

The effect of functional training and intermittent fasting on body components for women

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introduction:

In the recent period, training and nutritional programs have diversified in terms of their types and their impact on the human body, and training in its multiple forms has become a process that has an important role for the life of the individual in the advanced contemporary societies, as it works to develop and develop the individual's physical, functional and psychological capabilities and the possibility of using them to obtain the greatest benefit for himself and thus for the surrounding community.

The various training and nutritional programs also lead to the occurrence of some different physiological and physical changes, which leads to the progression of the level of athletic performance. If these changes are positive, the physiological adaptation of the body's organs to perform the physical load and perform the performance is achieved with high efficiency with an economy of effort. It includes changes in the circulatory and respiratory system and changes other physiological.

In addition to the general physiological changes, some of them are related to some other changes, such as body composition, and others are related to cholesterol and triglyceride levels, blood pressure, body adaptation to heat, and changes related to connective tissues. Fat and a decrease in total body weight, as well as physical training leads to a reduction in the level of cholesterol and triglycerides in the blood, and blood pressure decreases during exertion and in a state of rest, it increases the body's ability to work in hot weather and increases the strength of bones, ligaments, and tendons. Sports training depends mainly on subjecting the The change in the heart rate is where the volume of blood paid in one beat increases, which leads to a decrease in the heart rate per minute.

athlete to various types of physical and psychological pressures, which lead according to a special planning that ultimately aims to adapt the individual athlete with it in a way that makes him able to accomplish it in the appropriate way during competitions. And sports competitions. Accordingly, sports training is mainly concerned with what is called the sport of world-class levels or the sport of championships.

The importance of using functional exercises has emerged, which have some different physical and physiological effects on the human body. Functional exercises are one of the training methods that rely on training different muscle groups together and preparing them to perform daily tasks by simulating common movements that the individual may perform at home, at work or in sports. Different by using the muscles of the upper and lower body at the same time, it also increases the strength and balance of the body, which reduces the chances of injury.

Functional exercises are characterized by achieving many sports goals in the shortest possible time and in a way that helps activate the metabolism in the body, burn fat accumulated in different parts of the body, strengthen the heart, develop the elements of physical fitness with a feeling of strength and the ability to expend more energy, and help in achieving Fitness that enables the individual to perform many movements in a skillful manner and perform functional exercises using body weight or with the use of various sports equipment. It is a series of exercises that include balance and the absorption of proprioception. It is performed with the feet on the ground and without the assistance of the machine such force, which appears in an unstable state.

In the recent period, the nutritional programs have also diversified in terms of their types and their impact on the body by following a healthy diet suitable for the individual through the distribution of food and calories on the daily meals distributed during the day, provided that the diet is balanced and sound and commensurate with the energy needs necessary to show the daily activity of the individual. Following a diet is of great importance that benefits all parts of the body, namely controlling weight, preventing diseases, helping the body perform its various functions, and protecting cells from damage. It repairs damaged ones and helps to improve the functions of the internal organs. It also improves the psychological state and mood and from different types of nutritional programs (keto diet - intermittent fasting system - caloric system - vegetarian diet - chemical diet)

Intermittent fasting helps the body adjust growth hormone and insulin hormone so that they are secreted in a normal amount in the body. Certain

days during the day, the first certain days of the week, and it has several forms and methods. The most common method of the intermittent fasting system is to eat food during a period of (8) hours only of the day and abstain from it during the next (16) hours of the rest of the day And what is known as the food diet, and it is possible to do intermittent fasting of the 8: 16 type, either daily, day after day, or only during certain days of the week.

Intermittent fasting helps in losing weight by lowering insulin levels, which leads to cells releasing their glucose stores by using it as energy, which helps in losing weight. In several studies, it was found that intermittent fasting lowers blood pressure, heart rate, cholesterol, and triglycerides. Diets are easy to follow and effective, especially since they do not include many rules or food deprivations.

The research problem:

Through the researcher's work in the health club, she found that the women who frequent the club suffer from overweight and that they were applying several exercises and weight loss regimes, but their body did not respond to these methods. For this system and increase the burn rate and reach the goal of the study.

The research objective:

The study aims to identify the effect of functional training and intermittent fasting on body components for women, by identifying each of the following:

1. BMI (Body mass Index)
2. muscle mass
3. fat percentage
4. basal representation rate
5. fat-free mass

The research hypotheses

There are statistically significant differences between the pre and post measurements of the experimental group in favor of the post measurement in body components

1. BMI (Body mass Index)
2. muscle mass
3. fat percentage
4. basal representation rate

5. fat-free mass

The percentages of improvement between the pre and post measurements.

Conventions

Functional exercises:

They are exercises that use free weights, pulling with resistance, and the athlete's body weight as resistance to develop strength during performance and the use of exercises like movement in specialized sports. It also leads to better muscle balance, better joint stability, as well as coordination.

Intermittent fasting

It is a system that depends mainly on abstaining from eating for certain hours during the day or certain days of the week and has several forms and methods and helps to lose weight by lowering insulin levels, which leads to the cells releasing their glucose stores to be used as energy

BMI (Body mass Index)

It is a technical method for expressing body weight in light of its relationship to height, and it is a good indicator for expressing the degree of obesity through the equation weight in kilograms / squared of height in meters

Muscle mass

Muscle weight in the body in kilograms or pounds is the total weight of the body excluding the weight of fat in it, which includes the mass or weight of all organs including skin, bones, and body fluids in addition to muscle, which is the volume of total body tissues that correspond to muscles from the point of view of body composition that corresponds to mass fat free.

Fat percentage

It is the stored fat that represents the energy stores of the body and the storage of fatty tissues in the body under the skin and around the organs of the body such as the heart, kidneys, small and large intestines, and the rest of the viscera.

Fat-free mass

It is the mass of the body without fat, and it is the remaining part of the components of the body from bones, muscle tissue, ligaments, viscera, and other tissues of the body

Basal representation rate

It means the rate of consumption or expenditure of energy and burning of fat in the body when it is in a state of complete relaxation, or more clearly it

is the number of calories that the body needs daily to carry out basic functions while it is in a state of rest without making any effort

Procedures

First, the research method:

The researcher used the experimental method for its suitability to the nature of the research and achieving the goals by choosing one of its designs (pre-test and post-measurement) as the experimental group.

Second, the research sample:

The research sample was selected from the women who frequent the health club in Maadi, whose ages ranged between (25) to (30) years. The research sample included women and their number was (140) women trainee, and the research sample was chosen by the intentional method at a rate of (25%)) from the research community, where their number was (25) women. Seven women suffering from some diseases were excluded and three women refused their willingness to join the training, so the sample became (15) women and they were divided into (10) ten women for the experimental group and (5) five women for the survey group.

Sample selection conditions:

1. The sample members must meet the following conditions:
2. To have the desire to participate in the experiment, and approval will be taken from them in writing.
3. Not to undergo any other training program during the implementation of the proposed program.
4. They are free from any diseases that affect performance or regularity.
5. Not practicing any kind of sports activities during the past year.
6. Not using medical drugs on a regular basis.
7. Their BMI ranges between 30-40%.
8. Health club approval

Data collection Tools

First, the devices and tools:

To collect data and information related to the research topic, the researcher used many tools and measurements to achieve the research objectives. The research tools and the way they are used are as follows:

1. Medical scale to measure weight in kilograms
2. Use a rheostat to measure the total length in centimeters
3. blood pressure device

4. Pulse stopwatch
5. Body Components Device
6. iron ball
7. Resistant stick for arms and legs
8. medicine ball
9. iron wheels
10. foam mattress

Tests used:

1. Body composition measurements Body composition was measured using a body composition device

Steps to prepare the proposed program:

When designing the proposed training and nutritional program, the researcher relied on some books, research, and scientific references, Arab and foreign, the Internet.

survey study

The researcher conducted an exploratory study on a sample of five women from the same total research community and not members of the main sample, and the same conditions apply to them as the sample, and it was in the period from 26/7/2021 to 30/7/2021. The purpose of this study was as follows:

1. Determining the locations of the experiment and its suitability for the application.
2. Determining the difficulties that the researcher may face when implementing the basic program.
3. Ensuring ease of measurement procedures and avoiding any obstacles.
4. Choosing the appropriate devices for taking measurements and ensuring their validity.
5. Design a form for recording measurements and data.
6. Identifying the suitability and validity of the proposed program for the sample members.
7. Training assistants to use the tools and devices needed to measure tests.
8. Conducting scientific transactions for physical exams

Program foundations:

1. That the proposed exercises and the nutritional program contribute to achieving the desired goal of the research.

2. That the exercises and the nutritional program fit with the selected research sample.
3. The program should be flexible so that any modification can be made according to changing conditions.
4. The program should be characterized by diversity, whether in training, assignments, or diets, to increase the suspense of the research sample members.
5. The use of appropriate nutritional elements to carry out the training program exercises allow to work in an atmosphere characterized by fun and pleasure
6. The program load should be between 70% and 80%.
7. To be placed on a sound scientific basis after studying Arab and foreign references and research

The objective of the proposed training program:

Development and change in measurements (components of body composition)

Program content:

The program contains a food program (intermittent fasting) where abstaining from eating for a certain number of hours and eating within a certain number of hours, such as using a diet (8: 16), where eating is done within (8) hours and abstaining from food within (16) hours and during the eight hours The five meals are divided into the number of hours allowed to eat, while the other 16 hours include the number of hours of sleep, and only hot drinks are consumed

The training program (functional exercises) also contains exercises (squats, iron ball exercises, medicine ball, resistance exercises). The training unit was divided between 45 to 60 s and included:

The warm-up: with a duration of 1 (0) minutes, aims to summon the activity of the sample members, and prepare the muscles, joints, ligaments, and the respiratory circulatory system. It also contains various exercises of stability and movement. Regular attendance will be committed, and absences will be allowed once a month as a maximum, so that the attendance rate is similar for all sample members. It does not affect the results.

The main part: The duration of this part ranges to (30 mins), as it contains a general preparation and a special preparation for the use of special

exercises for the (functional exercises) program. This stage is a set of different movements and exercises in addition to the use of some tools and devices.

Cooling down: It is the final part of (5mins) that allows the body to recover from the intensity of the exercise. It must start with slow and more relaxed movements like the warm-up movements, as this period allows the heart rate to return to its normal state through stretching, swings and breathing exercises.

Training unit template
Table (1)

N	Unit parts	Content	Notes
1	Warm up	Light running and stretching A set of warm-up exercises suitable for the safety and components of a training load	Gradually increase the intensity of training
2	Main part	Running exercises Functional exercises Legs exercises Abdominal and back exercises Arm exercises	Pay attention to performing the correct tactic to prevent injuries
3	Concluding part	Concluding part Calming exercises, A group of calming exercises and stretches that are proportional to the time and severity of pregnancy	Consider the gradual descent of the intensity of training

food program :

A food program for intermittent fasting was designed under the supervision of Assistant Professor Dalia Mohamed Talaat, by placing certain foods and specifying the time in which any of the foods should not be eaten, and this is an example of it

Table (2),

Day	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Meal (1)	A piece of fat-free white cheese 2 tablespoons + 1 boiled egg + 2 toast or a quarter of a local loaf + a tomato and a	2 omelet eggs with vegetables, a spoonful of white cheese + 2 brown toast or a quarter of a loaf of bread + a tomato + a	3 large spoonful of oats, a large cup of skimmed milk, a medium banana	3 large spoons of broad beans with a small spoon of oil + 2 spoons of white cheese + 2 toast or a quarter of a local loaf of tomato + a cucumber	4 large spoons of corn flakes + a cup of skimmed milk and a spoon of honey	3 tablespoons of cheese with vegetables + 2 toast or a quarter of a local loaf + a fruit	1 boiled egg + 1 large tablespoon of broad beans with salt + 1 tablespoon of oil + 1 tablespoon of fat-free white cheese + 2 toast or a quarter of a local loaf of tomato + a cucumber (salad)

	cucumber (salad)	cucumber (salad)		(salad)			
Meal (2)	fruit	fruit	fruit	fruit	fruit	fruit	fruit
Meal (3)	100 gm of rice + 100 gm of cooked vegetables + a quarter of grilled chicken 250 gm + salad	Quarter of a local loaf + 100 gm of cooked vegetables + a piece of medium grilled 60 gm of meat + salad	100 gm rice + 100 gm cooked vegetables + 60 gm medium chicken piece in the oven + salad	100 gm pasta + 40 gm medium liver piece + salad	100 gm rice + 250 gm fish + large salad plate	Quarter of a local loaf + 100 gm of cooked vegetables + 60 gm of shish tawook + salad	100 gm rice + 100 gm cooked vegetables + 60 gm chicken pieces + breasts + salad
Meal (4)	A cup of low-fat milk + one fruit	2 dates + coffee + 1 fruits	4 almonds + 1 fruits	A cup of low-fat milk + coffee + a fruit	2tablespoons of tuna without oil + 1 fruit	Half a cup of popcorn + 1 fruit	7Sudanese grains without salt + one fruit
Meal (5)	A large spoon of oats + a large cup of fat-free yogurt + a spoon of honey or a spoon of jam	A large spoon of oats + a large cup of fat-free yogurt + a spoon of honey or a spoon of jam	A large spoon of oats + a large cup of fat-free yogurt + a spoon of honey or a spoon of jam	A large spoon of oats + a large cup of fat-free yogurt + a spoon of honey or a spoon of jam	A large spoon of oats + a large cup of fat-free yogurt + a spoon of honey or a spoon of jam	A large spoon of oats + a large cup of fat-free yogurt + a spoon of honey or a spoon of jam	A large spoon of oats + a large cup of fat-free yogurt + a spoon of honey or a spoon of jam

Fruits: apple, one small fruit - banana half a fruit - dates 2 fruits - mango half a small fruit - watermelon a cup - orange a small fruit - plum 2 fruits
Cooked vegetables: zucchini - okra - spinach - eggplant

Program implementation steps:

The proposed program was implemented on the experimental group for a period of (3) three months, starting from 25/8/2021 until 25/11/2021, that is, over a period of (12) weeks.

Experimental group:

A food program (intermittent fasting) was implemented with a training program (functional exercises) for a period of (12) weeks at a rate of (3) three times a week, and the training time was (45:60) s.

Tribal measurements:

Tribal measurements were made from 16/8/2021 to 17/8/2021, then it was done as follows:

1. Measurement of weight and height on 16/8/2021.
2. Body composition measurements on 17/8/ 2021.

Program implementation:

The proposed program was implemented on the experimental group for a period of (3) three months, starting from 25/8/2021 until 25/11/2021, that is, over a period of 12 weeks, with (3) three training units per week. The duration of the training unit is (45) minutes until The time of the training unit reached 60 minutes with a total of (36) training units. The components of the program were developed and the intensity levels of the load were determined according to the heart rate per minute. The training was carried out at a medium intensity, which is equivalent to 70%, with a gradual increase in the load by increasing the number of repetitions until it reached in The end of the program The load is less than the maximum, which is equivalent to 80% of the maximum heart rate.

The program was conducted over a period of (12) weeks (3) diets by (1) diet each month and the components of the program were developed through measurements of body components.

The research considered when implementing the research experiment the following:

- The warm-up time and components should be the same during the program period, which is the inclusion of stretching exercises and various light speeds, and that the main part includes exercises to strengthen the muscles of the legs, abdomen, and arms, including free exercises without using tools and other basic exercises using tools. The functional training program includes the training as follows: four training groups of rest A minute between each group, each group consisting of (4: 6) exercises, and there is a rest in between (10) seconds between each exercise, the repetition of each exercise from (10: 12) several.
- Training at the beginning of the program with an average load, which is equivalent to 70%, with a gradual increase in the load by increasing the number of repetitions, until at the end of the program the less than maximum load, which is equivalent to 80% of the maximum heart rate for each woman, was reached.
- Follow the positive rest system in proportion to the intensity of the load scheduled for each period of training, in terms of rest, as well as some simple flexibility exercises.
- The training took place on Saturdays, Mondays and Wednesdays of every week for the experimental group in the evening.

- The food program (intermittent fasting) should be suitable for all sample members in terms of (number of calories - dates - type of activity).
- That the diet contains all the nutrients that the individual needs (protein - carbohydrates - fats - minerals and vitamins).
- Change the diet every two weeks according to body measurements.
- Determine the number of hours to eat and the number of hours not to eat for the trainees.
- Determining the quantities in meals, specifying the types of allowed and not allowed meals, the dates of each meal and the number of hours of sleep.

The difficulties that the researcher faced:

- Women's fatigue due to the pressure of work during the day.
- Some women did not adhere to the diet at times during the research period.
- Lack of commitment by some women to attend training during the research period.

Statistical treatments:

The data for the tests and measurements were unloaded and classified for each of the measurements (before - after) using the Spss program for the following statistical treatments:

1. descriptive statistics
2. The significance of the differences between Mann Whitney
3. Significance of the Willkekson Differences
4. improvement rate

Results:

It deals with the presentation of the results that could be reached through the statistical processing of the data under study and considering the measurements used and to facilitate the presentation method. The results were presented according to the order of the hypotheses as follows:

There are statistically significant differences between the pre and post measurements of the experimental group in favor of the post measurement in body components

- BMI
- muscle mass

- fat percentage
- basal representation rate
- fat-free mass
- The percentages of improvement between the pre and post measurements

Table (3)

The differences between the two measurements (pre/post) in the group (training + fasting) And their percentages of improvement (n = 20)

%	الدلالة	Z	مجموع الراتب	متوسط الراتب	العدد	الاتجاه	المتغيرات	البيان
31,01	0,005	* 2,80	- 55,00	- 5,50	10 - -	- + =	مؤشر كتلة الجسم (BMI)	مكونات الجسم
24,5	0,005	* 2,80	- 55,00	- 5,50	10 - -	- + =	الوزن	
18,4	0,005	* 2,80	- 55,00	- 5,50	- 10 -	- + =	الكتلة العضلية (SM)	
10,2	0,005	* 2,80	- 55,00	- 5,50	- 10 -	- + =	معدل التمثيل القاعدي (BMR)	
20,7	0,005	* 2,80	55,00 -	5,50 -	10 - -	- + =	الكتلية الخالية من الدهون (FFM)	
20,9	0,005	* 2,80	55,00 -	5,50 -	10 - -	- + =	نسبة الدهون (TBF)	

Discuss the results:

It is clear from Table (3) that there are statistically significant differences between the two measurements, tribal and remote, in the following variables related to body components in favor of the post-measurement of the experimental group.

It is also clear that there are improvement rates in the components of the body that ranged between (7: 31.1%) and the researcher attributes the improvement in the percentage of fat, muscle mass and body mass to the use of intermittent fasting with the practice of functional exercises, which is one of the training methods that achieved great success in improving physiological

aspects. For the trainees, it includes the activities of multiple means and the employment of devices and tools that increase motivation when training Ashraf Yahya (2013) (10) indicated that functional training improves the efficiency of the circulatory and respiratory systems, and the researcher believes that the changes that occurred in fat, muscle mass and body mass as a result of the use of the intermittent fasting diet and the regular practice of functional exercises, which led to many changes At the level of body composition and the size of fat and muscle, this is consistent with what was indicated by Muhammad Othman (2012) (34), Rana Zuhdi (2014) (16) and Osama Al-Nimr (2013) (8) that regular functional training leads to valuable changes in Body build, style, size, body composition and muscle mass.

As shown in Table (3), there are statistically significant differences between the pre- and post-measurement in all body components, and there are improved percentages that ranged between 10.2: 31.1%.

The researcher believes that this improvement may be due to following the intermittent fasting diet and practicing the training program on a regular basis, which led to a decrease in the percentage of fat and fat-free mass, a decrease in the percentage of body mass index, an increase in the percentage of muscle mass and the percentage of burning rate

This agrees with el kutury, Monas (2019), Omar Mohamed (2021), Ahmed Samir (2018) that intermittent fasting and functional training have a positive effect on body components.

Thus, the first hypothesis is partially achieved, which states that there are statistically significant differences between the tribal and remote measurements of the experimental group in favor of the dimensional measurement in body components.

Thus, the second hypothesis, which states that there are percentages of improvement in the components of the body, the research leader, and thus it becomes clear that functional training achieves many sports goals in the shortest possible time and stimulates metabolism while burning fat accumulated in different parts of the body and elements of physical fitness and increases the efficiency of the respiratory circulatory system Increasing the heart's ability to pump blood to different parts of the body and improving the body's ability to burn more calories throughout the day also has a positive effect on raising the metabolic rate.

Research Conclusions:

Considering the objectives of the research and within the limits of the study sample and its characteristics, and through the statistical treatments used, the researcher reached the following conclusions:

- The functional training program and the intermittent fasting regimen had a positive effect on body components: fat mass, muscle mass, body mass, and lean mass.

Recommendations:

- Through the application of the program and in light of the conclusions and results within the limits of the research sample, the researcher reached the following:
- Using the proposed training program in different sectors (schools, clubs, youth centers).
- It is recommended to use the suggested training program and the suggested diet intermittent fasting to develop physiological and physical fitness to all ages.
- An attempt to use the proposed program for functional training and intermittent fasting on different samples.
- Work to spread awareness of the importance of practicing functional exercises and following the intermittent fasting system because of their positive effects on the general health of individuals.
- Paying attention to the weight of trainers and conducting training sessions to increase their ideas and information.
- It is necessary to disseminate the training program and the proposed nutritional program to all concerned parties.

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