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An Integrated Training Program for Weight Control in Obese Adults

Perrotta Francesco[1]* and Vitiello Salvatore[2]

[1]Universidad Internacional Iberoamericana - UNINI México (UNINI-MX)
[2]Docente tutor coordinatore,Università Roma 3- Roma, Italy

***Corresponding author:** Perrotta Francesco, Universidad Internacional Iberoamericana, UNINI México (UNINI-MX).

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Abstract

Background: Obesity is a multifactorial condition requiring effective interventions for weight loss and improved functional status. This study aimed to compare the effectiveness of different intervention programs based on physical activity and diet on body weight, physical performance, and body composition (lean mass) in adults.

Methods: 141 participants were recruited and randomly assigned to one of four groups: 1) Aerobic exercise + fitness diet (Aerobic); 2) Muscle-strengthening exercise + diet (Strengthening); 3) Muscle-strengthening + Aerobic + diet (Mixed); and 4) Control group (no intervention). Outcomes were assessed in terms of weight loss, improved physical performance, and changes in lean body mass.

Results: All three intervention groups showed significant weight loss, unlike the control group. The group that followed a mixed activity program (aerobic and strength training) showed the greatest improvement in physical performance. Regarding body composition, the combined intervention (mixed) and strength training resulted in less lean mass loss than the group that followed only an aerobic program. The data were also correlated with bone mineral density.

Conclusion: A weight loss program that combines aerobic exercise, muscle strengthening, and diet represents the most effective strategy for improving functional status, even in obese adults.

Keywords: Weight Loss; Aerobic Exercise; Muscle Strengthening; Obesity; Physical Performance; Body Composition

Introduction

The study involved 141 participants, randomly assigned to one of four groups. The first group performed aerobic exercise and followed a fitness diet; the second group followed a muscle-building program and a diet; the third group followed a muscle-building program combined with aerobic exercise and a diet; and the fourth group was the control group, following neither an exercise program nor a diet.

The results showed that participants in the three intervention groups lost weight, while there were no significant changes in the control group. In terms of physical performance, performance increased more in the mixed-activity group than in the aerobic-only group or the muscle-building group. Regarding lean mass, the loss was lower in some groups thanks to the combined intervention and muscle strength compared to other groups thanks to aerobic activity. This is also reflected by the density of mineral oil. According to this study, a weight loss program combined with aerobic

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exercise and muscle building is the most effective way to improve the functional status of even obese adults.

The Physical Activity Investigation Group of the European Association for the Study of Obesity (EASO) recently published current guidelines on the management of physical activity in overweight and obese people.

The document emphasizes that weight loss should be gradual, avoiding excessive weight loss in a short period of time. Maintaining a low weight (through both diet and physical activity, the benefits of which can be combined) is essential to achieving good health and reducing complications related to excess weight. Exercise plays a key role in this feeling. Different types of exercise have been shown to have a positive impact on the health of those who practice them [1].

Moderate-intensity aerobic activity (such as walking, hiking, running, cycling, etc.) is associated with weight loss and is achieved in less than 150-200 minutes per week. Moderate intensity refers to maximal effort during the activity, scoring a 5-6 on a scale of 0 to 10, or maintaining a heart rate of 50-70% of your maximum heart rate. This type of activity also helps reduce visceral fat, a major risk factor for cardiovascular disease, for everyone, especially those with obesity, diabetes, and/or hypertension. Interval training should be evaluated and prescribed by your doctor, so that it can be followed by a specialized physical therapist.

We also know that physical activity has beneficial effects on a psychological level and can increase the feeling of well-being.

Therefore, diet and exercise are friends of health.

Exercise and diet aren't necessary to achieve your desired goal, but due to the benefits they both provide and improve results, they should be managed in concert with your doctor. Finding the right balance between caloric intake from food and exercise is key to improving your health and reducing the risk factors associated with weight gain.

Objectives of the New Managers

Get More Strength and Improve your Physical Condition

Improving your physical condition reduces the risk of chronic diseases and promotes a healthier, more fulfilling life. It increases your ability to perform daily activities that don't require strength or endurance.

Exercise has a positive effect on eating habits. For example, it reduces the urge to consume large amounts of weed. Regular physical activity improves mental state and vitality [2-5].

This means reducing visceral and liver stress and increasing the risk of cardiovascular disease. By improving insulin sensitivity, it prevents type 2 diabetes. These benefits are tangible even with a small weight loss of 5-10% of body weight.

A primary focus is on weight maintenance. We'll try to control your weight in a broad area so your little one loses weight in a short area.

Optimizing the Benefits of Bariatric Surgery

After surgery, a structured exercise program will improve your muscular and cardiorespiratory fitness. Exercise is an integral and essential part of a long-term strategy for maintaining a healthy weight after surgery.

It's important to emphasize that over 70% of chronic degenerative and neoplastic diseases (the main cause of motor disability) are potentially preventable through lifestyle changes. Since sedentary behavior due to this chronic disease is an independent risk factor, it's clear that a healthy lifestyle requires physical activity and that it should be maximized [6-8].

In fact, physical exercise, in appropriate doses and ways, can contribute positively to the development, maintenance, and improvement of health, and in particular to improving cardiorespiratory fitness and lipid balance (see the detailed summary of the beneficial effects of physical exercise).

It has been shown that, through various means of livelihood, overweight and obese adults engage in physical activity which can contribute to:

- weight loss
- to maintain weight loss
- to the reduction of abdominal perivisceral fat.

For a first-level, effective, and simple intervention, it is possible to establish a generic and/or structured physical activity program, referring to the lifestyle levels declared in the anamnesis.

The goals of a physical activity prescription are:

- Change your lifestyle.
- Motivate the patient to perform physical activity every day.
- Aim for a daily consumption of around 300 kcal through structured physical activity.
- Initially, allow your child to be physically active for 150-250 minutes a week and then increase to more than 250

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minutes in subsequent weeks.

Minutes Per Week

Based on the data obtained from the diary, the doctor will be able to prescribe a targeted and specifically designed exercise program for the patient, taking into account that:

- The initial exercise program may require clinical supervision for some people.
- Exercise should be initially performed at low intensity and gradually increased.
- The program must be realistic, with shared objectives, developed over time and with particular attention to capabilities. of the patient's movement and its changes.
- It is important to avoid trauma during exercise by choosing the most suitable one for the injury, to avoid premature injuries.
- Interruption of activity (for example, it is better to use a cycle ergometer or a portable ergometer instead of walking at a walking pace) (fast or run).
- Obese people should be encouraged to plan and record their physical activity at least one week in advance.
- anticipating the time needed to lift it to the top.
- Patients should document their exercise by keeping a diary and recording the duration and intensity of effort (in the exercise prescription operational module, the prescription table can also be used as
- diary of activities carried out).

The Benefits of Physical Exercise can Only be Obtained if Continued Over Time

For this reason, it is essential that physical activity be part of a lifestyle, also taking into account the potential rewards that obese people can obtain, particularly the perception of improved metabolic and physical health.

When prescribing specific physical activities, the simple but fundamental principle of promoting all those activities that can be easily integrated into daily life and that naturally counteract a sedentary lifestyle must be applied, especially with reference to those patients who can be defined, based on lifestyle classification, as Sedentary and Less Active [9-10].

Donation Tips

- take the stairs, avoiding the elevator when possible;
- do not use the short code travel such as to make small purchases, go to a shop or any public office;
- move around as much as possible even at home (for example, don't use the television remote control) and don't wait for them to move you;
- encounter places that include physical activity (e.g., gardening);
- park your car every few minutes from your workplace or home;
- take frequent walks (for example in a park with trees or to monuments or museums).

The key aspects to keep in mind when prescribing an adequate and practicable program for the assignment are:

- choosing the type of physical exercise to achieve a relationship with your lifestyle habits (there is no need to plan activities in the early morning)
- if you are used to staying in your room until late);
- the convenience of access to the place where the physical activity takes place (better to look for an on-site gym or a walk home)
- of the work that has a swimming pool on the other side of the city);
- the economic aspect of the chosen activity;
- the choice of the type of physical activity to be carried out in relation to the subject's preferred orientations (it is useless to prescribe childbirth)
- to a person who refuses to know how to do it or does not enjoy it);
- (on the rowing machine and on the manual ergometer) thus promoting adherence to the program and ensuring greater training effects;
- the patient's physical conditions, understood as the organism's predisposition to practice a certain type of physical exercise in the context of that others (for example in severely obese subjects - class III - it is not advisable to start the physical exercise program) prescribe jogging, which should generally be avoided unless the patient is asked to do so, because it will tend to pulsate especially the joints of the lower limbs and the spine; in subjects with prostate pathologies, it may be possible

It is not recommended to remain seated on the bicycle saddle for long periods.

Just as there is a food pyramid, there is also a pyramid of activities.

Ex-motor. It represents an example of a lifestyle to which the patient must refer as a final goal in an ideal crescendo of adherence, depending on the lifestyle derailment of the progressively acquired.

For a first-class and easy-to-implement intervention, it is possible to establish a general and/or structured physical activity program, referring to the lifestyles reported in the anamnesis [11].

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It is useful to consult the table which indicates, based on the body mass of the diet, the time required to consume approximately 300 kcal during some typical physical activities.

For a more detailed and effective intervention, it is possible to calculate the energy diary (EDM) based on the information obtained from the Physical Activity Diary. EDM assessment is useful for planning and implementing a specific physical activity program, using the tools available in the appropriate field.

A personalized weight loss program for older adults (64 years and older) based on exercise recommendations for obese individuals. This program focuses on safety, efficacy, and long-term sustainability.

Weight Loss Program for Very Obese People (>64 Years)

General objectives

- Promote gradual and sustainable weight loss (0.5-1 kg per week)
- Improve physical function and independence.
- Reduce the risk of chronic diseases (diabetes, hypertension, osteoarthritis)
- Increase muscle mass to prevent sarcopenia
- Reduce the risk of damage

Type of Exercise

The Program Includes Three Essential Components

- Aerobic activity (to reduce calories and improve cardiovascular health).
- Strength exercises (to maintain muscle mass and function).
- Flexibility and balance exercises (to reduce the risk of stress).
- Program structure

Phase 1: Adaptation (0-4 weeks)

- **Objective:** Train the body to move without excess.
- **Aerobic Activity:** slow walking (10-15 minutes a day, 3-4 days a week)
- **Strength Exercises:** Body weight movements (e.g., wall stands, arm raises) 2 times a week
- **Flexibility and Balance:** Gentle stretching and balance exercises (e.g., standing on a stone) 5 minutes a day

Phase 2: Progress (5-12 weeks)
Goal: Increase calorie consumption and muscular endurance.
Aerobic Activity: walking at a light pace or on a slight incline (20-30 minutes, 4-5 times a week)
Strength Exercises: use of small weights or elastic bands (3 times/week, 8-12 repetitions per exercise)
Flexibility And Balance: gentle yoga or stretching exercises (10 min/day)
Phase 3: Consolidation (over 12 weeks)
Goal: maintain results and avoid gaining weight again.
Aerobic Activity: 30-45 minutes of walking, swimming or cycling (5-6 times a week)
Strength Training: training with light weights or machines (3-4 times/week)
Flexibility and Balance: Pilates, Tai Chi or specific movement exercises (10-15 min/day)

Intensity and progression

- Start with low intensity (RPE 3-4 above 10) and gradually increase
- **Goal:** Reach moderate intensity (RPE 5-6) after 6-8 weeks
- **10% rule:** Increase duration or intensity by up to 10% per week
- **Monitor your Heart Rate:** maintain 50-70% of your maximum heart rate

Special Considerations

- Adapt the exercise to any joint problems or medical conditions.
- Includes warm-up and cool-down to prevent injury.
- Make sure you stay well hydrated and watch for any signs of fatigue.
- Periodically evaluate your progress to maintain motivation.

For a 75 kg student doing ballet for 60 minutes, how many calories will he burn? Justify your answer.
Calories of a 75 kg student playing ball for 60 minutes.

To estimate the caloric intake of a physical activity, the MET (Metabolic Equivalent of Tarea) is used, which represents the energy intake compared to the basal metabolism.

The general formula for calculating the calories burned in a day is the Total Daily Energy Expenditure (TDEE), which is obtained by multiplying your Basal Metabolic Rate (BMR) by a Physical Activity Factor (PAF).

Basal Metabolic Rate (BMR) Calculation

Rate (BMR) represents the calories the body burns at rest to maintain vital functions (respiration, circulation, body temperature, etc.). The most commonly used formulas are the Mifflin -St. Jeor equation or the Harris-Benedict equation, which take into account gender, weight, height, and age [12].

Mifflin -St Jeor equation (considered more accurate)

- Men: MB = (10×Weight in kg) +(6.25×Height in cm) −(

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5×Age in years) + 5

- Women: MB = (10×Weight in kg) +(6.25×Height in cm) −(5×Age in years) − 161

Physical Activity Factor (PAF)

The Physical Activity Factor (PAF) is a multiplier applied to the BMR to estimate the additional calories burned through movement and exercise.

Physical Activity Level	Description	LAF Factor (Multiplier)
Sedentary	Little or no physical activity	1.2
Slightly Active	Light exercise/sports 1-3 days a week	1,375
Moderately Active	Moderate exercise/sports 3-5 days a week	1.55
Very Active	Intense exercise/sports 6-7 days a week	1,725
Extremely Active	Heavy physical work or very intense workouts every day	1.9

If you have a Basal Metabolic Rate (BMR) of 1400 kcal and are Moderately Active (BMR = 1.55), your TDEE will be:

TDEE=1400×1.55=2170 kcal per day

This value (2170 kcal) is your general estimate of the calories you consume in an average day.

Quemated Calories burned = MET × Weight (kg) × Time (h) Quemated Calories burned = MET × Weight (kg) × Time (h) Quemated Burnt Calories = MET × Weight (kg) × Time (h) Calories burned = MET×Weight (kg)×Time (h)

The MET formula (Metabolic Equivalent of Task) is:

Calories burned = MET×Weight (kg)×Time (min)×0.0175

Where

- The MET of the balloon is about 8.0 (source: Compendium of Physical Activities).
- Student weight = 75 kg
- Uptime = 60 minutes = 1 hour
- Calories = 8.0 × 75 × 1 = 600 kcal Calories = 8.0 \times 75 \times 1 = 600 \ text{ kcal } Calories = 8.0 × 75 × 1 = 600 kcal

For example, playing for an hour requires an energy intake of approximately 600 kcal for a 75 kg student.

What's the formula for estimating VO2 max? For a student weighing 75 kg and running 3200 m in 12 minutes (Cooper test), what would the result be?

Estimating VO2 max with the Cooper test

The Cooper test is a method for estimating maximal oxygen consumption (VO2 max) based on the distance covered in 12 minutes. The formula used is:
VO2 má x max = (D−504, 9)/ 44.73VO $_2$ má x max = (D - 504.9) / 44.73VO2 m á x max = (D−504, 9)/ 44.73

Where:

- This is the distance traveled by metro (in our case 3200 m).
- 504.9 and 44.73 are empirically determined coefficients.

Calculation

VO2m · x max = (3200−504.9) / 44.73 VO_2m · x max = (3200 - 504, 9)/ 44.73 VO2 max = (3200−504, 9)/ 44.73 VO2 max = 2695.1/44.73 VO $_2$ max = 2695.1/44.73 VO2 max max = 60.25 ml/kg/min VO2 m á x max \ aprox . approximately 60.25 ml/kg/min

A high VO2 max indicates excellent physical condition and good oxygen-carrying capacity [13-15].

Conclusion

- Caloric gas: 600 kcal for 60 minutes of exercise.
- Estimated VO_2 max: 60.3 ml/kg/min for a person running 3200 m in the Cooper test.

The formula to estimate maximal oxygen consumption (VO_2 max) based on the distance covered in 12 minutes (Cooper test) is as follows:

VO_2 max (ml · kg−1 · min −1) = 44.73Distance traveled in meters−504.9

Data and Results

- Distance Traveled (D): 3200 m
- Body Weight: 75 kg (not used in this specific estimation formula)

Running the Calculation

VO_2 max =44.733200−504.9
VO_2 max =44.732695.1
VO_2 max≈60.25 ml · kg−1 · min−1
The result for the student is 60.25 ml · kg−1 · min−1.

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Interpretation and Result

A value of 60.25 ml/kg/min is considered very good for a young athlete, indicative of excellent aerobic capacity. This value is typical of well-trained athletes, such as elite soccer players, runners, and footballers.

Very Efficient

Basic plan for a research project in physical activity, health, performance, and education sciences
Topic (The student must choose a topic relevant to physical activity, health, performance, or education sciences, "The Impact of Physical Exercise on Concentration in Secondary School Students."

Scientific problem (Describe the specific problem you want to study. Example: "Is there a relationship between regular exercise and students' ability to concentrate?")

Objectives and/or Hypotheses of the Study

Main objective: (e.g., "Evaluate the effect of a physical exercise program on students' concentration").

Hypothesis: (For example, "Students who exercise regularly will perform better on concentration tests than sedentary students.")

Population (Show)

Museum Description: (Edit, gender, number of participants, inclusion and exclusion criteria. Example: "50 students aged 16 to 18 from a local secondary school").

Variables

- Dependent variables dependent: ("Average level of concentration through cognitive processes").
- Independent variable(s): ("Frequency and intensity of physical exercise").

Material (Tools)

Medical Tests: (Example: "Stroop concentration test, physical activity cues, physical activity monitoring devices").

Type of Research

"Experimental investigation with group control").

Time
Phase 1: Selection of participants (1 month),
Phase 2: Implementation of the exercise program (3 months),
Phase 3: data collection (1 month),
Phase 4: Data Analysis and Reporting (2 months)").

Project Title:

The Impact of Physical Exercise on Concentration Among Secondary School Students

Introduction

Exercise is known for its beneficial effects on physical and mental health. Several studies have demonstrated a positive link between physical activity and cognitive functions, including concentration. However, the extent to which physical activity affects the attention span of secondary school students continues to be a topic of interest. This study aims to investigate how different types and durations of physical exercise influence students' attention and concentration [16-18].

Objectives of the Investigation

- To analyze the impact of physical exercise on the concentration of secondary school students.
- Compare the effects of different types of exercise (aerobic, anaerobic, yoga, stretching).
- Consider whether the duration of your exercise affects your ability to concentrate.
- Evaluate the differences in impact between students with regular physical activity habits and sedentary students.

Methodology

Participants: Approximately 100 secondary school students will participate, divided into groups based on their physical activity routine.
Study Design: experimental study with experimental and controlled groups.

Procedures

- Students will be asked to complete an initial concentration test (e.g., the Stroop test or the sustained attention test).
- You will be assigned to different physical activities during a specific period (15, 30, 45 minutes) or to the exercise control group.
- After the physical activity, students will repeat the concentration test.
- Collect and analyze data to identify significant changes in concentration ability.

Evaluation tools

- Stroop test to reflect on selective attention.
- Sustained Attention Test (CPT) to assess sustained

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concentration.
- Cuestionaries to collect information on the student's physical activity habits and well-being.

Data Analysis

- Statistical analysis of differences between groups using independent tests or ANOVA.
- Correlation between duration of physical activity and improvement in concentration.
- Possible qualitative analysis of students' comments regarding their perception of the effectiveness of the exercise.

Expected Results

It is hoped that students participating in the exercise sessions will achieve better concentration than the control group. It is also assumed that the effects may vary depending on the type and duration of the exercise.

Practical Implications

Study halls could have important implications for the education system, suggesting the integration of specific physical activity programs to improve students' attention and academic performance.

Conclusions

This project explores the foundations of physical activity to improve student concentration, contributing to scientific research on youth education and well-being. If approved, students will be able to advocate for the integration of exercise strategies into their school routines.

Research Plan: The Impact of Physical Exercise on Concentration in Secondary School Students

Scientific Problem

Is there a relationship between regular exercise and concentration among high school students?

Objectives and/or Hypotheses of the study

Goals
- To analyze the influence of physical exercise on students' ability to concentrate.
- Evaluate whether different types of exercise (aerobic, anaerobic) produce different effects on concentration.
- Study the effect of frequency and duration of physical activity on attention span.

Hypothesis
- H1: Students who regularly engage in physical activity have a greater ability to concentrate than sedentary students.
- H2: The type of exercise affects concentration in different ways.
- H3: Greater frequency of physical activity, greater ability to concentrate.

Population (Exhibition)

- Secondary school students (grades 14-18).
- Number of students approximately 100-200, divided into:
- Experimental group: students who regularly practice physical activity (at least 3 times a week).
- Control group: students who do not regularly engage in physical activity.
- The museum will be random, but representative of gender, education and level of education.

Variables

Independent variable
- Regular physical exercise (type, frequency and duration of activity).

Dependent Variable: Employee
- Ability to concentrate (measured through cognitive tests and specific signals).

Material (Tools)

- Stroop test and/or sustained attention test (d2 or CPT) to assess concentration.
- Lifestyle tips (frequency of physical activity, study habits and dreams).
- Physical activity monitoring devices (smart watches or tracking apps).
- Statistical analysis with SPSS or similar software.

Type of Research

- Quasi -experimental study with comparison between groups (active students vs. sedentary students).
- Longitudinal study with previous and subsequent drugs for a period of 3 to 6 months.

Time

- **Month 1:** Music planning and recruitment.
- **Months 2-3:** Initial data collection (concentration tests, signals, physical activity monitoring).
- **Months 4-5:** Follow-up and final data collection.

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- **Month 6:** Statistical analysis and interpretation of results.
- **Month 7:** Drafting and publication of the investigation report.
- **Research Plan:** The Impact of Physical Exercise on Concentration in Secondary School Students
- Scientific problem

Can Exercise Improve Concentration In High School Students?

Methodology: To answer the research question, an experimental approach will be adopted. Two groups of secondary school students will be selected: an experimental group that will exercise regularly (e.g., three times a week) and a control group that will not exercise regularly. Both groups will be monitored for a period of three months.

Participants: secondary school students, divided into two groups based on their exercise routine (experimental group vs. control group). • Concentration test: psychometric tests should be used to assess concentration.

Standardized tests, such as the Continuous Performance Test (CPT) and self-assessment indicators that indicate the level of concentration during school activities [19].

Procedure

Initially, both groups will complete concentration tests.

The experimental group will participate in a structured exercise program, while the control group will maintain a daily routine with scheduled exercises.

After three months, both groups will be subjected to concentration tests again.

Data Analysis

- Data collected from the concentration tests and stimuli will be analyzed using appropriate statistical techniques, such as the Student's t test, to compare mean concentration points between the two groups. Additionally, you will examine the correlation between exercise frequency and concentration points.
- Expected Results If we assume that the experimental group, which will regularly perform physical exercise, will show significantly higher concentration scores than the control group, this indicates an improvement in concentration due to physical exercise.

Conclusions The results of this study may suggest that regular physical exercise has a positive impact on the concentration of secondary school students, with practical implications for integrating physical activity into school curricula to improve academic performance.

Objectives and/or Hypothesis: of the Study

- **Objective:** To examine the relationship between regular physical exercise and concentration level in secondary school students.
- **Hipótesis:** Hypothesis: Students who exercise regularly show greater concentration than those who don't.

To enrich your investigation and further analyze the impact of exercise on secondary school students' concentration, you can consider the following additional data

Motivation Level

- **Motivation Level Questions:** Gather information on how motivated students are to exercise and how this motivation may influence their cognitive development.
- **Relationship between motivation and concentration:** To examine whether motivation to perform physical activity has a direct correlation with improved concentration.

Population (Show)

- Secondary school students. (14 to 18 years old)
- Sample exhibition of at least 100 students, divided into two groups:
- **Experimental group:** students who regularly practice physical exercise (at least 3 times a week).
- **Control group:** students who do not exercise regularly.
- The selection will be random among different classes and schools.

Objective of the Investigation

The primary objective of this research is to explore the impact of physical exercise on the concentration and cognitive performance of secondary school students. Specifically, it aims to compare the concentration levels of students who regularly exercise and those who do not.

Population (Show)

- Target Population: secondary school students aged 14 to 18.
- Museum: At least 100 students divided into two groups:
- Experimental group: composed of students who regularly practice physical exercise (at least 3 times a week, for a period of at least 3 months).
- Control Group: compatible with students who do not exercise regularly (less than 3 times a week).

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- Selection Criteria: Participants will be screened at the beginning, ensuring balanced representation across classes and schools. Factors such as socioeconomic status and cultural background will also be taken into account to avoid conflicts.

Methodology

- **Study Design:** Experimental study with two groups (experimental and control) for a period of 8 weeks.
- **Intervention:** Students in the experimental group regularly engage in physical activity, monitored through a weekly diary and fitness apps. Students in the group tended not to make any changes to their lifestyle, maintaining their existing habits.

Concentration drug

Concentration Will be Meditated Using Various Methods

- **Cognitive concentration tests:** Standard tests such as the Continuous Performance Test (CPT) will be administered, which measure the ability to concentrate and pay attention.
- **Self-assessment:** Students will have to answer questions before and after the intervention to evaluate their perception of concentration and difficulties at school.
- **Teacher observations:** Teachers will observe changes in concentration and participation levels during the lesson, using an observation form.

Data Analysis

The data will be analyzed using statistical methods to compare the concentration points between the two groups. You will use analysis of variance (ANOVA) to determine if there are significant differences in concentration points before and after the intervention.

Correlative tests will also be used to explore the relationship between exercise level and changes in concentration [20].

Hypothesis

- Main Hypothesis: Students who regularly exercise will show significant improvement in concentration compared to students who do not exercise.
- Secondary Hypothesis: The improvement in concentration will be more evident in subjects who require greater cognitive effort.

Ethical Considerations

- All participants will provide their informed consent and the data will be processed anonymously.
- There will be a tendency to understand the wishes of students who do not want to participate in the experimental group.

Time

- Preparation and selection of performances: 1 month
- Intervention: 8 weeks
- Data collection: initial (week 0), during (weeks 4 and 8) and final (week 8)
- Data analysis and final report writing: 2 months

Hopeful Conclusions Discussion

It is hoped that regular exercise improves students' concentration by reducing distraction levels and improving their ability to focus during school activities. This may have practical implications for integrating exercise into the school routine, optimizing learning.

Objective of the Investigation

To explore how physical exercise, in terms of frequency and duration, influences secondary school students' concentration during class.

Survey Question

How does physical exercise affect secondary school students' concentration levels in terms of attendance and duration?

Hypothesis

Students who exercise regularly (both in terms of frequency and duration) will tend to have higher levels of concentration than those who exercise little or not at all.

Variables

- Independent Variable: Physical exercise (frequency and duration of weekly physical activity).
- Variable Dependence: the level of concentration of the students, calculated on average via:
- Cognitive Tests (e.g., tests of memory, attention, and problem solving).
- Classroom Observations (e.g., attention during lectures, active participation, and ability to follow instructions) [21].

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Methodology

Show

- Secondary school students, divided into groups based on their exercise routines (e.g., high physical activity group, low physical activity group, sedentary group).
- Number of participants: minimum 100 students to ensure the validity of the results.

Instruments

- Questionnaires to receive information on weekly physical activity (frequency, duration and type of exercise).
- Standardized cognitive tests to assess concentration (e.g., Stroop test, short-term memory tests).
- Systematic classroom observations, using a calibration scale to record students' concentration behaviors (number of distractions, active participation).

Procedure

Initial data collection: Each student completes an exercise guide. Teachers observe and record initial concentration levels in class.
Pre-intervention cognitive testing: All students complete cognitive testing to establish a baseline.
Intervention/Observation: Monitor exercise levels for a period of 6-8 weeks.
Post-intervention cognitive tests: At the end of the observation period, students begin completing cognitive tests.
Classroom observations: Continuous monitoring of concentration observations throughout the study period.

Data Analysis

- Use statistical analysis to compare concentration levels before and after intervention between different groups (e.g., ANOVA, independent tests).
- Analysis of correlations between exercise frequency/duration and cognitive testing recommendations and classroom observations.

Expected Results

It is hoped that students who exercise more will be more cognitively alert and have better concentration in class than students who exercise less.

Conclusions and Implications

- If the hypothesis is confirmed, the research will suggest that regular physical exercise could be a positive factor in improving students' concentration.
- Implications for schools: Encourage the integration of regular physical activity into school routines as a strategy to enhance learning.

This survey plan can be useful in identifying practices that improve academic achievement and student well-being [22].

Material (Tools)

- Cuestionaries to collect information on students' exercise habits.
- Cognitive tests (e.g., Stroop test, short-term memory test, sustained attention test).
- Classroom observations by teachers to assess attention and participation.

Material (Tools)

Requests

- Use it to collect information about students' exercise habits, such as frequency, duration, and type of physical activity performed (e.g., sports, aerobic exercise, gym training, etc.).
- Specific questions to identify any factors that influence concentration (such as sleep quality, diet, stress, etc.).

Cognitive Tests

- **Stroop Test:** measures cognitive inhibition and concentration, particularly the ability to resist distractions (e.g., the name of a color written in a different color).
- **Short-Term Memory Test:** assesses the ability to maintain and manipulate information in memory for short periods.
- **Sustained Attention Training:** Improves the ability to maintain attention on one area for a prolonged period of time, such as in vigilance tasks or tasks that involve responding to visual and auditory stimuli.

Observations in Learning Situations

Observe directly during class or around the school to see how students react to areas requiring concentration, before and after exercising.

Possibility of using a rating scale to measure the level of concentration, for example through notes on the frequency of distraction or active participation.

Interviews or Focal Groups

Interviews with students to obtain feedback on their perceptions of the impact of physical exercise on concentration.

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Focus groups with teachers or parents to gain further perspectives on the effects of exercise on students, both academically and socially.

Monitoring Academic Performance

Collect academic scores and results to ensure there is a correlation between exercise attendance and academic performance.

Methodology

- **Exhibit:** Secondary school students, divided into two groups: a group that exercises regularly (at least 3 times a week) and a group that does not exercise regularly.
- **Duration:** The observation period can last from 4 to 6 weeks, to collect data in different school situations and with different variables.
- **Data Analysis:** Comparison of cognitive test results between two groups, analysis of questionnaire responses and observations, and correlation with academic performance. Use of descriptive and inferential statistics to determine the impact of exercise on concentration.

Goals

- Determine whether physical exercise has a positive impact on student concentration.
- Identify possible differences between students who regularly engage in physical activity and those who do not, with regard to cognitive and behavioral considerations in the classroom.

Type of Research

- Experimental investigation with comparison between the experimental group and the control group.
- **Mixed method:** quantitative (cognitive tests) and qualitative (observations).

Objective of the Investigation

Main objective: To examine the effect of physical exercise on the concentration ability of secondary school students.
Research Question: Does physical exercise affect the concentration of secondary school students, improving their cognitive performance and attention during class?

Methodology

- **Experimental group:** students who regularly participate in physical exercise sessions, such as aerobic exercises, team sports or other physical activities.
- **Control group:** students who do not regularly participate in physical exercise during the study.

Music Selection (Weeks 1 & 2)

- Identify a group of secondary school students with diverse exercise habits (sedentary, moderately active, very active).
- Administer an initial questionnaire to collect information on physical activity level, eating habits, diet, etc.
- Administer an initial cognitive test to establish baseline concentration level.

Exercise Monitoring (Weeks 3 to 8)

- Students monitor their daily physical activity (type of exercise, duration, frequency).
- Periodic cognitive tests (e.g., every 2 weeks) to reflect on changes in concentration.

You can also gather information on external variables, such as stress levels or any changes in your eating habits.

Data Analysis (Weeks 9 and 10)

Analyze the data to see if there are significant correlations between exercise intensity, frequency, and concentration.

Identify customers or trends across various physical activity groups

Data Collection Methods

Amount

- Cognitive Tests: Concentration and memory tests are administered, such as the Stroop test, the sustained attention test, or tests that require mental concentration.
- Before And After Assessments: Cognitive tests are administered to each student at the beginning and end of the study to assess improvement in cognitive performance.

Qualitative

- Classroom Observations: Teachers can observe and note students' concentration levels during lessons, noting any improvements after introducing physical exercise.
- Tests or Questions: Students may be asked or completed questions regarding their level of concentration and the benefits achieved during the study period.

Measuring Instruments

- Self-assessment tips: for better self-awareness in concentration.
- Observations: made by teachers or investigators during lessons.
- Questionnaires to record physical activity data.

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- Standardized cognitive tests to assess concentration (e.g., Stroop test or sustained attention test).
  Data analysis software for statistical processing.

Data Analysis

- Quantitative analysis: Use statistical analysis (e.g., independent tests) to compare pre- and post-tests with the test between experimental and control groups.
- Qualitative analysis: coding observations and interviews to identify recurring themes in improving student concentration and well-being.

Conclusions Expected

- It is hoped that the exercise group will achieve significant improvements in concentration compared to the control group.
- Analysis of the effectiveness of physical exercise and an educational strategy to improve academic performance.

This research design could provide useful information for educators and schools to better understand the importance of physical activity in improving students' cognitive abilities [23].

Time

- Week 1: Study preparation, participant selection and administration of baseline concentration tests.
- Week 2-3: Start of intervention: groups begin their exercise program.
- Week 4-7: Regular exercise monitoring and weekly cognitive assessments.
- Week 8: Final evaluation of cognitive assessments and recognition of self-perception data. Analysis of results and comparison between groups.
- Week 9-10: Data analysis and preparation of the final report.

Expected results

- If we assume that students who exercise regularly will show significant improvement in concentration compared to the control group.
- Improves concentration in students with regular physical activity compared to sedentary students.
- Identify the relationship between different levels of physical exercise and cognitive performance.

Data Analysis

- Descriptive statistics to compare pre- and post-intervention outcomes between groups.
- Analysis of variance (ANOVA) to determine if there are significant differences between groups in terms of concentration.

Conclusions and Implications

Studies on the impact of exercise on the concentration of secondary school students have shown that regular physical activity produces significant improvements in students' concentration and cognitive performance. Exercise stimulates the production of neurotransmitters such as dopamine and serotonin, which are essential for improving cognitive functions, including memory, attention span, and exercise management.

Extensive studies have shown that students who engage in moderate physical activity, such as walking, running, or team sports, have a greater ability to concentrate on work and school, improve academic performance, and reduce study-related anxiety. Similarly, incorporating short sessions of physical exercise into the school day has been shown to improve attention and reduce mental fatigue, promoting greater learning effectiveness [24].

Transcendence

Integrating physical activity programs into schools: Research suggests that schools should encourage daily physical activity as an integral part of the educational curriculum. This may include sessions Short exercises during lessons, extracurricular physical activities, or incorporating active activities into the school day.
Educational policies: School administrators and policy makers could consider physical exercise as a key element in improving academic achievement by increasing support for physical activity and sport programs in schools and creating environments that support physical activity that is accessible to all students [25].
Helping teachers: Teachers can benefit from knowledge on how to incorporate short physical activities into lessons to improve student concentration. This can be especially helpful in classes with students who struggle with concentration or attention deficit disorder.
Promoting healthy lifestyles: A broader focus on exercise could also be an opportunity to educate students about the importance of maintaining a healthy lifestyle, promoting physical activity as a hobby not only to improve concentration, but also for overall mental and physical health.

In conclusion, physical exercise not only contributes to students' overall health, but also proves to be a powerful tool for improving their cognitive abilities and optimizing their academic performance.

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