The Impact of Aerobic Training Program on some of the Biochemical Variables, Fatness Index for Men 35–40 Years at Sulaimaniya Governorate Centre

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Introduction

The current study consists of an introduction and five sections. Section one is an introductory section including the importance, problem, aims, hypothesis and fields of the study. It is a well known fact that sports and sport exercises are an important source for the individual's health and supporting other sources like good healthy food. Man, in ancient times, used to rely on his muscular powers in moving and getting food and there was no environmental pollution due to vehicles, factories and some machines used in making readymade foods. Sports and sports exercises that are performed scientifically help in maintaining a healthy body, thus preventing nowadays diseases like obesity. Thus, there is a relation betweenj the individual's general health and physical fitness. Treadmill is among the means used in performing sports exercises in particular walking and running. It is widely used in fitness centres, sport halls, training centres and

houses. This study deals with the impact of training program using treadmill on some of the biochemical variables, obesity index and . The study aims at preparing a training program in accordance with the scientific bases for men 35–40 years at Sulaimaniya Governorate Centre and identifying the impact of an aerobic training program on some of the biochemical variables, obesity index and for men 35–40 years. The study hypothesized that there are significant differences between the pre and post tests for the biochemical variables, obesity index . The study sample consisted of 15 individuals at Zara Fitness Centre in Sulaimaniya Governorate for the period December 15th 2010–March 8th 2011. Section two is a literature review. Section three deals with the methodology adopted where experimental approach is used. The researcher has deliberately selected the study population representing 15 individuals at Zara Fitness Centre in Sulaimaniya Governorate. Three of them were excluded as they took part in the pilot study, thus the total number is 13. Questionnaire form was by the researcher to set up the training program on the treadmill and then was reviewed by number of experts. The training program lasted for eight weeks with three units a week. Data were tackled using the suitable statistical means. Section four deals with results discussion and analysis through using SPSS software. Section five sums up with the conclusions:

1. There were no significant differences among the pre and post measures as related to obesity index for the sample.
2. There was a weight decrease for the individuals using the treadmill.
3. There were significant differences in blood cholesterol for those who used the treadmill.
4. There were no significant differences among the pre and post tests for the biochemical variables (LDL, HDL, TG).

The study recommended the following:

1. Making a similar study with increasing training program period to 12 weeks.
2. The adoption of the training program using the treadmill through low intensity interval training in order to decrease weight.
3. Making a similar study with the increase of the training program period.
4. Applying the training program using the treadmill on women sample with the same age group.

1.1 Introduction and Importance of the Study:

Sports role in developing the society is becoming more efficient and scientifically enriching all the related fields.

It is rather difficult to look at the world's physical daily needs today without looking at the individual's body harmony and integrity. Human body is a masterpiece in case it is delicately developed. It is a well known fact that physical fitness helps in developing the individual's health through directly impacting the functional bodies.

There is a relation between the physical fitness and the individual's health where man life pattern has a role. Man, in ancient times, used to rely on his muscular powers in moving and getting food and the absence of environmental pollution makes him healthy. On the contrary, man nowadays increasingly rely on readymade foods and this is why physical fitness and general health curve is decreasing in particular at early ages. Preventing obesity should be first considered before considering other treatments. Laziness, apathy and non–adherence to a training program are a critical factor in developing obesity. Obesity is

related with diabetes, heart and kidney diseases and anxiety in addition to the difficulties in determining the mechanism of man movement, in particular back and feet pains.

Obesity occurs when fat increase in the body expressed as fat percentage in the body. Anyone is obese if fats are more than (25%) for men and (35%) for women. The (20–25%) is the usual limit between the usual level and obesity for men while it is (30–35%) for women.

Increasing total fats in blood plasma affects man life due to the relation between such increase and diseases. There is also a relation between weight increase and fats in body and glycerine in blood. Sports exercises decrease low density lipids (LDL), that could lead to arteriosclerosis in case of accumulation leading to thrombus, and increase high density lipids (HDL) that carry cholesterol in the arteries and other cells to the liver to be disposed.

Aerobic training programs are the main target for all physical fitness programs where they are related to health protection, weight, obesity prevention and decreasing lipids in particular at the abdomen. Through the repeated field visits to fitness and training centres and some friends houses, the researcher observed that the majority of the houses have a treadmill for its suitable price and ease of use. Accordingly, the study idea came to use the treadmill to implement an aerobic training program using low intensity interval training.

The importance of the study lies in preparing an aerobic training program through using treadmill to be applied on a sample of men (35–40 years) in Sulaimaniya Governorate Centre to identify its impact on some of the biochemicalt variables, fatness index and maximum ability for oxygen consumption.

Study Procedures

3.1 Study Approach:

Experimental approach is used for it is suitable in the study. Experimentation is a deliberate and conditional change for certain incident and monitoring and explaining the resulting changes

3.2 Study Community and Population:

The study community consisted of (15) men subjects (35–40 years) took part in physical fitness training at Zara Centre for Fitness in Sulaimaniya Governorate. They were deliberately selected and three of them were excluded for taking part in pilot experiments. Thus, the final community consisted of (12) subjects and the training program that lasted for (8) weeks (three units a week) was applied.

3.3 Homogeneity among the Study Population:

Homogeneity among the subjects was made regarding age, length and weight. Table (1) shows the means and standard deviations of the indicators used.

Table (1)
Means and Standard Deviations of the Study Community

statistical signs variables	X'	Y±
age/ year	37.50	1.62
weight/ kg	95.08	10.8
length/ cm	173.75	5.75

3.4 Data Collection:

In order to complete the proper scientific procedures, the following means were used for collecting data:

- Questionnaire
- Measurements.
- References.
- Literature review.
- Internet.

3.5 Tools Used:

The following tools have been used by the researcher:

- Light Spectroscope.
- Measuring tape.
- Body weight measuring tool type (OSK) for measuring mass to less than (50gm).
- Stop watch type (Rhythm) for measuring time to less than (0.01 sec)/ 6.
- Treadmill type (Life Fitness) USA made/ 6.
- Heart beats tool type (Run Tec) Finland made/ 6.
- Whistle/ 2.
- Various medical tools (injections, sterilizing alcohol, cotton, various solutions, measuring tubes, test tubes).
- Manual calculator type (Casyo)/ 2.

3.6 Measurements and Tests used in the Study:

- Body measurements:
  - Body length measurement.
  - Body weight measurement.
- Functional Measurements
  - Obesity index measurement.
  - Lipoproteins measurement (cholesterol, TG, HDL, LDL).
  - VO_2max measurement.

3.7 Characteristics of Body, Physical and Functional Measurements:

3.7.1 Weight Measurement:

Weight was measured using medical scale to measure weight to less than (50g).

3.7.2 Length Measurement:

Length was measured using a wall where the researcher has made grades. The subject will stand barefoot with the back along the wall and both the feet, hips and shoulder are close to the wall. Length is measured from the ground to the highest point by putting a ruler horizontally above the head to be vertically intersected with the wall thus pointing the subject length/ cm.

3.7.3 Obesity Index Measurement:

Lipids at waist and hips were measured in order to get accurate information on the lipids amount in the body. The subject will stand upright and the narrowest circumference of the waist will be measured using a measuring tape. The widest circumference at the hip will also be measured. Then waist measurement will be divided upon the hip measurement to get the value to be compared with lipids rate table at the waist and hip as shown in table (2).

Table (2)
Waist and Hip Range (inch)

gender	excellent	good	medium	high	extreme
Male	<0.85	0.85–0.9	0.91–0.95	0.96–1.0	>1.0
Female	<0.75	0.75–0.8	0.81–0.85	0.86–0.9	>0.9

3.8 Heart Beats Measurement and Monitoring:

In order to identify the training intensity, the researcher has used heart beats monitoring tool type (Run Tec) consisting of a sender and a receiver. The sender is a belt to be put on the subject chest (above the interseptum muscle) and waves are moved through wireless vibrations. The receiver is a watch to be put at the subject wrist indicating the changes of the subject heart beats.

This tool helps in determining the training intensity through the input of the information (age and weight) to be compatible with the training program requirements.

This tool is effective in accurately measuring the following variables:

1. Determining heart beats.
2. Determining the highest level of heart beats.
3. Determining the lowest level of heart beats.

Hazza Mohammed stated that heart beat monitoring tools are valuable where they measure an important physiological variable, namely heart beats (4: 26) where the consumed energy during physical activity could be estimated.

3.9 The Training Program:

The training program was designed as shown in appendix (1). It was reviewed by specialists in the field sports training and sports physiology as shown in appendix (2). Specialists' notes were taken into consideration to finalize the training program as shown in appendix (3). The training program was then applied for (8) weeks with (3) training units a week (Saturday, Monday and Wednesday) for the period December 12th 2009–February 24th 2010. Training was done on the treadmill with intensity (60–70%) of the maximum heart beats, different among the subjects. Low intensity interval training was adopted and lasted for (1215) minutes.

3.9.1 Considerations of Applying the Training Program:

- Starting the training units with 10 minutes warm up.
- Increasing the load within the weeks as shown in appendix (6).
- Using work to rest ratio (1: 0.5) as a rest among repetitions.
- Using rest relief.
- Fixing the exercise intensity in the training program while deducing the maximum average of pulse indicator according to the following equation:

(210–half of age) – (0.02×body weight/kg) + 4 = 49

- Working with (60–70%) of the maximum average of pulse indicator for each of the subjects on the treadmill. Repetitions were fixed in accordance with the subjects level and exercise difficulty grading through the pilot experiment.
- Finishing the training units with relaxation exercises.
- Providing the subjects with nutritional guides.

3.9.2 Characteristics of the Treadmill:

The treadmill used in the study is (9500) model (TR900–0172–07) Life Fihess, made in USA. The highest limit of the subject weight, in accordance with the treadmill manual, is (160)kg and the speed is (0.8–20 km/hr).

It was provided with heart beats monitoring tool also referring to the speed, time and distance fixed by the subject in addition to kilometres and calories consumed during the performance.

3.10 Final Experiment:

3.10.1 Pre Measurement:

The pre measurement was done before starting the training program within the period (December 23th–24th 2009). At the first day, blood sample was taken to measure the biochemical variables (cholesterol, TG, HDL, LDL) after fasting for (12) hours in addition to measuring obesity index and weight. At the second day, VO_2max was measured.

3.10.2 Initiating the Training Program:

After finishing the pre measurement, the training program was initiated on December 26th 2009–February 24th 2010 for eight weeks.

3.10.3 Post Measurement:

The post measurement was made after finishing the training program and was made on February 25^{th}–27^{th} 2010.

3.11 Statistical Means:

SPSS software was used through applying the following means:

1. Mean.
2. Standard deviation.
3. T test for independent samples.

Section Four
Results and Discussions

4.1 Obesity Index Measurements Results and Discussion for both Pre and Post Measurements:

4.1.1 Obesity Index Measurements Results for both Pre and Post Measurements:

Table (4)
Means, standard deviations T calculated value for pre and post measurements and probability level for obesity index

statistical signs measurement	pre measurement		post measurement		T calculated value	significance
	X'	Y±	X'	Y±		
obesity index	0.984	0.051	0.980	0.045	0.267	0.79

Significant at probability level p<0.05

Table (4) indicates that there is no significant difference in both pre and post measurements for obesity index where T calculated value is (0.267) with significance value (0.79) which is larger than the significance value ($\alpha = 0.05$).

4.1.2 Obesity Index Measurements Discussion:

Table (4) indicates that there is no significant difference in measuring obesity index. Mean of the pre obesity index is (0.984) while it is (0.980) in post obesity index which is high as shown in table (4). This agrees with Krieger who indicated that the main

controlling energy source of the exercise has no role in losing fats. Some of the studies have proposed that high intensity interval training is more useful in losing fat than medium intensity. Pacheco et al. found that there is a loss in body fat in a training group that spent (80–90%) of maximum load high intensity. No significant changes were observed in body fat for the group that spent low intensity.

It was found that those who regularly take part in high intensity exercises had low skin folds. The applied training program in this study is low intensity interval training and is not accompanied by a nutritional program. Al Jumeili found that the best methods to decrease fat component is the common method that combine sports program and nutritional rationing (3: 57).

Hanna thinks that decreasing body fats is due to applying a sports program in relation with controlling food taken where calories are fixed in accordance to basic metabolism that provide the body with the necessary calories to complete the functional processes for (24) hours (8: 54).

The current study concludes that one of the main factors leading to absence of non–significant differences is due to the short period of the training program where it lasted for only eight weeks. This is mentioned by Abdul Fattah who pointed out that in order to obtain real physiological adaptations the athlete should be regularly and continuously trained for (8–12) weeks (26: 42).

4.2 Weight Results and Discussion for both Pre and Post Measurements:

4.2.1 Weight Results for both Pre and Post Measurements:

Table (5)

Means, standard deviations T calculated value for pre and post measurements and probability level for weight

statistical signs measurement	pre measurement		post measurement		T calculated value	significance
	X'	Y±	X'	Y±		
weight	95.08	10.80	88.83	10.59	6.10	0.000

Significant at probability level p<0.05

Table (5) indicates that there is a significant difference in both pre and post measurements for weight where T calculated value is (6.10) with significance value (0.000) which is smaller than the significance value ($\alpha = 0.05$).

4.1.2 Obesity Results Discussion:

Table (4) indicates that there are significant differences in measuring weight for the favour of the post test. This agrees with Ahmed (1998) who pointed out that aerobic training (walking for 30 minutes daily) for (30) minutes will decrease body weight (36: 137).

This also agree with Millor et al. (1997) in their study made within the last twenty five years on middle age subjects (39.5 years) whose weight are (92.7kg) and found that the best method of decreasing weight is sports–nutritional program food by the nutritional program then sports program (47: 41).

This could be due to thyroid gland hormones secretion because of physical activities that lead to increasing metabolism in particular fats metabolism, thus decreasing body weight. This is also confirmed by Ahmed et al. where he pointed out that physical activity increase the secretion of thyroxin hormone, one of the thyroid gland hormones that increase metabolism (11: 71).

Al Qitt also confirmed that one of the hormone functions is to increase cells metabolism that increase oxygen consumption,

the oxidation of fats and glycogen and renewing tissues (30: 150). He also pointed out that thyrotrobin hormone prepared for secreting thyroxin from the thyroid gland increase in response to exercise (30: 34).

4.3 Lipoproteins Results and Discussion for both Pre and Post Measurements:

4.3.1 Lipoproteins Results for both Pre and Post Measurements:

Table (6)

Means, standard deviations T calculated value for pre and post measurements and probability level lipoproteins

statistical signs measurement	pre measurement		post measurement		T calculated value	significance
	X'	Y±	X'	Y±		
cholesterol Mg/dl	206.08	40.90	187.83	36.83	5.32	0.000
TG Mg/dl	161.00	83.12	151.17	65.89	0.484	0.638
HDL Mg/dl	41.92	4.56	43.50	10.34	0.534	0.604
LDL Mg/dl	126.33	39.16	126.000	32.28	0.045	0.965

Significant at probability level p<0.05

Table (6) indicates that there is a significant difference in both pre and post measurements for cholesterol where T calculated value is (5.32) with significance value (0.000) which is smaller than the significance value (α = 0.05). There are no significant differences in both pre and post measurements for TG, HDL and LDL where T calculated value is (0.484, 0.534, 0.045) with significance value (0.638, 0.604, 0.965) respectively which is larger than the significance value (α = 0.05).

4.1.2 Lipoproteins Results Discussion:

Table (6) indicates that there are significant differences in cholesterol where physical activity is low intensive in long period and this will increase fats consumption a main source for energy.

Total rate of fats is (80%) in addition to carbohydrates and this will decrease cholesterol to normal levels (29: 55).

This agrees with Al Hayali and Krouse where they both confirmed that aerobic interval training characterized by load repetitions followed by rest relief result in reducing cholesterol and reduce the rate of cholesterol in blood plasma (8: 28) (44: 27).

This also agrees with Ahmed study made on a group of males and females applying an aerobic program (walking for 30 minutes a day) for (30) days where cholesterol decreased (36: 137).

Salama, in his study on (18) subjects applying high and low intensive training programs for (12) weeks, concluded that cholesterol has decreased in blood (22: 247).

Other studies concluded that training help to clean arteries of apothems as they decrease total cholesterol in blood (18: 46).

Huttunem also confirmed that aerobic physical activity decrease (TG) concentration (42: 220).

Some studies indicate that the decrease in try–glycerines is related with type and size of the physical activity (8: 65). Regular sport activity helps in removing and using try–glycerines by the muscular cells instead of being deposited in the lipid tissue or to be removed through the liver (38).

Continuous physical activity leads to the partition of try–glycerines where lipid acid molecules are used by the working muscles through blood circulation. Epinephrine helps in this process as this hormone activates the cell membrane which in turn activates the enzyme, called lipase, to divide the fats and release lipid acid to go to the blood circulation (12: 189).

The researcher thinks that the decrease in the try–glycerines in the current study is due to using triglycerides to obtain energy for sport activity and being not significant indicates the need for increasing the time of interval training in future programs.

As for HDL concentration, it was not significant in the current study despite the increase of HDL concentration. This agrees with Kanaley where nutritional–sports program was used in healthy subjects where HDL never increased (45: 1756).

The researcher thinks that practicing exercises regularly lead to non–significant increase in the current study thus decreasing the concentration of triglycerides where it was found that there is a direct relation between TG decrease and HDL–C increase (36: 138).

Recent studies showed that aerobic exercises increase HDL thus reducing the possibility of heart diseases. Studies have shown a steady increase in HDL structure from (20–30%) for the athletes practicing load in comparison with their non–athletes counterparts because of training period and size and the change in body composition, nutrition, loss of weight and HDL concentration before training (37: 261).

LDL concentration in the current study decreased without being significant. This agrees with William who pointed out that aerobic training for (12) weeks never changed LDL concentration for middle age men (51: 81).

This also agrees with Qisra who indicated that the group adopting nutritional program alone had LDL decrease without being significant and this is why she recommended the combination of nutritional program with aerobic exercises to improve fat clearly (28: 8).

Another study has pointed out that LDL in load training is affected by weight decrease, size of plasma and type of meals should be taken into consideration when there is a decrease in LDL after training (40: 94).

The researcher thinks that the nutritional program affect LDL concentration and this is why it is preferable to combine the

nutritional program with the training program adopted in the current study.

4.4

Section Five
Conclusions and Recommendations

5.1 Conclusions:

1. There were no significant differences among the pre and post measures as related to obesity index for the sample.
2. There was a weight decrease for the individuals using the treadmill.
3. There were significant differences in blood cholesterol for those who used the treadmill.
4. There were no significant differences among the pre and post tests for the biochemical variables (LDL, HDL, TG).
5. There were significant differences in VO_2max for those who used the treadmill.

5.2 Recommendations:

1. Making a similar study with increasing training program period to 12 weeks.
2. The adoption of the training program using the treadmill through low intensity interval training in order to decrease weight.
3. The adoption of the training program using the treadmill through low intensity interval training in order to improve VO_2max.
4. Making a similar study with the increase of the training program period.
5. Applying the training program using the treadmill on women sample with the same age group.

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Appendices

Appendix (1)
The Training Program

1st Week/ 1st & 2nd training units

Time of each repetition	No. of repetitions	Interval among repetitions
5 minute	5	1:1/2

2nd Week/ 3rd & 4th training units

Time of each repetition	No. of repetitions	Interval among repetitions
5 minute	6	1:1/2

3rd Week/ 5th & 6th training units

Time of each repetition	No. of repetitions	Interval among repetitions
5 minute	7	1:1/2

4th Week/ 7th & 8th training units

Time of each repetition	No. of repetitions	Interval among repetitions
5 minute	5	1:1/2

5th Week/ 9th & 10th training units

Time of each repetition	No. of repetitions	Interval among repetitions
5 minute	6	1:1/2

6th Week/ 11th & 12th training units

Time of each repetition	No. of repetitions	Interval among repetitions
5 minute	7	1:1/2

7th Week/ 13th & 14th training units

Time of each repetition	No. of repetitions	Interval among repetitions
5 minute	8	1:1/2

8th Week/ 15th & 16th training units

Time of each repetition	No. of repetitions	Interval among repetitions
5 minute	6	1:1/2

Appendix (2)
Names of Experts and Specialists

Name	Field	University
Prof. Dr. Yaseen Taha Al Hajjar	Sports Training Physiology	College of Physical Education/ University of Mosul
Prof. Dr. Safaa Taha Al Hajjar	Sports Training	College of Physical Education/ University of Salahalddin
Prof. Dr. Iyad Mohammed Abdullah	Sports Training	College of Physical Education/ University of Mosul
Prof. Dr. Enad Jarjees Abdul Baqi	Sports Training	College of Physical Education/ University of Mosul
Prof. Dr. Moataz Younis	Sports Training	College of Basic Education/ University of Mosul
Assist. Prof. Dr. Yaseen Omer	Sports Kinetics	College of Physical Education/ University of Sulaymanya
Assist. Prof. Dr. Khorsheed Rafeeq	Sports Training	College of Physical Education/ University of Sulaymanya
Assist. Prof. Dr. Rayan Hasso	Sports Training Physiology	College of Basic Education/ University of Mosul
Assist. Prof. Dr. Eman Najem Al Deen Abbas	Sports Training Physiology	College of Physical Education/ University of Sulaymanya
Dr. Badhar Ali Jokel	Sports Training Physiology	College of Physical Education/ University of Salahalddin
Dr. Abdullah Majeed	Sports Training	College of Physical Education/ University of Salahalddin
Dr. Sarhant Abdul Khaliq	Sports Training	College of Physical Education/ University of Salahalddin
Dr. Maan Abdul Kareem Jassim	Sports Training	College of Physical Education/ University of Mosul
Dr. Deema Faraj Kareem	Sports Rehabilitation	College of Physical Education/ University of Sulaymanya
Dr. Amal Sabir Ali	Training Physiology	College of Physical Education/ University of Sulaymanya

Appendix (3)

The New Training Program

1st Week

Days	Warm up/ minute	Time/ minute	Repetition	Work to rest ratio	Intensity	Total time
Saturday	10	5	5	1: 0.5	60–70%	45 minute
Monday	10	5	5	1: 0.5	60–70%	45 minute
Wednesday	10	5	5	1: 0.5	60–70%	45 minute
						135 minute

2nd Week

Days	Warm up/ minute	Time/ minute	Repetition	Work to rest ratio	Intensity	Total time
Saturday	10	5	5	1: 0.5	60–70%	45 minute
Monday	10	5	5	1: 0.5	60–70%	45 minute
Wednesday	10	5	5	1: 0.5	60–70%	45 minute
						135 minute

3rd Week

Days	Warm up/ minute	Time/ minute	Repetition	Work to rest ratio	Intensity	Total time
Saturday	10	5	6	1: 0.5	60–70%	52.5 minute
Monday	10	5	6	1: 0.5	60–70%	52.5 minute
Wednesday	10	5	6	1: 0.5	60–70%	52.5 minute
						157.5 minute

4th Week

Days	Warm up/ minute	Time/ minute	Repetition	Work to rest ratio	Intensity	Total time
Saturday	10	5	5	1: 0.5	60–70%	45 minute
Monday	10	5	5	1: 0.5	60–70%	45 minute
Wednesday	10	5	5	1: 0.5	60–70%	45 minute
						135 minute

5th Week

Days	Warm up/ minute	Time/ minute	Repetition	Work to rest ratio	Intensity	Total time
Saturday	10	5	6	1: 0.5	60–70%	52.5 minute
Monday	10	5	6	1: 0.5	60–70%	52.5 minute
Wednesday	10	5	6	1: 0.5	60–70%	52.5 minute
						157.5 minute

6th Week

Days	Warm up/ minute	Time/ minute	Repetition	Work to rest ratio	Intensity	Total time
Saturday	10	5	6	1: 0.5	60–70%	52.5 minute
Monday	10	5	6	1: 0.5	60–70%	52.5 minute
Wednesday	10	5	6	1: 0.5	60–70%	52.5 minute
						157.5 minute

7th Week

Days	Warm up/ minute	Time/ minute	Repetition	Work to rest ratio	Intensity	Total time
Saturday	10	5	7	1: 0.5	60–70%	60 minute
Monday	10	5	7	1: 0.5	60–70%	60 minute
Wednesday	10	5	7	1: 0.5	60–70%	60 minute
						180 minute

8th Week

Days	Warm up/ minute	Time/ minute	Repetition	Work to rest ratio	Intensity	Total time
Saturday	10	5	6	1: 0.5	60–70%	52.5 minute
Monday	10	5	6	1: 0.5	60–70%	52.5 minute
Wednesday	10	5	6	1: 0.5	60–70%	52.5 minute
						157.5 minute