Scientific journal of physical and sports education(RSEPS)
(ISSN): 1135-1111 / EISSN 2661 - 7358
https://www.asjp.cerist.dz/en/PresentationRevue/452

Volume: 24/ N°: 01 (2025), p 280-286

The Effect of a Recreational Physical Activity Program on Changes in Body Mass Index in Overweight School Adolescents (15-18 Years)

NEZZAR Mouhamed University of Souk Ahras/ laboratory of RBPAPS, (ALGERIA) mouhamednezzar24@gmail.com	LAZZOUTI Alaeddine[1] University of Oum Elboughi/ Laboratory of RBPAPS, (ALGERIA) alaeddine.lazzouti@univ-oeb.dz	BELOUNIC Rachid University of Algies 3, (ALGERIA) rachid.belounis@yahoo.com

Received: 30/08/2024 **Accepted: 05/11/2024**

Abstract:

Low physical activity is a significant risk factor for public health across different segments of society. This is particularly evident in the physiological changes that occur in the human body after prolonged periods of low physical activity. The researchers aim to propose a program based on recreational physical activity, incorporating aerobic exercises, muscle strengthening, and anaerobic activities, to be implemented after validating its effectiveness on a group of school-aged adolescents (15-18 years) over a period of three months. The participants were high school students aged 15-18 years who were overweight or obese, as classified by their body mass index (BMI). They were selected from two high schools in the municipality of Tamlouka, Guelma, with 15 students representing both the experimental and control groups. The experimental group participated in a structured recreational sports program for three months, with three sessions per week. Pre- and post-measurements were conducted, yielding the following results:

- There were statistically significant differences in BMI between the pre- and post-measurements ($p < 0.05$) with a medium effect size ($d = 0.41$), favoring the post-measurement. This indicates that the proposed program effectively reduced the body mass of the participants, which the researchers attributed to a decrease in fat mass and a slight increase in muscle mass, likely contributing to higher energy expenditure.

Keywords: Recreational sports activity, body mass index, overweight and obesity.

Article info

[1] *LAZZOUTI Alaeddine*

1. Introduction

The technological development that the world is witnessing today is the result of deep efforts, research, and studies, with scientific dimensions. The world is experiencing many political, economic, and social crises..., which have extended and become so extensive as to threaten human health.

It has become a given that human capital is the basis of all development, so various countries of the world are witnessing a noticeable shift towards interest in human development, and this is evident to us, especially in dealing with the problems that affect society. Conceivably health-related issues are at the top of the concerns of most countries of the world, as the latter have begun to spend enormous budgets on scientific research, which they see as the basis for finding solutions to these crises, and thus achieving preventive health dimension and building a healthy and productive society. Among the most influential health problems facing the world today, we find obesity, which has become one of the risk factors that affect all segments of society, and the adolescent group is one of these segments that revolve around this factor (obesity), and studies have attributed the causes of its occurrence to many causes that differ from one society to another.

Physical inactivity is the fourth leading risk factor for mortality worldwide, accounting for 6% of mortality, after high blood pressure (13%), tobacco use (9%), and high blood sugar (6%). Levels of physical inactivity are on the rise in many countries worldwide, causing significant harm to individual and public health. Physical inactivity is a major factor in weight gain and obesity. (world health organisation,, 2009). A.Beriksi and others (2016) indicated that lack of movement has been considered one of the causes of death in developed countries since 2012, with 5.3 million deaths per year, which exceeds the values of tobacco use (5.1 million per year), which made lack of movement classified among the risk factors for individual health. (Brikci, William, & Bertucci, 2016).

Adolescence is one of the essential periods in a person's life, as it witnesses biological and physical changes that aim to transition from childhood to mature youth. At this stage, a person is exposed to changes in body weight, especially toward an increase in weight more than the regular or ideal weight. The adolescent is more likely to gain weight that is not necessary, which means that there is a defect in one of the factors that express the lifestyle. Jung Ha Park and others (2020) point out that one-third of the world's population aged 15 years and over have insufficient physical activity, which affects their health. The average number of hours an adult spends in sedentary behavior is between 7 to 8 and a half hours per day (Park, 2020). Body mass index (BMI) recommended by The World Health Organization (WHO) is the most common measure of overall overweight and obesity (WHO, 1998) used for population and clinical screening. A person with a BMI equal to or more than 25 kg/m2 is considered overweight. A person with a BMI of 30 kg/m2 or more is typically regarded as obese (MOUSSOUNI, 2023).

The lifestyle today provides the appropriate environment for gaining excess weight that leads to obesity and weight gain in the presence of a Sedentary lifestyle and lack of physical activity. From the above, researchers suggested a program for recreational sports and physical activity to reduce the manifestations of sedentary behavior among a group of students studying at the secondary schools of the municipality of Tamlouka-Guelma who suffer from being overweight (obesity included). Accordingly, the following question:

- Does the proposed program based on recreational sports and physical activity have an effect in

reducing the body mass index values of school-aged adolescents (15-18 years) who suffer from overweight (obesity included) for a period of three months?

2. Methods:

2.1 Sample and procedures :

The researchers relied on a sample of students studying in two high schools in the municipality of Tamlouka, Guelma province, aged (15-18 years) and in adolescence, with a body mass index greater than 25 based on weight and height. The study sample included 30 male students divided into two groups. Fifteen students were in the control group and 15 scholars were in the experimental group. The researchers relied on the body mass index in selecting the sample; height was measured in centimeters with portable standard stature tape (Seca, German) while the participant was in a standing position, and weight was measured in kilograms with a portable digital weighing scale (Seca, Germany),. The measurements were taken during the physical education and sports class (before the class started) in April 2023. Two male students were selected from each educational group in the two secondary schools, and the criteria for determining the study sample were determined as follows:

- **Gender:** which was limited to males only. The program was implemented in the summer of 2023 (June, July, August) to fulfill the condition of devoting oneself to the sports program and adhering to it. The female category was excluded due to the difficulty of dealing with this category and the failure of the condition of commitment and continuity in training, especially during the period mentioned above.

- **Body mass index:** Male students who suffer from overweight or obesity are selected according to the previous indicator.

- **Commitment and continuity:** Before the final selection of the sample members, an agreement was made with the students on the necessity of adhering to the instructions of those in charge of the program during a period of 3 months at a rate of three sessions per week, and the final sample members agreed to that.

2.2 Study variables:

The variables were determined according to the following methodological procedures:

2.2.1 Recreational sports physical activity program:

It is a recreational training program prepared by researchers that relies on physical and motor exercises that stimulate energy consumption and increase expenditure rates based on aerobic exercises, muscle strengthening exercises, and semi-sports games. The philosophy of building the program was based on a combination of educational movement situations and exercises, physical training situations, and workshops for natural or indoor muscle strengthening using external weights. The total number of sessions was 36 Training sessions at a rate of 12 sessions per month.Some physiological and morphological indicators were also taken for follow-up and monitoring the training load (body mass index, heart rate)

- **First month (June 2023):** The total number of sessions was 12 sessions at a rate of 1 and a half

hours per session. The first week of June was devoted to physical, physiological, and psychological preparation for the basic program, as the sample members have low levels of physical activity and are not involved in clubs or regular sports practice groups. Gradually increase the load starting from the second week and do not schedule the sessions consecutively so that the student does not fall into a state of stress or excessive fatigue that affects the course and objectives of the program.

- **Second month (July 2023):** The total number of Training sessions is 12 at a rate of 1 and a half hours per session. The researchers relied on aerobic exercises, resistance exercises, and four sessions for muscle strengthening inside the hall, with the programming of mini-matches in football and volleyball for recovery and recreation.

- **Third month (August 2023):** The total number of Training sessions is 12 at a rate of 1 hour and 20 minutes. The researchers relied on speed and resistance exercises and used exercises with higher intensity, four sessions for muscle strengthening, two sessions for physical recovery with flexibility exercises, and some low-intensity games.

2.2.2 Anthropometric measurements:

Body Mass Index (BMI) : as a means of measurement that allows for evaluating the relationship between body weight and height to compare the results with the reference table results to determine the person's

- A scale of the type (seca 762) was used to determine the weight;
- A ruler of the type (seca 220) was used to determine the height;

The table below was also relied upon in classifying individuals:

Table 1. the reference values for BMI in males

BMI / AGE	low weight	Normal weight	Overweight	Obesity
[15-16 years]	[14.60-17.25]	[17.26-23.29]	[23.29-28.60]	≥28.60
[16-17 years]	[15.12-17.80]	[17.80-27.90]	[23.90-29.14]	≥29.14
[17-18 years]	[15.60-18.28]	[18.28-24.46]	[24.46-29.70]	≥29.70
18 years	[16.00-18.50]	[25.00-18.50]	[25.00-30.00]	≥30.00

IOTF standards to classify (COLE et coll , 2000)

2.3 Statistical analysis:

The researchers relied on RStudio (2024.04.2 Build 764) software for statistical analysis as an open-source tool to run R, which provides the necessary tools for statistical analysis.

3. Results

3.1 Test of Normality:

Based on the data collected after applying the pre- and post-measurements of the Body Mass Index (BMI) on the study sample, the researchers reached the following results:

Table 2. Shapiro-Wilk Normality Test

	BMI-TEST	BMI-RETEST
Sample	**15**	
Mean	**24.40**	**23.83**
SD	**1.78**	**0.86**
Shapiro-Wilk test	**0.976**	**0.934**
P-VALUE	**0.937**	**0.318**
DECISION	No significance	No significance

Source: Produced by the researchers

From the table above, the results of the Shapiro-Wilk test are not statistically significant, as the p-values for the pre-and post-test results are greater than the significance level of 0.05. Therefore, the data are normally distributed ($P > 0.05$, null hypothesis accepted and data are called as normally distributed.), which allows the researchers to use the paired t-test.

3.2 Paired T-Test:

By comparing the group's results in the pre-and post-tests using the paired t-test to identify differences, the researchers reached the results shown in the following table:

Table 3. Paired T-Test

	BMI-TEST	BMI-RETEST
Sample	**15**	
Mean	**24.40**	**23.83**
SD	**1.78**	**0.86**
Paired T-Test	**2.05**	
P-VALUE	**0.042**	
Cohen's d	**0.41**	
DECISION	There is a significance	

Source: Produced by the researchers

The results of the statistical inference to check for differences showed that the t-test value was 2.04, with a p-value of 0.042, which is less than the significance level of 0.05. This indicates statistically significant differences between the results of the two measurements. The results of the effect size based on Cohen's coefficient (d=0.41) showed that the effect size was medium with a statistically significant difference between the two measurements.

4. Discussion:

The researchers, after determining the Body Mass Index (BMI), relied on the IOTF criteria to classify the students according to this index and identify those with overweight, obesity, and normal

weight. These are global standards derived from a comprehensive study conducted by a group of researchers in 1980 on many individuals across various countries (the United Kingdom, the United States, Brazil, Hong Kong, the Netherlands, Singapore).

The purpose of using this tool is that many epidemiological studies rely on it, allowing for comparisons with the values of other researchers worldwide. This aligns with a foreign study in which these criteria were established as an important means for conducting comparisons (Rolland-Cachera et al., 1982). These values have also been used in studies conducted in Algeria on different groups within the community, such as the study (Salima TALEB, 2011), (Belounis Rachid, 2013), (العزوطي ع.ا، 2021)

Statistical analysis of the pre- and post-intervention BMI data revealed a significant positive impact of the recreational sports program. The program effectively shifted participants' BMI towards the normal or ideal range. A paired t-test confirmed this significance ($p < 0.05$), with a moderate effect size ($d = 0.41$). This positive change was primarily attributed to a reduction in fat mass, coupled with a potential slight increase in muscle mass. The program's emphasis on continuous, gradually increasing, and full-body physical activity was instrumental in increasing energy expenditure and improving overall physical activity levels.

In a study involving an intervention with recreational physical activity over a period of 6 to 35 weeks, improvements in body mass and composition were observed in school-age children and adolescents (Raphael.S, 2023), aligns well with the general approach recommended by the World Health Organization (WHO). Physical activity is indeed emphasized by WHO as a key strategy in preventing and combating obesity and overweight. By promoting regular physical activity, WHO aims to reduce the prevalence of these conditions and their associated health risks globally. (World Health Organization, 2020). A study investigated the effect of a 12-week physical education program on self-efficacy in overweight schoolgirls aged 15-17 years. The experimental group participated in moderate-to-vigorous aerobic exercise (approximately 90 minutes, three times a week). At the end of the intervention, the experimental group reported a significant reduction in body mass index (BMI). The results suggest that a 12-week program of moderate-to-vigorous aerobic exercise is an effective intervention for weight loss. (Latino F, 2021) ; According to Patrice Queneau and Christian Roques, inactivity is directly related to the number of hours a person spends in a sitting or semi-reclined position between waking up and going back to sleep. In other words, the person spends most of the day in these positions. (PatriceQueneau & ChristianRoques, 2018) .Engaging in sports during leisure time is a key factor in achieving physical health(صحراوي ع.، 2023) , (Seghari, 2023). The practice of PAS provides well-being and contributes to health prevention, particularly among young people, through health education. (BOUKHERRAZ, 2022)

5. CONCLUSION

Physical activity is considered one of the essential means of balancing health and disease, as supported by the results of various studies and recommendations from international health organizations. However, to achieve its benefits, sports activity must be scientifically organized according to training principles and educational methodologies aimed at improving physical fitness and reducing risk factors. This study focused on one such risk factor—overweight and obesity—within an important demographic group. A systematic recreational sports program was proposed for three months for a group of students aged 15-18 years to assess its effect on changes in their body weights, which subsequently impacted their body mass index (BMI), the basis for individual classification. The researchers found statistically

significant differences between the pre-and post-measurements ($p < 0.05$) in BMI, favoring the post-measurement, with a medium effect size. This confirms a significant weight change, indicating that the proposed program was effective in reducing weight among the study sample.

6. Bibliography List:

- Belounis Rachid. (2013). La sédentarité et les habitudes alimentaires comme facteur de risque de l obesité chez les adolescents. *These de Doctorat*. Alger, Universite Alger 3 IEPS.
- BOUKHERRAZ, R. &. (2022). Les enjeux des APS et leurs impacts sur la santé « Investigation des données scientifiques ». *المجلة العلمية للتربية البدنية و الرياضية, 21*(1), 449-466.
- Brikci, A., William, & Bertucci, D. F. (2016, 11 3). Sédentarité et condition physique d'élèves de 5ème analyse des résultats obtenus dans différents environnements sociaux,. *Humanities and Social Sciences Education*, pp. 43-60. Récupéré sur https://hal.archives-ouvertes.fr/hal-01391267
- Latino F, C. S. (2021). The Influence of Physical Education on Self-Efficacy in Overweight Schoolgirls: A 12-Week Training Program. *Frontiers in Psychology, 12*.
- MOUSSOUNI, A. S.-Y. (2023). PREVALENCE AND SOCIO-DEMOGRAPHIC DETERMINANTS OF OVERWEIGHT AND OBESITY AMONG ADULT POPULATION OF ALGERIA. *Revista Universitară de Sociologie*(3), 221-236.
- Park, J. H. (2020). Sedentary Lifestyle: Overview of Updated Evidence of Potential Health Risks. *Korean journal of family medicine, 41*(6), 365–373.
- PatriceQueneau, & ChristianRoques. (2018). *La médecine thermale.* Paris: John Libbey Eurotext,.
- Raphael.S, I. W. (2023). Effects of physical activity on body mass and composition of school-age children and adolescents with overweight or obesity: Systematic review focusing on intervention characteristics. *Journal of Bodywork and Movement Therapies, 33*, 154-163.
- Rolland-Cachera, M. F., Sempe, M., Guilloud-Bataille, M., Patois, E., Péquignot-Guggenbuhl, F., & Fautrad, V. (1982). Adiposity indices in children. *Citation DataThe American Journal of Clinical Nutrition, 36*(1), 178-184.
- Salima TALEB. (2011, 01 10). Obésité des enfants scolarisés à Tébessa (1995-2007) : prévalence,Comportement alimentaire et facteurs socio-économiques. *These dee Doctorat*. Constantine, l'Université Mentouri de Constantine INATAA.
- Seghari, T. &. (2023). Sports Participants and Its Effect on Body Posture in Adolescents. A Scoping Review Study. *المجلة العلمية للتربية البدنية و الرياضية, 22*(1), 624-641.
- world health organisation,. (2009). *Global health risks mortality and burden of disease attributable to slected major*. Genev.
- World Health Organization. (2020). *WHO Guidelines on Physical Activity and Sedentary Behaviour*. Geneva.
- العزوطي ع.ا. (2021). دراسة علاقة النمط الجسمي)زيادة الوزن والسمنة (بمستوى النشاط البدني لدى التلاميذ المتمدرسين بثانويات ولاية قالمة 18 – 15)سنة(. *مجلة تفوق في علوم وتقنيات النشاطات البدنية والرياضية, 6*(1), 497-522.
- صحراوي ع .&., م. (2023). إتجاهات أساتذة معهد علوم وتقنيات النشاطات البدنية والرياضية نحو أوقات الفراغ لممارسة النشاط الرياضي الترويحي. *المجلة العلمية للتربية البدنية و الرياضية, 22*(1), 401-415.