

A REVIEW OF THE IMPACT OF PHYSICAL ACTIVITY - REGULAR EXERCISE AND HEALTHY EATING ON OVERCOMING OBESITY AND WEIGHT LOSSMohammad Mohammadi¹, Farah Asadi²**ABSTRACT**

Obesity has been suggested as a serious health problem. In many parts of the world, obesity is paradoxically associated with malnutrition. These problems are now so prevalent that they have replaced traditional problems such as malnutrition and infectious diseases. With the advancement of technology in the present century and the spread of motor poverty, obesity has become widespread and the age of obesity has decreased. The prevalence of obesity and subsequent metabolic diseases related to obesity has been increasing in the last two decades and obesity has reached pandemic proportions in the world. In this regard, many studies and researches have been done to examine various methods of weight loss and obese people have different ways to lose weight, which can have dangerous side effects. Therefore, among all the selected methods, the only way to have a positive and lasting effect is to have a proper diet along with a regular exercise program following the exact scientific principles, to have a proper diet with a regular exercise program following the exact scientific principles. Attention to the type, intensity, weekly frequency, individual conditions, and the number of calories consumed by physical activity plays an important role in the success and effectiveness of a sports prescription that can be offered to people. It is also important to balance the number of calories your calorie intake and consumption.

Key words: Physical activity. Regular exercise. Obesity. Weight loss. Healthy eating.

1 - Department of Physical Education, Faculty of Literature and Humanities, Malayer University, Malayer, Iran.

2 - Master of Sport Physiology, Iran.

E-mail author:

m.mohammadi@malayeru.ac.ir
farah1348asadi@gmail.com

RESUMO

Uma revisão do impacto da atividade física - exercícios regulares e alimentação saudável na superação da obesidade e perda de peso

A obesidade tem sido apontada como um sério problema de saúde. Em muitas partes do mundo, a obesidade está paradoxalmente associada à desnutrição. Esses problemas são agora tão prevalentes que substituíram os problemas tradicionais, como a desnutrição e as doenças infecciosas. Com o avanço da tecnologia no século atual e a disseminação da pobreza motora, a obesidade se espalhou e a idade da obesidade diminuiu. A prevalência da obesidade e subsequentes doenças metabólicas relacionadas à obesidade tem aumentado nas últimas duas décadas e a obesidade atingiu proporções pandêmicas no mundo. A este respeito, muitos estudos e pesquisas têm sido feitos para examinar vários métodos de perda de peso e pessoas obesas têm diferentes maneiras de perder peso, o que pode ter efeitos colaterais perigosos. Portanto, entre todos os métodos selecionados, a única maneira de ter um efeito positivo e duradouro é ter uma dieta adequada juntamente com um programa de exercícios regulares seguindo os princípios científicos exatos, ter uma dieta adequada com um programa de exercícios regulares seguindo os princípios científicos exatos princípios. A atenção ao tipo, intensidade, frequência semanal, condições individuais e número de calorias consumidas pela atividade física desempenha um papel importante no sucesso e eficácia de uma prescrição de esportes que pode ser oferecida às pessoas. Também é importante equilibrar o número de calorias com a ingestão e o consumo de calorias.

Palavras-chave: Atividade física. Exercício regular. Obesidade. Perda de peso. Alimentação saudável.

Orcid author:

<https://orcid.org/0000-0002-4513-0189>
<https://orcid.org/0000-0002-8537-2203>

INTRODUCTION

The increasing decline in physical activity and inactivity is the cause of many prevalences of chronic physical and mental illnesses related to today's lifestyle.

One of the destructive effects of motor poverty is the spread of obesity and overweight and related problems that over the past decade, there has been an unprecedented epidemic in adults in developed as well as developing countries (Fox et al., 2006).

Obesity is associated with many physical complications, including cardiovascular disease, diabetes, hypertension, high cholesterol, and blood triglycerides, arthritis, asthma, and certain types of cancer (Bouchard, Jean, 1995).

Considering the importance of obesity and increasing age in the incidence of diseases and related disorders, and since increasing the level of physical fitness and performing physical activities play a role in reducing obesity and its consequences, in this regard, daily physical activity as an important behavior about disease prevention and mortality has been emphasized by various researchers (Ahmad et al., 2012).

Towfighi et al., (2014) stated in their research that; Aerobic exercise significantly reduced weight, body mass index, and subcutaneous fat percentage of obese people after the fourth week of exercise and after the last training session of the eighth week compared to before exercise.

So that today physical activity has been introduced as an important strategy of daily leisure programs and an inactive lifestyle is associated with overweight, obesity, cardiovascular disease, hypertension, type 2 diabetes, and some cancers.

Obesity is one of the most important risk factors that ultimately lead to lipid disorders (Burke and Dickin, 2007).

Control of overweight and obesity should be through a combination of diet, exercise, and lifestyle changes; Inactivity is associated with an increased incidence of obesity and the risk of cardiovascular disease. Increasing physical activity is beneficial for all people in any age group, especially for the prevention of obesity.

Proper nutrition has been one of the most important determinants of disease and health during life,

There is a lot of research on obesity treatment methods.

However, most physical education and medical experts agree on the method of controlling diet along with physical activity as the most basic and scientific method of weight loss.

Therefore, according to the results of research, it seems that; there is still no general agreement on the role of physical activity, exercise, and diet in weight loss (Dehghanpour and Rahimi, 2010).

The results of the research may be inconsistent with the type, intensity, and duration of exercise and, most importantly, the lack of control over the food consumed and the type of nutrition.

On the other hand, little research has been done on the role of nutrition (with the same calories) in weight changes. Therefore, this research sought to find an answer to the question that; Physical activity - Exercise and healthy eating affect overcoming obesity and weight loss or not?

MATERIALS AND METHODS

The present study is a review. In this method, various sources on obesity, physical activity and diet have been studied and elements related to the research topic have been extracted from the mentioned sources and by interpreting the findings, we have tried to use the sources and studies of other researchers on The subject of the research is discussion and conclusion.

Statistical sample

Since such researches do not have a society and a sample of statistics, so it can be said that the study population, records, documents, documents were available, among the sources that were somehow related to the subject, a number that are more accurate and detailed.

More on the subject of research, were selected. In this study, out of about 150 related sources, 42 sources that are more credible and closer to the subject were identified and studied.

Physical activity - exercise

Physical exercise promotes many capabilities such as; Muscular strength and

cardiovascular system, movement inhibitions, and weight loss.

Frequent and regular physical activity improves the function of the immune system and prevents the occurrence of various diseases such as; Prevents heart failure, diabetes, and obesity (Stampfer et al., 2000).

The US Public Health Service (PHS) and the American College of Sports Medicine (ACSM) recommend approximately 30 minutes of moderate-intensity physical activity (e.g., brisk walking) to improve cardiovascular function and metabolism, thereby reducing the prevalence of obesity. Also, at least 45-60 minutes a day of moderate activity is needed to prevent weight gain and consequently obesity for the majority of the population (Aghamolaei et al., 2009).

To have a regular, scientific and effective exercise program, several important principles must be considered, which are: Type and intensity of exercise and physical activity - duration of training session and repetition of that training session per week, individual conditions - calories consumed physical activity.

Exercise should be done for at least 30 minutes 5 to 7 days a week to prevent obesity and improve cardiovascular health. This amount of exercise can burn between 1000 and 1200 calories per week, the amount of calories burned depends on the duration and intensity of exercise and a person's weight (Kaminsky and Bonjemi, 2005).

Combined exercise including aerobics and resistance is preferred, although an exercise program such as diet should be designed for the individual (Rada et al., 2018).

Exercise can increase insulin sensitivity and be effective in controlling the progression of type 2 diabetes. Long-term aerobic exercise can have beneficial effects on blood pressure.

Regular exercise (30 minutes a day and two or three times a week) is a proven way to lower total cholesterol, increase high-density lipoprotein (LDL), lower low-density lipoprotein (HDL), and improve your overall health.

In obese adults, the combination of aerobic exercise and resistance exercise increases physical performance more than other exercises alone. For example, a program that includes 15 minutes of balance training, 15 minutes of flexibility, 30 minutes of aerobics, and high-intensity resistance training (30 minutes) can be helpful (Jakicic, 2009).

For most people, walking is the best and most appropriate type of exercise. Walking instead of using the car for short distances and using the stairs instead of the elevator can be effective

Exercise consumes energy in two ways: One is to increase the amount of fuel during exercise and the other is to increase the amount of energy consumed during rest after exercise.

For the second case, let's give an example: Moderate-intensity physical activity for ten minutes can increase the body's energy expenditure by 5 to 15 percent at rest for 24 to 48 hours. In athletes, the amount of energy consumption at rest is 5 to 20% higher than normal people (Towfighi et al., 2014).

During rest, 50% of the energy needed for metabolism is provided by fats and the rest by sugars. In light exercise, fats still play a role. But as exercise intensifies, sugar metabolism becomes more pronounced. This is why experts find light exercise more beneficial for weight loss (Ahmad et al., 2012).

Start exercising daily should be as much as an obese person can afford, after physical fitness and initial weight loss, the intensity, and duration of exercise can be increased.

The minimum fuel consumption of the body to achieve physical fitness is estimated at 1000 kcal per week. The optimal rate for weight loss is about 2000 kcal per week (Kaminski and Bonjemi, 2005).

Recent research, especially in the twentieth century, shows that; Proper and continuous exercise improves and increases the amount of strength, muscle endurance, cardiorespiratory endurance, flexibility and also, causes fitness and reduces body fat.

The goal of continuous activity and exercise is to achieve the desired physical condition to have more health and vitality and longer useful life (Shahidi and Rostamzadeh, 2011).

Healthy eating

An energy-balanced diet is the most commonly recommended way to lose weight. This diet should be nutritionally adequate and limited only in terms of energy intake. This limitation is such that fat reserves are sufficient to meet the daily energy needs.

Daily energy of 1000-50 kcal is suitable to achieve this goal. The amount of energy varies from 1200 to 1800 kcal

depending on the size and amount of activity, from person to person.

Regardless of the energy limit, healthy eating should be taught and this training should also include increasing the amount of physical activity. Various methods are suggested to control and treat obesity and overweight, in most of these methods, the emphasis is on reducing food intake with different proportions of nutrients and increasing energy consumption by increasing physical activity and exercise.

There has been a lot of research on obesity treatment methods. Although most physical education and medical experts agree on the method of controlling diet along with physical activity as the most basic and scientific method of weight loss, however, according to the results of research, it seems that there is still no general agreement on the role of exercise and diet on weight loss (Dehghanpour and Rahimi, 2010).

Epidemiological and clinical studies suggest the use of balanced low-calorie diets and increased physical activity in the control of obesity (Wing et al., 2010).

A better understanding of the relationship between physical activity and diet can enhance efforts to promote health outcomes for which diet and inactivity are two risk factors.

Therefore, before designing effective strategies and adopting preventive strategies to improve both health-related behaviors, it is necessary to create better insights in people regarding the interaction of nutrition and physical activity, as well as the coexistence of habits such as physical activity and inappropriate eating behaviors (Pronek et al., 2004).

Obesity

Obesity and overweight are defined as abnormal or excess storage of fat that has a detrimental effect on health. Body Mass Index (BMI) is a simple weight- and height-

dependent index used to classify overweight and obesity in adults (Stone et al., 2018).

To determine it, the weight division formula in kilograms is used in height per meter to the power of two (kg/m^2).

In the case of adults, overweight and obesity as defined by the WHO have the following characteristics:

- Overweight: If you have a BMI greater than or equal to 25
- Obesity: If you have a BMI greater than or equal to 30

BMI is the most useful way to measure overweight and obesity because it applies to both genders and all ages. However, it should be noted that the same index in different people does not mean the same thing. For children, in addition to body mass index, the age factor should also be examined to diagnose overweight and obesity (Caruth and Skinner, 2001).

Statistics of overweight and obesity

Some recent WHO statistics are as follows: In 2016, over 9.1 billion (small number system) of this overweight, more than 650 million are obese, most of the world's population live in countries that are overweight and obese due to underweight, Takes more losses (overweight and obesity, 2017).

Obesity is a global epidemic and its impact on public health has become a major concern (Stone et al., 2018).

More than one-third of adults (37.5%) and about (15%) or 12.5 million children and adolescents in the United States are obese (Muzmadar et al., 2011). Obesity is a major risk factor for the development of the metabolic syndrome and other health-related disorders (Rada et al., 2018). Metabolic syndrome affects 35% of American adults over the age of 20, as shown in Figure 1.

A set of cardiac risk factors including abdominal obesity, blood sugar, blood pressure, and dyslipidemia include: High triglycerides or low cholesterol levels are high-density lipoproteins (Jialal et al., 2014).

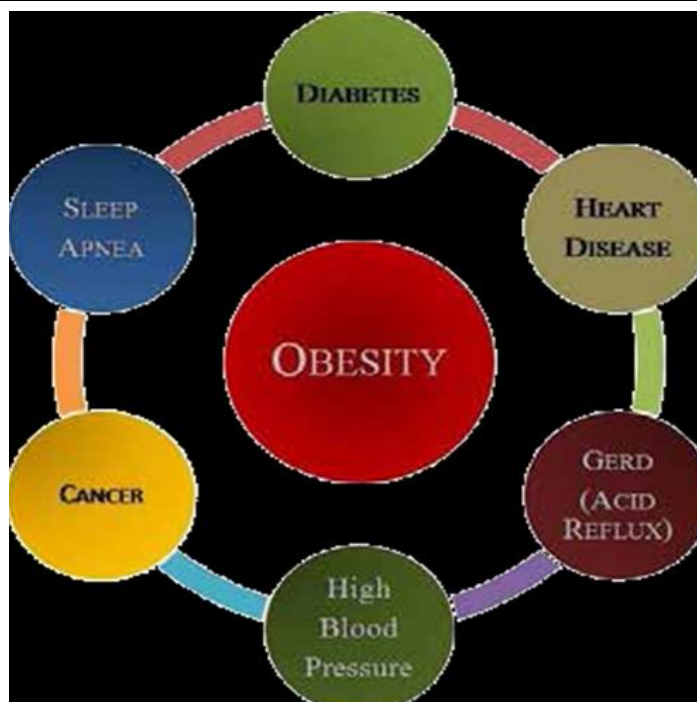


Figure 1 - A set of cardiac risk factors (Jialal et al., 2014).

The cause of obesity and overweight

The main reason for obesity and overweight is the imbalance between calories consumed and calories received, in other words: Increased intake of high-energy and high-fat foods, increased physical inactivity due to the expansion of sedentary work,

changes in public transportation methods, and urbanization. Changes in food and physical activities are often the result of environmental and social changes related to development, and the lack of policies in the areas of health, agriculture, transportation, urbanization, nature, food industry, distribution, marketing and education (Stone et al., 2018).

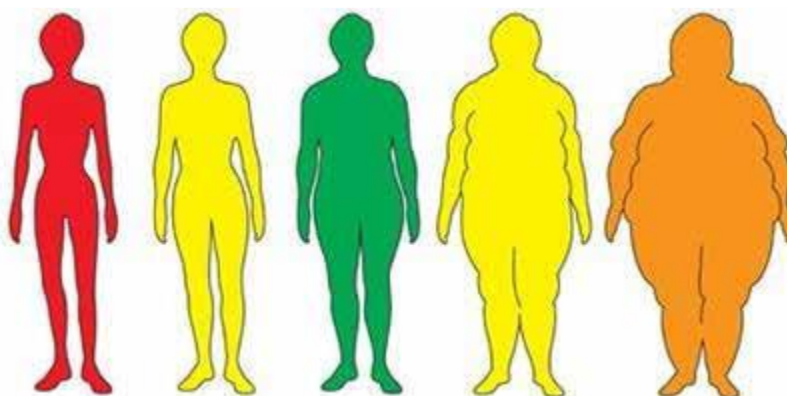


Figure 2 - Physiological and physical changes of obesity in children and adolescents.

Body Mass Index (BMI)

BMI is the most widely used method for measuring overweight and obesity. BMI is obtained by dividing weight (in kilograms, W) by the square of height (in meters, H), i.e. $BMI = W / H^2$. BMI is a simple index commonly used to classify overweight and obesity in

adults. This index is the most useful scale for overweight and obesity because it is used equally in both sexes and all ages of adults. The World Health Organization defines BMI as equal to or greater than 25 as overweight and BMI as equal to or greater than 30 as obesity, as shown in Table 1.

Table 1 - Classification of overweight and obesity according to obesity grading.

Classification of overweight and obesity	
BMI	Classification
18/5>	Lightweight
18/5-29/4	normal
25/0-29/9	Overweight
30/0-34/9	Grade 1 obesity
35/0-39/9	Grade 2 obesity
40<	Grade 3 obesity

Waist Circumference

A waist circumference of more than 102 cm in men and more than 88 cm in women, which indicates an increased risk, is equivalent to a BMI of 25 to 34. When both waist circumference and body fat percentage are high, they are important predictors of heart failure and other risks associated with obesity. Therefore, it is recommended that the waist circumference be less than 88 cm in women and less than 102 cm in men.

Waist to Hip Circumference (WHR)

Waist to hip ratio or waist/hip ratio more than 0.8 in women and more than 1 in men is also associated with a high risk of cardiovascular disease (Nasrollahi Borujeni et al., 2019).

Deurenberg Equation

The Dornberg equation is used to estimate the percentage of body fat. This equation is used to determine the amount of fat in people using BMI, age, and sex.

Fat percentage of 20 to 25 percent and more in men and 25 to 33 percent and more in women are usually considered excessive amounts and are associated with health and metabolic risks of obesity (Pasdar et al., 2015).

Percentage of body fat=
 $(1/2 \times \text{BMI}) + (0/23 \times \text{age}(\text{year})) - (10.8 \times G)$
 For men (G = 1), for women (G = 0)

Consequences of Obesity and Overweight in the Field of Health

Increased BMI is a major risk factor for non-communicable diseases such as cardiovascular disease (heart disease and stroke), which were the leading cause of death in 2012. Diabetes, musculoskeletal diseases, especially osteoarthritis, some cancers such as endometrial, breast, ovarian, prostate, liver, gallbladder, kidney, and intestinal cancers, the risk of non-communicable diseases, increases with increasing BMI.

Childhood obesity is associated with obesity, premature death, and disability in adulthood but in addition to increasing the risk in the future, children with obesity also experience problems such as shortness of breath, increased risk of fractures, high blood pressure, symptoms of early cardiovascular disease, insulin resistance, and the physiological effects of obesity (Ahmad et al., 2012).

Causes of overweight and obesity

The main reason for overweight and obesity is the imbalance between calories received and calories consumed by a person. In other words, we can say: Overweight is the

result of an imbalance between food intake and physical activity. Overweight and obesity have the following problems:

- 1- High intake of high-energy and high-fat foods
- 2 - Decreased physical activity due to sedentary nature most jobs change transportation style and increase urbanization Consumption of high-calorie foods without a proportional increase in physical activity leads to unhealthy weight gain and decreased levels of physical activity also leads to energy imbalance resulting in weight gain (Wu et al., 2009).

Among the following reasons play an important role in the prevalence of overweight and obesity:

Inheritance and nutritional genomics

Most of the hormonal and neurological factors involved in weight regulation are genetically determined; this includes short-term and long-term symptoms that determine satiety and eating. Small defects in gene expression or interference can be significantly involved in weight gain.

The number and size of fat cells, the regional distribution of fat in the body, and (RMR) (the rate of resting metabolism) are also affected by genes. Studies on twins show that genes determine 50 to 70 percent of susceptibility to obesity. Dietary and lifestyle choices can activate or inactivate obesity genes (Towfighi et al., 2014).

Insufficient physical activity

Lack of exercise and a generally sedentary lifestyle along with chronic overeating are also causes of weight gain. The sedentary nature of society is a factor in increasing the growing problem of obesity. People exercise less and spend more time in low-energy activities watching TV or movies, using computers, playing video games, sitting in the car, and driving to work or destination (Heidari et al., 2012).

Inflammation

Adipose tissue actively secretes a wide range of pro-inflammatory and anti-inflammatory cytokines. The effects of these cytokines are: Insulin insensitivity to hyperlipidemia Decreased muscle protein and

oxidative stress Scientists have found a direct link between obesity and inflammatory diseases such as cardiovascular disorders, some cancers, and type 2 diabetes. In humans, chronic overeating stimulates the key to inflammation and leads to weight gain and insulin resistance, and central obesity is strongly associated with inflammatory factors, especially CPR.

Simple changes in diet and lifestyle can change the inflammation associated with obesity. Foods like oranges are anti-inflammatory while cream may be pre-inflammatory. Antioxidants and omega-3 polyunsaturated fatty acids reduce the severity of inflammation (Wing et al., 2010).

Sleep and circadian rhythms

Sleep deprivation alters endocrine settings related to hunger and appetite; therefore, hormones affecting appetite are affected and they can cause high energy intake, and persistent sleep deprivation can change the amount of food you eat and contribute to the obesity epidemic. Some people may work shifts and face too much light at night; this can disrupt circadian rhythms and increase the prevalence of obesity (Heidari et al., 2012).

Stress

Stress is another factor for obesity. Under stress, cortisol is released and stimulates insulin secretion to keep blood sugar in a steady-state, so appetite increases (Heidari et al., 2012).

Taste and appetite

The food and the taste of those enjoyable answers make the endless variety of foods that are available at any time and a reasonable price can be involved in high-calorie intake because people eat more when different types of food are served to them than when only one type of food is served, naturally, when the food is consumed, the desire to consume it decreases (Heidari et al., 2012).

Volume of meals

Overeating activity is partly the result of oversized food presses. The presses and calories that restaurants and fast food stores offer in one meal are often more than one

person's energy needs for the whole day (Towfighi et al., 2014).

Fattening compounds

Obesity compounds are chemical compounds foreign to the body that disrupt the natural metabolism of fats and ultimately lead to high fat and obesity. These compounds can be called endocrine disruptors because they alter hemostasis lipids, alter fat storage and metabolic regulation, disrupt energy balance, or alter satiety and appetite regulation to increase fat accumulation and obesity. Suspicious examples of this in the environment and food preparation are bisphenols and phthalates, which are found in many plastics used in food packaging. These substances are transported into or stored in processed foods (obesity and overweight, 2013).

Methods called weight loss in obese people

Most people who are obese and overweight, dissatisfied with their condition, resort to different methods to lose weight, which sometimes has dangerous side effects. Methods that experts do not recommend any them. People resort to methods such as single food, diuretics, hydrotherapy, strict diets, and the use of tools, none of which are beneficial (Burke and Dickin, 2010).

Single food, i.e. skipping one of the meals such as lunch or dinner, is the most common type of obesity treatment in people. Researchers have found that skipping a meal during the day causes a lack of essential vitamins and minerals in the body and endangers health. Single-meal programs are very low in energy and low in calories, and have a devastating effect on the nervous system, especially in the long run because few starchy substances reach the body (Burke and Dickin, 2010).

Three drugs, Sibutramine, Orlistat, and Rimonabant, have been approved by the FDA for long-term use for weight loss purposes, but all three have side effects. Sibutramine, for example, may increase blood pressure and heart rate.

Orlistat causes unpleasant gastrointestinal side effects. Rimonabant is also associated with side effects such as nausea and gastrointestinal side effects, but is more self-limiting, and is more severe in people with diabetes (Johnson et al., 2010).

Taking diuretics causes the body to lose water (dehydration) and electrolytes such as potassium (hypokalemia) and sodium (hyponatremia), causing muscle weakness and low blood pressure. Laxatives excrete nutrients from the body, and with long-term weight loss, a person becomes malnourished, deficient in certain nutrients (especially electrolytes), and complications such as digestive problems, malnutrition, hair loss, gout, and depression (Choi et al., 2005).

The use of more weight loss devices is common among women. The use of tools such as vibrators, massagers, stretch belts, thermotherapy, massage therapy, acupuncture, creams, ointments, gels, saunas, slimming earrings only reduces the size of people and does not affect burning fat.

The belts that are advertised, just because the tissues are compressed, make the person look thin, which is temporary and after a while, the body returns to normal. Vibrating devices do not expel fat and are only effective in calming the nerves.

Choosing a thick plastic cover also causes sweating and only causes dehydration, and the lost weight is replaced after drinking fluids. In the meantime, according to credible scientific evidence, the best and most effective way to lose weight is to do regular exercise and control your diet. To maintain weight, it is important to have equal energy intake and energy consumption (Towfighi et al., 2014).

RESULTS

For a person to have a regular, scientific and effective exercise program, several important principles must be considered:

- 1- Type of exercise and its intensity,
- 2- Length of each exercise session and its weekly frequency,
- 3- Individual conditions,
- 4- Calories consumed by physical activities.

Type of exercise and its intensity

Sports are divided into two categories: 1) Aerobic exercise and 2) Anaerobic exercise. Of these two categories, the best type of exercise that leads to fat burning and ultimately weight loss is aerobic exercise (Towfighi et al., 2014).

But resistance exercise, which is part of anaerobic exercise, can also be very

effective in maintaining non-adipose tissue (LBM) and increasing metabolic rate. For exercise to produce the maximum amount of fat burning in a person, the intensity of exercise should be adjusted based on his heart rate. According to the available evidence, the highest rate of fat burning in the heart rate range is 60-70% of the maximum heart rate (Kaminsky and Bonjemi, 2005).

How to calculate the maximum heart rate is calculated as follows:

: MHR = 220 – Age) 1

2): Maximum heart rate: 217- (Age × 0.85) :

3): Maximum heart rate: 217- (Age × 0.85):

Workload or training pressure can be expressed using METs as an estimate of oxygen uptake. Single METs are equivalent to resting metabolic rate and approximately equivalent to 3.5 ml of oxygen per kilogram of body weight per hour (Kaminsky and Bonjemi, 2005).

The length of each exercise session and its weekly frequency

The minimum time required for each exercise session is 30 minutes (Kraemer et al., 1999).

This time is the net amount of each session and depending on the person's physical fitness; about 5 minutes to warm up at the beginning of the session and 5 minutes to cool down at the end should be added. For people who have not had an exercise program before, it is recommended that sessions start at 10 minutes and eventually increase to 30 minutes (Donley et al., 2003).

It is even recommended that these 30 minutes of exercise be divided into three sets of 3 minutes per day, as this will increase energy expenditure (Burke and Dickin, 2010).

Regarding the weekly frequency of exercise, it was previously recommended that a person exercise three days a week but today, the best program is such that a person should exercise for 30 minutes most days of the week (Towfighi et al., 2014).

Individual conditions

Despite the things that have been said about the intensity of exercise, the intensity of exercise varies in different people depending on the level of exercise skills of the person and his physical fitness. The less skill and physical

fitness a person has, the less intense the training but the higher the energy consumption. However, for an athlete to expend more energy, he must also train harder (Kaminsky and Bonjemi, 2005).

Calories consumed by physical activity

The amount of calories consumed during exercise is directly related to the amount of weight loss, which can be used to calculate the number of calories consumed (Kaminsky and Bonjemi, 2005).

Kcal/min=METs × BW (kg) ×3/5/200

For example, for a 70 kg person, you want to prepare an exercise program with 1000 kcal calories per week and with METs = 6. In this case, first; net Calorie intake due to exercise will be equal to METs = 5 (the amount of METs at rest is 1 which decreases the activity of METs), Second: According to the equation (70. 5.3 5 5.3) / 200 = 1.6 Kcal/min, the calorie content is calculated to be 6.1. Third: To reach 1000 kcal per week, a person should exercise 164 minutes per week or 41 minutes per day with a frequency of 4 sessions per week (or 33 minutes per day with a frequency of 5 sessions per week). If instead of 1000 kcal, 2000 kcal per week we wanted to consume energy (with the same intensity of 1.6 Kcal/min), then one should exercise 328 minutes per week or 47 minutes per day with the frequency of all days of the week (Nasrollahi Borujeni et al., 2019).

The effects of exercise on weight loss

In addition to increasing the number of calories consumed, exercise can play an effective role in weight loss by reducing a person's appetite. In this regard, many factors such as intensity, duration, and type of exercise, in turn, are important (Mahan et al., 2012).

A study showed that; Short-term loss of appetite (1-2 days) and energy intake occurs only in training sessions with a longer duration (60 minutes vs. 30 minutes) and a higher intensity of 70% VO₂ max vs. 30% VO₂ max) (King et al., 1994).

Another study emphasizes that; Running on a treadmill with different intensities reduces the feeling of hunger, but does not affect Absolute intake (Vatansever-Ozen et al., 2011). In the latest articles, it is emphasized

again that; Diet and exercise programs together lead to significant weight loss and maintain this weight loss (Wu et al., 2009).

In another study, the effects of weight training on fat-free mass were investigated, it was found that the people who did these exercises, their fat-free mass was better maintained (Kramer et al., 1999). In another study, the effects of high-intensity intermittent exercise on body composition showed that this type of exercise significantly reduced body fat mass, especially in the abdomen, flanks, and increased fat-free mass and aerobic power (Heidari et al., 2012).

The importance of weight loss

In general, the amount of weight loss in a week for the following reasons should not be more than 2 pounds (or one kilogram) per week:

- 1) Muscle tissue (LBM) is better preserved.
- 2) A person's ability to maintain weight loss is more appropriate due to gradual lifestyle changes.
- 3) Small weight changes mean that less water is lost and we do not have Positive False weight loss.

To lose one pound (0.5 kg) of body fat per week, a person must consume less or consume 500 kcal of energy per day to make a total of 3,500 kcal per week, which is roughly equivalent to one pound of fat fuel. In non-athletes, this reduction in calories can be received as follows:

- 1- Exercise to burn 250 Kcal
 - 2- Reduce energy intake by 250 Kcal
- This rate will double if the goal is to lose two pounds (1 kg) per week (Burke and Dickin, 2010).

CONCLUSION

In general, this study can recommend regular exercise programs with certain intensity with caution, along with proper nutritional guidelines for this segment of society that has a growing population to community health centers.

Because of the above, The complications of obesity are very wide and only its medical complications can be summarized as follows: (Coronary artery disease, diabetes, dyslipidemia, hypertension, hypertrophy of the idiopathic skull, stroke, cataract, severe

pancreatitis, cancer (breast, cervix, colon, esophagus, pancreas, kidney and prostate), Inflammation of the veins (venous congestion), Gout, skin complications, gynecological disorders (irregular menstruation, infertility, polycystic ovary syndrome), Gallbladder disease, non-alcoholic fatty liver disease and lung diseases (obstructive sleep apnea and shortness of breath) Therefore, it is concluded that; Having a proper diet along with a regular exercise program is in line with strict scientific principles.

Attention to the type, intensity, weekly frequency, individual conditions, and the number of calories consumed by physical activity plays an important role in the success and effectiveness of a sports prescription that can be offered to people. It is also important to balance the number of calories your calorie intake and consumption.

REFERENCES

- 1-Aghamolaei, T.; Tavafian, S.S.; Hassani, L. exercise perceived benefits and barriers among students in Hormozgan University of Medical Sciences]. Iranian Journal of Epidemiology. Vol. 4. Núm. 3-4. p. 9-15. Persian. 2009.
- 2-Ahmad, H.M.; Blaha, M.J.; Nasir, K.; Rivera, J.J.; Blumenthal, R.S. Effects of physical activity on cardiovascular disease. American Journal of Cardiology. Vol. 15. Núm. 109. p.288-95. 2012.
- 3-Bouchard, C.; Jean, D.P. Physical activity and health:hypertensive, metabolic, and atheroschorotic diseases. Research Quarterly for Exercise and Sport. Vol. 66. p. 268-75. 1995.
- 4-Burke, L.; Deakin, V. Clinical sports nutrition, 4th ed. Sydney: McGraw-Hill Medical.2010.
- 5-Caruth, B.R.; Skinner, J.D. The role of dietarycalcium and other nutrieents in moderating, body fat in preschool children. Int J Obes Relat, Metab Disord. Vol. 25. p.559-66.2001.
- 6-Choi, H.K.; Atkinson, K.; Karlson, E.W.; Curhan, G. Obesity, weight change, hypertension, diuretic use, and risk of gout in men: the health professionals follow-up study. Archives of Internal Medicine. Vol.165. Núm. 7. p.742-8. 2005.

- 7-Dehghanpour, M.; Rahimi, A. The effects of isotonic exercising method on under-skin fat rate in nonathlete boy students of Islamic Azad University of Shabestar (Persian). *Iranian Journal of War and Public Health*. Vol. 2. Num. 6. p.46-9. 2010.
- 8-Donley, J.E.; Hill, J.O.; Jacobsen, D.J.; Potteiger, J.; Sullivan, D.K.; Johnson, S.L. Effects of a 16- month randomized controlled exercise trial on body weight and composition in young, overweight men and women: the Midwest Exercise Trial. *Archives of Internal Medicine*. Vol. 163. Núm. 11. p.1343-50. 2003.
- 9-Fox, C.S.; Pencina, M.J.; Meigs, J.B.; Vasan, R.S.; Levitzky, Y.S.; D'Agostino, R.B. Trends in the incidence of type 2 diabetes mellitus from the 1970s to the 1990s: the Framingham Heart. Study. *Circulation*. Vol. 27. Núm. 25. p.2914-8. 2006.
- 10-Heidari, M.; Freund, J.; Boutcher, S. The effect of high-intensity intermittent exercise on body composition of overweight young males. *Journal of obesity*. 2012.
- 11-Jakicic, J.M. The effect of physical activity on body weight. *Obesity*. Vol. 17. Núm. S3. p. S34-S8. 2009.
- 12-Jialal, I.; Kaur, H.; Devaraj, S. Toll-like receptor status in obesity and metabolic syndrome: a translational perspective. *J Clin Endocrinol Metab*. Vol. 99. Núm. 1. p.39-48. 2014.
- 13-Kaminsky, L.A.; Bonzheim, K.A. *ACSM's Resource Manual for Guidelines for Exercise Testing and Prescription*, 5th ed. Baltimore, MD: Lippincott Williams & Wilkins. 2005.
- 14-King, N.; Burley, V.; Blundell, J. Exercise-induced suppression of appetite: effects on food intake and implications for energy balance. *European journal of clinical nutrition*. Vol. 48. Núm. 10. p.715- 24. 1994.
- 15-Kraemer, W.J.; Volek, J.S.; Clark, K.L.; Gordon, S.E.; Puhl, S.M.; Koziris, L.P. Influence of exercise training on physiological and performance changes with weight loss in men. *Medicine and science in sports and exercise*. Vol. 31. Núm. 9. p.1320-9. 1999.
- 16-Mahan, L. K.; Escotte-stump, R. J. *Krauses. food and the nutrition care process*. 13th edition. 2012.
- 17-Nasrollahi Borujeni, N. Debid es claro, pero Dios. Descripción y relación entre la función cardiorrespiratoria y la composición corporal utilizando métodos modernos en hombres y mujeres de Isfahani, *Journal of Applied Sports Physiology*. Vol. 15. Núm. 29. p.41-27. 2019.
- 18-Obesity and overweight. 2017. <http://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>.
- 19-Obesity and overweight, Fact Sheet N 311, Update. 2013. available from : <http://www.who.int/mediacenter/factsheets/fs311/en/>
- 20-Pasdar, Y.; Niazi, P.; Darbandi, M.; Khalundi, Á. Izadi, N. Evaluación de la actividad física y su efecto sobre la composición corporal y la calidad de vida en empleadas de la Universidad de Ciencias Médicas de Kermanshah en 2013, *Revista de la Universidad de Ciencias Médicas Rafsanjan*. Vol. 14. p.110-99. 2015.
- 21-Pronek, N.P.; Anderson, L.H.; Crain, A.L.; Martinson, B.C.; O'Connor, P.J.; Sherwood, N.E. Meeting recommendations for multiple healthy lifestyle factors. Prevalence, clustering, and predictors among adolescent, adult, and senior health plan members. *Am J Prev Med*. Vol. 27. Suppl. 2. p.25-33. 2004.
- 22-Rada, I.; Deldicque, L.; Francaux, M.; Zbinden- Foncea, H. Toll like receptor expression induced by exercise in obesity and metabolic syndrome: A systematic review. *Exerc Immunol Ver*. Vol. 24. p.60-71. 2018.
- 23-Shahidi, F.; Lotfi, G.R.; Rostamzadeh, N. The relationship between physical fitness with body fat percentage and serum lipids and difference variables in boys 13 to 15 years old, urban and rural. *Exercise of Physiology*. Vol. 12. Núm. 77-94. 2011.
- 24-Stampfer, M. J.; Hu, F. B.; Manson, J. E.; Rimm, E. B.; Willett, W. C. Primary Prevention of Coronary Heart Disease in Women through Diet and Lifestyle. *New England Journal of Medicine*. Vol. 343. Núm. 1. p. 16. 2000.

25-Stone, T.W.; McPherson, M.; Gail Darlington, L. Obesity and Cancer: Existing and New Hypotheses for a Causal Connection. EBioMedicine. Vol. 30. p.14-28. 2018.

26-Towfiqi, A.; Ghaffari, Yusuf Depresión, N. El efecto de un programa de ejercicio aeróbico seleccionado con dieta controlada sobre la pérdida de peso en hombres obesos, Revista Iraní de Ciencias de la Nutrición e Industria Alimentaria. Vol. 9. Núm. 2. p. 94-85. 2014.

27-Vatanserver-Ozen, S.; Tiryaki-Sonmez, G.; Bugdayci, G.; Ozen, G. The effects of exercise on food intake and hunger: Relationship with acylated ghrelin and leptin. Journal of Sports Science and Medicine. Vol. 10. Núm. 2. p.283-91. 2011.

28-Wing, R.R.; West, D.S.; Grady, D.; Creasman, J.M.; Richter, H.E.; Myers, D. (2010). Effect of weight loss on urinary incontinence in overweight and obese women: results at 12 and 18 months. J Urol. Vol. 184. Núm. 3. p.1005-10. 2010.

29-Wu, T.; Gao, X.; Chen, M.; Van Dam, R. Long-term effectiveness of diet-plus-exercise interventions vs. diet-only interventions for weight loss: a meta-analysis. Obesity Reviews. Vol. 10. Núm. 3. p.313-23. 2009.

Received for publication in 16/08/2021

Accepted in 29/12/2021