The effect of cardio training on some physiological variables among obese female students in some of Al-Azhar institutes in Minya

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Introduction and research problem:

Sports and nutrition play an important role in the lives of nations and peoples, as the physical and nutritional condition of the individual is a mirror that reflects his physical condition during the different periods of his life. Also, the individual's persistence in practicing various sports activities and following healthy diets contributes to improving his physiological, physical and mental condition. It also helps in improving the level of physical fitness and even getting rid of chronic diseases such as high blood pressure, cardiovascular diseases, as well as obesity and anemia resulting from malnutrition.

"Abdul Rahman Abdul Basit" (2017: 12) believes that practicing sports in the current era is practiced for two main goals: sports for health and disease prevention, the second goal of sports is for championship, as practicing sports is a double-edged sword. If sports are practiced while neglecting the health aspect, health damages result, so sports practice

must be regulated according to sound nutritional health foundations :10) . (12

Elin & Alexander (2017: 1) indicate that obesity is one of the problems that affect the physical and mental health of a person, causing many diseases. In recent years, the world has witnessed a continuous increase in the average body mass, as this matter has sounded the alarm bell, as it has become necessary to develop strategies to reduce the spread of obesity among all segments of society. This is what the results of many studies have indicated about the necessity of regular exercise on an ongoing basis, along with following healthy eating habits to avoid obesity and get rid of excess weight.

Obesity is one of the diseases resulting from excessive weight gain, as there is an inverse relationship between the percentage of fat in the body and physical fitness. The meaning of having fat is that the individual's effort and the food he eats exceed the amount of activity expended, which leads to the accumulation of fat in certain areas of the body that differ in men than in women. Obesity has become easy to measure, and weight gain is one of the negative effects of eating food that is not suitable for the blood type. This inappropriate food slows down the process of food metabolism, which reduces the process of burning fat in the body and increases weight, as well as storing water in the body, which leads to a malfunction in the functions of the thyroid gland. However, adhering to the diet program specific to each blood type is sufficient to get rid of excess fat and maintain the ideal weight. (Nahid Ahmed Abdel Rahim 2010: 30)

Mufti Ibrahim (2010: 25) explains that the best way to get rid of obesity is to practice various sports exercises, as societies have recently started practicing aerobic sports due to their positive effects in reducing the percentage of fat in the body, the surroundings and excess weights. They are exercises performed at a medium or relatively slow speed, separated by short periods. This type of exercise is called "cardio exercises" and examples of them include (jumping rope - jogging and running - walking - cycling).

Abu Al-Ala Abdel Fattah (2000: 99) believes that practicing sports is of special importance for women to reach a good level of motor performance that enables them to meet the demands of daily life, which results in positive changes in the efficiency of the respiratory circulatory system in a noticeable way, represented by getting rid of shortness of breath, reducing the rate of breathing and getting rid of the phenomenon of panting, regularizing the breathing process, and regulating the heartbeat.

From here, we find that sports have become the first and basic pillar to face the challenges of progress and growth in general, and because it is the element that influences the health and efficiency of a person and thus affects the level of his performance and efficiency in all fields, sports have become foundations, sciences and rules that stem from the horizons of scientific progress in all fields, which guarantees and achieves the advancement of the level of sports and physical performance. (Ibrahim Salama 2000: 15)

Hala Muhammad (2023: 1809) mentions that cardio exercises are one of the most important aerobic activities in which the muscles use oxygen and glucose to obtain energy. They are also called cardiovascular

exercises, as they increase the heart rate while doing such exercises. They also deplete the glucose in the body and begin the process of burning fat, because the body needs large amounts of oxygen to convert fat into energy. Such exercises contribute greatly to improving physical fitness in general, improving the level of the heart muscle, and helping to burn calories and burn fat, especially visceral fat in the body.

Tomas & Rowland (2018: 95) state that cardio training is one of the activities that require moderate to high intensity effort, which is followed by the emergence of physiological responses and changes in the body's internal systems as reactions to the application of physical loads during physical effort in training and sports competition, which is considered a true indicator of the physiological and physical condition of the athlete.

Ahmed Nasr El-Din (2014: 27) explains that practicing cardio exercises and moderate and intense sports activities such as brisk walking, running and similar activities is of great importance, as it contributes to raising the metabolic rate and helps in losing weight and increases the density, strength and hardness of bones. Training also protects against heart disease, blood pressure, diabetes and osteoporosis, maintains weight, prevents loss of muscle mass and helps in improving many physiological variables.

Through the researcher's review of many previous references and studies that dealt with cardio exercises and their role in improving some physiological variables in various samples, such as the study of "Abdul Hamid Al-Aidi" (2024), "Kholoud Ahmed Muhammad and others" (2023), "Iman Wajih" (2021), "Abdul Malik Qasimi, Hossam Al-Din Sharit" (2021).

Through the researcher's work as a teacher at Al-Azhar Al-Sharif, she noticed that many female students in the various Al-Azhar institutes suffer

from excess weight as a result of the accumulation of fat in many different areas of their bodies, which led to excessive obesity. This may be due to their weak nutritional culture or their following wrong nutritional habits and behaviors or as a result of consuming calories higher than the required daily rate. It may also be due to not exercising in general. Therefore, the high rate of obesity negatively affects the efficiency of some physiological functions of the various vital organs in the body, such as high blood pressure and blood sugar levels, as well as high heart rate and weak breathing. Hence, the base of sports practice must be expanded among different groups in general and obese female students in particular, in a way that contributes to improving their physiological condition.

The importance of the research:

A- Scientific importance:

The scientific importance of this research appears in that it is an attempt to develop a program based on cardio training and to know its effect on some physiological variables in obese female students in some Al-Azhar institutes in Minya.

B- Applied importance:

The applied importance of the current research appears in the following:

- This research is one of the applied researches that contribute to improving the physiological efficiency of various vital body systems in various categories in general and obese female students in particular.
- This research is one of the researches that deals with an important category of society, which is female students of Al-Azhar institutes.
- The results of the current research contribute to developing training programs that contribute to improving the efficiency of the body's vital systems in obese female students in particular.

Research objective:

The current research aims to design a program using cardio training and to know its effect on some physiological variables represented in (vital capacity - blood oxygen percentage - resting pulse rate - systolic and diastolic blood pressure) in some obese female students in some Al-Azhar institutes in Minya.

Research hypotheses:

1-There are statistically significant differences between the averages of the pre- and post-measurements of the experimental group in some physiological variables represented in (vital capacity - blood oxygen percentage - resting pulse rate - systolic and diastolic blood pressure) in favor of the post-measurement.

2-The percentage changes between the averages of the pre- and post-measurement scores of the research sample differ in some physiological variables among obese female students in some Al-Azhar institutes in Minya under study.

Terms and concepts included in the research:

-**Cardio training:**

"Wedny" (2023: 10) defines cardio training as "a group of exercises and sports activities that help adapt and accustom the body and all its vital organs, especially the heart, blood vessels and lungs, to increasing the flow of blood carrying oxygen to the muscles, and this happens by increasing the breathing rate and heart rate during their practice".

-**Obesity:**

"Taha Abdel Hamid" (2019: 21) defines obesity as "an increase in body weight above the normal limit due to the accumulation of fat in it, and this accumulation results from excessive food intake compared to a small

percentage of the daily muscular and athletic effort that the person performs".

Research procedures:

-Research methodology:

The researcher used the experimental method due to its suitability to the nature of the research, and the experimental design was used for one group by following the pre- and post-measurement.

-Research community:

The research community included obese female students in some Al-Azhar institutes in Minya Administration.

-Research sample:

The researcher deliberately selected the research sample from obese female students in some Al-Azhar institutes in Minya Administration, numbering (15) female students with a percentage of (%53.57) as a basic sample. The researcher also selected a survey sample of (12) female students with a percentage of (%42.86) from the research community and outside the basic sample of the research. (1) female student was excluded with a percentage of (%3.57) for not regularly implementing the cardio training program under study. Table (1) shows the numerical distribution of the research sample.

(1) Table

Numerical distribution of the basic and exploratory research sample

Sample	Number	Percentage
Main research sample (on which the cardio training program will be applied)	15	53.57%
Exploratory research sample (conducting scientific procedures for the tests used)	12	42.86%
Excluded	1	3.57%
Total	28	100%

-Conditions for selecting the research sample:

1. **They should be obese female students.**
2. **They should be students of Al-Azhar institutes in Minya administration.**
3. **They should have the desire and willingness to participate in implementing the proposed cardio training program.**

Moderate distribution of the research sample:

To ensure the moderate distribution of the research sample, the researcher calculated the coefficient of skewness and flatness for the basic research sample in light of growth rates (age - height - weight), and some physiological variables represented in (vital capacity - oxygen percentage - pulse during rest - systolic and diastolic blood pressure) and Table (2) shows this

Table (2)

Mean, median, standard deviation, skewness coefficient and kurtosis coefficient of the variables under investigation for the basic research sample (n = 15)

Variables		Unit of Measurement	Unit of Measurement	Unit of Measurement	Unit of Measurement	Unit of Measurement	Unit of Measurement	Standar
				Standard Deviation		Standard Deviation	Standard Deviation	Deviatio
Growth Rates	Age	Year	13,27	13,00	0,77	1,04	-1,13	
	Height	cm	147,93	150,00	7,25	0,85-	0,64	
	Weight	kg	84,40	85,00	5,84	0,31-	0,84	
Physiological Variables	Vital Capacity	mL/Liter	2020,0	2000	146,97	0,41	-1,36	
	Blood Oxygen Level	L/min	96,20	96,00	1,22	0,49	1,72	
	Resting Heart Rate	beats/min	83,53	84,00	3,34	0,42-	-0,87	
	Systolic Blood Pressure	beats/min	130,47	132,00	6,04	0,76-	1,48	
	Diastolic Blood Pressure	beats/min	79,00	77,00	5,13	1.17	-0,48	

It is clear from Table (2) that the skewness coefficients for the basic research sample in the variables (growth rates - some physiological variables) under study are limited to (1.17: -0.85), and the flatness coefficients are limited to between (1.72: -1.36) and they all fall between ±3, which indicates that the basic research sample follows a normal distribution.

-Data collection methods:

The researcher used the following data collection methods to suit the nature of the research:

First: Tools and devices used:

- •Restameter to measure height and weight.
- •Mooney Aspirometer to measure (vital capacity).
- •Oximeter to measure heart rate and blood oxygen level.
- •Measuring tape.
- •Stopwatch.
- •Medicine ball weighing 3 kg.
- •Cones.
- •Graduated box.
- •Whistle.

Second: Forms used in the research:

1- A form for recording the results of basic data as well as tests of physiological variables for obese female students under study. (Appendix 2)

2- A form for surveying the opinions of experts on identifying the most important physiological variables for obese female students under study. (Appendix 3)

3- A form for surveying the opinions of experts on the most important tests that measure physiological variables for obese female students under study. (Appendix 4)

Third: Physiological tests used in the research:

The researcher reviewed many previous references and studies such as "Abdul Hamid Al-Aidi" (2024), "Kholoud Ahmed" (2023), "Khaled Abdel Ghaffar and others" (2022), "Iman Wagih" (2021), "Abdul Malik Qasimi, Hossam El-Din Sharit" (2021) in order to determine the most important physiological variables under study, as the researcher placed these tests in a survey form and presented them to a group of experts in the field of sports health sciences (Appendix 1). The tests that received more than 70% of the experts' opinions were selected, and Table (3) shows this.

Table 3

Expert opinion poll on physiological variables tests in obese female students Under investigation (n = 9)

Relative Importance	Disagree	Agree	Tests	No.
%22,22	7	2	Heart Rate	.1
%100	-	9	Vital Capacity	.2
%88,88	1	8	Blood Oxygen Level	.3
%77,77	2	7	Resting Heart Rate	.4
%11,11	8	1	Blood Lactate Concentration	.5
%88,88	1	8	Systolic Blood Pressure	.6
%88,88	1	8	Diastolic Blood Pressure	.7
%100	-	9	Fat Mass	.8

The results of Table (3) show the following:

-The percentage of the experts' opinions on determining the most appropriate physiological tests for obese female students under study ranged between (11.11%: 100%). The researcher selected the tests that obtained a percentage higher than 70% of the experts' opinions, and thus the physiological tests that were agreed upon are as follows:

- Vital capacity test and its unit of measurement (milliliters).
- Blood oxygen level test and its unit of measurement (liters/min).
- Resting pulse rate test and its unit of measurement (pulse/min).
- Systolic and diastolic blood pressure test and its unit of measurement (pulse/min).

Scientific transactions of physiological tests under investigation:

A - Validity:

The validity of the physiological tests for obese female students in some Al-Azhar institutes in Minya under study was calculated through the validity of the side comparison on a survey sample similar to the research community and outside the basic research sample, numbering (12) female students, where their grades were arranged in ascending order to determine the distinguished level (upper quartile) and their number was (3) female students and the less distinguished level (lower quartile) and their number was (3) female students, then the significance of the differences between them in the tests under study was calculated and Table (4) shows the result.

Table(4)

Significance of differences between the discriminant (upper quartile) and the least discriminant (lower quartile) in the tests of the physiological variables under study (N1 = N2 = 3)

Variables	Unit of Measurement	Upper Quartile (N = 3)		Lower Quartile (N = 3)		Mean Rank	Z-Value	Significance Level
		M	SD	M	SD			
Vital Capacity	mL/Liter	2173,3	52,49	1833,3	47,14	5,00 2,00	1.98	0.004
Blood Oxygen Level	L/min	98,00	0,82	95,67	0,47	5,00 2,00	1.97	0.005
Resting Heart Rate	beats/min	79,00	1,41	87,67	0,47	2,00 5,00	2,02	0,043
Systolic Blood Pressure	beats/min	121,67	2,05	131,67	1,25	2,00 5,00	1,99	0,046
Diastolic Blood Pressure	beats/min	73,00	1,41	82,33	2,05	2,00 5,00	2,02	0,043
Fat Mass	Percentage	24,00	1,63	27,00	1,63	2,00 5,00	2,33	0,023

Table (4) shows the following:

- There are statistically significant differences between the upper quartile (distinguished) and the lower quartile (least distinguished) in the

physiological tests under study and in the direction of the upper quartile (distinguished) in those tests, which indicates the validity of the tests and their ability to distinguish between groups.

B- Stability:

-To calculate the stability of the physiological variables tests for obese female students under study, the researcher used the method of applying the test and reapplying it on a sample of (12) obese female students from some Al-Azhar institutes in Minya from the research community and outside the basic sample, with a time interval between application and reapplication of (3) three days, and Table (5) shows the correlation coefficients between application and reapplication in the tests under study.

Table(5)

Correlation coefficients between application and reapplication in physiological tests Under investigation (n = 12)

Variables	Unit of Measurement	Application		Re-Application		Correlation Coefficient
		M	SD	M	SD	
Vital Capacity	mL/Liter	2050,0	144,34	2058,3	138,2	0,98
Blood Oxygen Level	L/min	97,00	1,08	97,17	1,28	0,96
Resting Heart Rate	beats/min	83,42	3,35	83,00	3,19	0,91
Systolic Blood Pressure	beats/min	128,33	4,46	128,17	4,51	0,99
Diastolic Blood Pressure	beats/min	77,92	3,80	78,33	4,25	0,95
Fat Mass	Percentage	27,00	2,38	27,33	1,89	0,89

The tabular value of (r) at a degree of freedom (10) and a significance level of (0.05) = 0.576

- It is clear from Table (5) that the correlation coefficients between the application and reapplication of the physiological tests under study ranged between (0.89: 0.99) and all of them are statistically significant correlation coefficients as the calculated

(r) values are greater than the tabular value of (r) at a significance level of (0.05), which indicates the stability of these tests.

Fourth: Cardio training program: The researcher reviewed many references and scientific studies that dealt with cardio training for various samples, such as the study of "Abdul Hamid Al-Aidi" (2024), "Kholoud Ahmed" (2023), "Khaled Abdel Ghaffar and others" (2022), "Iman Wagih" (2021), "Abdul Malik Qasimi, Hossam El-Din Sharit" (2021) in order to determine the elements of the proposed training program in order to present them to the experts, Appendix (1), in order to express their opinions regarding those elements. The following will clarify the opinions of the experts regarding the elements of the program, which are as follows:

-The goal of the program:

The cardio training program aims to try to improve some physiological variables in obese female students at some Al-Azhar institutes in Minya.

-Program development foundations:

The researcher took into account many factors when developing the program, perhaps the most important of which are the following:

First: General foundations:

-The program's suitability for the age group involved in the research.

-Considering the gradualness of the training load.

-Applying the principle of continuity in training.

-Applying the principle of gradualness in the training load.

-Determining the duties of the daily training unit.

-Availability of security and safety factors.

Second: Special foundations:

-Determining the general goal of the training program.

-Determining the sub-purposes.

-Choosing the appropriate exercises for the program, represented by:

A- Warm-up and stretching exercises.

B- Exercises for special physical fitness for different muscle groups.

C- Exercises corresponding to the muscle groups working in the training unit.

D- Exercises for calming and relaxation.

-Applying training load variables (intensity - repetitions - volume - rest periods) according to the scientific foundations of sports training.

-Instilling a spirit of competition among the research sample and encouraging them to perform well.

-Using appropriate training methods and means.

-Using evaluation methods to identify the progress of the program.

-**Time planning and number of training units for the program:**

After reviewing many scientific references and reference studies that dealt with training programs using cardio training, the researcher designed a survey form for the experts' opinions, and their number was (9) experts, Appendix (1), in order to identify the main axes that the proposed training program should include to achieve the research goal. Perhaps the most important of these axes are the following:

-Determining the time period for the program as a whole.

-Determining the number of training units per week.

-Determining the number of training units per month.

-Determining the parts of the training unit and the time of each part.

The researcher took into account the following conditions when selecting the experts:

1. That they have scientific and practical experience in the training process.
2. That they have scientific experience in the field of sports health sciences.
3. His experience in the field should not be less than 10 years.

Table(6)

Expert opinion survey on the time planning of the proposed cardio training program (N = 9)

Relative Importance	Expert Opinion		Criteria	No.	
	Disagree	Agree			
%88,88	1	8	**Duration of the training program (10 weeks)**	1	
%77,77	2	7	Number of weekly training sessions (3 sessions)	2	
%88,88	1	8	Number of training sessions per month (12 sessions)	3	
%88,88	1	8	Total number of training sessions (30 sessions)	4	
%100 %100 %100 %100	- - - -	9 9 9 9	Training session duration (60 minutes) is divided as follows: • Warm-up time (10 minutes) • Main part time (40 minutes) • Cool-down time (10 minutes)	5	

Table (6) shows that the experts' approval rate ranged between (77.77% to 100%) and the researcher was satisfied with (70%) of the experts' approval to accept the program's axes.

From the above, the following is clear:

1. **Total program time** = (10) weeks.
2. **Number of training units per week** = 3 units per week on (Sunday, Tuesday, Thursday).
3. **Number of training units during the program as a whole** = 30 units.
4. **The program weeks were divided into stages of the preparation period**:

-**General preparation stage** = (4) weeks.

-**Special preparation stage** = (4) weeks.

-**Competition preparation stage** = (2) weeks.

Table(7)

Dividing the program weeks into the stages of the preparation period

Period	Preparation Period									
Stage	General Preparation				Specific Preparation				Competition Preparation	
Weeks	1	2	3	4	5	6	7	8	9	10

The following is an explanation of each of them:

- **General preparation stage:**

This stage takes a period of (4) weeks, and exercises are given in it to prepare and raise the body's efficiency to complete the rest of the training unit with special efficiency and vitality.

- **Special preparation stage:**

This stage takes a period of (4) weeks, and cardio training is given in it, which will contribute to improving the level of some physiological variables for obese female students under study.

- **Pre-competition stage:**

This stage takes a period of (2) weeks, and its goal is to develop technical skills, master competitive performance, and maintain the levels acquired through the various competition situations.

5. **Determine the intensity of the load through scientific references, which are as follows:**

- **Maximum load** = 80%: 100% of the maximum that the individual can bear.
- **High load** = 65%: less than 80% of the maximum that the individual can bear.
- **Medium load** = 50%: less than 65% of the maximum that the individual can bear.

6.Determining the time of the training unit:

The researcher fixed the daily application time of the research experiment at (60) minutes during the daily training unit, and the time of the unit was distributed as follows: (preparation and warm-up) for (10) minutes, the main part for (40 minutes), (cooling down and conclusion) for (10) minutes.

7. Determining the time of the program periods as follows:

-Total general preparation time (4) weeks × (180 minutes) = (720 minutes).

-Total special preparation time (4) weeks × (180 minutes) = (720 minutes).

-Total preparation time for competitions (2) weeks × (180 minutes) = (360 minutes).

7.Determining the total time of the proposed training program = (1800) minutes.

8.Determining the periodic load cycle: (2:1) for each period of the program.

Figure (1)

Determining the pregnancy cycle during the program, stages and weeks

Preparation Period										Period	
1:2										Load Cycle	
Specific Preparation						General Preparation				Stage	
10	9	8	7	6	5	4	3	2	1	Weeks	
										Maximum	Load Degree
										high	
										Moderate	
180	180	180	180	180	180	180	180	180	180	Weekly Time (	
360 min		min 720				min 720				Total	

8. Determine the load degrees on the number of weeks of the program using the load cycle (1:2) as follows:

-The number of maximum pregnancy weeks in the program is 2 weeks, which are.(8 ,5)

-The number of high pregnancy weeks in the program is 4 weeks, which are.(9 ,6 ,3 ,2)

-The number of average pregnancy weeks in the program is 4 weeks, which are.(10 ,7 ,4 ,1)

Steps to implement the research:

-Exploratory study:

The researcher conducted a survey study on (12) obese female students in some Al-Azhar institutes in the Minya Education Administration from the same research community and from outside the basic research sample during the period from 10/8/2023 AD to 10/11/2023 AD with the aim of identifying the following:

-The validity of the tools used to conduct the program.

-Scientific transactions for the tests used in terms of validity and reliability.

-Results of the survey study:

The results of the survey study resulted in:

-The validity of the tools and devices used in the program.

-The validity and reliability of the tests used in the research were verified.

-Program implementation:

After identifying the basic variables and the tools used, the researcher conducted the following:

-Pre-measurement:

The researcher conducted the pre-measurement in the period from 10/12/2023 to 10/13/2023, which included measurements (age - height - weight) as well as some measurements of physiological variables for the female students under study.

-Program implementation:

The implementation of the cardio training program began on the sample under study in the period from 10/15/2023 to 12/21/2023 for a period of (10) weeks and consists of (30) training units at a rate of (3) units per week.

-Post-measurement:

The post-measurement was conducted on the same tests that were conducted in the pre-measurements and under the same conditions as the pre-measurements and in all the variables under study during the period from 12/24/2023 to 12/26/2023.

-**Statistical treatments used**:

To calculate the research results, the researcher used the following statistical methods:

-Arithmetic mean.

-Median.

-Standard deviation.

-Skewness coefficient.

-Pearson correlation coefficient.

-Percentage change rates.

-Non-barometric Mann wittny test.

-Paired simple T-test for one group.

The researcher accepted a significance level at (0.05) and used the SPSS-V25 program to calculate some statistical coefficients

Clarification and discussion of the results of the first hypothesis: which states:

1- There are statistically significant differences between the averages of the pre- and post-measurements of the experimental group in some physiological variables represented in (vital capacity - blood oxygen percentage - resting pulse rate - systolic and diastolic blood pressure) in favor of the post-measurement.

Table (8)

Significance of statistical differences between the averages of the pre- and post-measurement scores of the experimental group members in some physiological variables under study (n = 15)

Variables	Unit of Measurement	Pre-Test		Post-Test		Mean Difference	T-Value	Significance Level
		M	SD	M	SD			
Vital Capacity	mL/Liter	2020,0	146,97	2353,3	80,55	333,3	7,70	Significant
Blood Oxygen Level	L/min	96,20	1,22	99,13	0,62	2,93	4,33	Significant
Resting Heart Rate	beats/min	83,53	3,34	71,07	7,06	12,46	6,14	Significant
Systolic Blood Pressure	beats/min	130,47	6,04	119,47	4,10	11,00	5,39	Significant
Diastolic Blood Pressure	beats/min	79,00	5,13	73,80	4,61	5,20	3,28	Significant
Fat Mass	Percentage	28,13	2,09	21,33	1,01	6,80	10,04	Significant

The tabular (t) value at a degree of freedom (14) and a significance level of 0.05 = 1.761

It is clear from Table (8) the following:

- There are statistically significant differences between the average scores of the pre- and post-measurements of the research sample members in some physiological variables in favor of the post-measurement, as all the calculated (t) values are greater than the tabular (t) value at a significance level of (0.05).

Referring to the results of the previous table, it is clear that there are statistically significant differences between the average scores of the pre- and post-measurements of the experimental group in the physiological variables in favor of the post-measurement. The researcher attributes the noticeable improvement in the level of some physiological variables represented in (vital capacity - blood oxygen percentage - resting pulse rate - systolic and diastolic blood pressure) among the obese female students under study to the proposed training program and what it includes in many cardio exercises that are characterized by their simplicity and ease of performance, which were developed in a way that suits the condition of the obese female students, taking into account the gradation in these exercises from easy to difficult and from simple to complex, which would have led to improving the health of the heart, blood vessels and lungs. It also helps in lowering blood pressure and the level

of harmful cholesterol, which reduces the risk of heart disease. In addition, it has helped in burning calories significantly, which contributes to reducing excess fat and thus causing a significant improvement in the health status of the obese female students.

The researcher also attributes this change in the level of physiological variables among obese female students to the students' desire and insistence on completing all units of the training program in the best possible way, understanding that practicing sports in general and cardio training in particular contribute greatly to improving the efficiency of the body's vital systems and activating blood circulation, which contributes to improving their overall health.

This result is consistent with the results of the study of "Abdul Hamid Al-Aidi" (2024), "Kholoud Ahmed" (2023), "Iman Wajih" (2021), "Abdul Malik Qasimi, Hossam El-Din Sharit" (2021), which indicated that cardio training has a positive effect on various physiological variables such as vital capacity, oxygen percentage, pulse rate, blood pressure, and reduced body fat percentages.

According to this, the researcher has verified the validity of the first hypothesis, which states that "there are statistically significant differences between the averages of the pre- and post-measurements of the experimental group in some physiological variables represented in (vital capacity - blood oxygen percentage - resting pulse rate - systolic and diastolic blood pressure) in favor of the post-measurement.

Presentation and discussion of the results of the second hypothesis: which states:

2- The percentages of change differ between the averages of the pre- and post-measurement scores of the research sample in some physiological variables among obese female students in some Al-Azhar institutes in Minya under study.

Table (9)

Percentage changes in the post-test scores compared to the pre-test scores for the research group in some physiological variables among obese female students in some Al-Azhar institutes in Minya under study (n = 15)

Variables	Unit of Measurement	Mean Pre-measurement		Mean Post-measurement		Percentage Change	Direction
		M	SD	M	SD		
Vital Capacity	mL/Liter	2020,0	146,97	2353,3	80,55	%16,50	Post-measurement
Blood Oxygen Level	L/min	96,20	1,22	99,13	0,62	%3,05	Post-measurement
Resting Heart Rate	beats/min	83,53	3,34	71,07	7,06	%14,92	Post-measurement
Systolic Blood Pressure	beats/min	130,47	6,04	119,47	4,10	%8,43	Post-measurement
Diastolic Blood Pressure	beats/min	79,00	5,13	73,80	4,61	%6,58	Post-measurement
Fat Mass	Percentage	28,13	2,09	21,33	1,01	%24,17	Post-measurement

Table (9) shows that:

-There are differences in the rates of percentage changes in the post-test scores compared to the pre-test scores for the research group in some of the physiological variables under investigation, as the percentage changes ranged between (6.58%: 24.17%) and in the direction of the post-test, which indicates the positivity of cardio training in improving some physiological variables among obese female students in some Al-Azhar institutes in Minya under investigation.

Referring to the results of the previous table, it is clear that there are differences in the rates of percentage changes in the degrees of the post-test measurements compared to the pre-test measurements for the research sample at the level of some physiological variables represented in (vital capacity - oxygen percentage - resting pulse - systolic and diastolic blood pressure) under investigation and in the direction of the post-test measurement. The researcher attributes the clear and tangible improvement in the results of some physiological variables among obese female students in some Al-Azhar institutes in Minya to the training

program based on cardio exercises that the students implemented in the best possible way, as the ease and simplicity of these exercises and their standardization in a scientific manner contributed positively to a clear improvement in many variables of the health condition, as such exercises contribute greatly to improving the level of physical fitness and improving the students' ability to move easily and smoothly, as they help in improving the level of cardiac and respiratory fitness as well as reducing the heart rate during rest as a result of enhancing the work of the heart, as they help in improving blood circulation and facilitating the process of blood flow to the various organs of the body and thus reducing the risk of developing atherosclerosis, as well as It improves the efficiency of the lungs and increases the rate of oxygen that the body benefits from.

This is consistent with what was indicated by "**Bahaa El-Din Salama**" **(2000),** as regular training helps improve the efficiency of the respiratory system by increasing the lungs and their capacity, thus increasing their efficiency in saving effort with an increase in the effectiveness of absorbing atmospheric air. The increase in maximum vital capacity is determined by increasing the volume of pulmonary ventilation and its efficiency anatomically and physiologically, which increases the rate of oxygen extraction in the pulmonary alveoli and muscle tissue.

This result is consistent with the results of the study of "**Abdul Hamid Al-Aidi**" **(2024),** "**Kholoud Ahmed**" **(2023),** "**Khaled Abdel Ghaffar and others**" **(2022),** "**Iman Wagih**" **(2021),** "**Ihab Muhammad**" **(2019),** "**Abdul Malik Qasimi, Hossam El-Din Sharit**" **(2021)**,Which its most important results indicated that cardio training has a positive effect in improving the level of some physiological variables in different samples.

Thus, the researcher has verified the validity of the second hypothesis, which states that "the percentages of change differ

between the averages of the pre- and post-measurement scores of the research sample in some physiological variables among obese female students in some Al-Azhar institutes in Minya Administration under study.

Conclusions and recommendations:

First - Conclusions:

In light of the research results, the researcher reached the following conclusions:

1- Cardio training has a positive effect on the level of some physiological variables in obese female students under study, as is evident from the significance of the statistical differences between the average scores of the pre- and post-measurements of the experimental group in some physiological variables under study and in favor of the post-measurement.

3- Cardio training has caused a positive change in the level of some physiological variables in obese female students under study, as the values of the percentage change rates for the variables under study ranged between (6.58%: 24.17%) and in the direction of the post-measurement, which indicates the positivity of cardio training in improving the physiological condition of obese female students in some Al-Azhar institutes in Minya under study.

Second - Recommendations:

In light of the research results, the researcher recommends the following:

1- The need to pay attention to using cardio training on many other samples due to its positive impact on some physiological variables such as vital capacity, oxygen percentage, blood pressure rate, and heart rate.

2- The need to educate community members about the importance of cardio training and its role in raising the level of some physiological variables.

3- Working to educate female students about practicing sports in general and cardio training in particular due to its important and vital role in improving the physiological condition and efficiency of the body's various vital systems.

4- The need to pay attention to using cardio training in more research and other studies.

5- Conducting more similar scientific studies and research on other samples and different age groups.

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Abstract

The effect of cardio training on some physiological variables among obese female students in some Al-Azhar institutes in Minya

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The research aimed to design a program using cardio training and to know its effect on some physical variables represented in (vital capacity - blood oxygen percentage - resting pulse rate - systolic and diastolic blood pressure) in some obese female students in some Al-Azhar institutes in Minya, where the researcher used the experimental method due to its suitability to the nature of the research, and the experimental design was used for one group by following the pre- and post-measurement, and the research community included obese female students in some Al-Azhar institutes in Minya Administration, and the researcher selected the research sample intentionally from obese female students in some Al-Azhar institutes in Minya, numbering (15) students with a percentage of (53.57%) as a basic sample, and the researcher also selected a survey sample of (12) students with a percentage of (42.86%) from the research community and outside the basic sample of the research, and the number (1) student was excluded with a percentage of (3.57%) for not regularly implementing the cardio training program under study, and she was from The most important results reached by the researcher are that cardio training has a positive effect on the level of some physiological variables in obese female students under study, as is evident from the significance of the statistical differences between the average scores of the pre- and post-measurements of the experimental group in some physiological variables under study, in favor of the post-measurement. Cardio training also caused a positive change in the level of some physiological variables in obese female students under study, as the values of the percentage change rates for the variables under study ranged between (6.58%: 24.17%) and in the direction of the post-measurement, which indicates the positivity of cardio training in improving some physiological variables in obese female students in some Al-Azhar institutes in Minya under study.

Keywords:
Cardio training – Physiology variables - Obese female students.

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