample group was chosen with a non-probability method and with a casual style, composed of 20 person. Two groups has been created (experimental and control) 10 person in each one. We selected this sample because it is compatible with the nature of the research, the possibility to contact them at any time as well as their desire to practice sport.

Homogeneous sample

Table(1) represent the homogeneity of the two research groups

Variables	The Experimental Group			The Control Group		
	Mean	Standard Deviation	Coefficient of Variation	Mean	Standard Deviation	Coefficient of Variation
Age	57.20	5.789	10.12%	60.10	7.445	12.39%
Duration of Disease	14.50	2.550	17.58%	13.30	3.268	24.57%
Length	179.50	2.779	1.55%	177.60	4.695	2.64%
Weight	87.40	4.624	5.29%	89.00	4.643	5.22%

From table 1, we notice that all the values of coefficient of variation are between (1.55% and 24.57%) and less than 30%.It indicates that there is a homogeneity in each group and thus the sample is homogeneous. When we compare the two groups, we find that the experimental group is the most homogeneous in the variables of age,

duration of disease and length whereas the control group is the most homogeneous in the variable of weight.

Parity between the two groups

Table (2) shows parity between the two groups

Variables	The Experimental Group		The Control Group		Calculated T
	Mean	Standard Deviation	Mean	Standard Deviation	
Age	57.20	5.789	60.10	7.445	1.011
Duration of Disease	14.50	2.550	13.30	3.268	0.845
Length	179.50	2.779	177.60	4.695	1.006
Weight	87.40	4.624	89.00	4.643	0.679

From the table we notice that all calculated T values are between 0.679 and 1.011 and it is less than the T value extracted from the statistical tables under P-value 0.05 and degree of freedom 18. This indicates that there are no significant differences and thus the two groups are equivalent.

4-5 Research Tools

Data collection tools

- Foreign and Arabic references
- State diabetes association in Msila
- Directorate of health

Research tests

Blood test laboratory to measure the cumulative blood sugar.

Cumulative Glucose Test

The cumulative glucose is measured to know the level of sugar in the blood over three months before the examination. This examination is done in the laboratory by taking a sample of venous blood and

examining it. It is not used to diagnose diabetes but to follow up patients with diabetes.

For diabetics, they must maintain the rate of 7% or less and whenever the cumulative glucose percentage exceeds 7%, it indicates a lack of regularity and poor control of diabetes and thus the possibility of complications.

4-6   Field Study Application

The Pre Test

The pretest was done on both groups (control and experimental) to measure the level of cumulative glucose on Wednesday, February 1st, 2017 at 8 am by taking a sample of blood in one of the city's laboratories.

The Training Program

The researchers prepared a simple training program suitable for the experimental sample relying on their field experiment, the opinions of specialists in the field of sport training and the scientific sources specialized in training programs. As well as, on a group of researches and studies in the different ways of training which made the application of the program easy and appropriate for the group age. Its main goal is to minimize from blood glucose in men with type2 diabetes and those who do not practice any physical activity.

The program was divided on 36 training units, 30mn for each unit. The application of the training units has taken three months where three units were done weekly on Saturday, Monday and Wednesday.

The Post Test

After the application of the training program, researchers have done the posttests on Saturday, April, 30th 2017 with the same style and the circumstances of the pretests.

4-7   Statistical Methods

The statistical methods are among the most important ways to understand the essential factors that affect the studied case. It helps

also to analyze, apply and criticize the results. Each research has its own statistical styles that fit the type of the problem, its properties and its objectives. We have calculated the obtained results by the statistical package program for social sciences s.p.s.s version 19 using the following:

Mean, Standard Deviation, Coefficient of Variation and Differences Test.

4-8   The Results

1. Presentation and Interpretation

Table(3) shows the results of the pre and posttests of the experimental group in the cumulative blood sugar %

Variable	test	Mean	Standard deviation	Calculated T	Tabular T
Cumulative sugar level	Pre Post	13.25 10.69	0.53 1.36	6.996	2.262

P-value 0.05 and degree of freedom (n-1)is 9

We notice from the table that calculated T (9.996) is more than tabular T(2.262). As a result, we can say that there are statistical differences between the pre and the posttests in the experimental group in favor of the posttest. It indicates the effectiveness of the training program in minimizing from cumulative glucose.

Table (4) shows the results of the pre and posttests of the control group in the cumulative blood sugar %

Variable	test	Mean	Standard deviation	Calculated T	Tabular T
Cumulative sugar level	Pre Post	13.14 12.89	0.46 0.46	1.135	2.262

P-value 0.05 and degree of freedom (n-1) is 9

From the table we notice that calculated T (1.135) is less than tabular T (2.262). As a result, we can say that there are no statistical significant differences between the pre and the posttests in the control group.

Table(5) shows the results of the posttest of the experimental and the control groups in the cumulative blood sugar %

Variable	Group	Mean	Standard deviation	Calculated T	Tabular T
Cumulative sugar level	Experimental Control	10.69 12.89	1.36 0.46	4.823	2.101

P-value 0.05 and degree of freedom (n-2) is 18

From the table we notice that calculated T (4.823) is more than tabular T (2.101). As a result, we can say that there are statistical significant differences between the experimental and the control group in the posttest in favor of the experimental group. It confirms the effectiveness of the training program in minimizing from cumulative blood sugar.

4-9   Discussion

The First Hypothesis: there are statistically significant differences between the pre and posttests in measuring the level of cumulative sugar of the experimental group. T value reached (6.996) whereas tabular T value reached (2.262) at P-value (0.05) and degree of freedom (9). Since the calculated value is more than the tabular one, we synthesize that there are differences between the two tests in the variable of cumulative sugar in favor of the posttest. Thus, the group achieved significant improvement in its results and proved its ability to do the test. Moreover, the suggested training program has a positive effect on the research group. This was confirmed by (Akil Housin Idrous, 1993), walking is the best suit for diabetics because it does not contain pressure movements that protect the retina and the blood vessels.

The Second Hypothesis: there are statistically significant differences between the pre and the posttest in measuring the level of cumulative sugar of the control group. T value reached (1.135) whereas tabular T reached (2.262) at P-value (0.05) and degree of freedom (9). Since the calculated value is less than the tabular one, we synthesize that there are no differences between the tests in the variable of cumulative

sugar. It indicates that no change or progress occurred in the group during the period of experiment. As a result, the training program has an effect on the experimental group.

The Third Hypothesis: there are statistically significant differences between the control and the experimental groups in measuring the level of cumulative sugar in the posttest. Since T value is more than tabular T, we synthesize that there are differences between the two groups in the posttest in favor of the experimental group. It indicates that the experimental group achieved a significant improvement in its results and proved its ability to do the test. Thus, the suggested training program has a positive effect on the research sample. Moreover, studies confirmed that diabetics when they practice any physical effort or return to their work, they find that the level of their blood sugar is reduced.

The experimental treatment proved and eliminated some of the ambiguity we had in the general hypothesis that was formulated as follows: the suggested training program with walking has an effect in reducing from blood glucose in men with type2 diabetes. With the relatively achievement of the partial hypotheses, we can say that our general hypothesis has been achieved according to the theoretical evidence and the statistical treatment.

5- Conclusions and suggestions

1. **Conclusions**

- The suggested training program with walking exercises has a statistically significant positive effect in reducing blood glucose.
- The progress in the level of blood glucose between the pre and the posttest of the experimental group.
- There are no significant differences between the pre and the posttests for the control group.

2. Suggestions

- Paying attention to sports exercises for diabetics because of its importance in reducing blood glucose.
- Organizing educational courses throughout the year on physical activity for diabetics.
- Opening sports clubs for diabetics with the guidance of their medical staff.

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