The journal « sports creativity »

Volume: (16) / N°: (01)-(2025), p 427-458

The effect of Zumba exercises accompanied by a suggested diet on weight loss improvement of some anthropometric measurements and body image in overweight women.

تأثير تمرينات الزومبا بمصاحبة نظام غذائي مقترح في إنقاص الوزن وتحسين بعض القياسات الانثروبومترية وصورة الجسم لدى السيدات ذوات الوزن الزائد.

Ala'a Abdullah Al Rawdhi [1] , **Abdul Ghani Mujahid Mutahhar** [2]

آلاء عبدالله الروضي [1] ، **عبد الغني مجاهد مطهر** [2]

[1] Sana'a University - Faculty of Physical Education - Yemen , ala'a.al-rawdhi@su.edu.ye

[2] Sana'a University - Faculty of Physical Education - Yemen , a.motaher@su.edu.ye

Received: 09/01/2025 **Accepted: 13/02/2025** **Published:01/06/2025**

Abstract:

Research objective: To identify the effect of Zumba exercises accompanied by a proposed diet in losing weight and improving some anthropometric measurements and body image in overweight women. The research sample consisted of (10) women, who were deliberately selected from the research community. The researchers used the experimental method, due to its suitability to the nature of the research. The research results confirmed the achievement of the research hypothesis. The research concluded by presenting the most important recommendations, including the necessity of benefiting from Zumba exercises accompanied by diets in health and fitness centers.

Keywords: Zumba, diet, weight loss, anthropometric measurements, body image, overweight

الملخص :

هدف البحث: التعرف الى تأثير تمرينات الزومبا بمصاحبة نظام غذائي مقترح في انقاص الوزن وتحسين بعض القياسات الانثربومترية وصورة الجسم لدى السيدات ذوات الوزن الزائد، تكونت عينة البحث من (10) سيدات، تم اختيارهن بالطريقة العمدية من مجتمع البحث، استخدام الباحثان المنهج التجريبي، وذلك لملائمته لطبيعة البحث، جاءت نتائج البحث مؤكدة على تحقق فرض البحث، واختتم البحث بعرض اهم التوصيات منها ضرورة الاستفادة من تمرينات الزومبا المصحوبة بنظم غذائية في مراكز الصحة واللياقة البدنية.

الكلمات المفتاحية : الزومبا، والنظام الغذائي، انقاص الوزن، القياسات الانثربومترية، صورة الحسم ، الوزن الزائد

1. Introduction to the research:-

Lack of physical activity is one of the most prominent features of rapid technological development, which has made women tend to rest, and made her body vulnerable to fat accumulation, which increases their weight, expands the size of their clothes, and decreases their level of satisfaction with their body image, and they become vulnerable to many chronic diseases associated with lack of movement, such as obesity and its complications; which has made developed countries push sports researchers to study this phenomenon and study the effect of sports on it, and its role in improving women's general health, psychologically and physically.

Obesity is a reservoir for many diseases, and being overweight is a chronic condition that requires a lot of effort and work to get rid of it, using all available methods. (Subhi Shahada Al-Eid, 2007, p. 65)

The ideal way to lose weight is achieved by combining food regulation with physical activity, so that food is regulated in terms of quantity and quality, in addition to choosing aerobic exercises as a physical activity characterized by medium intensity and high volume. (Subhi Ahmad Qablan and Al-Jabour, 2012).

Women are keen to have an attractive and acceptable physical image, according to the image determined by culture, as women are always looking for the type of body or shape that is considered attractive, which varies according to culture and time, as the full body in the past was an example of the image of a beautiful woman, and thinness has become an example of that image at the present time. (Abdul Rahman Muhammad Al-Aissawi, 2001, p. 45).

The issue of body image in terms of satisfaction and dissatisfaction clearly affects women. No woman feels satisfied with her body image, but rather she often sees something in it that needs to be modified. The feeling of dissatisfaction is often centered around weight, as she needs to lose weight to look better. (Ibrahim Ali Ibrahim and Al-Nil, 1994, p. 4).

The human body consists of different tissues (bones, muscles, and fats), and bone tissues are relatively stable, while muscle and fat tissues are subject to increase and decrease, and are quickly affected by sports training. (Youssef Lazem Kamash and Abu Khait, 2011, p. 268).

However, a woman's body differs from a man's body in terms of the percentage of muscle and fat, as the percentage of fat in a man's normal weight is (13:21%), and for a woman (23:31%). The goal of losing weight is to increase the percentage of fat in the body, as it is responsible for maintaining the efficiency of muscle movement and increasing the chances of contracting chronic diseases. (Khaled Ali Al-Madani, 2008, p. 11).

Zumba exercises are a type of aerobic training that can burn a lot of calories. One hour of them helps burn approximately 300: 1000 calories and more of fat, thanks to the variety between its fast, slow and rhythmic athletic movements at the same time (Nimat Ahmed Abdel Rahman, 2000).

Zumba exercises are fitness exercises that depend on music and some Latin and international folkloric dances, where music is mixed with many sports exercises, through a group of dance movements of varying intensity between high and low, performed to rhythmic musical tunes that aim to affect the heart rate, increasing or decreasing. (27)

In light of the above, it is clear that there are a number of scientific indicators that indicate the existence of a correlation between each of: physical activity and food on the one hand, and body weight and improving its measurements and image on the other hand. Because this relationship requires more scientific research to discover its dimensions and benefit society from it, the idea of this research came about, which aims to know the effect of Zumba exercises - accompanied by a proposed diet - in losing weight and improving some anthropometric measurements and body image, in overweight women, in the hope that this

research will come out with the desired benefit in improving the health of the individual and society and reducing the money spent on it.

2. Research problem:-

The researchers noticed through their association with the community and their work in the field of sports training, that many local women's fitness centers suffer from the problem of overweight women withdrawing from their sports programs designated for weight loss, and stopping their continued participation in them, under several justifications such as: loss of passion for continuing, or not seeing encouraging results from participation, or trying other means of losing weight such as: abstaining from eating foods, using chemical drugs, undergoing surgeries... etc. The researchers attribute the reason for this problem to the failure of these centers to take into account the effect of food in controlling weight, and the effect of music in regular training, as their training programs often rely on boring routine exercises, such as exercises based on purely sports equipment or based on repeated counting, and do not rely on stimulating exercises, such as rhythmic exercises accompanied by suggested diets, whose movements are characterized by spontaneity, beauty, and harmonious harmony with the music, which helps in improving the mood and forgetting fatigue, and their diets are characterized by nutritional balance, which helps in controlling weight and adjusting it to its ideal levels, and therefore the researchers seek - from During this research - to participate in solving this problem by studying the effect of Zumba exercises - accompanied by a proposed diet - in losing weight and improving some anthropometric measurements and body image in overweight women. The researchers believe that Zumba exercises are one of the modern and effective rhythmic trends in sports training methods, especially since there are many previous experimental studies that confirmed the effectiveness of training accompanied by music, including the study (Nashwa

Jabara Allah Daraj, and Miso Al-Daw, 2018) which confirmed that the training program accompanied by music led to weight loss more effectively than the program not accompanied by music, and that music has a great effect in improving mood and psychological state, which leads to practicing sports exercises in the best possible way.

3. Research Objective:-

The research aims to identify the effect of Zumba exercises - accompanied by a suggested diet - on each of:

- Body weight.
- Some anthropometric measurements: chest circumference, upper arm circumference, abdominal circumference, hip circumference, thigh circumference.
- Body image.

Among obese women aged between (30-39) years, members of the (Eve Fitness) Center for Sports Health, in the capital, Sana'a.

4. Research hypotheses;-

The research assumes the existence of statistically significant differences between both pre- and post-measurements in favor of the post-measurement of the effect of Zumba exercises - accompanied by a proposed diet - in each of:

- Body weight.
- Some anthropometric measurements: chest circumference, upper arm circumference, abdominal circumference, hip circumference, thigh circumference.
- Body image.

Among obese women aged between (30-39) years, members of the (Eve Fitness) Center for Sports Health, in the capital, Sana'a.

5. Search terms:-

5.1. Zumba exercises:

It is a type of aerobic exercises inspired by Latin dance movements accompanied by diverse music and helps improve the physical, health, social and psychological condition of the individual. Zumba means in Latin the word "bee buzz" and is a Colombian slang word meaning fast movement like a bee. (Wafaa El-Sayed Mahmoud Attia, and Abu Zeid, 2019) Quoted from: Mary, L, John B, S. Carl, F, Richard, M, Jose, R. (2012)

5.2. Balanced diet:

It is the food that is able to meet the body's various needs for construction, repair, energy and disease resistance, and which contains all the essential nutrients such as proteins, carbohydrates, fats and minerals, in addition to a sufficient amount of water to ensure the continuation of life in a healthy way. (Naji Mustafa Abu Rmaila and Al-Malkawi, 2014, p. 11)

5.3. Weight loss:

It is the gradual and deliberate reduction of excess fat accumulated under the skin, by following sports exercises accompanied by a balanced diet, and within the limits indicated by the standard ideal weights table for adults according to body height and size, while maintaining the appropriate level of physical fitness. (Operational definition)

5.4. Anthropometric/body measurements:-

Anthropometry is a Greek term consisting of two words: the first (anthropos) meaning human, and the second (metron) meaning measurement, and the sum

of the two words anthropometry means the science of measuring the size of the human body. (Ahmed Nasr El-Din Sayed, 2003, p. 254)

The research was interested in studying changes in the measurement of some body circumferences, in addition to studying changes in its weight and image.

5.5. Body image:-

A term that refers to the shape of the body as perceived by the individual in his mind and the way the body appears to himself. (Hussein Ali Mohamed Fayed, 2004).

5.6. Overweight:

It is an abnormal or excessive accumulation of fat that may harm health, and people who suffer from overweight are those whose body mass index ranges from 25 to 29.9 kg/m2. (Ihab Mohamed Emad El-Din Ibrahim, 2016, p. 417)

6. Research areas:

6.1. Human field:

Women participating in the first three months of the training year 2024 AD, at the (Eve Fitness) Health and Sports Center in the capital Sana'a,

6.2. Spatial field:

The (Eve Fitness) Health and Sports Center, which is a sports training and healthy nutrition center for women, in the Old Sana'a District in the capital Sana'a.

6.3. Time field:

The period from 01/13/2024 AD to 03/06/2024 AD, which is the period of applying the training program to the basic research sample.

7. Previous studies-:

7.1. Arabic studies:

1) **Hossam El-Din Sharit, (2023) (04)** conducted a study entitled "Proposing a sports training program using cardio exercises to reduce the percentage of fat and improve body image in obese women (20-30) years old". The research sample consisted of: (30) women aged between (20:30) years, who were distributed equally into two experimental and control samples. The sports training program designed by the researcher was applied, consisting of (16) training sessions divided over (08) weeks (2 sessions/week). The results showed that the training program proposed by the researcher had a clear effect in reducing the increase in the percentage of fat in the body and improving the body image of the sample members.
2) **Nadia Saleh Ali Al-Sayed, (2021) (12)** conducted a study entitled "The Effect of a Proposed Training Program Using Zumba Training on Some Physical Variables and Body Composition for Women" aimed to know the effect of the program on selected aspects of physical variables and body composition. The researcher used the experimental method because it suits the nature of her study, and deliberately chose her study sample, which amounted to (45) women, from among women whose ages ranged between (30-40) years, and she concluded that there is a strong relationship between practicing sports activities and the body's ability to burn calories.
3) **Sara Mohamed Marsal, and others (2019) (16)** conducted a study entitled "The effect of aerobic exercises using a step box on some components of body composition and body circumference among obese female students at Mansoura University." The researcher used the experimental method by designing a single group for a sample of (10) female students who were deliberately selected. The results showed that aerobic exercises have a positive effect on the variables of body composition, body circumference, and weight loss.

4) **Walaa Abdel Fattah Mohamed Ahmed (2019) (20**) conducted a study entitled "The effectiveness of a proposed aerobic program for weight loss on some functional variables for women aged (25:30) years" aimed at developing a proposed aerobic program for weight loss and improving the level of physical fitness, efficiency of the circulatory and respiratory systems, and blood lipid levels for women aged (25-30) years. The researcher used the single-group experimental design, and the research sample was deliberately selected from among obese women wishing to lose weight. The most important results of the study were a decrease in body weight and an improvement in the levels of: blood lipids, efficiency of the circulatory and respiratory systems, anthropometric measurements, and physical fitness of the research sample members
5) **Wafaa El-Sayed Mahmoud Attia, and Abu Zeid (2019) (19)** conducted a study entitled "The effect of a proposed aerobic exercise program to improve body image, depression, and some personality variables in obese women" using the experimental method, on a sample of (20) women training in a fitness gym in one of the training centers in Haram, who suffer from disorders in body image and some personality variables, physical, mental, mood, social, and moral traits. The results of the study confirmed the improvement of all the physical variables under study, and the study recommended the necessity of individuals suffering from body image disorders participating in relevant sports training programs.
6) **Farah Khaled Abdullah Al-Karkhi, (2017) (03)** conducted a study entitled "The effect of special physical exercises on some body measurements for women aged 30-40 years" using the experimental method on a sample of (10) women. Among the most important results reached by the study: a

decrease in body weight and circumference in addition to the symmetry of body parts.

7.2. Foreign Studies:

1) **Barghothi, (2022) (24)** conducted a study entitled "The effect of aerobic exercises on physical fitness and body composition among female students of physical education at Palestine Technical University in Ramallah" using the experimental method on a deliberate sample of (22) female students for a period of (8) weeks with (3) training doses per week, each dose (60) minutes. The results indicated an improvement in body fat mass.
2) **Allistia, et al. (2021) (22**) conducted a study entitled "Effects of Zumba and Zumba Strength on Body Fat and Body Circumference in Women Aged 20-40 Years". It aimed to analyze the effect of differences between Zumba and Zumba Strength exercises on the variables under study. The study used a quasi-experimental design with a control group. The most prominent results were: Zumba exercises are more effective in reducing body fat thickness and body circumference.
3) **Aukštuolytė, et al. (2018) (23)** conducted a study entitled "Effects of body composition and body image on sedentary working women participating in Zumba or functional training programs: a pilot study". The research sample consisted of (31) volunteers, (16) volunteers who participated in Zumba programs and (15) volunteers who participated in the functional training program. The sample members filled out the body image scale questionnaire, and it was found that the level of satisfaction with body image improved among the participants in the functional training programs.
4) **Baştuğ, et al. (2016) (25)** conducted a study entitled "The effect of CrossFit, Pilates and Zumba exercises on body composition and image in women". The research sample consisted of (80) volunteers aged between (35-50)

years, divided into two experimental and control groups. The mixed exercise program was applied: (CrossFit, Pilates, Zumba). The results showed an improvement in the variables under study: body weight, body mass index, in addition to an improvement in the level of satisfaction with body image among the sample members.

5) **Seguin, et al. (2013) (26)** conducted a study entitled "The effect of strength training on improving body image and physical activity behaviors among middle-aged and elderly women in rural areas". The sample consisted of Research from (341) rural female volunteers. The application of the training program led to an improvement in both body image and physical fitness among the sample members.

8. Research plan-:

8.1. Study method:

The research used the experimental method using the pre- and post-measurement method for one experimental sample due to its suitability to the nature of the research.

8.2. Study community:

The study community consisted of women participating in the (Eve Fitness) Sports Health Center in the capital, Sana'a.

8.3. Study sample:

The basic sample of the study included (10) female volunteers who were deliberately selected from the study community, and the conditions for selecting sample members were applied to them.

8.4. Conditions for selecting sample members:

The sample members were selected according to the following conditions:

1) To be overweight (body mass index ranging from 25: 29.9 kg/m2.(

2) To be between 30-39 years old.

3) To be a beginner in practicing sports, especially Zumba exercises.
4) To not practice any other sports activity during the period of implementing the training program.
5) To be in good health in terms of:

- Not smoking.
- To not use any medications that cause fluid retention in the body.
- To be free of muscle, bone and spine injuries.
- To be free of thyroid diseases.
- To not have been exposed to serious diseases such as cancer, stroke, heart attack or muscle diseases.
- To not follow any medical diet that would affect the results of the study.

6) To be fully prepared to implement all components of the training program in terms of:

- Attending all training sessions for the program.
- To follow the diet accompanying the program.
- Drink enough fluids daily: approximately (11.5) cups, equivalent to (2.7 liters).
- Get enough sleep for your body, from 7 to 8 hours every night.

8.5. Moderate distribution of sample members:

The moderation of the distribution of sample members' data was confirmed according to Table No. (1) shown below:

Table (1) Statistical description of the individuals of the basic sample of the research

N=10

	Variables	Unit of measurement	Arithmetic mean	Standard deviation	Coefficient of skewness
1	Age	Year	33.7	3.06	0.36
2	Height	cm	159	3.5	0.001
3	Body weight	kg	68.56	3.91	-1.308-
4	Chest circumference	cm	101.3	7.92	0.22
5	Upper arm circumference	cm	34.4	3.17	0.07
6	Abdominal circumference	cm	87.2	3.88	-.573-
7	Hip circumference	cm	109.9	3.73	-.031-
8	Thigh circumference	cm	66	3.5	0.001
9	Body image	degree	3.12	0.635	-1.416-

It is clear from Table (1) that the data for the research sample are average and not scattered and are characterized by the normal distribution of the sample, as all values of the deviation coefficients ranged between (-1.308, -.36), i.e. they were limited to ±3, which confirms the moderation and homogeneity of the data of the basic variables of the research sample.

8.6. Devices and tools used in measurement tests:

	Name of the device	Purpose	Measurement unit
1.	rest meter	Measures the total length of the body	In centimeters
2.	Calibrated medical scale	Measures the weight of the body	In kilograms
3.	Measuring tape	Measures the circumference of the body	In centimeters
4.	Questionnaire	Measures the level of satisfaction with body image	degree

8.7. Selection of assistants:-

Three assistants were selected from among colleagues working at the Sports Health Center (Eve Fitness), and they were given an introductory lecture on the various aspects of the research, especially those related to the application of the following-:

1) The training unit for Zumba exercises
2) The accompanying diet
3) Measurements related to the research variables

8.8. Exploratory research experiment:

1) The Zumba training unit was applied with the proposed diet on a survey sample selected from within the study community and outside the basic sample of the research,
2) The size of the survey sample was (5) women who were deliberately selected.
3) The survey experiment was applied during the period from 06/01/2024 to 09/01/2024,
4) The survey experiment was applied with the aim of:

- Testing the Zumba training unit and identifying its defects.
- Testing the tools and devices used in the research and ensuring their validity.
- Discussing aspects related to the proposed diet.
- Testing and modifying the procedures for measuring the variables under study.
- Testing the validity of time and place and making appropriate modifications to them.
- Testing the capabilities of the research assistants and providing them with appropriate instructions.
- Determining the validity and reliability coefficients of the tests used in the research.

8.9. Scientific coefficients of tests:

1) **Validity coefficient:** The validity coefficient refers to the ability of the tests used in the research to measure the research variables honestly. This was verified by presenting these tests to a number of experts who hold a doctorate degree in physical education, to determine their validity for measurement. They all reported the validity of these tests and the validity of their content.
2) **Reliability coefficient (Pearson):** The reliability coefficient refers to the ability of the tests used in the research to give the same results if they are reapplied to the same individuals, and under the same conditions. This was verified using the (retest) method, where these tests were applied to the exploratory sample, and reapplied after three days, and the correlation coefficient between the two applications was calculated as shown in Table No. (2) below:

Table No. (2) Correlation coefficient (Pearson) between the first and second applications of the research tests on the survey sample

n=5

	Tests	Unit of measure	Correlation coefficient
1.	Body weight	kg	.998**
2.	Chest circumference	cm	.997**
3.	Upper arm circumference	cm	.990**
4.	Abdominal circumference	cm	.998**
5.	Hip circumference	cm	.994**
6.	Thigh circumference	cm	.993**
7.	Body image	degree	.984**

Table (2) shown above shows the high values of the correlation coefficients (Pearson) and their closeness to the correct one in all tests used to measure the research variables, which indicates that these tests enjoy a high degree of stability.

It is worth noting that all the tests used in this research are standardized tests that have been used in many previous studies, and they already enjoy a high degree of validity and stability, given that they have become axioms of measurementIn the sports field

9. Research Procedures:

9.1. Applied Procedures:

The Zumba training unit - accompanied by the proposed diet - was applied to the members of the basic sample, and its effect on their research variables was measured as follows:

1) **Pre-measurement:** It was conducted on Wednesday 10/01/2024 AD, and its results were recorded in the form prepared for that.
2) **Program Application:** The training unit was applied for a period of (8) weeks, starting from 13/01/2024 AD until 06/03/2024 AD.
3) **Post-measurement:** It was conducted on Thursday 07/03/2024 AD, and its results were recorded in the form prepared for that.

9.2. Research variables:

1) **Independent variable:** Zumba exercises accompanied by a suggested diet.
2) **Dependent variables:**

- Body weight.
- Some anthropometric measurements: chest circumference, arm circumference, abdominal circumference, hip circumference, thigh circumference.
- Body image.

9.3. Zumba Training Unit:

The training unit was presented for research after reviewing many previous studies, research, periodicals, websites, and Arab and foreign references related to the use of sports training and diets in improving research variables, and after consulting experts in the field of sports training and sports nutrition. The training unit included determining the training goal, implementation time, content, and tools necessary for implementation, as: The training unit aimed to improve the measurements of the variables under study in overweight women. It was implemented over a period of (8) weeks at a rate of (05) days/week with a total of (40) training units, each unit lasting (60) minutes. It included moderate-intensity aerobic exercises in the form of various Latin movements (dances) (salsa, reggaeton, merengue, cumbia). The music videos and their movements

were taken from Zumba playlists on the Internet. The intermittent training load method was used when implementing the program, where the trainee is given a specific load followed by a rest period, and the load is repeated again, then a rest period, and so on... so that the pulse rises to (180) beats per minute, while the rest period ends when the pulse drops to (120) beats per minute, then another load is given, which means that the rest period is not complete. The exercises were performed at a medium intensity ranging between (50:60)% of the maximum resting heart rate (metabolic pulse rate). The training unit consisted of three parts, as follows:

1) **Warm-up (5) minutes:** In which the body is prepared and ready to perform the required activity by choosing slow exercises with a slow rhythm and calm movements that include all parts of the body in order to prepare the vital systems associated with physical activity, such as the circulatory system and the respiratory system.
2) **The main part (50) minutes:** In which exercises were used at a faster rhythm in a gradual ascending manner, using all parts of the body continuously and at a medium speed, so that all muscles of the body are gradually activated, especially the large ones, and the principles of sports training and aerobic work were taken into account in a manner that is appropriate for the age and health of the women within the scope of the research sample.
3) **Cooldown (5) minutes:** In this, calm exercises were chosen to stretch the working muscles and ensure that the body and its systems return to their normal state before exercise.

Tools and equipment used in training: Gym, electric screen (55) inches to display Zumba exercises, headphones, flash drive (64) GB

9.4. Proposed Diet:

1) The diet list accompanying Zumba exercises was proposed after being presented to the experts and their opinion was sought on its suitability to improve the study variables. The list included a proposal of 2,200 calories/day for each sample member. The list contained the food groups for the system: milk and its derivatives, vegetables, fruits, grains/starches, protein, fats, in addition to water. It also contained food alternatives within each food group: These are various food items that sample members can compare between to choose the appropriate alternative for them. Each alternative represents a single food portion with a specific amount (in cups, spoons, or grains). It also contained the number of calories that make up each portion of the food alternatives, as well as the number of suggested portions per day for each food group, in addition to the daily calorie plan at the level of the single food group and at the level of the total groups.
2) The content of the diet list was divided into three sub-lists, each list for a main meal (breakfast, lunch, dinner). The diet was also presented to nutrition experts to express their opinion on it, and in light of that, appropriate modifications were made. On it, and its final form,
3) The diet lists were delivered to the sample members, and they were enabled to choose the appropriate food items for them from among the alternatives included in it, without compromising the number of calories specified for each food group, and they were stressed on the need to fully adhere to the implementation of that system without increase or decrease, during the entire training period,

4) The sample members were followed up on a daily basis to verify the integrity of the implementation of the system, and to respond to inquiries raised about it.

9.5. Statistical treatments:

To answer the research hypotheses, the pre- and post-questionnaire data for the sample members were entered into an Excel file and then processed statistically at a significance level of 0.05 using the following statistical measures for the (SPSS) program, version (24):

1) Arithmetic mean.
2) Standard deviation.
3) Deviation coefficient.
4) Pearson correlation coefficient.
5) Test (t) for two non-independent samples.

In addition to the percentage of improvement in the variables, which was calculated using the following equation: (before measurement - after measurement) ÷ before measurement × 100

10.Presentation and discussion of results:

10.1. Presentation of results:

1) The research hypothesis states the following:

"There are statistically significant differences between the pre- and post-measurements in favor of the post-measurement of the effect of Zumba exercises - accompanied by a proposed diet - in each of:

- Body weight.
- Some anthropometric measurements: chest circumference, upper arm circumference, abdominal circumference, hip circumference, thigh circumference.
- Body image.

Among obese women aged (30-39) years, members of the (Eve Fitness) Health and Sports Center, in the capital, Sana'a".

2) To verify the validity of this hypothesis, both the significance of the differences between the two scales and the level of improvement in measuring the variables were used, as shown in the following two tables, No. (3) and (4):

Table No. (3) shows the arithmetic mean of the pre- and post-measurements and the differences, and the significance of the differences using the (t) test for the variables under study.

1) N=10

	Variables	Unit of measure	Arithmetic mean			Significance of differences	
			Before	after	differences	T	Sig.
1.	Body weight	kg	68.56	60.09	60.09	20.87	0.001
2.	Chest circumference	cm	101.3	93.5	93.5	11.76	0.001
3.	Upper arm circumference	cm	34.4	31.7	31.7	10.37	0.001
4.	Mid-abdominal circumference	cm	87.2	80.9	80.9	10.55	0.001
5.	Hip circumference	cm	109.9	106.9	106.9	9	0.001
6.	Thigh circumference	cm	66	62	62	3.69	0.005
7.	Body image	degree	3.12	3.98	3.98	-8.82-	0.001

T is a function at sig ≤0.05

It is clear from Table No. (3) shown above that there are differences between the pre- and post-measurements for all the variables under study and that the significance level (sig) for all the calculated (t) values for those differences ranged between (0.001, 0.005), which is a level less than (0.05), which indicates that

those differences are statistically significant differences in favor of the post-measurement in all those variables.

The following figure shows the graphical representation of the arithmetic mean data in the table above.

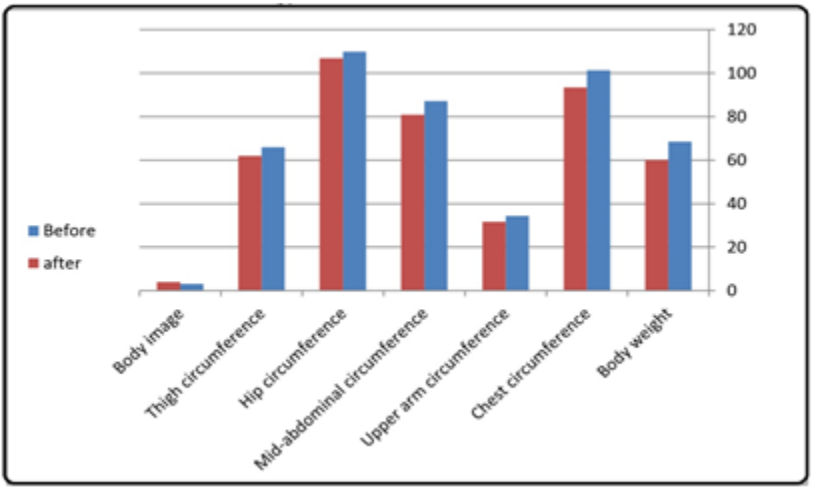

Figure (1) shows the graphical representation of the arithmetic mean mentioned in the table above.

Table No. (4) Improvement rates in the variables under study

N=10

	Variable	Unit of measurement	Improvement rate
1.	Body weight	kg	12.35%
2.	Chest circumference	cm	7.70%
3.	Upper arm circumference	cm	7.85%
4.	Abdominal circumference	cm	7.22%
5.	Hip circumference	cm	2.72%
6.	Thigh circumference	cm	6.06%
7.	Body image	degree	27.56%

It is clear from Table No. (4) shown above that the percentage of improvement in the post-measurement compared to the pre-measurement for all variables under study ranged between (2.72%, 27.56%). These percentages can be arranged in ascending order from the least improvement to the greatest improvement as follows: hip circumference, thigh circumference, abdominal circumference, chest circumference, upper arm circumference, body weight, body image.

The following figure shows a graphic representation of the improvement rates mentioned in the table above.

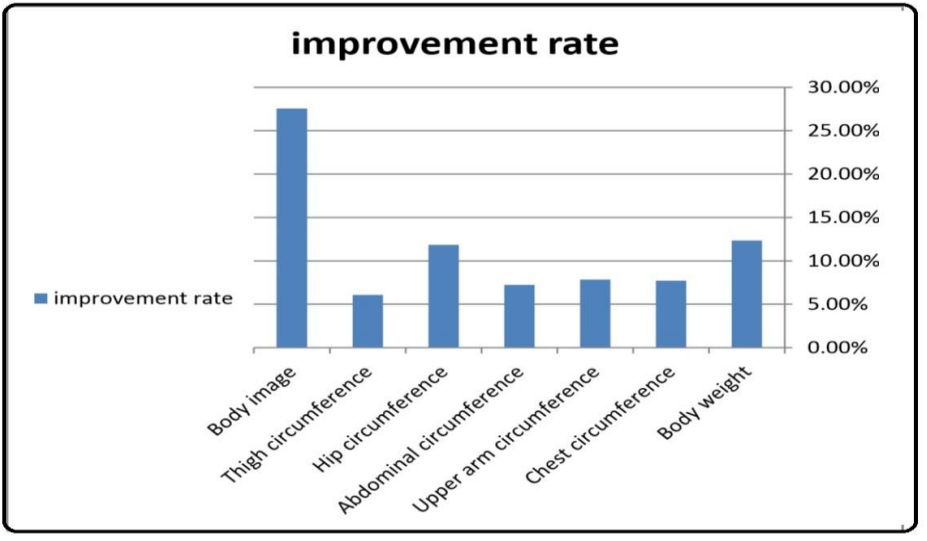

Figure (2) shows the graphic representation of the improvement rates in the research variables.

10.2. Discussion of the results:

1) It is clear from Table No. (3) shown above regarding the arithmetic mean and significance of the differences, that the calculated (t) values for the differences in the variables under study (body weight, chest circumference,

upper arm circumference, abdominal circumference, hip circumference, thigh circumference, body image) were respectively (20.87, 11.76, 10.37, 10.55, 9.00, 3.69, -8.82-) and with significance levels (0.001, 0.001, 0.001, 0.001, 0.001, 0.005, 0.001), all of which are less than the significance level (0.05), which indicates that these differences are statistically significant differences between the pre- and post-tests and in favor of the post-test in all these variables.

2) As is clear from Table No. (4) regarding the improvement rates, there is an improvement in all the variables under study (body weight, chest circumference, arm circumference, abdominal circumference, hip circumference, thigh circumference, body image) and the improvement rates for these variables were as follows: (12.35%, 7.70%, 7.85%, 7.22%, 2.72%, 6.06%, 27.56%) and the order of this improvement was in descending order - from the most improved variable to the least improved variable - as follows: The body image variable was the most improved variable, followed by body weight, then arm circumference, then chest circumference, then abdominal circumference, then thigh circumference and finally hip circumference.

3) Referring to Tables (3) and (4) mentioned above, it is clear that applying Zumba exercises accompanied by the proposed diet on the research sample had a clear positive effect in improving all the variables under study.

4) Providing appropriate professional care in applying Zumba exercises to sample members in light of what the scientific foundations and rules of the principles of sports and physiological sciences tell us in the aspects of training and nutrition had an effective positive impact in improving the research variables, especially in the following aspects:

- Taking into account the principle of gradualness in the volume and intensity of training in a manner that is consistent with the health and ages of sample members.
- The training unit included aerobic exercises that ensure the work of all parts of the body, and the use of the intermittent training method, which is characterized by its ability to improve the efficiency of the individual's vital organs and develop his basic physical and motor ability and help control weight with proper nutrition,
- The use of music in the training process as a motivating factor to improve the athletic performance of the sample members, which enabled them to continue performing for a longer period and enjoy the exercises and forget fatigue or the desire to stop,
- The effectiveness of the proposed balanced diet to accompany Zumba exercises, and the regularity of the sample members in applying it, helped them lose weight and improve body shape, and worked to reduce the increase in the percentage of fat in the body in general and in the areas of measuring the circumferences of body parts in particular, thus achieving an improvement in anthropometric measurements and the body image under study.

5) Many scientific references have confirmed the validity of the foundations followed by researchers in implementing the training program, including the following:

- What was indicated by (Subhi Ahmad Qablan and Al-Jabour, 2012). That achieving the optimal method for losing weight requires combining dietary regulation and physical activity,
- What was indicated by (Issam Abdul Khaliq, 2003) that intermittent training is characterized by its ability to improve the efficiency of the individual's vital

systems and develop his basic physical and motor abilities, and increase the athlete's motivation to continue away from the traditional form, as the individual does not get bored of the short period but continues to be active, which is a method that helps the individual control weight with appropriate nutrition.

- What was indicated by (Maysaa Mshakra and Darwish,, 2021, pp. 20-21) is that music has a clear importance during exercise, as it is a motivating factor for performing exercises, and distracts the trainee from thinking about the amount of effort expended, so the performance continues and improves.
- What (Issam Al-Hasanat, 2009) pointed out is that the diet is the influential part in the subject of physical fitness, as what the individual eats affects the activities he practices, and thus affects the results of the physical plan that the individual draws for himself, which helps to build his muscles and reduce the percentage of fat in his body, and what the individual draws for himself in terms of daily or sports activity contributes to burning a lot of calories and moderation in what he eats of foods.

6) The results of our study are consistent with the results of many previous and related studies, including the following:

- Studies by (Nadia Saleh Ali Al-Sayed, 2021), (Walaa Abdel Fattah Mohamed, 2019), (Farah Khaled Abdullah Al-Karkhi, 2017) on the effectiveness of sports training programs in losing weight in terms of the ability of these programs to get rid of excess body fat in a safe and effective way and their ability to increase the metabolic rate and burn calories, and in terms of emphasizing that the age group of women (30-40 years) is the stage of exposure to weight gain and accumulation of charges in various parts of the body.

- Studies by: (Allistia, et al., 2021), (Walaa Abdel Fattah Mohamed Ahmed, 2019), (Sara Mohamed Marsal et al., 2019), (Farah Khaled Abdullah Al-Karkhi, 2017) on the effectiveness of aerobic exercises in improving body circumferences, as the deficiency in these circumferences is due to the deficiency in the volume of fatty tissue by an amount greater than the increase in the volume of muscle mass, and that aerobic exercises are able to burn the accumulated fat in the body circumferences, and lose the fluids stored in them.
- Studies (Hossam El-Din Sharit, 2023), (Baştuğ, et al., 2016), (Aukštuolytė, et al., 2018), (Wafaa El-Sayed Mahmoud Attia, 2019), (Seguin, et al., 2013) on the effectiveness of physical exercises in improving body image in women, in terms of the ability of these exercises to bring about positive psychological changes, and the fact that women are more critical and judgmental of their body image than men, and that this is the reason for the high level of anxiety and depression among them, and that dissatisfaction with body image is greatly affected by the societal culture controlled by the media, which often prefers models of thin and non-obese bodies.

11.Conclusions and recommendations:

11.1. Conclusions:

The application of Zumba exercises accompanied by the proposed diet had a statistically significant positive effect on weight loss and improvement of some anthropometric measurements (chest circumference, upper arm circumference, abdominal circumference, hip circumference, thigh circumference), and body image, among the research sample members.

11.2. Recommendations:

The researchers recommend the following:

1) Women's health and fitness centers should include Zumba exercises accompanied by the proposed diet within the framework of their training plans, and offer them to their members who are overweight women and women who suffer from low physical fitness - especially those with chronic diseases - as therapeutic and preventive exercises, while encouraging women to practice them regularly, for at least 45 minutes daily, during most days of the week, if not all.
2) We recommend that the Faculty of Physical Education at Sana'a University submit a proposal to the Yemeni Universities Council to issue a decision to generalize the teaching of the physical fitness and health course to first-year students in all Yemeni university colleges as a mandatory university requirement, similar to what is practiced in many Arab and foreign countries, and in a way that ensures the achievement of: benefiting from the expertise and academic capabilities available to physical education professors in this field, raising the level of community awareness of the impact of sports in improving individual health, and expanding the base of practicing sports to become a way of life among members of society.
3) Encouraging the public and private sectors to invest in women's sports projects in a way that contributes to achieving a better healthy life for Yemeni women, while giving priority to filling the positions of these projects for graduates of colleges of physical education.
4) Continuing to conduct experimental research in the field of women's sports health in a way that ensures the extraction of appropriate therapeutic prescriptions for many physical and psychological diseases prevalent in society as a result of the phenomenon of physical inactivity and lack of physical activity.

12.References:-

Arabic References:-

1) Abdul Rahman Muhammad Al-Aissawi, New in Mental Health, Al-Maaref Foundation, 2001. P. 11. 45.
2) Ahmed Nasr El-Din Sayed, Theories and Applications of Sports Physiology, Dar Al-Fikr Al-Arabi, 2003, p. 254.
3) Farah Khaled Abdullah Al-Karkhi, The Effect of Special Physical Exercises on Some Body Measurements in Women Aged 30-40 Years, Conferences of Arts, Humanities and Natural Sciences; The First International Conference on Arts and Sciences, Arab Conference Network, Kingdom of Saudi Arabia - Jeddah 2017.
4) Hossam El-Din Sharit, A Proposed Sports Training Program Using Cardio Exercises to Reduce Fat Percentage and Improve Body Image in Obese Women (20-30) Years Old, Journal of the Academy of Social and Human Studies, Volume 15, Issue 1 (January 31, 2023), pp. 663-674.
5) Hussein Ali Mohamed Fayed, Social Phobia and its Relationship to Body Image and Self-Concept among Female University Students, Journal of Psychological Counseling, Issue 18, 2004, pp. 1-49,
6) Ibrahim Ali Ibrahim and Maysaa Ahmed Mustafa Al-Nil, Body Image and Its Relationship to Some Psychological Variables: A Comparative Psychometric Study among a Sample of Female Students at Qatar University, Journal of Psychological Studies, Volume 4, Issue 1, 1994, pp. 1-40. P. 4
7) Ihab Mohamed Emad El-Din Ibrahim, Modern Laboratory Measurements (Physiological - Physical - Height - Body Composition), Alam Al-Riyadh Publishing Foundation and Dar Al-Wafa Printing House, 2016, pp. 11. 11. 417.

8) Issam Abdul Khaliq, Sports Training: Theories - Applications, Al-Maaref Foundation, 2003.

9) Issam Al-Hasanat, Sports Health Science, Osama House for Publishing and Distribution, 2009.

10) Khaled Ali Al-Madani, Healthy Nutrition, Center for Arabization of Health Sciences, 2008, pp. 111-112. 11.

11) Maysaa Mshakra and Mohamed Darwish, The Effect of Aerobic Exercises on Physical Fitness in Women (20-45 Years), Master's Thesis, Arab University of Ben M'hidi - Oum El Bouaghi, Algeria. 2021, pp. 20_21

12) Nadia Saleh Ali Al-Sayed, The Effect of a Proposed Training Program Using Zumba Exercises on Some Physical Variables and Body Composition in Women. Beni Suef Journal of Physical Education and Sports Sciences, Volume 4, Issue 8, Volume 2, 2021, pp. 244-277.

13) Naji Mustafa Abu Rmaila and Nahla Mahmoud Al-Malkawi, Nutrition for Human Health, Dar Amna Publishing, 2014. p. 11

14) Nashwa Jabara Allah Daraj, and Nahid Suleiman Miso Al-Daw, The Effect of a Training Program with and Without Music on Weight Loss in Women Aged (25-30) Years in the Police Gym. Unpublished Master's Thesis, Faculty of Physical Education and Sports, Sudan University of Science and Technology, 2018.

15) Nimat Ahmed Abdel Rahman, Aerobic Activities, Al-Maaref Foundation, 2000.

16) Sara Mohamed Marsal, Manal Talaat Mohamed Ayoub, Mahrous Mohamed Qandil Khalil, and Ayman Mohamed Shehata Mohamed, The Effect of Aerobic Exercises Using a Step Box on Some Components of Body Composition and Body Circumference among Obese Female Students at

Mansoura University, Scientific Journal of Physical Education and Sports Sciences, Volume 2019, Issue 34 (March 31, 2019), pp. 135-150.

17) Subhi Ahmad Qablan and Nayef Mufdi Al-Jabour, Sports for All (Culture - Health), Arab Community Library for Publishing and Distribution, 2012.

18) Subhi Shahada Al-Eid, Weight Loss and Weight Gain and the Secrets of Wellness, Dar Al-Masirah for Publishing and Distribution, 2007. P. 65.

19) Wafaa El-Sayed Mahmoud Attia, Heba Mohamed Saeed Abu Zeid, The Effect of a Proposed Aerobic Exercise Program to Improve Body Image, Depression and Some Personality Variables in Obese Women, Journal of Theories and Applications of Physical Education and Sports Sciences, Volume 32, Special Issue, pp. 312-343, 2019.

20) Walaa Abdel Fattah Mohamed Ahmed Mansour, The Effect of a Proposed Aerobic Exercise Program to Lose Weight on Some Functional Variables in Women Aged 25-30 Years, Scientific Journal of Research and Studies in Physical Education, Issue 37, 2019, pp. 411-430. 21.

21) Youssef Lazem Kamash and Saleh Bashir Saad Abu Khait, Introduction to Sports Biology, Dar Al-Wafa for Printing and Publishing, 2011, p. 268.

Foreign references:

22) Allistia, Syahida & Rahayu, Setya & Baitul Mukarromah, Siti & Sumartiningsih, Sri. (2021). The effects of zumba and strong by zumba on body fat and circumference in women aged 20–40. Jurnal SPORTIF : Jurnal Penelitian Pembelajaran. 7. 430-441. 10.29407/js_unpgri.v7i3.16778.

23) Aukštuolytė, Ernesta & Tamulionytė, Vilma & Daunoravičienė, Algė & Knispelytė, Giedrė & Berškienė, Kristina. (2018). Dynamics of Body Composition and Body Image of Sedentary Working Women who Attend Zumba or Functional Training Programs: Pilot Study. Baltic Journal of Sport and Health Sciences. 2. 2-8. 10.33607/bjshs.v2i109.190

24) Barghothi, F. (2022). The Effect of Aerobic Exercises on Physical Fitness & Body Composition among Female Physical Education Students in Palestine Technical University in Ramallah. Palestine Technical University Research Journal, 10(3), 61–77.

25) Baştuğ, Gülsüm & ÖZCAN, Rabia & GÜLTEKİN, Duygu & GÜNAY, Ömer. (2016). The effects of Cross-fit, Pilates and Zumba exercise on body composition and body image of women. International Journal of Sports, Exercise and Training Science. 2. 10.18826/ijsets.25037.

26) Seguin, R. A., Eldridge, G., Lynch, W., & Paul, L. C. (2013). Strength Training Improves Body Image and Physical Activity Behaviors Among Midlife and Older Rural Women. Journal of extension, 51(4), 4FEA2.

World Wide Web Sites

27) https://www.zumba.com/en-US