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Proposing a training battery using adapted exercise for overweight women with cancer and its effect on weight loss: A field study in rehabilitation centers in Ain Wasara

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Abstract--Physical activity plays a crucial role in reducing obesity among cancer patients. Regular exercise has been shown to have numerous benefits for individuals undergoing cancer treatment, helping to mitigate the adverse effects of both the disease and its treatments. Here are ten key points highlighting the importance of physical activity in combating obesity in cancer patients. **Weight Management:** Engaging in regular physical activity is essential for maintaining a healthy weight, which is particularly important for cancer patients to reduce the risk of obesity-related complications. **For example Metabolic Health:** Exercise helps regulate metabolism, contributing to improved insulin sensitivity and glucose control, crucial factors in preventing and managing obesity. **Muscle Mass Preservation:** Physical activity aids in preserving lean muscle mass, which is often compromised during cancer treatments, helping patients maintain a healthier body composition. **Improved Cardiovascular Health:** Regular exercise enhances cardiovascular health, reducing the risk of heart-related issues that may arise in conjunction with obesity and certain cancer treatments.

Keywords--physical activity, cancer patients, obesity.

Introduction

Engaging in sports plays a pivotal role in maintaining one's physical health, fitness, and aesthetic appeal. Regular exercise contributes to the development of a healthy, well-rounded physique characterized by vitality, flexibility, fitness, and agility, while also serving as a means of warding off illness. The Islamic faith has, in fact, encouraged participation in sports, as exemplified by the noble hadith attributed to our esteemed figure, Omar bin Al-Khattab (may God be pleased with him), who advised, "Teach your children swimming, archery, and horse riding."

In our modern, technologically advanced era, physical activity assumes a fundamental role in countering the growing sedentary lifestyle resulting from scientific advancements. Specifically chosen physical exercises target the joints and muscle groups involved in movement, promoting increased circulation of blood to these vital areas, including muscles, bones, and ligaments, consequently enhancing their size and strength. The primary objective of sports training is to comprehensively prepare individuals not only in terms of their physical and motor skills but also in psychological and intellectual aspects, aiming for the highest attainable performance in their chosen sporting endeavors.

The objective of sports training consistently revolves around achieving specific goals within a given organization. The process of sports training serves as a means to cultivate a diverse pool of young athletes, elevating their skill levels and uncovering talents primed for reaching elite levels of performance. This underscores the fundamental concept of training, where issues such as obesity or weight gain are often rooted in the consumption of excessive quantities of energy-dense foods, including carbohydrates and fats. Alternatively, these concerns may stem from unhealthy habits or psychological and emotional challenges. Identifying such conditions involves assessing an individual's ideal weight based on their gender and age, allowing for a comparison with their current weight. * This leads individuals to engage in various types and forms of physical activities, each tailored to their personal preferences, with the aim of attaining good health, happiness, and leisure. Sports serve as the fountain of youth and vitality for both men and women, as they help reduce body fat percentages in women, manage weight, and enhance overall fitness. It's worth noting that women often have a higher percentage of body fat compared to men.

Incorporating "**aerobic exercise**" into one's routine should not be overlooked, as it offers women numerous benefits, including improved fitness, healthier skin, and disease prevention. As a result, studies and research in sports science and physical education have emphasized that relying solely on a diet program is insufficient; it must be complemented by carefully selected physical activities like aerobic exercise. Aerobic exercise has gained popularity among people of all ages and genders due to its entertaining and invigorating movement patterns. It not only contributes to reducing obesity and excess weight but also helps alleviate psychological disorders and depression, particularly considering the multitude of pressures women often face. Furthermore, research has consistently

* Abu Al-Ula Ahmed slave Al-Fattah, Ahmed Victory Debt sir , Sports And decrease the weight The Road to Agility And fitness , Dar: house Thought Arabi , Cairo , p. 92, 1994 .

recommended the importance of maintaining a consistent exercise regimen over an extended period to facilitate adjustments in weight and body mass index. Therefore, our research aims to investigate the effectiveness of a set of scientifically designed physical exercises for weight loss in a specific group of women: those who are dealing with breast cancer.

Statement of the problem

Physical activity is a significant component of weight management and overall well-being. It plays a crucial role in maintaining good health and achieving a fit physique when combined with a balanced diet. Additionally, engaging in sports can boost an individual's productivity, foster positive thinking, and help prevent weight gain or the recurrence of weight after it has been lost. It also reduces the risk of various lifestyle-related diseases, including atherosclerosis and obesity. In our contemporary society, many people lead sedentary lives with little physical movement, relying heavily on technology and spending prolonged periods sitting. To counteract this trend, it's essential to motivate individuals to increase their physical activity and participate in sports they enjoy, such as walking, running, or group games, as long as these activities are performed regularly. Some individuals may require supervision and monitoring when starting an exercise program.

The decline in physical activity and movement is a prominent feature of our modern era, marked by scientific and technological advances. Modern devices and tools have become integral to daily life, reducing the need for physical exertion. This shift has contributed to the rise of contemporary health issues associated with inactivity, including obesity, breast cancer, hypertension, heart disease, knee joint osteoarthritis, among others. Adaptive sports activities hold a significant position in modern societies as they encompass aspects of health, intellect, physical fitness, and psychological well-being. Consequently, they are of great importance in societal policies.

However, engaging in any sports activity should adhere to certain conditions, including undergoing medical examinations to prevent potential mistakes that could lead to health complications and negatively impact participants. †Obesity is a medical condition characterized by the accumulation of excessive body fat, which can have detrimental effects on one's health. It is typically assessed using the body mass index (BMI) and further evaluated by considering factors like the distribution of fat (waist-to-hip ratio) and the presence of risk factors for heart disease. BMI is closely associated with both the percentage of body fat and the overall amount of body fat. In contemporary society, obesity is seen as an undesirable condition for both men and women. It doesn't solely result from overeating; research has shown that it can also be attributed to a sedentary lifestyle, inactivity, and a lack of physical exertion, in addition to overconsumption of energy-dense foods, especially those high in calories. ‡

† Berdjem Radwan, Beloumi Abd Al-Hakim, *The reality of medical and health monitoring among junior football players. Journal of Mathematical Creativity*, Issue 14, University of M'sila, p. 142, 2014. .

‡Farouk Abdel Wahab, Sports, *Health and Fitness*. 1st edition, Dar Al-Shorouk. Cairo, p. 78, 1995.

Researchers have dedicated significant efforts to the study of obesity and the associated health risks it poses. Numerous studies and research endeavors have consistently highlighted obesity as a pressing health issue, often linked to the rapid development of conditions such as cancer, atherosclerosis, hypertension, kidney failure, and heart disease. The more an individual gains weight, the less active they tend to be, perpetuating a cycle of weight gain that can become increasingly challenging to reverse. Eventually, excess fat accumulates to a point where it restricts an individual's mobility and ability to lead an active life.

In recent times, there has been a remarkable advancement in the field of physical education. This progress has prompted changes in individuals' perceptions and attitudes towards physical education and its significance. It's no longer solely about engaging in sports for the sake of achieving championships; rather, it has evolved into a broader concept that encompasses overall health and well-being. § Indeed, sport has evolved into more than just a pursuit of championships; it has become a vital means to attain health, fitness, and disease prevention, making it an essential aspect of life for every member of society.

As humans have created and increasingly relied on machines for various daily tasks, we've inadvertently become captives of their convenience. This reliance on automation has led many of us to carry out our essential daily activities with minimal physical effort, resulting in a decline in overall fitness due to our sedentary lifestyles. The proliferation of technological entertainment, comfort-enhancing devices, reduced physical activity, and poor dietary habits featuring calorie-rich but nutritionally deficient foods have collectively heightened the risk of various diseases, including obesity. Obesity, characterized by a body fat percentage exceeding the normal limit determined by the World Health Organization's Body Mass Index (BMI) method, has become a prevalent issue affecting a substantial portion of the population.

To address and mitigate this problem in advanced industrial societies, it is imperative to employ modern, scientifically established approaches, with a focus on well-structured training programs grounded in sound scientific principles. Such programs should also involve careful control over the intensity of training loads to promote health and combat obesity effectively. ** These exercises encompass a series of physical postures and movements designed with the intention of sculpting and strengthening the body while enhancing its diverse motor skills. †† Exercise is regarded as the most cost-effective preventive treatment globally, and it has assumed a significant role, particularly among women. Diet, too, plays a crucial part, as adopting proper dietary habits is a reliable pathway to maintaining good health. Women tend to experience fat accumulation more than men, and this fat tends to increase gradually with age, largely due to a lack of physical activity.

§Khawaldi katar Al-Nada, *The effectiveness of implementing a proposed program using aerobic exercises and Zumba to reduce obesity in women*, Institute of Science and Technology of Physical Activities and Sports, Oum El Bouaghi, p. 5, 2020.

**Mohamed Ahmed Laila, *The effect of a proposed training program using Zumba aqua exercises for weight loss for women*, Graduate College of Physical Education and Sports, Khartoum, p. 7, 2018.

††Sahra Hanna Boulous, *Sports Culture*, Dar Al-Manahj for Publishing and Distribution, p. 55, 2014.

The primary motivation for women to engage in this type of exercise is to reduce their body fat percentage and manage their weight effectively, thus preventing obesity and achieving a healthy and well-toned physique. This drive prompts women to frequent fitness and exercise facilities, maintaining a consistent practice routine alongside dietary adjustments. The health benefits that result from these efforts encompass various adaptations, including weight and fat reduction, contributing to the prevention of obesity.#

Exercise also serves the practical purpose of helping individuals meet their daily physical requirements. Furthermore, it has a recreational and psychological dimension, as individuals often experience a sense of comfort and relaxation after exercising. During exercise, the body releases endorphins, which are chemicals that improve mood and overall well-being. Considering this, we can pose a general research question:

- "How effective is a modified training program in facilitating weight loss in breast cancer patients?"
- To delve deeper into this topic, several specific research questions can be formulated:
- "Are there statistically significant differences between the pre- and post-measurements of the experimental group members in terms of weight loss?"
- "Are there statistically significant differences between the pre- and post-measurements of the experimental group members concerning the reduction in abdominal circumference?"
- "Are there statistically significant differences between the pre- and post-measurements of the experimental group members concerning the reduction in pelvic circumference?"
- "Are there statistically significant differences between the pre- and post-measurements of the experimental group members concerning the reduction in thigh circumference?"

Study hypotheses

Main hypothesis

The modified training battery has a clear effect on weight loss among women with breast cancer.

Sub-hypotheses

- There are statistically significant differences between the pre- and post-measurements of the experimental group members regarding weight loss.
- There are statistically significant differences between the pre- and post-measurements of the experimental group members regarding the low level of physical measurements of abdominal circumference.
- There are statistically significant differences between the pre- and post-measurements of the experimental group members regarding the low level of physical measurements of pelvic circumference.

††Khawaldi Katr al-Nada, previous reference, p. 7.

- There are statistically significant differences between the pre- and post-measurements of the experimental group members regarding the low level of physical measurements of thigh circumference.

Objectives of the study

- To determine the effectiveness of a proposed motor training program using adapted sports activities in reducing obesity in breast cancer patients
- Determine the extent to which there are statistically significant differences between the pre- and post-measurements of the experimental group members regarding weight loss.
- Determine the extent to which there are statistically significant differences between the pre- and post-measurements of the experimental group members regarding the low level of physical measurements of abdominal circumference.
- Determine the extent to which there are statistically significant differences between the pre- and post-measurements of the experimental group members regarding the low level of physical measurements of pelvic circumference.
- Determine the extent to which there are statistically significant differences between the pre- and post-measurements of the experimental group members regarding the low level of physical measurements of thigh circumference.

Significance of the study

Scientific Significance

The significance of the study lies in the fact that its results help to identify the importance of practicing adapted physical activity in reducing obesity among women with breast cancer, maintaining health, and preventing modern diseases in general.

- It contributes to identifying the appropriate type of training program for weight loss in terms of its application duration, intensity, and appropriate category.
- Adults in general and those who suffer from the problem of being overweight in particular are encouraged to practice physical activity in order to lose weight and maintain health.
- Draw the attention of researchers or trainers in trying to use a time-regulated sports program whose exercises are subject to modification to suit the abilities and characteristics of similar groups in order to try to achieve the best results.
- It may be useful for researchers to shed light on such studies, because of their importance in revealing weaknesses and sources of strength in weight reduction programs.

Practical significance

- The significance of this study lies in its earnest effort to evaluate the significance of an exercise program focused on reducing body fat percentages, specifically targeting obese women and breast cancer patients, while considering the aspect of time management.
- Furthermore, it strives to raise awareness, not only among women in general but especially among those dealing with obesity, regarding the pivotal role of exercise in obesity prevention and the maintenance of a healthy physique.
- Additionally, this study aims to contribute to the promotion of the importance of dedicated sports facilities and fitness centers for women, underlining their role in fostering physical well-being and overall health.

Rationale of the study

We were motivated to select this topic due to a combination of objective and subjective reasons:

- Objective rationale: Our choice of this topic is motivated by both objective and subjective factors. One significant objective factor is the scarcity of research focusing on the significance of healthy exercise, particularly concerning women. Existing studies, if any, often fail to extend their scope to include older women, regardless of whether they are employed or homemakers; we recognize the sensitivity of this age group and the pressing need for women in this demographic to engage in physical activity and maintain an active lifestyle, given the alarming rise of obesity within this segment of society in recent times.
- Subjective Rationale: We chose to explore the dimension of emphasizing the significance of promoting healthy physical activity within sports facilities and gyms. Our aim is to underscore its role and influence in addressing obesity while conveying its importance, with a particular emphasis on women. Additionally, our humble research endeavors aim to provide these centers with a morale boost.

Terms and concepts included of the study

Program

- Linguistically: The origin of the word is English: “program” and its verb is to program, meaning to teach.
- Technically: It is the operational steps within the planning process for a pre-designed plan. They entail allocating time, determining implementation methods, and assessing the capabilities needed to achieve the plan's objectives.
- Procedurally: This refers to the approach and tools used to establish scientific foundations and principles with the aim of achieving a particular objective. It considers the individual's abilities and traits who is involved in the process.

Training program

Matveev recognizes that “these are the practical stages within the planning process for a pre-designed training program aimed at developing athletes. It entails careful consideration of how time is allocated, the methods of execution, and the feasibility of achieving the plan's goal, ultimately striving for the highest or topmost level of athletic performance.” ^{§§}

Procedurally

When we refer to a training program, we are encompassing all the training activities and methods that are designed to achieve specific training objectives. These activities are organized in a logical and sequential manner within a specific time frame..

Adapted training program

- Linguistically: The origin of the word is English: “ *program* ” and its verb is to program, meaning to teach. ^{***}
- Terminologically: It is the executive steps of the planning process for a plan that was designed in advance and what that entails in terms of time distribution, implementation methods, and possibilities for achieving the plan's goal.^{†††}
- Procedurally:
- By the term program, we mean the method or means according to which scientific foundations and principles are established to reach a specific goal, taking into account the capabilities and characteristics of the person dealing with it.

Obesity

- Linguistically: In the Arabic language, "obesity" is described as the opposite of "emaciation," and there is a dispute over terms such as "starveling" and "fat," with "ghee" being a term used to refer to someone who is overweight or chubby.^{†††}
- Terminologically: Obesity is characterized by an excessive increase in body weight, surpassing the normal limit due to the accumulation of fat within the body. This accumulation occurs when there is an imbalance between the energy intake from food and the energy expenditure by the body. ^{§§§}
- the definition Procedural By the term obesity we mean excess Excessive To weigh the body on the weight ideal a result To accumulate Fats .

^{§§} Sherit Manal, *proposal for a training program for weight loss in women, a memorandum submitted to obtain a master's degree*, specializing in sports training, Institute of Science and Technology of Physical and Sports Activities at the University of Biskra, Algeria, p. 8, 2022.

^{***} www.ejabat.google.com/ejabat.2023.02.09/11:43:52s

^{†††} Amin Anwar Al-Khouly, *Physical and School Education*, Dar Al-Fikr Al-Arabi, Cairo, Egypt, p. 17, 1996.

^{††††} Ibn Manzur, Dictionary of *Lisan al-Arab*, Dar al-Ma'arif, p. 53, BS.

^{§§§§} Bin Hani Zain Al-Abidin and Al-Wadyan, Mahmoud Akl and others, *Principles of Physical Education*, Kunuz Al-Ma'rifa House for Publishing and Distribution, Amman, p. 77, 2016

Breast cancer

cancer the breast he tumor malignant Output on Reproduction Random And Others natural For a group from cells in the breast Which lead to to destruction Fabric the original then Invade Tissue surrounding and sometimes. Move to Places Other especially Liver, Lungs or Bones that Lead to death For the case in absence treatment . ****

Presentation of the previous studies previous studies

First study

In a 2002 master's thesis conducted by Mona Talib Thabet titled "*The Impact of a Prescribed Scientific Aerobics Curriculum on Fat Percentage and Body Weight Reduction*," the objective was to assess the effectiveness of a scheduled aerobics program in reducing fat percentage and body weight among female students majoring in aerobics, in comparison to students specializing in other fields. The researcher adopted an experimental approach, utilizing a sample of 18 female students, with 9 of them being from the fourth stage of the volleyball major. This group constituted the experimental group, and data collection relied on various tests.

The study yielded the following outcomes: The prescribed aerobics curriculum had a positive impact on reducing fat percentage. However, there was no significant effect observed on body weight. The findings underscore the importance of considering curriculum content, especially the inclusion of non-aerobic exercises, as they can have a substantial impact on cardiovascular and pulmonary health.

Second study

In a 2011 master's thesis authored by Howaida Al-Sadiq Atallah Muhammad, titled "*The Impact of a Proposed Aerobic Exercise Program for Weight Loss Among Women Aged 35-45 Years*," submitted to the University of Sudan to fulfill the requirements for a master's degree, the research sought to evaluate the effects of a recommended aerobic exercise regimen on specific physical variables. These variables included body weight, fat weight, and various body circumferences (such as chest, waist, shoulder, buttocks, and upper arm circumferences). The study employed an experimental methodology, specifically a pretest-posttest design. The posttest measurements were conducted on a purposive sample of 16 women who were enrolled in the sports center at the Burri Police Club in Khartoum. Data collection involved utilizing various tests.

The study produced the following outcomes: The proposed program significantly contributed to weight loss and a reduction in body fat percentage. These positive effects were evident in the presence of statistically significant differences in the

****Larousse Medical, bookstore - Larousse, Paris, France, 9th, ed.p425.1999

post-measurements. Additionally, there were statistically significant differences observed in the measurements of chest circumference, waist circumference, buttocks circumference, shoulder circumference, and upper arm circumference, further supporting the program's effectiveness in achieving weight loss and various physical improvements.

The third study

In a 2014 study conducted by Magda Nagy Nasr Abdel Halim and Maha Qabbari Mahmoud Hassan, titled "*A Training Program for Walking and Running with Suggested Nutritional Modifications and Its Impact on Oxidation and Fitness Variables among Women Aged 35-45 at the Smouha Club in Alexandria*," the primary objective was to formulate a training regimen that combines walking and running, accompanied by recommended dietary adjustments, specifically designed for women aged 35-45. The study aimed to assess the effects of this program on various oxidation and reduction variables, as well as certain morphological, physiological, and physical performance variables. The sample for this research comprised 12 women who were intentionally selected. The study employed an experimental and descriptive approach, utilizing a single group due to the research's nature.

The findings of the study revealed that the implementation of the walking and running training program, in conjunction with dietary modifications, contributed to the improvement of oxidation-reduction variables and relevant biochemical parameters. Furthermore, the combined approach of walking and running exercises within the mixed training system resulted in enhanced physical fitness. Additionally, it had a positive impact on morphological and physiological variables, specifically in reducing fat accumulation in various areas of the body, including the abdomen, shoulder, upper arm, hip, and thigh. The carefully devised nutritional program, with all its components readily available, facilitated its practical application for the research participants and made it accessible for a wider audience to follow.

Fourth study

In a 2018 study conducted by Laila Ahmed Mohamed Ahmed, titled "*The Impact of a Proposed Training Program Utilizing Zumba Water Exercises for Weight Loss among Women in Khartoum State*," the primary objective was to evaluate the effects of a recommended training regimen incorporating Zumba aqua exercises on weight loss. The research involved a sample of 23 women, and the training program was diligently administered. Weekly data collection was carried out throughout the program, accompanied by a nutrition program tailored to each individual's blood type. The sample was intentionally selected, and the study was executed using an experimental approach. Data collection relied on various tests. The study's outcomes demonstrated a positive contribution to weight loss. Statistically significant differences were observed between the pre- and post-measurements, with the post-measurements favoring a reduction in weight.

Fifth study

In a 2008 study authored by Nashwa Jabbara Allah and Daraj Jabbara Allah, titled *"The Impact of a Training Program with and without Music Accompaniment on Weight Loss among Women Aged 25-30 at the Police Facility,"* the primary objective was to ascertain which of the two methods had a more significant impact on weight loss among women. The study employed a purposive sampling approach, recruiting three groups of participants daily. From these groups, the first and second groups were selected for further analysis. The experimental method was adopted, with data collection relying on various assessments.

The study's findings indicated the presence of an effect in the weight loss programs, as evidenced by differences between pre- and post-measurements. Additionally, statistically significant differences were observed between the program that incorporated music and the program without musical accompaniment. The study also highlighted the significant impact of music on enhancing mood and psychological well-being, consequently motivating individuals to engage more effectively in the exercise program.

Sixth study

In a 2020 study conducted by Khawaldi Katar Al-Nada, titled *"The Efficacy of Implementing a Proposed Training Program Utilizing Aerobic Exercises and Zumba for Obesity Reduction in Women (Aged 35-45),"* submitted as a master's thesis at Oum El Bouaghi University, Algeria, within the Institute of Science and Technology of Physical and Sports Activities, the primary objective was to assess the effectiveness of a suggested program that incorporated aerobic exercise and Zumba for weight reduction. The research sample comprised 11 women who actively practiced aerobics and Zumba in the city of Oum El Bouaghi. The participants were intentionally selected, and the study adopted an experimental approach, employing various assessments as data collection tools.

The study findings indicated several significant outcomes

- The proposed training program had a measurable impact on the circumferences of certain body areas, including the chest, upper arm, hip, pelvis, thigh, and calves. This impact was attributed to the effectiveness of aerobic exercises and aerobic dancing (Zumba) in reducing body fat percentages in these areas, resulting in a more aesthetically pleasing appearance and a reduced risk of developing related health conditions.
- The combined implementation of the proposed training program and adherence to a balanced diet yielded favorable results, affirming the validity of the hypotheses proposed and applied during the research. These findings suggest the potential for reducing obesity among women in this age group through the prescribed approach.

Analysis of the previous studies

The studies relevant to the research topic exhibited considerable diversity and variation, encompassing differences in the types of proposed training programs,

the curriculum structures, and the age profiles of the study samples. Despite these variations, there was a consensus on the core element of the research, which is the utilization of a training program as the primary intervention. A majority of these studies focused on female participants, offering valuable insights that aided the researcher in controlling and fine-tuning the proposed training program within the scope of the research.

Temporal scope: These studies were conducted between 2002-2020).

The approach used

Previous studies on this topic exhibited variations in the research methods employed. Some studies utilized the descriptive method, primarily due to the nature of the data under investigation, while others adopted an experimental approach. These studies also diverged in their methodologies for implementing the proposed programs and collecting information from the study subjects. In the current study, the approach aligns with certain previous studies, as it utilizes the descriptive method and employs a similar method for data collection. However, it differs from some other studies that opted for the experimental method as the primary research approach.

The sample

A consensus was evident among many previous studies as they primarily focused on female participants. In the current study, there is alignment with certain studies in terms of the sample being women. However, variations were observed, with the current study differing from others in its choice of sample, which was influenced by the specific characteristics and objectives of the study population.

Data collection tools

The current study aligns with some previous studies in using the training program to collect study-related information from the subjects.

Benefit from previous studies

Collectively, the body of previous studies has made substantial contributions by shedding light on key foundational aspects that are pivotal to the current study. These foundational aspects include:

- Determine the topic and purpose of the current study.
- Determine the appropriate approach to the topic of the current study.
- Determine the sample, method of selecting it, and its size.
- Determine the content of the questionnaire directed to this category.
- Determine appropriate tools for collecting data.
- Determine statistical treatments in a manner consistent with the nature of the hypotheses and objectives of the current study

Methodology of the research

Methodological approach

The method serves as the fundamental tool and apparatus of scientific inquiry, and there is no path to advancement in the realm of scientific research without a precise methodological framework. In the absence of a well-defined method, the researcher may find themselves adrift in their endeavors, potentially losing their way and failing to attain the desired outcomes or objectives of their research. Hence, it becomes imperative for the researcher to carefully select the most appropriate method for their study, as every research endeavor is inherently associated with a particular methodological approach.

The process of investigating a problem is facilitated by research methods, which serve as an objective means through which the researcher can explore a phenomenon. The primary objectives of employing a research method include diagnosing the phenomenon, discerning its various dimensions, identifying its causal factors, devising methods of mitigation or treatment, and ultimately deriving generalizable conclusions that have practical applications .^{†††}

The research problem is what dictates the method that can be used. The difference in method is due to the nature of the problem and the available capabilities. There may be more than one method in a particular research study. However, we determine the available or existing conditions and the type of method chosen, which is the experimental method.

Experimental design

It is an approved and controlled change in the specific conditions of an event, and the resulting changes in the event itself are observed and interpreted ^{††††}.

- Choosing the validity of the hypotheses.
- Reaching the designated result .^{§§§§}

Population of the research

When a researcher opts to undertake field research, it is paramount to establish a clear and well-defined research community. The research community encompasses all entities that possess the requisite characteristics warranting study. This community can comprise individuals, institutions such as universities, or organizations. Regardless of the composition, it is imperative that the research community is devoid of ambiguity. In other words, the researcher must precisely delineate the boundaries and parameters that encompass the research community to ensure a focused and meaningful investigation. ^{*****} *The*

^{††††}Lahassan Abdullah Bashiwa, Nizar Abdul Majeed Al-Barawi, *Scientific Research Concepts, Methods and Applications*, Al-Warraq Publishing and Distribution, Amman, 2010, p. 156.

^{†††††}Mabrouka Omar Mhirrak, *The Comprehensive Guide to Scientific Research*, Arab Nile Collection, Egypt, 2008, p. 327.

^{§§§§}Budawood Abdel Yameen, *Scientific Research Methods in the Sciences and Techniques of Physical and Sports Activities*, Office of University Publications, 2010, p. 17

^{*****} Mabrouka Omar Mhirrak, previous reference, p. 173.

researcher chose the research population consisting of a group of Twenty (20) women practicing sports who suffer from obesity and breast cancer in Ain Wasara rehabilitation centers.

Sample of the research

The sample serves as the representative model upon which the researcher bases the entirety and emphasis of their work. It constitutes a subset of the research community that the researcher is studying and analyzing, with the objective of extrapolating the findings acquired from the sample to the broader community from which it was drawn. It is essential for the sample to accurately reflect the characteristics and attributes of the original community and embody the key features relevant to the research objectives. In essence, the sample should exhibit a likeness to the broader community, ensuring that it effectively captures the essence of the research inquiry. ††††

We selected the sample intentionally and it consists of 15 women who practice continuous sports training and suffer from obesity and breast cancer. The following conditions were relied upon in the sample selection process:

- It is necessary to maintain consistent training at the gym as a regular practice.
- For the current study, it is imperative that the participants meet specific criteria. They should be individuals who are both obese and diagnosed with breast cancer. This selection criteria is essential to align with the study's objectives and goals.

Fields and limits of the research

The spatial scope of the field study

The term "geographical scope" refers to the specific geographic area or location where the study sample is situated. In the context provided, the field study was conducted at the Fitness Club Israa, which is situated in Djelfa state. This represents the geographical scope within which the research sample was situated and where the study was carried out.

Time range for the field study

The experimental field work consists of two stages: The first stage: represented by the exploratory study, which in turn was divided into two studies:

- Date of conducting the survey: 11/25/2022
- The second stage: the basic study extended from:
- Date of taking pre-measurements: 01/02/2023
- Date of dimensional measurements: 01/09/2023

††††Hussein Ali Al-Saadawi, Suleiman Al-Hajj Akab Al-Hayani, *Scientific Research Tools in Physical Education*, Arab Society Library for Publishing and Distribution, Amman, 2013, p. 33

Adjusting the procedures for the study variables

The field study requires controlling the variables in order to control them as much as possible on the one hand and on the other hand specify the rest of the study variables as follows:

Independent variable

It is the factor that the researcher deals with by changing it to investigate its relationship to the dependent variable in the subject of the study.

Determine the independent variable

The independent variable in our research is: the motor training program

Dependent variable

It is the phenomenon that exists, disappears, or changes when the researcher applies or changes the independent variable ****.

Identify the dependent variable

The dependent variable in our research is: obesity

Extraneous variables

It is what strengthens or weakens the relationship (determines the strength of the relationship) between the research variables, and is represented in our research in: adapted sports activities

The study population

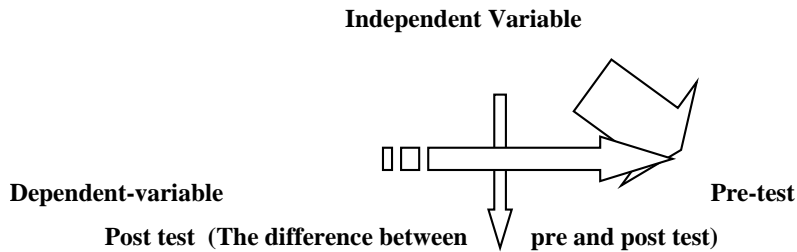
The term "study population" refers to the group of individuals who are the subjects of the research and who meet all the criteria necessary for conducting the study. In this particular research, the study population consists of breast cancer patients who are women actively engaged in sports training at the Fitness Club Israa hall. These individuals represent the specific group under investigation in the study.

Experimental designs

A post-hoc mental experiment involving a single group typically employs a group of individuals to examine a phenomenon related to a specific sports activity that is the focus of the study or measurement within that group. The following diagram illustrates an experimental model of this method.

****Hussein Ahmed Al-Shafi'i, Suzan Ahmed Morsi, *Standards of Criticism of Scientific Theses*, Dar Al-Wafa' for the World of Printing and Publishing, Cairo, 2004, p. 75.

Experimental variable



Data collection methods

Testing

A test is defined as a standardized measurement and method of examination and testing to compare the behavior of one or more people^{§§§§§}.

Hardware testing

This type of test uses various measuring devices, whether in experiments, scientific research, or inspection and diagnostic operations^{*****}.

Based on the findings from theoretical readings and prior studies, and in accordance with research guidelines, several data collection devices and methods were employed, including:

Height

Height is measured for examinations from a standing position facing upright, flat, touching the buttocks and sitting with the back flat, the head perpendicular to the torso, the eyes and ears in a horizontal plane, the buttocks pressed together on the wooden board, and the examinee must take a deep inhale and hold it, after the measurement is conducted.

Weight

The subjects are weighed while standing in the middle of the scale, wearing minimal clothing, and the weight is recorded To the nearest 1/10 (volume) †††††

^{§§§§§}Muwaffaq Asaad Mahmoud, *Tests and Tactics in Football*, Dar Degla Publishers and Distributors, Amman, 2009, p. 19.

^{*****}Mohsen Ali Al-Saadawi, Suleiman Al-Hajj Akab Al-Hayani, *Scientific Research Tools in Physical Education*, Arab Society Library for Publishing and Distribution, Amman, 2012, pp. 138-139.

^{†††††}Mustafa Al-Sayeh Muhammad, Salah Anas Muhammad, *European Physical Fitness Test*, Dar Al-Wafa for the World of Printing and Publishing, p. 93.

Measurement tools

Length measuring device

Flexible metric tape measure that does not stretch when stretched and does not shrink.

Weight measuring device

It is used to determine body weight (in kilograms, kg, electronic scale)

Exploratory study

Before commencing the basic study, we then discussed a preliminary step, which is a preliminary study carried out by the researcher on the sample before carrying out his research with the aim of choosing research methods and tools. It served as the basis for the subject of the study by following a set of objectives:

- Identify the difficulties facing the implementation of measurements.
- Ensure the validity of the tools and devices used.
- Know the correct methods for making measurements.
- Determine the order of measurements and save time and effort.

Field study procedures

Pre-test

Pre-tests were conducted on January 2, 2023, and the student researcher established the conditions. For physical measurements, the devices and tools used to carry out the measurements as much as possible, with the availability of an anthropometric bag in order to achieve the same conditions when conducting dimensional measurements.

Methods used by this program

This program is based on a set of scientific foundations:

- The capabilities at the coach's fingertips.
- The level of practices in terms of skills and athletic performance ability.
- Principles of training and foundations of sports planning.
- Ensuring diversity and using the latest exercises in implementing the program.
- Paying attention to the recreational aspect and not neglecting the element of suspense and discussion *****.

*****Haneen Mahmoud Mukhtar, *Foundations of Program Planning in Football*, Cairo., 1988, p. 244

Steps for developing training programs

The principles on which the program is based

The design of any training program for any sporting event must be based on other sciences, such as physiology and medicine Sports, biomechanics, psychokinetics, etc.

The general objective and sub-objectives of the program

The goal of the program is derived from the goal of the plan itself, which must be achievable. Setting goals greatly helps in choosing appropriate exercises and methods of implementing them.

Identifying exercises within the sections of the training program

- Warm-up (warm-up exercises)
- Main section (exercises to develop skill and physical abilities)
- Conclusion (calming down exercises)

Organizing exercises within the training program

It depends on several elements: the components of the training load and how it is distributed in the phases of the units Training, as well as the distribution of training times for each part of the program.

The implementation steps in implementing the training program are as follows

- The trainer explains the vocabulary of the training unit, learns the effect of the previous load, and solves problems.
- Organizing the training location before starting training.
- Preparing the necessary devices and tools.
- Perform a good warm-up.
- Implementing the vocabulary of the training unit gradually according to the correct scientific sequence.
- Perform exercises to calm down and relax.

Training program evaluation

The coach must set specific dates to evaluate all aspects of the training program (physical, skill, tactical) through tests related to that, for the purpose of knowing the strengths and weaknesses to make the necessary adjustments.

Research tool

The research tool consists of a proposed training program consisting of two sessions per week for a period of 3 months. It was prepared by proposing a set of exercises and activities that serve the objectives of the research, specifying the

load, intensity, and duration of each exercise, and proposing 4 training sessions for each week.

The week	First session	Second session
Week 01	Cardio Running on the machine 30 d Bike 10 D Lengthen 5 d	Cardio 30 minutes (running/walking) Resistance exercises (lower body - thigh 5 exercises - leg 5 exercises - buttocks 5 exercises) Each exercise is 30 seconds * 2 without weights
Week 02	Third session Cardio 25 minutes - warm-up 05 minutes Upper body resistance exercises 15 minutes (arms - shoulders - chest - back) Each exercise is 30 seconds * 2 without weights	Fourth session Cardio 30 D Resistance exercises for the middle part of the body (abdomen and waist): 8-10 exercises Each exercise is 30 seconds * 3 without weights
Week 03	Fifth session Rhythmic exercises using steppes 40 minutes for the entire body	Sixth session Same as the first session
Week 04	Seventh session The same as the third session, but with light weights like a stick - bands	Eighth session Yoga class 30 D
Week 05	Ninth session: 25 D -Running inside the hall with warm-up movements from standing for 8 minutes -Using abdominal machines, medicine ball in various positions, 12 d	Tenth session Slow running 15 D Average running 15 minutes Normal walking 10 d Stretching exercises 05 d
Week 06	Eleventh session Zumba 30 d	Twelfth session Bike 20 d Running on the machine 25 d
Week 07	The thirteenth session Heats from stability 10 d Movements using a stick 30 D Arm - shoulder - chest Lengthen 05 d	Fourteenth session Cardio Bike 30 d Motion heating 05 d Exercises for the lower part 10 minutes (thigh-leg-buttocks)
Week 08	Fifteenth session Light running 15 D Movement heaters 10 d Abdominal resistance exercises - waist 6-8 exercises 20 d Each exercise is 30 seconds * 3 without weights	Sixteenth session Yoga 45 D
Week 09	Seventeenth session Zumba 45 d	Eighteenth session Pilates exercises 45 d

Week 10	Nineteenth session Exercises on steppes 30 d Extension 15 d	Twentieth session Cardio Aerobic 30 d Stabilization warm-ups for the upper part (arm - shoulder - chest) 30 seconds * 4 using a weight stick - rubber
Week 11	Twenty-first session Same as the fourteenth period But with a medicine ball and compression rubber	Twenty-second session Pilates exercises 45 d Week 12
Week 12	Twenty-third session Light walking 10 d Fast walk 05 D Light running, speed increased by 15 minutes Stretching exercises 10 d	Twenty-fourth session Zumba 45 d

Validity and reliability

After the initial design of the training program in light of the theoretical literature related to the subject of the study and consultation with some specialists in the field, the initial design of the program was presented to a group of specialists in the field of training and physical preparation in the Department of Physical Education and Sports at the University of Djelfa. Based on the advice provided by the coaches, especially those related to the training load, intensity, and duration of each exercise, the number of sessions was reduced from 3 sessions per week to two sessions per week. The application of the program spanned over 3 months, equivalent to 12 weeks, with two training units per week. Instead, the number of training units for the program is 24 units. Note: Regarding diet, we did not impose a special diet on the research sample, except for general advice on nutrition, which is reducing sugars and pastries, avoiding eating between meals, etc.

Statistical tools and methods

Following the application phase, the data collected through the utilized tools, specifically the proposed program, were transcribed. The objective was to prepare the data for statistical analysis and processing using the SPSS program. This data processing involved several key processes, including:

- 1.4.2.7. Equation of percentages: number of repetitions x 100/total number of sample.
- 2.4.2.7. T test equation: According to this law, we will try to identify the extent and existence of significant differences in the measurements of the respondents.

$$t = \frac{m - \mu}{s / \sqrt{n}}$$

Standard error score $\alpha = 0.05$

Degree of freedom: df=N-1

Where N : represents the number of individuals in the sample

Arithmetic mean

Its aim is to extract the standard deviation, in addition to comparing results between sample members. Speaking of the arithmetic mean, its equation is as follows :

Q: repetitions.

N : the number of sample members

Standard deviation

The standard deviation is considered one of the most important and most accurate measures of dispersion, as it is the square root of the average sum of the deviations of the values from their arithmetic mean. Therefore, it shows the extent to which the subject's degree is far from the central point, as it will be useful in calculating statistical equations :

$$\sigma = \sqrt{\frac{\sum(x_i - \mu)^2}{N}}$$

whereas:

σ : standard deviation

\sum : Arithmetic average

μ : Sample value

N: number of sample. ssssss

Results

Presentation, analysis and discussion of the results of the study:

Results of the general values of the research sample (before applying the adapted motor training program)

Table 06
the results of the general values of the research sample *(before applying the adapted motor training program)*

	Age	the weight	height
SMA	42.20	104.55	160.6
standard deviation	5.44	13.68	3.72

ssssssSaladin Allam. *Educational and psychological measurement and evaluation: its basics, applications and contemporary aspects*. B I. Dar Al-Fikr Al-Arabi, Egypt, p. 211.

Minimum value	35.00	72.30	155.00
Maximum value	51.00	133.40	168.00
Coefficient of variation	12.90	13.09	2.31

From Table No. 06, we can observe the following statistical information:

1. Age:

- Mean Age: 42.20 years
- Standard Deviation: 5.44
- Minimum Age: 35.00 years
- Maximum Age: 51.00 years
- Coefficient of Variation: 12.90%

2. Weight

- Mean Weight: 104.55 kg
- Standard Deviation: 13.68
- Minimum Weight: 72.30 kg
- Maximum Weight: 133.40 kg
- Coefficient of Variation: 13.09%

3. Height

- Mean Height: 160.6 cm
- Deviation from the Norm: ± 3.72 cm
- Minimum Height: 155.00 cm
- Maximum Height: 168.00 cm
- Difference Factor Value: 2.31

This indicates Strong Homogeneity Among the Sample Elements.

Weighing results

Table 07
results of the weight After 12 weeks The first from application Movement training program

Statistics	SMA	standard deviation	Minimum value	Maximum value	Coefficient of variation	Difference in weight
Week 01	104.55	13.68	72.30	133.40	13.09	1.705
Week 02	102.84	13.27	72.00	130.00	12.90	1.32
Week 03	101.52	13.07	70.50	129.00	12.88	1.405
Week 04	100.12	13.08	69.60	127.50	13.06	0.53
Week 05	99.59	13.11	69.00	127.00	13.16	0.985
Week06	98.60	12.92	68.60	126.00	13.10	1.06
Week07	97.54	12.98	68.00	124.60	13.31	1.21
Week 08	96.33	12.78	67.00	123.00	13.26	0.685

Week 09	95.65	12.54	67.00	121.00	13.11	0.895
Week 10	94.75	12.26	66.00	119.00	12.94	0.74
Week 11	94.01	12.36	65.30	118.00	13.15	1.215
Week 12	92.35	12.21	65.00	117.50	13.22	0.45
The outcome	98.19	3.67	92.80	104.55	3.73	1.02

Based on the results of Table No. 07, we notice that the values of the arithmetic mean weight are limited to between 104.55 kg during the first week and 92.35 kg during week No. 12, with an arithmetic average of 98.19 kg and a standard deviation of ± 3.67 . We also note that the value of the difference The average weight between sessions was 1.02 kg, meaning that the weight loss rate was 1.02 kg, with a standard deviation of ± 0.38 , a minimum value of 0.45 in week 12, and a maximum value of 1.74 in the first week.

Results of physical exercises before applying a motor training program

Table 08
Results of physical exercises before applying a motor training program

Statistics	Abdominal circumference	Pelvic circumference	Thigh circumference
SMA	113.40	117.90	71.75
standard deviation	6.89	6.66	8.61
Minimum value	99.00	110.00	63.00
Maximum value	127.00	132.00	89.00
Coefficient of variation	6.08	5.65	12.00

The results of Table No. 08 indicate that the arithmetic mean value of abdominal circumference before applying a motor training program was 113.40, with a standard deviation of 6.89, a minimum value of 99.00, a maximum value of 127.00, and a coefficient of variation value of 6.08, which indicates the presence of homogeneity. The arithmetic mean value of the pelvic circumference before applying a motor training program was 117.90, with a standard deviation of 6.66, with a minimum value of 110.00 and a maximum value of 132.00, and the coefficient of variation was defined as a value of 5.65, which indicates the presence of strong homogeneity among the sample elements.

- The arithmetic mean value of thigh circumference before applying a motor training program was 71.75, with a standard deviation of 8.61, a minimum value of 63.00, and a maximum value of 89.00.
- The coefficient of variation is 12.00, which indicates the presence of moderate homogeneity among the sample elements.

Results of the physical circumferences after applying a conditioning motor training program

Table 09
Results of the physical circumferences after applying a conditioning motor training program

Statistics	Abdominal circumference	Pelvic circumference	Thigh circumference
SMA	110.65	114.90	70.65
standard deviation	6.57	6.46	8.38
Minimum value	96.00	108.00	61.00
Maximum value	123.00	130.00	87.00
Coefficient of variation	5.94	5.63	11.86

Based on Table No. 09, we note that the arithmetic mean value of abdominal circumference after 12 weeks of applying a motor training program is 110.65, with a standard deviation of 6.57, a minimum value of 96.00, a maximum value of 123.00, and a coefficient of variation value of 5.94. This indicates that there is strong homogeneity among the sample elements. The arithmetic mean value of the pelvic circumference after 12 weeks of applying a motor training program was 114.90, with a standard deviation of .46. 6, with a minimum value of 108.00, a maximum value of 130.00, and a coefficient of variation value of 5.63, which indicates the presence of strong homogeneity among the sample elements. The arithmetic mean value of thigh circumference after 12 weeks of applying a motor training program was 70.65, with a standard deviation of 8.38, a minimum value of 61.00, a maximum value of 87.00, and a coefficient of variation value of 11.86, which indicates the presence of moderate homogeneity among the sample elements.

Results of comparing the weight of the research sample after 12 weeks of applying a motor training program.

Table 10
analysis variance For the differences in the weight After 12 weeks

Statistics	SMA	standard deviation	Difference in weight	Statistical significance
Week 01	104.55	13.68	1.705	Not a sign
Week 02	102.84	13.27	1.32	Not a sign
Week 03	101.52	13.07	1.405	Not a sign
Week 04	100.12	13.08	0.53	Not a sign
Week05	99.59	13.11	0.985	Not a sign
Week06	98.60	12.92	1.06	Not a sign
Week07	97.54	12.98	1.21	Not a sign
Week 08	96.33	12.78	0.685	*
Week 09	95.65	12.54	0.895	*
Week 10	994.75	12.26	0.74	*
Week 11	94.01	12.36	1.215	**
Week 12	92.35	12.21	0.45	**

Displaying the results of comparing circumferences for the research sample

Table 11
results of comparing circumferences for the research sample

Statistics		Abdominal circumference	Pelvic circumference	Thigh circumference
Week1	SMA	113.40	117.90	71.75
	standard deviation	6.89	6.66	8.61
Week 12	SMA	110.65	114.90	70.65
	standard deviation	6.57	6.46	8.38
Statistical significance		*(0.05)	** (0.01)	Not a sign

Based on the results presented in Table No. 11, which represent the analysis of variance between the measurements taken during the first week and the twelfth and final week, the following observations can be made:

- Abdominal Circumference: Statistically significant differences were observed at the significance level of 0.05. This suggests that there were significant changes in abdominal circumference between the first and twelfth weeks of the study.
- Pelvic Circumference: Statistically significant differences were observed at a higher level of significance, 0.01. This indicates that there were significant changes in pelvic circumference between the first and twelfth weeks, and these changes were even more pronounced.
- 3. Thigh Circumference: In contrast, no statistically significant differences were observed in thigh circumference between the first and twelfth weeks. This suggests that there were no significant changes in thigh circumference over the course of the study.

Presentation and discussion of the results of the first hypothesis

The first hypothesis: "There are statistically significant differences between the pre- and post-measurements of individuals in the experimental group with regard to weight loss."

Table 12
the statistical methods used to test the first hypothesis

	Sum of squares	Mean squares	Test	Moral value sig	Significance level	Statistical decision
Within groups	180.014	90.007	41.01	0.00664	0.05	Statistically significant
outside groups	5844.952	216.480				
the total	6024.967	306.487				

Based on the information provided in Table No. (12), which outlines the statistical methods employed in addressing the first hypothesis, we can observe the

following calculations: Sum of Squares Within the Groups: 180,014- Average of the Squares Within the Groups: 90,007. Sum of Squares Outside the Groups: 5,844,952. Average of the Squares Outside the Groups: 216,480; Total Sum of Squares: 6024.967; Average of the Total Squares: 306.487. These calculations are indicative of the variance within and between groups in the study, providing important information for hypothesis testing and further statistical analysis.

The value of the T test was 41.01, with a significant value of sig estimated at 0.00664, at a significance level estimated at 0.05. When comparing the moral value to the level of significance, we notice that the moral value is greater than the level of significance, which indicates the presence of statistical significance. This indicates that the first hypothesis, which states: "There are statistically significant differences between the pre- and post-measurements of members of the experimental group with regard to weight loss" has been confirmed.

Presentation and discussion of the results of the second hypothesis

The second hypothesis: "There are statistically significant differences between the pre- and post-measurements of the experimental group members regarding the low level of abdominal circumference measurements".

Table 13
the statistical methods used to test the second hypothesis

	Sum of squares	Mean squares	Test	Moral value sig	Significance level	Statistical decision
Within groups	3055.583	218.256	11.03	0.0425	0.05	Statistically significant
outside groups	2969.383	197.959				
the total	6024.967	306.487				

Based on Table No. (13), which represents the statistical methods used in treating the second hypothesis, we note that the sum of squares within the groups amounted to 3055.583, and the average of the squares was estimated at 218.256, while the sum of squares outside the groups was estimated at 2969.383, and the average of the squares was estimated at 197.959, while the total of The total squares are 6024.967, and the average squares are estimated at 306.487. The value of the T test was 11.03, with a significant value of sig estimated at 0.0425, at a significance level estimated at 0.05. When comparing the moral value to the level of significance, we notice that the moral value is greater than the level of significance, which indicates the presence of statistical significance. This indicates that the second hypothesis, which states: "There are statistically significant differences between the pre- and post-measurements of members of the experimental group with regard to the low level of abdominal circumference measurements" has been confirmed.

Presentation and discussion of the results of the third hypothesis

The third hypothesis states: "There are statistically significant differences between the pre- and post-measurements of the experimental group members regarding the low level of pelvic circumference measurements."

Table 14
the statistical methods used to address the third hypothesis

-	Sum of squares	Mean squares	Test	Moral value sig	Significance level	Statistical decision
Within groups	414.705	103.676	46.20	0.00763	0.05	Statistically significant
outside groups	5610.262	224.410				
the total	6024.967	306.487				

Based on the information provided in Table No. (14), which outlines the statistical methods used to address the third hypothesis, the following observations can be made: Sum of Squares Within the Groups: 414.705- Average of the Squares Within the Groups: 103.676. Sum of Squares Outside the Groups: 5610.262- Average of the Squares Outside the Groups: 224.410. Total Sum of Squares: 6024.967 - Average of the Total Squares: 306.487. The T-test value is reported as 46.20, with a significant value (sig) estimated at 0.00763, at a significance level of 0.05.

In comparing the T-test value to the significance level, it is observed that the T-test value is greater than the significance level. This indicates the presence of statistical significance. Consequently, the third hypothesis, which asserts that there are statistically significant differences between the pre- and post-measurements of members of the experimental group with regard to the low level of pelvic circumference measurements, has been confirmed.

Presentation and discussion of the results of the fourth hypothesis

The fourth hypothesis: "There are statistically significant differences between the pre- and post-measurements of members of the experimental group regarding the low level of thigh circumference measurements."

Table 15
the statistical methods used to test the fourth hypothesis

-	Sum of squares	Mean squares	Test	Moral value sig	Significance level	Statistical decision
Within groups	325.507	106.567	23.15	0.0425	0.05	Statistically significant
outside groups	4236.223	228.423				
the total	4561.73	334.99				

Based on the table above (15), the statistical methods used in treating the fourth hypothesis, we note that the sum of squares within the groups It was 325,507, and the average of the squares was estimated at 106,567, while the sum of the

squares outside the groups was estimated at It was 4236.223, and the average of the squares was estimated at 228.423, while the total sum of the squares was 4561.73, and the average of the squares was estimated at 334.99.

The value of the T test was 23.15, with a significant value of sig estimated at 0.0425, at a significance level estimated at 0.05. When comparing the moral value to the level of significance, we notice that the moral value is greater than the level of significance, which indicates the presence of statistical significance. This indicates that the fourth hypothesis, which states: “ There are statistically significant differences between the pre- and post-measurements of members of the experimental group regarding the low level of thigh circumference measurements.” was confirmed.

Presentation, analysis and discussion of the main hypothesis

Through the presentation and examination of the outcomes related to the subsidiary hypotheses, which are worded as follows: “There are statistically significant differences between the pre- and post-measurements of the experimental group members with regard to weight loss” for the first hypothesis, and “There are statistically significant differences between the pre- and post-measurements of the group members.” experimental group with regard to the low level of physical measurements of the abdominal circumference” for the second hypothesis, and “there are statistically significant differences between the pre- and post-measurements of members of the experimental group with regard to the low level of physical measurements of the pelvic circumference” for the third hypothesis, and “there are statistically significant differences Between the pre- and post-measurements of the experimental group members regarding the low level of thigh circumference measurements with respect to the fourth hypothesis. All of them were *confirmed*. On this basis, the main hypothesis was: “*The proposed motor training program using adapted sports activities is effective in reducing fatigue in breast cancer patients.*” is thus confirmed.

General discussion of the results obtained

After implementing the suggested training program aimed at reducing anger among breast cancer patients and considering the outcomes we have acquired, we can draw the following conclusions:

- The proposed training program to reduce fatigue in breast cancer patients has a role in weight reduction, as the arithmetic mean weight decreased significantly from 104.55 kg before the start of a motor training program to 92.35 kg after three months of applying the program, which indicates the effectiveness of the applied motor training program.
- The proposed training program to reduce weight in breast cancer patients also has a role in reducing abdominal circumferences, which include abdominal circumference, pelvic circumference, and thigh circumference.
- The arithmetic mean of abdominal circumference was known to decrease significantly from 113.40 before the start of a movement training program to 110.65 after three months have passed since the program was implemented.

- As for the pelvic circumference, the arithmetic mean value for the sample members decreased from 117.90 before the start of the program to 114.90 after the program was implemented. The same applies to the thigh circumference, which in turn decreased from 71.75 before applying a movement training program to 70.65 at the end of the program, which indicates the effectiveness of the applied movement training program.

Conclusion

Based on the presentation and analysis of the hypothesis results, we can conclude that:

- The proposed motor training program using adapted sports activities is effective in reducing fatigue in breast cancer patients.
- There are statistically significant differences between the pre- and post-measurements of the experimental group members regarding weight loss.
- There are statistically significant differences between the pre- and post-measurements of the experimental group members regarding the low level of abdominal circumference measurements.
- There are statistically significant differences between the pre- and post-measurements of the experimental group members regarding the low level of pelvic circumference measurements.
- There are statistically significant differences between the pre- and post-measurements of the experimental group members with regard to the low level of thigh circumference measurements.

Suggestions and recommendations

In light of the study's findings, we recommend

- Creating awareness through visual, informative, and print media is crucial for educating individuals on the development of behavioral weight control programs. These programs should encompass the enhancement of eating habits, including aspects like portion control, eating pace, and food quality. The primary objectives are to promote overall health and rectify any misconceptions related to nutrition and weight management.
- Holding seminars and forums to spread the culture of practicing physical activity for health.
- Do not use medications that reduce appetite or increase weight, as they cause unwanted health complications.
- Completing sports facilities and structures and rehabilitating sports fields and arenas to practice physical activity in order to maintain health.
- Regular exercise for female athletes and routine examinations for early detection of breast cancer.
- Paying attention to sports medicine because of its great importance in preventing the incidence of such diseases and diagnosing them before they occur or in their initial stage.

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