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# Article

# The Effect of Mediterranean Diet (MD) Accompanying Zumba Exercises in Reducing the Percentage of Cellulite for Women Aged (30-45) Years

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## **Abstract**

The research aimed to identify the effect of the Mediterranean diet and Zumba exercises on the percentage of cellulite for women aged (30-45) years. Therefore, The researcher prepared the Mediterranean diet program and the Zumba exercises that fit the research sample's capabilities. The study sample was represented by (20) female employees who had cellulite exclusively, where the Mediterranean diet programs were applied through the distribution of a weekly food program and the accompanying Zumba exercises. The above program was carried out on the research sample for 3 months (12 weeks) by two training units per week, which were graded from easy to difficult. After implementing the two programs and conducting post-tests, the researcher concluded the following conclusions: The Mediterranean diet positively reduced the percentage of cellulite found in specific areas of the body (thigh, hip, and abdomen) because the values were significant, knowing that its components are available, which made it easy to apply. Besides, using Zumba exercises along with the Mediterranean diet helped reduce fat, water, and waste accumulation and gradually disappear. The researcher recommends that the Mediterranean diet be identified because its materials and nutrients depend on unsaturated fats and their high nutritional value. Emphasis on adopting different diets for those with high weight to reduce weight. Moreover, the use of Zumba exercises and other physical exercises accompanying music in hospitals and rehabilitation centers because of their role in increasing the fun and happiness of patients and eliminating depression and stress.

Keywords: Mediterranean Diet, Zumba Exercises, Cellulite

## Introduction

*Introduction and the research importance* 

Cellulite is a concern for most women, especially as summer approaches when they look to various means that may help eliminate this problem that distorts the beauty of their bodies. Undoubtedly, most women are prone to the appearance of cellulite, which is one of the problems that affect women more than men because fat accumulates in the buttocks, back, and thighs. With the multiplicity of techniques being discussed and their effectiveness, several elements play a role in the emergence of cellulite. Besides that, several factors can help fight it to at least reduce its appearance, with the difficulty of getting rid of it permanently. The world has recently witnessed a great interest in the issue of multiple diets, espe-

cially for women, due to their increased weight and lack of movement. Besides, low-fat burning, which led to a high percentage of cellulite resulting from the accumulation of fat and water under the skin, resulted in most women resorting especially after thirty, to the Mediterranean diet (MD). It is one of the best diets because it improves health in general, protects against diseases, is characterized by its diversity, and is not limited to a certain type of food without others, provided that it is natural. This diet is based on monounsaturated fats and is linked to Zumba exercises, which depend on more than one skill and are accompanied by music. Therefore, the importance of research was categorized in identifying the effect of the Mediterranean diet accompanying Zumba exercises to reduce the percentage of cellulite for women aged (30-45), year.

## Material and methods

# Research problem

Food habits and dietary patterns differ from one person to another, and from one country to another, and cooking methods differ between countries. However, they depend on basic and standard aspects. The researcher noticed that the female employees' diet was eating fast and fatty foods with saturated fats, which led to the accumulation of fatty masses under the skin and the appearance of cellulite, which is called (orange peel syndrome) in multiple areas of the body and a low level of physical activity for them. Furthermore, most of them refrained from performing physical exercises, especially Zumba exercises, and did not adhere to a healthy diet. Since the researcher specializes in food and nutrition, a Mediterranean diet program rich in dietary fiber and unsaturated fats as a healthy balanced diet was prepared. In addition to rhythmic Zumba exercises to reduce the percentage of cellulite in the body for women aged (30-45) years.

# Research objectives

The research objective can be summarized as Preparing both a Mediterranean diet program that matches the research sample, and Zumba exercises to suit the capabilities of the research sample. Besides, identifying the percentage of cellulite in the research sample and the effect of the Mediterranean diet and Zumba exercises on the percentage of cellulite for women aged (30-45) years.

## Research hypotheses

There are significant differences between the pretests and post-tests in favor of the post-tests in the Mediterranean diet on the percentage of cellulite among women aged (30-45) years. Moreover, there are significant differences between the pretests and post-tests and in favor of the post-tests in some Zumba exercises on the percentage of cellulite among women aged (30-45) years.

#### Research limits

The human domain: a sample of women (employees in the College of Basic Education) aged (30-45) years.

Time-domain: 1/12/2020 - 30/3/2021

Spatial domain: The gymnasium of the Department of Physical Education and Sports Sciences / College of Basic Education / Al-Mustansiriya University.

#### Research methodology and field procedures

Research Methodology: The researcher used the experimental method for one experimental group due to its suitability to the research nature.

Research sample: The research sample was selected from 20 women employees in the College of Basic Education / Al-Mustansiriya University for 2020-2021

who have cellulite exclusively and were registered in the gymnasium of the Department of Physical Education and Sports Sciences.

Equipment and tools used in the research

Rug

Leather tape measure

Stopwatch and medical scale

Dumbbells and electric treadmill

Arab and foreign sources

Personal interviews

Mediterranean Diet Appendix (1)

Zumba exercises Appendix (2)

A list of data collection and data recording for the sample members

#### Result

*Steps to implement the research* 

A special list was prepared for the members of the research sample, containing all the information required for the research results and fields for recording the results of Zumba exercises.

A list was filled by the competent doctor to record the degree of cellulite before and after the application of the Mediterranean diet and to start the statistical treatments to obtain accurate results.

#### Tests and measurements used in the research

A set of Zumba exercises was selected, through which it was possible to identify the effect of increasing the percentage of cellulite throughout the application of these exercises and the difference that occurred after the end of the specified period. In addition, the application of the Mediterranean diet shows the extent of tangible improvement due to this interaction between the diet prepared by the researcher and the Zumba exercises due to the lack of sufficient information on how to measure the degree of cellulite infection using known devices. The researcher relied on the data of the specialized doctor available to her to record the degree of cellulite incidence for each of the sample members, which was confirmed by her before and after applying the Mediterranean diet and performing Zumba exercises on them.

## Exploratory experiment

The exploratory experiment was conducted on 6/12/2020 for (5) female employees outside the research sample. In this experiment, the sample was defined on the Zumba exercises used and the sequence of their performance where the experiment aimed at the following:-

Determine the adequate time for Zumba exercises.

Verify the efficiency of the auxiliary work team.

Identifying the errors that appear to be avoided when applying the main experi-

The connection between the Mediterranean diet and Zumba exercises.

Determining the Zumba exercises to be performed and set by the researcher, as well as defining the diet meals that are required to be taken within the nutritional program of the specific Mediterranean diet.

Detecting the degree of cellulite through the competent physician for the sample members.

# Field research procedures

## **Pretests**

The pretests of the research sample were conducted in the gymnasium of the Department of Physical Education and Sports Sciences / College of Basic Education / Al-Mustansiriya University on 20/12/2020. Accordingly, the Zumba exercises for the research were conducted, as well as measuring the degree of cellulite for female employees within the research sample within a special form for each individual of the research sample.

#### Mediterranean diet

The Mediterranean diet is one of the most important diets that help burn fat and control it, whereas no diet lacks regular exercise to enhance its benefits. Knowing that Zumba exercises positively affect the working mechanism of the appetite regulation center in the brain. Moreover, the Mediterranean diet for this research must contain vegetables, fruits, fish, legumes, nuts, beans, grains, and unsaturated fats, such as olive oil, and include a small or very low amount of meat and dairy products, to control the number of calories entering the body.

#### Zumba exercises

Zumba exercises were carried out from 27/12/2020 to 28/3/2021 for 3 months, with two training units per week. The number of training units reached (24) training units, as the time was 60 minutes, including warm-up and cool-down, taking into account the gradation in intensity.

#### Post-tests

The post-tests were conducted under the same conditions as the pretests on 29/3/2021, which included the Zumba tests of agility, flexibility, speed, and cellulite percentages, after the completion of the specified period for the Mediterranean diet, the implementation of Zumba exercises, and their inclusion in the form prepared for each member of the sample.

#### Statistical tools

The researcher used the statistical package for the social sciences (SPSS) to obtain the statistical results of the research.

# Presentation, analysis, and discussion of the results

Presenting, analyzing, and discussing the percentage of fat and cellulite in some areas of the body

The research results shown in Table (1) indicate significant differences between the pre and post-measurements in favor of the post-measurements. The researcher attributes the remarkable improvement in the decrease in the percentage of fat and cellulite to its impact on the Mediterranean diet and Zumba exercises, which had a clear impact on raising the body's metabolic rate significantly. Besides, increasing the burning of calories and the possibility of burning more fat through the exercise the nutritional and sports programs, which helped to tighten the body, reduce the percentage of fat, reduce the thickness of the skin folds and prevent its sagging.

Variables	Arithmetic mean		Standard deviation		t-calculated	Significance
Thigh	Pre	Post	Pre	Post		
						S.
	23,02	20,35	1,60	1,20	8,50	
Hip	22,30	20,35	1,25	0,60	7,15	S.
Abdomen	23,33	22,01	1,58	0,84	9,20	S.

Table 1. The arithmetic mean, standard deviation, and t-value to measure the percentage of cellulite in some areas of the body

<sup>8</sup> indicated that reducing calories in the diet and reducing all fats and carbohydrates may be the best approach to preventing overweight and obesity. Furthermore, the balance between incoming and expended energy helped a lot in losing weight by burning calories with physical exercise, as energy is burned at the expense of the body's stored fat weight, leading to weight loss, <sup>4</sup>. A wide range of literature has confirmed that the Mediterranean diet is effective in preventing obesity, as it showed that high adherence to the Mediterranean diet is associated with a lower risk of obesity. Besides that, obese individuals who underwent a low-calorie Mediterranean diet significantly reduced their body weight, which was confirmed by <sup>20, 10</sup>. Whereas, a low-fat vegan diet resulted in more significant reductions in body weight and fat mass compared to a Mediterranean diet <sup>16</sup>. A systematic review reported that clinical Mediterranean diet trials showed significant weight loss <sup>17</sup>. High adherence to the Mediterranean diet maintains long-term weight loss. This positive association is mainly attributed to the Mediterranean diet 12. Therefore, it can be found that the Mediterranean diet was effective and positive in controlling calories, which had a significant role in reducing weight and reducing fat and cellulite in the research sample because of its positive repercussions on the reduction of oxidative stress in the body. This is due to the ability of the antioxidants available in the main foods of this diet to inhibit the effect of oxidizing molecules. Zumba is one of the sports that helps the individual to burn body fat and reduce its size through the oxygenic physical effort that increases the consumption of calories in the body. 15, Sharky 1997 also notes that this consumption of calories is related to the intensity and duration of exercise, and whenever the intensity of exercise is high. However, it affected the body's use of its stored fat as an energy source, which ultimately led to a decrease in the percentage of body fat as well as fat mass <sup>14</sup>. Many people receive Zumba lessons in several countries because of its influential effect on burning calories and losing weight, as it burns between (700-1000) kilocalories per hour. In addition to that, it eliminates depression, anxiety, and tension and raises the hormone serotonin, which gives a feeling of happiness and comfort <sup>2</sup>. Similarly, <sup>21</sup> indicated that direct exercise has the most significant impact on improving the level of fats in the blood and the body 3, confirming that the effectiveness of the aerobic exercise used affected increasing the metabolism of stored fat in the body. Aerobic exercise is one of the main determinants of long-term success in weight loss programs, as this exercise increases fat oxidation, which appears with weight loss as a result of the breakdown of fatty tissue during exercise and the release of fatty acids 5, indicating that aerobic training for Zumba exercises led to an improvement in all anthropometric variables (thigh, abdomen, hip) and positively affected the percentage of fat in the body and reduced it, this was agreed with 2 study. The examinations of the research sample (infected with cellulite) by the competent doctor showed that they were positive, as a significant improvement in the percentage of cellulite

was noted. Consequently, the Zumba exercises accompanying the Mediterranean diet in which the controlled calories had a significant role in the decrease. These findings are consistent with <sup>11</sup> results that a lifestyle that includes diet and exercise results in a loss in body weight. This result is also consistent with study <sup>7</sup>, which confirmed that physical exercise and diet for obese women had a positive effect in reducing the percentage of fat in some areas of the body and the accumulation of fat, water, and waste known as cellulite in the areas (shoulder, upper arm, hip, and thigh).

Presenting, analyzing, and discussing the results of flexibility, agility, speed endurance, and compatibility

Table (2) indicates that there are significant differences between the pre and post-measurements in favor of the post-measurements in flexibility, agility, endurance, compatibility, and the development of all these variables.

Variables	Arithmetic mean		Standard deviation		t-calculated	Significance
Flexibility	Pre	Post	Pre	Post		
	6,76	10,35	0,81	1,62		S.
					0,166	
Agility	7,06	5,30	0,17	0,42	8,93	S.
Endurance	7,60	11,01	0,51	1,30	11,13	S.
Compatibility	7,86	6,40	0,20	0,55	9,93	S.

Table 2. The arithmetic mean and standard deviation of each of the variables, flexibility, agility, endurance, and compatibility (for the research sample).

## **Discussion**

The researcher attributes the emergence of these differences in all variables in favor of the post-test of the experimental group to the effect of the Mediterranean diet, along with the diversification between the sports movements of the Zumba exercises chosen by the researcher by relying on exercises and dance movements that are based on the principle of excitement and spreading a spirit of fun and happiness. In addition to the presence of vitality in it and not feeling monotonous, boredom and getting rid of psychological pressure and tension increased the desire and motivation of the sample members to perform and develop these exercises. These activities work to raise the metabolism significantly and increase the burning of more fat and calories through exercise, which helps to tighten the body, reduce the percentage of subcutaneous fat and prevent its sagging. This was confirmed by <sup>9</sup>, who indicated that specific Zumba dances work to tighten and strengthen certain body parts (such as the buttocks, thigh, and stomach muscles) and improve endurance. The study of <sup>18</sup> also showed vast differences in the intensity of Zumba exercises. It attributed this to the type of dance, the enthusiasm of the trainer, and his experience in managing the group, where these factors led to a difference in the studies. However, Zumba exercises require moving many body muscles and continuing to perform them for long and continuous periods. Thus, the intense and continuous work for muscle need glycogen on an ongoing basis to carry out the necessary movement, and when the oxygen available before the start of Zumba exercises is depleted, the stored fat supplies the muscles with additional glycogen, which helps to burn them and increase the metabolic rate and thus burn calories and maintain health, agility and body weight. This is agreed with <sup>16, 5</sup>.

Moreover, <sup>13</sup> pointed out that Guided Zumba training can be applied to improve well-being, physical fitness, neuromuscular function, and body fat. Likewise, <sup>7</sup> indicated that the various physical exercises had a positive impact on developing the motor abilities of the research sample members; this is consistent with <sup>5,6</sup> also indicated that aerobic training for Zumba exercises led to an improvement in all physical variables such as compatibility, flexibility, and endurance, which is consistent with the current study. Thus, through this study, the researcher believes that it is possible to raise awareness of the concept and importance of the Mediterranean diet and Zumba and work to spread it at the local level from a scientific, health, and nutritional point of view.

#### **Conclusions**

The Mediterranean diet positively reduced the percentage of cellulite found in some areas of the body (thigh, hip, and abdomen) because the values were significant, knowing that its components are available, which made it easy to apply.

Using Zumba exercises with the Mediterranean diet helped reduce fat, water, and waste accumulation and gradually disappear.

## Recommendations

The Mediterranean diet should be identified because its nutrients depend on unsaturated fats and high nutritional value.

Zumba exercises and other physical exercises accompany the music because of their effect in reducing the percentage of cellulite and the accumulation of waste, fat, and water in the abdomen and buttocks.

Nutritional awareness by the media and fitness centers to guide and teach citizens proper food habits and the importance of exercising for health.

Conducting similar research and studies on samples of different genders and ages.

Emphasis on following different diets for those with high weights to reduce weight.

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Appendix (1)

Mediterranean diet

The first day:

Breakfast: Fat-free yogurt with strawberries and oats added to it Lunch: A piece of cheese on whole-grain bread, vegetables Dinner: Tuna salad with olive oil and a piece of fruit

The second day:

Breakfast: Oats with raisins

Lunch: leftover tuna salad from day one

Dinner: green salad with fat-free feta cheese, olives, and tomatoes

The third day:

Breakfast: omelet with vegetables, tomatoes, and onions, and a piece of fruit

Lunch: a piece of cheese on whole wheat bread, with vegetables

Dinner: Mediterranean lasagna

The fourth day:

Breakfast: Yogurt with fruit pieces and liqueur Lunch: Leftover lasagna from the day before

Dinner: grilled salmon with brown rice and vegetables

The fifth day:

Breakfast: boiled eggs, with vegetables prepared in olive oil

Food: Yogurt with pieces of fruit, oats, and nuts

Dinner: a grilled piece of meat, with salad and baked potatoes

The sixth day:

Breakfast: an apple with raisins, oats, and nuts

Lunch: A piece of cheese on whole-wheat bread and vegetables

Dinner: Mediterranean-style pizza

The seventh day:

Breakfast: omelet with vegetables and olives Lunch: Leftover pizza from the day before

Dinner: a piece of grilled chicken with vegetables, potatoes, and a piece of fruit

A note on the Mediterranean diet program

Add fish to meals twice weekly or replace seafood instead of meat and chicken.

It is possible to eat light foods between meals. Healthy snacks include nuts, a piece of fruit, carrots or celery sticks, berries or grapes, yogurt, and apple slices with almond butter.

Drink plenty of water from 6 to 8 glasses of water daily.

Permitted foods: vegetables, fruits, legumes such as fish, eggs, nuts, poultry, natural oils such as avocado oil and olive oil, as well as dairy products such as cheese and yogurt.

Foods to avoid in the Mediterranean diet

Foods that contain high sugar content, such as soda water and ice cream

Foods that contain refined wheat, such as white bread, pasta, and spaghetti.

Avoid using refined oils such as soybean oil.

Altogether, avoid eating processed meats such as hot dogs and mortadella.

Stay away from eating products in the supermarket under the label "diet," "lite," and "fat-free" because completely processed food is not considered healthy food.

Appendix (2) Zumba exercises

The first exercise: exercises to get rid of cellulite in the thighs



Take a squatting position and tighten the stomach muscles, open the legs with the waist, spread the arms wide so that they are equal to the shoulders, tighten the chest muscles forward and up, then slowly go down with the regulation of the breath, regular practice this exercise continuously daily, count 10 times in the beginning until You pray up to 50 times after that.

The second exercise: exercises to get rid of cellulite in the buttocks



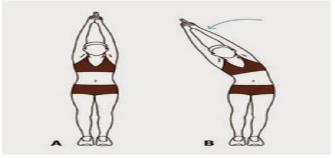
Put a pillow on the floor or a rug, then lie down with your back stretched on it, bend your knees with the feet fixed, slowly raise the pelvic muscles when starting to exercise until the chest and knees are flat, and do not move your feet when doing this exercise, and slowly go down on the ground, repeat these exercises regularly daily, the first time start 5 times and then continue up to 50 times a day. However, lifts help to tighten the muscles, which increases the body's ability to burn the fat stored in the buttocks, which helps to tighten the skin better.

The third exercise: exercises to get rid of cellulite in the inner thighs



It is possible to get rid of the relaxation of the muscles in this area by lying on one side, putting one leg on top of the other, raising your leg and holding for a few seconds, then raising the leg and repeating this movement. Then alternate between the sides and raise the legs, give each leg five times at the beginning of practicing this exercise, after this gradually increase 5 additional times for each week.

The fourth exercise: exercises to get rid of cellulite in the chest



Tighten the abdominal and chest muscles together by raising the hands as high as possible until the chest muscles are tightened, and they rise. This exercise will strengthen the chest muscles and rid us of the relaxation of the body then raise the hands after 3-5 seconds, repeat this exercise at first 5 times, then regularize this exercise daily and increase the duration until it reaches 50 times a day.

The second method in this exercise is extending the hands in front of the chest and then holding them intertwined; this exercise is one of the important exercises to get rid of cellulite found in the buttocks and arms.

The fifth exercise: exercises to get rid of cellulite in the abdomen and waist

Tighten the abdominal muscles, extend the arms in front of the chest area, and make the feet close together and fix them on the ground, move the waist to the right, then the middle, then the left while keeping the abdominal area tight. It is preferable not to move the waist to the right and then the left directly because this hurts the waist muscles; repeat this exercise 10 times and regularly in its daily performance.

The second method of exercise to get rid of cellulite in the abdomen and waist is standing and making the feet close together and extending the hands forward, then bending down in a squatting position, when descending, the fingers touch the direction in which they went down, and make the hands touch the right side and go down once to the right and again to the left, repeat This exercise daily 10 times on the first day and then add 5 times every day until we reach 50 times.

The sixth exercise: kickback exercises to get rid of cellulite



Sit on the floor from the abdomen, raise the upper part of your and rest on the hands, bend one knee, and raise the second leg as if you are kicking the leg to the ceiling; try to kick with the foot; you may find it difficult to balance on one knee, and difficulty kicking, but this exercise is important to get rid of cellulite in the legs and buttocks.

The seventh exercise: squatting exercises to get rid of cellulite



Using dumbbells in this exercise, use the hands and extend them forward towards the chest, a little distance between the feet, and start to go down in a squatting position; this exercise significantly saves you from cellulite in the buttocks. It is essential to repeat this exercise.

The eighth exercise: exercises to get rid of cellulite lunges



Stand so that the feet are very close to each other, put the hands on the waist, tighten the back, abdomen, and chest with the chin raised slightly forward, take a step forward, give one leg a step forward and then bend the knee, provided that the second knee is straight back, not straight, with leaning on the toes.

The ninth exercise: Heal Repeats exercises to get rid of cellulite



These exercises are considered one of the most powerful exercises to get rid of cellulite, and this is because they depend on the electric treadmill to get rid of cellulite in the thighs, abdomen, and chest.