

**The role of physical activity In reducing the spread of risk factors for heart diseases for adolescent enrolled in schools "A Field Study of Some Second-Year High School Classes at Martyr Ali Boussahaba High School, Draria"**

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**Reeceived: 11/07/2024 , Accepted: 23/11/2024 , Published: 03/12/2024**

## **ABSTRACT**

I have addressed the need for physical activities in the life of the adolescent, because of its advantages in reducing the factors leading to heart disease such as obesity, blood pressure, smoking and diabetes. And other diseases, which have become purely the interest of the researcher, being diseases of the times, all related to cardiomyopathy over time.

Due to the importance of the topic our study was aimed at knowing the role that sport plays in the life of a teenager and how it reduces the determinants that lead to heart disease, which made us ask the following question in what is the role of physical activity in reducing the spread of heart risk factors in adolescents Teachers? and for this he used the analytical

descriptive method in order to give the results reached using the measure of mathematical physical activity NAP and the measurement of physical mass IMC research that the study was done on some sections of the second year high school in the high school martyr Ali Boucloud Dabussi and this in order to give results The study concluded that sports physical activity has a major role in reducing obesity, which is a factor for heart disease over time.

**Keywords:** Physical activity; Heart ; Determinants of heart disease "obesity " ;adolescent enrolled in school.

## **INTRODUCTION**

Physical sports activities are essential for human physical and mental health. Physical activity involves movement that requires energy exertion during various sports practices. It is also defined as any daily activity performed by individuals in their lives. Such activities are particularly important during adolescence, a critical phase in a person's life. Adolescence is typically defined as the age range

between 14 and 18 years, a volatile and challenging period that every individual experiences. This stage serves as the first test of life's journey, characterized by numerous physiological, morphological, and psychological changes. These changes can lead to the development of both positive and negative habits, such as smoking, drinking, and drug abuse, among others. Adolescents are also at risk of developing various common, serious, or chronic illnesses, such as diabetes, hypertension, malnutrition, obesity, and more.

Many unhealthy habits and diseases can, over time, result in heart disease or what is known as cardiomyopathy. These conditions are widespread in Algeria in general and particularly in Algerian high schools, which form part of the broader social fabric of Algerian society. It is evident that many students today suffer from chronic diseases, with obesity—a global and local epidemic—being especially concerning. Obesity has severe consequences on an individual's physical, mental, and overall health. Over time, it can lead to cardiac diseases that pose a serious risk to life, such as fatal heart attacks.

This led us to propose the following problem statement:

### **1. General Problem:**

- What is the role of physical sports activity in reducing the risk factors for heart diseases among adolescent students?

#### **1.1 Sub-questions:**

1. What is the relationship between obesity and the occurrence of heart diseases?
2. How does physical sports activity help reduce obesity among adolescent students?

### **2. General Hypothesis:**

- Physical sports activity plays a significant role in reducing the risk factors for heart diseases among adolescent students.

#### **2.1 Sub-hypotheses:**

1. There is a strong relationship between obesity and the occurrence of heart diseases.
2. Physical sports activity has a significant impact on reducing obesity among adolescent students.

### **3. Study Objectives:**

- To identify the role of physical sports activity in reducing the prevalence of risk factors for heart diseases.
- To examine whether there is a relationship between obesity and the occurrence of heart diseases.
- To explore the significant role of physical sports activity in reducing obesity among adolescents.

To achieve the objectives of this research, the descriptive analytical method was employed, as it was deemed suitable for this study conducted on a sample of students at Martyr Ali Boussahaba High School.

#### **4. Definition of Terms:**

##### **4.1 Definition of Physical Activity:**

###### **Linguistic Definition:**

Physical activity refers to agility, speed, and dedication in work (Rateb Ahmed Qabi'a et al., 1997, p. 595).

###### **Technical Definition:**

Physical activity involves the movement of the human body through skeletal muscles, resulting in energy expenditure exceeding that at rest. This definition encompasses all life activities undertaken by individuals, such as performing physical tasks like walking, moving, climbing stairs, or engaging in physical work at home, in the garden, or on the farm. It also includes any recreational or sports-related physical activities. From this, it becomes clear that physical activity is a behavior carried out for work, recreation, therapy, or prevention, whether spontaneous or planned.

Scientists and researchers have used the term "physical activity" as a primary domain encompassing various aspects and frameworks of human physical culture. Among these scholars is Larson, who regarded physical activity as a main system under which all other sub-systems fall (Al-Khouli Amin Anwar, p. 22).

###### **Operational Definition:**

Physical activity is a set of movements produced by specific muscle groups, accompanied by energy expenditure. The nature of this expenditure varies according to the type, intensity, and volume of the activity.

###### **Definition of Risk Factors:**

In epidemiology, a risk factor is a variable associated with an increased likelihood of disease or infection. Sometimes, the term "determinant" is used to describe a variable that is associated with either an increase or a decrease in risk.

#### **4.2 Obesity**

###### **Linguistic Definition:**

Obesity: Excessive body size or corpulence (Louis Maalouf, Jesuit, 1986, p. 194).

###### **Technical Definition:**

Obesity refers to an excessive accumulation of fat in the body, which increases a person's weight and alters their body shape and composition, leading to a state of obesity.

### **Operational Definition:**

Obesity, also known as corpulence, is defined as an increase in fat mass to a level that affects an individual's health, resulting from an imbalance in the body's overall composition.

### **4.3 Definition of Heart Disease:**

Heart disease, also known as cardiopathy, is an umbrella term that refers to a wide and varied range of diseases affecting the heart.

#### **Definition of the Heart:**

- **Linguistic Definition:**

The heart is a muscle about the size of a fist, supplied by three coronary arteries that provide it with nourishment and oxygen (Abu Al-Majd Ayman, 1999, p. 4).

- **Technical Definition:**

The heart is a hollow muscular organ located in the center of the chest, on the left anterior side of the rib cage, behind the sternum, between the lungs. It rests on the upper surface of the diaphragm, tilted slightly, with its axis deviating to the left. Its apex is approximately 9 cm away from the body's median plane. The heart is about the size of a fist (Abu Hiltam Abdul Halim, 2006).

- **Operational Definition:**

The heart is a muscular pump, and like other muscles, it requires oxygen as fuel. It pumps blood to nourish itself through the coronary arteries and supplies oxygen and other nutrients to the body's tissues and organs by circulating blood.

### **4.4 Definition of Adolescence**

- **Linguistic Definition:**

The term "adolescence" originates from the Arabic verb "رأهق," meaning to approach something. A boy is described as "muraahiq" when he is approaching puberty. The term "rahaqt al-shay'" means "I approached it." In this context, it signifies approaching maturity and adulthood (Turki Rabah, 1989, p. 241).

- **Technical Definition:**

Adolescence is the stage that begins with puberty and ends with adulthood and full maturity. In this study, adolescence refers to the age range of students between 14 and 21 years, which corresponds to the high school phase in the educational field (Mawwad Hassan, 1967, p. 79).

- **Operational Definition:**

Adolescence is defined as "the phase of approaching physical, mental, psychological, and social maturity." However, it does not represent full maturity, as individuals in this stage begin to

develop in these areas but do not achieve complete maturity until many years later, which may take up to 10 years.

## 5. Previous Studies:

**Lagreidi Khair 2014/2015:** The Relationship Between the Level of Physical Activity and the Phenomenon of Obesity Among Adolescent Students in Algeria: A Field Study of High School Students in the Northern District of Sétif.

The study aimed to identify the nature of the relationship between the level of physical activity and the phenomenon of obesity among high school students in the northern district of Sétif on a sample of **410 students** selected randomly. The sample consisted of high school students from the northern district of Sétif.

The researcher used the descriptive analytical method, the physical activity measurement questionnaire, and interviews. The results showed that some students suffer from being overweight, as determined by measuring the body mass index. Additionally, there is variability in the level of physical activity among high school students in the northern district of Sétif, and the relationship between the level of physical activity and the phenomenon of obesity is a weak inverse relationship.

## 6. Research Methodology

The choice of the research methodology is one of the most critical stages in the process of scientific research, as it determines how data and information are collected regarding the studied topic. Based on the research topic, which focuses on studying [the phenomenon], the methodology adopted for this study is the descriptive analytical method.

This method was deemed the most appropriate for the study as it involves examining prevailing facts related to a phenomenon, a specific situation, a group of individuals, a set of events, or particular conditions. (Rashwan Hussein Abdul Hamid, 2003, p. 66).

## 7. Population and Sample of the Research

### 7.1 Research Population:

In most cases, the statistical population in studies related to physical education, sports, and recreation is limited to individuals or entities that possess characteristics or traits observable, measurable, and subject to statistical analysis.

From a technical perspective, the research population refers to the original groups from which the sample methodology is drawn. These groups may include schools, teams, students, residents, or any other units. (Bouhouch Ammar and Mohamed Mahmoud Al-Dhenbiyan, 1995, p. 56)

In this study, the research population included second-year high school classes, represented by 255 students (males and females) from Martyr Ali Boussahaba High School, located in Dabousi, Draria.

### 7.2 Research Sample and Selection Method:

The sample is the initial model upon which the researcher relies to conduct the fieldwork. It represents a subset of the research population from which field data is collected. The sample is considered a part of the whole, meaning that a group of individuals from the population is selected to represent the research population.

The sample, therefore, is a specific portion or percentage of the original population, and the results of the study are then generalized to the entire population. The units of the sample can be individuals, animals, streets, cities, or others. (Zarwati Rachid, 2020, p. 334)

For this study, the sample included the classes mentioned above.

Class	Number of Males	Number of Females	Total
Second Year Mathematics	6	3	9
Second Year Technical Science	1	9	10
Second Year Management and Economics	7	8	15
Second Year Literature and Philosophy	11	8	18

## 8. Tools Used in the Research

Every study or scientific research employs a set of tools and methods that researchers adapt to their chosen methodology. These tools aim to uncover the truths the researcher seeks and to gather sufficient data and information relevant to the research topic. For this study, the following tools were utilized (Mohamed Shafiq, 1985, p. 106):

### 8.1 Tool for Estimating the Level of Physical Activity:

This tool is specifically designed to measure the level of physical activity (NAP). It was developed by the researcher "Martin, 2000" in French and later translated into Arabic. The translation was reviewed by six evaluators, consisting of professors from various specialties, to ensure that the meaning of the questions was preserved during the translation process.

The tool is a specialized questionnaire that encompasses all types of activities individuals engage in during their daily lives. It classifies physical activities for children and adolescents aged 10 to 18 years into seven categories based on the type of physical activity performed by the child or adolescent.

Each category is quantified in terms of the minutes or hours the student spends during a 24-hour period. The time spent is multiplied by the activity level specific to each category, and the totals for all seven categories are summed to determine the overall physical activity level, denoted as "NAP".

### 8.2 Body Mass Index (BMI):

Also known as the Quételet Index, BMI is a measurement tool that allows for assessing the relationship between body weight and height. It is used to compare an individual's measurements with reference

table results to determine their body type. This index is named after the Belgian mathematician Adolphe Quételet, who introduced it in 1871.

The BMI is calculated using the following formula: Adolphe Quételet

$$IMC = \text{Poids « kg »} / \text{taille}^2 \text{ « m »}$$

### 8.3 Pearson Correlation Coefficient:

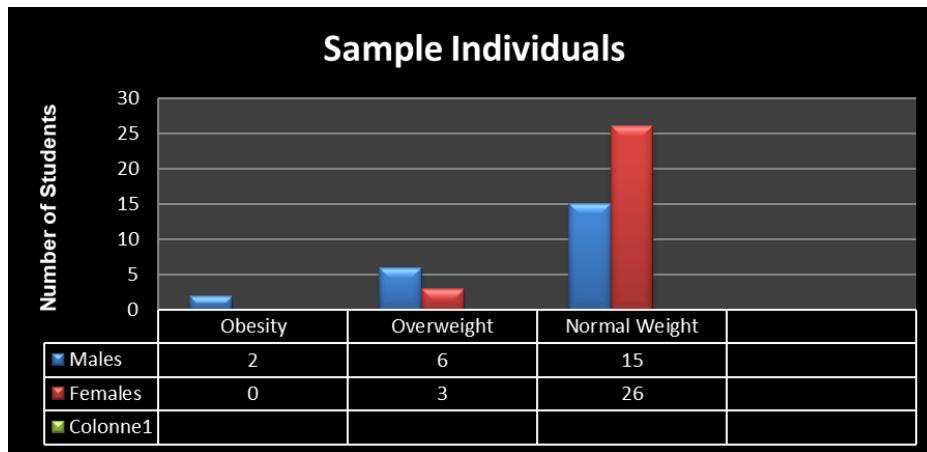
$$r = \frac{(\sum xy) - (\sum x)(\sum y) / n}{\sqrt{[\sum x^2 - (\sum x)^2 / n] \cdot [\sum y^2 - (\sum y)^2 / n]}}$$

$$\sqrt{[\sum x^2 - (\sum x)^2 / n] \cdot [\sum y^2 - (\sum y)^2 / n]}$$

## 9. Presentation, Analysis, and Discussion of Results

2- The total number of students and their distribution compared to the categories of the Body Mass Index for males and females:

No.	Age Group	Obesity		Overweight		Normal Weight	
		Males	Females	Males	Females	Males	Females
1	15-16	2	0	0	0	0	02
2	16-17	0	0	6	3	3	17
3	17-18	0	0	0	0	11	6
4	18	0	0	0	0	1	1
<b>Total</b>	/	2	0	6	3	15	26
<b>Percentage</b>	/	3.92%	0%	11.76%	5.88	29.41	50.90



**Frequency Table No. 01: Distribution of Sample Individuals According to Body Mass Index (BMI)**

**Results Analysis:**

Table No. (02) and Histogram No. (01) show the classification of students based on their Body Mass Index (BMI) and the categories they belong to according to age groups and both genders.

In the first category, there are 2 male students with a BMI that places them in the obesity category, representing 3.92% of the total sample, while no female students fall into the obesity category.

As for the second category, there are 6 male students with overweight, representing 11.76%, while 3 female students also have overweight, representing 5.88%.

In the third category, 15 male students have a normal weight, representing 29.41%, while 26 female students have a normal weight, with their percentage exceeding that of males at 50.90%.

According to each age group:

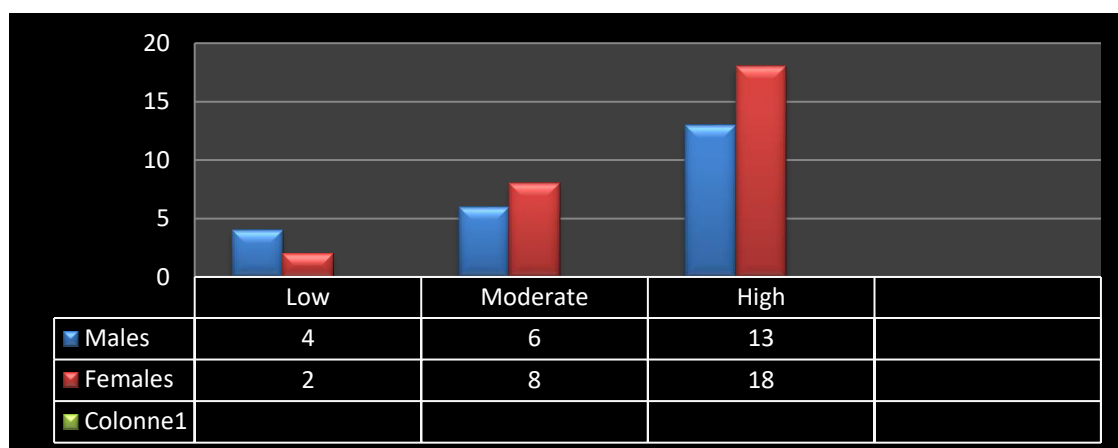
- First Age Group: There are 2 male students with obesity, and no cases of obesity among females. Additionally, no cases of overweight were recorded for either gender. As for normal weight, there are 2 female students, while no male students fall into this category.
- Second Age Group: No cases of obesity were recorded for either gender. However, there are cases of overweight: 6 male students and 3 female students. For normal weight, there are 3 male students and 17 female students.
- Third Age Group: No cases of obesity or overweight were recorded for either gender. However, there are 11 male students and 6 female students with a normal weight.
- Fourth Age Group (18 years): No cases of obesity or overweight were recorded for either gender. For normal weight, there is 1 male student and 1 female student.

From these results, we observe that the percentage of obesity is very low among both males and females. However, there are some indicators of overweight among both genders at a considerable percentage, which should be taken into account as a warning of the risk of obesity.

The remaining percentage, which represents the majority, falls into the normal weight category, with no signs of either overweight or obesity.

**Table No. 3: Distribution of Total Students by Age and Gender Compared to Categories of Physical Activity Level (NAP)**

No.	Age Group	Low		Moderate		High	
		Males	Females	Males	Females	Males	Females
1	15-16	4	2	3	6	3	12
2	16-17	0	0	3	2	9	5
3	17-18	0	0	0	0	0	0
4	18	0	0	0	0	1	1
<b>Total</b>	/	4	2	6	8	13	18
<b>Percentage</b>	/	7.84%	3.92%	11.76%	12.68%	25.49%	35.29%



**Histogram No. 02: Distribution of Sample Individuals by Categories of Physical Activity Level (NAP)**

**Results Analysis:**

From Table No. 03 and Histogram No. 02, we find that 4 male students have low physical activity, representing 7.84%, while 2 female students have low physical activity, representing 3.92%, which is a very small percentage.

As for moderate physical activity, 6 male students have moderate activity, representing 11.67%, while 8 female students also have moderate activity, representing 12.68% of the total sample.

Regarding high physical activity, both genders show significant activity levels, with 13 male students representing 25.49%, and 18 female students representing 35.29%. Both genders have high physical activity levels.

- **By Age Groups:**

In the first age group (15-16 years), 4 male students and 2 female students have low physical activity. 3 male students and 6 female students have moderate physical activity. As for high physical activity, there are 3 male students and 12 female students.

In the second age group (16-17 years), no cases of low physical activity were recorded for either gender. 3 male students and 2 female students have moderate physical activity. As for high physical activity, there are 9 male students and 5 female students.

In the third age group (17-18 years), no cases of low, moderate, or high physical activity were recorded for either gender.

In the fourth age group (18 years), no cases of low or moderate physical activity were recorded for either gender. However, there is 1 male student and 1 female student with high physical activity.

- **From these results:**

We observe that the percentage of low physical activity is very small for both males and females. Moderate physical activity is present but at a lower percentage for both genders. High physical activity represents the largest percentage among both males and females, making up the majority of the total sample.

These results indicate that physical activity plays an important role in the lives of adolescents. As shown in the table, high physical activity has the highest representation, while low physical activity is rare and almost nonexistent among both males and females.

**Table No. 4: Statistics on Physical Activity Levels ("Low + Moderate") and Their Relationship with Body Mass Index ("Overweight + Obesity")**

IMC NAP	Overweight + Obesity	Correlation Coefficient	Nature of Relationship	Significance Level	Degree of Relationship
Low + Moderate Physical Activity	20	-0.04	Inverse Relationship	0.05	Very Weak

**Analysis of Table No. 4:**

From Table No. 4, we observe that 20 students (male and female) have physical activity levels ranging from low to moderate and suffer from issues mostly related to overweight, with a small percentage (only two students) experiencing obesity.

The correlation coefficient value of -0.04 at a significance level of 0.05 indicates that the relationship between Body Mass Index (overweight + obesity) and physical activity levels (low + moderate) is inverse and very weak.

This result suggests that as physical activity levels decrease, there is a corresponding increase in the prevalence of overweight and obesity among the students.

**Table No. 5: Statistics on Physical Activity Levels ("Moderate + High") and Their Relationship with Body Mass Index ("Normal Weight")**

NAP \ IMC	Normal Weight	Correlation Coefficient	Nature of Relationship	Significance Level	Degree of Relationship
High Physical Activity	41	-0.01	Inverse Relationship	0.05	Weak

**Analysis of Table No. 5:**

From Table No. 5, we observe that 41 students (males and females) have a normal weight and exhibit very high physical activity levels.

The correlation coefficient value of -0.01 at a significance level of 0.05 indicates that the relationship between Body Mass Index (normal weight) and high physical activity is inverse and very weak.

This suggests that there is an inverse relationship, meaning that as physical activity levels increase significantly, there may be an imbalance in maintaining normal weight for individuals. This could potentially lead to disruptions in the body's equilibrium for students with high physical activity levels.

**10. Discussion of Results in Light of the Hypotheses:**

**10.1 Discussion of Results in Light of the First Hypothesis:**

There is a strong relationship between obesity and the occurrence of heart diseases.

Based on the results obtained, studies conducted by most researchers confirm a significant relationship between obesity and the incidence of heart diseases. The findings indicate that the longer obesity persists in an individual, the greater their risk of developing cardiovascular diseases and other related illnesses.

This conclusion aligns with the work of Youssef Mohamed Al-Zammar, who highlighted the risks of obesity. Additionally, the findings support the statement by Must et al. (1992), who emphasized that weight gain in adolescents leads to numerous diseases or even death over a prolonged period. Therefore, the hypothesis is validated.

**10.2 Discussion of Results in Light of the Second Hypothesis:**

Physical sports activity has a significant impact on reducing obesity among adolescent students.

From the results obtained, as presented in Table No. 4 and Table No. 5, it is evident that physical activity has an inverse relationship with obesity and weight gain. Specifically, when physical activity is low or moderate, adolescents are more likely to experience weight gain and obesity. This condition

poses severe health risks, including an increased likelihood of heart diseases and, in some cases, heart attacks in adolescents.

On the other hand, high physical activity also exhibits an inverse relationship with normal weight. As physical activity decreases, the likelihood of weight gain and obesity increases. For adolescents, maintaining an ideal body weight is a significant concern, leading many to engage in physical sports activities. However, excessive and intense physical activity can result in body fatigue and disruptions to the morphological and physiological aspects of adolescents.

This finding highlights the importance of moderation. Adolescents must balance their physical activity levels and maintain a healthy weight. Consequently, this hypothesis is partially validated, emphasizing the need for balanced physical activity to achieve optimal health and weight management.

### **10.3 Discussion of Results in Light of the General Hypothesis:**

Physical sports activity plays a significant role in reducing the risk factors for heart diseases among adolescent students.

By validating both the first and second hypotheses, the general hypothesis is necessarily confirmed. There is a strong relationship between physical sports activity and the reduction of risk factors for heart diseases, many of which are highly prevalent, including obesity—considered the disease of the modern era, particularly among adolescents.

Therefore, it is always recommended to engage in moderate physical activity appropriate to age, height, and weight for adolescents to maintain the physiological and morphological health of the body. This, in turn, reduces the risk of heart diseases, especially as adolescents are considered the foundation of society and should be in good health.

### **Supporting Studies:**

Several researchers have reached similar findings. For instance:

- **Alaa Eddine Al-Azzouti (2015/2016):** Studied the relationship between dietary habits and obesity among adolescent students. He found a direct relationship between adolescents' dietary habits and weight gain. The greater the adolescents' need for food, the higher the likelihood of weight gain and obesity.
- **Rachid Belounis (2012/2013):** In his study titled *Sedentary Lifestyle and Dietary Habits as Risk Factors for Obesity in Adolescents*, he concluded that increased consumption of food outside main meals is a dietary imbalance. This behavior leads to weight gain due to the high energy density of such foods.
- **Mazari Fateh, Dr. Sassi Abdelaziz, and Prof. Hammani Ibrahim (University of Bouira):** In their study titled *Lack of Physical Sports Activity and Its Impact on Increased Obesity Among Algerian Women*, they emphasized the importance of physical sports activity in reducing obesity among Algerian women. They also highlighted that obesity is both a global and local issue that needs to be addressed.

From these findings, it is evident that physical sports activity is essential for reducing the phenomenon of obesity, which poses a significant threat to individuals' lives. Obesity has numerous negative effects, impacting various aspects of life and increasing the risk of different diseases, including heart diseases, which may ultimately lead to heart attacks.

### **11. Study Results:**

Based on the results obtained, we observe the following:

- There are other factors contributing to obesity beyond external factors, such as genetic predisposition.
- There is a relationship between obesity and heart disease, as over time, obesity increases the risk of heart disease. Excessive weight gain may also lead to heart attacks.
- The importance of anthropometric assessments in an individual's life, conducted at least once a year.
- The essential necessity of physical activities, especially during adolescence.

### **12. Conclusion:**

In conclusion, physical sports activities play a significant role in the human body and life, as they reduce the risk of diseases, including obesity, which is a major factor contributing to heart disease.

Moreover, physical activity helps maintain the health of all body organs, particularly the heart and blood vessels. Sports enhance blood circulation by increasing heart rate and contraction strength while also promoting the dilation of the body's arteries.

From this, we deduce that physical sports activity is the primary factor for preventing obesity symptoms. It is also the most important method for protecting the respiratory and circulatory systems, which are crucial for the body as they supply oxygen to all organs. Additionally, physical activity is a fundamental tool for weight loss and eliminating excess fat in the body.

### **13. Recommendations:**

- Emphasize the importance of maintaining the body and conducting anthropometric assessments to ensure individual health.
- Raise awareness among parents about the importance of sports activities for maintaining body health and preventing obesity.
- Encourage adolescents to engage in sports activities in a regulated manner with moderate intensity to ensure both mental and physical well-being.
- Regularly monitor and measure the weight of adolescents and children at periodic intervals.
- Organize awareness campaigns for parents to prioritize their health and the health of their children, and to educate them about the risks of obesity and its consequences.

- Establish sports facilities to motivate adolescents, youth, children, and even adults to engage in sports activities for better health.

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