applied sciences

MDPI

Article

Mental Health, Overweight, and Physical Exercise in Young Portuguese Adults: A Cross-Sectional Study

Tânia Gonçalves [1], Diogo Monteiro [1,2], Rui Matos [1,2], Pedro Duarte-Mendes [3,4], Nuno Couto [2,5], Raul Antunes [1,2], Susana Diz [1,2], Nuno Amaro [1,2] and Miguel Jacinto [1,2,*]

1 ESECS, Polytechnique of Leiria, 2411-901 Leiria, Portugal; 1220292@my.ipleiria.pt (T.G.); diogo.monteiro@ipleiria.pt (D.M.); rui.matos@ipleiria.pt (R.M.); raul.antunes@ipleiria.pt (R.A.); susana.diz@ipleiria.pt (S.D.); nuno.amaro@ipleiria.pt (N.A.)
2 Research Center in Sport, Health, and Human Development (CIDESD), 5000-558 Vila Real, Portugal; ncouto@esdrm.ipsantarem.pt
3 Sport Physical Activity and Health Research & Innovation Center (SPRINT), 2040-413 Rio Maior, Portugal; pedromendes@ipcb.pt
4 Sport Sciences School of Rio Maior, Santarém Polytechnique University (ESDRM-IPSantarém), 2040-413 Rio Maior, Portugal
5 Polytechnic Institute of Castelo Branco, 6000-084 Castelo Branco, Portugal
* Correspondence: miguel.s.jacinto@ipleiria.pt

Abstract: The aim of this study was to see if there are any associations between mental health, Body Mass Index (BMI), and physical exercise (PE) in young Portuguese adults. The sample consisted of 414 people aged between 18 and 25 years old. A sociodemographic questionnaire designed for this study and the Mental Health Inventory were used. To analyze the results, the total sample was divided according to the criteria "BMI $\geq$ 5 kg/m^2"; "BMI < 25 kg/m^2"; "does not practice PE"; and "practices PE", and sample groups were formed with these names. It was found that there was an association between the dimensions of the Mental Health Inventory and the average time spent practicing PE in the total sample (r from 0.099 to 0.160) and in individuals with a BMI < 25 kg/m^2 (r = 0.154 and 0.169). In individuals with a BMI $\geq$25 kg/m^2, there was an association between the 'BMI' and depression variables (r = −0.174). In all groups, associations were found between the variables of age and BMI (r from 0.120 to 0.216). There was also a significant effect of group (non-exercise vs. exercise groups) on the dependent variables, Λ = 0.972, F(5, 408) = 2.329, p = 0.042, $\eta^2 p$ = 0.28. This study confirms the association between PE and mental health and suggests that BMI may have an influence on the appearance of depressive symptoms in young Portuguese adults.

Keywords: mental health; physical exercise; overweight; obesity; young adults

Academic Editor: Jongsung Lee

Received: 21 February 2025
Revised: 31 March 2025
Accepted: 3 April 2025
Published: 7 April 2025

Citation: Gonçalves, T.; Monteiro, D.; Matos, R.; Duarte-Mendes, P.; Couto, N.; Antunes, R.; Diz, S.; Amaro, N.; Jacinto, M. Mental Health, Overweight, and Physical Exercise in Young Portuguese Adults: A Cross-Sectional Study. *Appl. Sci.* **2025**, *15*, 4056. https://doi.org/10.3390/app15074056

1. Introduction

1.1. Obesity

According to the World Health Organization [1], obesity and overweight can be defined as an excessive accumulation of fat, representing a health risk. An individual is considered overweight when their Body Mass Index (BMI) is greater than 25 kg/m^2 and obese when it exceeds 30 kg/m^2. It is considered a global public health problem, and therefore, its prevention and treatment are imperative [2]. The most recent data from the World Health Organization (WHO) [1] estimates that obesity and overweight may cause the deaths of more than 1.2 million people a year in the WHO's European region alone.

There are numerous complications associated with being overweight, especially regarding the onset of chronic diseases, namely cardiovascular and metabolic diseases, osteoarthritis, and cancer [1]. The risk of developing these diseases is directly proportional to the increase in BMI (i.e., individuals with a higher BMI are more susceptible to the onset of chronic diseases) [3].

The relationship between poor eating habits and obesity has been the subject of study due to its associated health risks. Understanding how specific eating habits contribute to obesity can help establish public health interventions and strategies [4]. The concept that a positive energy balance is the main cause of excess body weight is well supported in the field of nutrition and health sciences. A positive energy balance occurs when the amount of energy (calories) consumed exceeds the energy expended through metabolic processes, physical activity, and other bodily functions. Although the equation of energy intake versus energy expenditure seems simple, the underlying causes of a sustained positive energy balance are highly complex and multifactorial. Healthy eating habits, on the other hand, are associated with a reduced risk of obesity, suggesting that improving eating habits helps to reduce weight and brings associated health risks [5].

These inadequate eating habits are often associated with low physical activity (PA), higher levels of sedentary lifestyles, and a lack of physical exercise (PE) practice, as demonstrated in young adults [6]. In turn, physical inactivity is strongly associated with a greater likelihood of developing obesity [7].

1.2. Mental Health and Obesity

In addition to the relationship between cardiovascular and metabolic diseases, studies have shown that being overweight is associated with higher levels of mental illnesses such as anxiety and depression (i.e., the higher the weight, the more severe the symptoms of these pathologies) [8].

The American Psychiatric Association defines mental health as a state of emotional, social, and psychological well-being, encompassing an individual's ability to effectively function in daily activities and their ability to adapt and change in the face of adversity [9]. According to the Eurobarometer [10], 1 in 2 people, totaling 46% of the population of the European Union, have experienced emotional or psychosocial problems manifested in the form of depression or anxiety in the previous 12 months.

According to Lin et al. [11], mental illness happens more often in people with obesity. The sample for this study consisted of 841 patients recruited for clinical interviews, all of whom were overweight or obese. Around two in five were diagnosed with mental illness. Obesity is also directly associated with mood swings [12].

Previously, the relationship between eating habits and obesity was discussed. In this subchapter, it should be noted that stress can affect behavior by inducing overeating and the consumption of foods high in calories, fat, or sugar [13]. Obesity seems to be the cause and consequence of mental illness, leading to a snowball effect. From another perspective, the stigma caused by weight and its resulting stereotypes are associated with discrimination and unequal treatment, which increases the risk of social isolation and loneliness and, consequently, depressive symptoms [14]. Contributing to this snowball effect, feelings of isolation are also associated with a reduction in PA and PE, which is related to the onset of or increase in obesity.

Obesity must, therefore, be addressed not only in terms of physical and psychological health, which have a major impact, but also in terms of its social aspect, in association with the contexts and influences of everyone. It can, therefore, be considered that the emergence and maintenance of obesity is due to the interaction between biological, psychological, and social factors [15].

Pathological anxiety can interfere with normal functionality and become limiting. There are various types of anxiety, including generalized anxiety, panic disorder, associated phobias, social anxiety, agoraphobia, and separation anxiety, among others [9]. Anxiety is diagnosed when these physiological responses are disproportionate to the situation that causes them and lead to significant suffering, impairing the normal functioning of people in various areas, such as social or occupational settings [9].

Some of its symptoms include depressed mood, decreased interest or pleasure, significant weight loss or gain, insomnia, fatigue, and feelings of worthlessness. These symptoms are the basis of clinically significant suffering [9].

When addressing pathologies that affect mental health, such as those mentioned above, it is also important to understand distress. This consists of a negative response to stress, which can generate physical and psychological maladaptation, posing a risk to health [9].

Similarly, another important aspect that should be considered because of the way it can affect mental health is emotional regulation and the establishment of relationships. In addition, individuals who have difficulty regulating their emotions also respond more negatively to more emotional situations and may also have difficulty regulating their behavior, becoming more aggressive or more prone to anxiety, depression, and stress [16].

Bearing these points in mind, mental health and obesity are extremely relevant issues, and it is crucial to explore their interaction, especially considering their connection with the practice of PE or the lack of it [17].

1.3. PE and Mental Health

PE has been associated with mental health benefits, helping to prevent symptoms linked to mental illness, such as anxiety and depression, and contributing to the maintenance of general well-being, regardless of the level of intensity of the practice [18]. From another perspective, negative mental health states, such as depression, are strongly associated with physical inactivity, constituting a barrier to the practice of PA [19].

In Portugal, according to the Eurobarometer, the level of physical inactivity is over 70 percent [20], which is quite worrying given that regular PA practice is a preventative factor for chronic diseases, particularly obesity and mental illness. For adults aged between 18 and 64, it is recommended that they practice at least 150 to 300 min per week of moderate-intensity aerobic PA or 75 to 150 min per week of vigorous-intensity aerobic PA [21]. It is important to mention that PA and PE are similar terms, but they characterize different contexts. PA is any movement that expends energy, while PE is a specific and intentional form of physical activity with clear goals for promoting physical fitness [22].

A study by Guddal et al. [23] revealed that higher levels of PE practice (more than four times a week) have a protective effect on psychological stress when compared to lower levels of practice. Another publication showed that participation in sports activities during secondary school influences mental state in adult life, so involvement in these activities is positively associated with reduced depressive symptoms, lower perceived stress, and a better mental state in early adulthood [24].

Nakagawa et al. [25] indicate that a greater amount of PE, particularly moderate-to-vigorous intensity PE, is associated with more effective psychological coping strategies in the face of negative situations, as well as better psychological development and well-being. In addition, the results also concluded that moderate-to-vigorous intensity PE causes stronger and longer-lasting positive psychological changes.

The practice of PE is a strategy to reduce the impact of an unhealthy lifestyle on mental health, with specific results in adolescents and young adults [26]. In another study by the same authors, Bernstein and McNally [27], it was found that moderate-intensity aerobic exercise can help attenuate negative emotions in individuals who have difficulties with

emotional regulation. This study reinforced the literature on the therapeutic effects of aerobic PE thanks to the experimental data it provided. Other authors have also found that PA has a positive influence on emotional well-being, improving mood and neutralizing symptoms of anxiety and depression through various neurobiological processes [28]. From another perspective, a sedentary lifestyle leads to a decline in psychological well-being, which is associated with an increase in depression and anxiety [29].

1.4. Mental Health, Overweight, and PE in Young Adults

Young adults, i.e., individuals aged between 18 and 25, are more susceptible to weight gain when compared to other age groups in the adult age group [30]. This seems to be associated with the structural changes that happen at this stage of life, namely full-time work, independence from parents, marriage, or cohabitation [31,32]. It also appears that in this transition from adolescence to adulthood, the quality of the diet seems to decrease alongside the practice of PE and PA, contributing to weight gain, especially during the first year of higher education [33].

The population in this age group has the lowest use of health services since they may not consider health to be a priority and, therefore, do not access the preventive health care that they might need to increase their literacy and optimize their current and future health [33]. In addition, this stage of life can also be associated with psychological underdevelopment and characteristics of age. Combining this with the poor physical health caused by obesity makes young people more susceptible to mental health problems.

Considering the variables described above (mental health, excess weight, and PE practice), this study aims to verify the associations established between these variables in young Portuguese adults. Knowing the harmful effects of being overweight and the rampant incidence of mental health problems, there is an urgent need to understand these associations so that increasingly effective health promotion and disease prevention strategies can be found.

To this end, the following hypotheses were formulated to guide this research:

H1: *There is an association between mental health and PE among the young adults of the total sample [26], young adults with a BMI* $\geq$*25 kg/m*^{2} *[34], and young adults with a BMI < 25 kg/m*^{2} *[18];*

H2: *There is an association between mental health and BMI in young adults from the total sample [8], young adults who practice PE [35], and young adults who do not practice PE [29].*

2. Materials and Methods

This quantitative, cross-sectional study was designed in accordance with the Declaration of Helsinki [36].

2.1. Participants

The study invited both male and female young adults aged between 18 and 25 to participate. The sample was a non-probabilistic convenience sample (snowball sampling method). A Google form was created and made available on social networks (e.g., Facebook, Instagram, LinkedIn, X). Participants who did not complete the entire questionnaire or who exceeded the age limit for the sample were excluded.

The sample size calculation for the multi-part analyses to be carried out was based on the recommendations of Faul et al. [37], which included the following parameters: anticipated effect (0.2); the power of the statistical level (0.5); probability level (0.05); and statistical power (1-β) (0.95). Taking these factors into consideration, the ideal minimum sample size was 314, which was respected in this study.

A total of 414 participants participated in this study (310 females) aged between 18 and 25, with a mean age of 22.32 (±2.16) years. The average BMI of the sample was 24.24 (±5.05) kg/m^2, ranging from 16.73 to 52.08 kg/m^2. Of these, 38% were university graduates, and it was found that 31.7% of the total did not practice PE.

2.2. Instruments

To collect socio-demographic data and data on exercise, a questionnaire was developed, consisting of six questions to categorize the population (e.g., gender, age, height, weight, educational qualifications) and three questions on the practice of PE in the last month (i.e., weekly frequency, duration of sessions, type).

To identify whether the participants were within the parameters considered normal for body weight or above (overweight), BMI was calculated using the data provided in the questionnaire. The BMI formula was used to conduct this calculation Weight/(Height^2) in kg/m^2. Values between 18.5 and 24.9 kg/m^2 are considered normal, values between 25 (inclusive) and 29.9 kg/m^2 are considered overweight, and values greater than or equal to 30 kg/m^2 are considered obese. For a BMI of less than 18.5 kg/m^2, the person is underweight for their height. For statistical analysis, participants were only assigned to two categories: BMI $<$ 25 kg/m^2 and BMI $\geq$ 25 kg/m^2.

In addition to the questionnaire, we also used the Mental Health Inventory, ref. [38] validated for the Portuguese population by Ribeiro [39] in a study of 609 students, with an internal consistency of over 0.80 and a total scale of 0.92 [39]. The aim of this instrument is to assess the mental health status of the general population, not just the clinical population, as a form of screening rather than diagnosis. This inventory is composed of 38 self-response items, and the sum of the answers obtained in each one translates to the participants' level of mental health. These are divided into 5 dimensions: anxiety (10 items), depression (5 items), loss of behavioral/emotional control (9 items), emotional ties (3 items), and general positive affect (11 items). The answer options vary depending on the question asked. Through these 5 dimensions, it is also possible, by grouping them together, to measure psychological distress (24 items) by adding the dimensions anxiety, depression and loss of behavioral/emotional control, and psychological well-being (14 items) to others such as general positive affect and emotional ties. Thus, as well as being a measure of mental health, it is also a measure of psychological well-being and distress.

For each item, participants were given five or six response options arranged on a Likert scale. In order to obtain the final score, constituting a dimension that is referred to as the Total later on, the scores for each item were added together, most of which were inversely rated, namely items 2, 3, 9, 11, 13, 15, 16, 19, 20, 21, 24, 25, 27, 28, 29, 30, 32, 33, 35, 36, and 38. Due to this inversion, all the results of the dimensions were interpreted as follows: higher values are associated with a better state of mental health and the absence of psychopathology, i.e., less anxiety, depression, and loss of emotional control and more positive affection and emotional ties.

2.3. Procedures

The study was carried out with the approval of the Ethics Committee of the Polytechnic of Leiria with the number CE/IPLEIRIA/04/2024. The data were collected in Google Forms format, with the access link to the form being disseminated through social networks (e.g., Facebook, Instagram, LinkedIn, X).

Participants were informed about the objectives of the study, the estimated time required for the study, approximately 10 min, and respect for ethical principles. Even so, no time limit was stipulated, and each participant had the freedom to manage their time when completing the questionnaire without external interference.

To validate the receipt of this information and confirm participation, participants filled in a check box. In the informed consent, the reference to voluntary collaboration in this study was explained, as well as the possibility that, at any time and for any reason, the participant could withdraw from collaboration. If the participant withdrew consent or did not agree to continue the study, all data collected from that participant would be excluded from the study.

2.4. Statistical Analysis

The data were analyzed using IBM SPSS software for Windows (version 29.0, IBM Corp, Armonk, NY, USA). Counts (and proportions), means, standard deviations (SDs), and 95% confidence intervals (CIs) were calculated to describe categorical and continuous variables. The data were presented (total sample) and then divided into the following groups: BMI $\geq$ 25 kg/m^2 group, BMI $\leq$ 25 kg/m^2 group, the group that does not exercise, and the group that does exercise. The Kolmogorov–Smirnov test (n > 50) and Levene test were used to verify the normality and homogeneity of the data, respectively. Pearson's correlation coefficients were also used to determine the association between all variables under analysis. The magnitudes of the associations were also determined (r = 0.10 to 0.29—small; r = 0.30 to 0.49—moderate; r = 0.50 to 1—strong) [40]. An MANOVA was performed to investigate the effect of each group (BMI group $\geq$ 25 kg/m^2 vs. BMI group < 25 kg/m^2 and non-exercise group vs. exercise group) on the set of dependent variables related to mental health. If MANOVA was significant, univariate ANOVAs were calculated for each dependent variable, followed by Tukey's post hoc analysis. For paired comparisons, the effect size was assessed using partial eta squared (partial η^2), while for overall differences between groups, eta squared (η^2) was applied. The effect sizes were interpreted based on Cohen's guidelines, with the following thresholds: $\leq$0.10 (small), $\geq$0.25 (medium), and $\geq$0.40 (large). For all tests, the significance level was set at $p < 0.05$.

3. Results

In this section, the results of the data collection are presented, including the total sample. Subsequently, the total sample is divided according to the following criteria: BMI $\geq$ 25 kg/m^2; BMI < 25 kg/m^2; does not practice PE; and practices PE.

3.1. Total Sample

First, descriptive statistics (Table 1) were analyzed for the total study population. This included the mean, standard deviation, and 95% CI for the variables age, gender, BMI, and average time practicing PE (in minutes). Also included were the number and percentages of participants by gender, level of education, and frequency of weekly exercise.

The mean age was 22.32 ($\pm$2.16) years, with a female predominance (74.6%). BMIs in the sample ranged from 16.73 Kg/m^2 to 52.08 kg/m^2, with a mean of 24.24 kg/m^2 and a standard deviation of 5.05 kg/m^2, which is considered a healthy weight but very near the overweight level. In terms of education, most participants had a university degree (38%). In this total sample, it was possible to see that 31.7% of the participants did not practice PE. The mean practice time per session in minutes was 57.34 ($\pm$28.85).

Similarly to the total sample, the mean age of the BMI group $\geq$25 kg/m^2 was 22.71 years, with a standard deviation of $\pm$2.04 years. Regarding BMI, which in this sample ranged from 25.10 to 52.08 kg/m^2, the mean was 29.58 kg/m^2, which is compatible with being overweight. It is important to note that 98 individuals were overweight, 24 were obese, and 18 were extremely obese. As was the case with the total sample, female participants also predominated in this group (65.7%). It was found that 34.3% of this group did

not practice exercise, which is most of them, while the remaining 28.6% practiced exercise between three and four times a week. The mean practice time was 66.70 (±26.99) min.

Table 1. Descriptive statistics for the total sample.

	Total Sample—Mean ± SD (95% CI)	BMI Group ≥ 25 kg/m²—Mean ± SD (95% CI)	BMI Group < 25 kg/m²—Mean ± SD (95% CI)	Non-Exercise Group—Mean ± SD (95% CI)	Exercise Group—Mean ± SD (95% CI)	
Mean Age (years) ± SD (95% CI)	22.32 ± 2.16 (18–25)	22.71 ± 2.04 (18–25)	22.13 ± 2.19 (18–25)	22.57 ± 2.06 (18–25)	22.57 ± 2.06 (18–25)	
Females	310 (74.9)	92 (65.7)	218 (79.6)	106 (81.5)	204 (71.8)	
Males	104 (25.1)	48 (34.3)	56 (20.4)	24 (18.5)	80 (28.2)	
BMI (kg/m²)—mean ± SD (95% CI)	24.24 ± 5.05 (16.73–52.08)	29.40 ± 5.28 (25.10–52.08)	21.61 ± 1.89 (16.73–24.84)	24.34 ± 5.27 (18.04–46.57)	24.20 ± 4.93 (16.73–52.08)	
Education level	2nd Cycle of Basic Education: 4 (1) Secondary: 134 (32.7) Professional: 48 (11.7) Bachelor: 156 (38) Master, Postgraduate, MBA: 32 (7.8) Others: 36 (8.8)	2nd Cycle of Basic Education 2 (1.4) Secondary: 44 (31.4) Professional: 12 (40.3) Bachelor: 58 (41.4) Master, Postgraduate, MBA: 12 (8.6) Others: 12 (8.6)	3° Cycle of Basic Education 4 (1.5) Secondary 90 (32.8) Professional: 36 (13.1) Bachelor: 100 (36.5) Master, Postgraduate, MBA: 20 (7.3) Others 24 (8.8)	3° Cycle of Basic Education 4 (3.1) Secondary 44 (33.8) Professional: 16 (12.3) Bachelor: 42 (32.3) Master, Postgraduate, MBA: 8 (6.2) Others: 16 (12.3)	2nd Cycle of Basic Education: 2 (0.7) Secondary: 90 (31.7) Professional: 32 (11.3) Bachelor: 16 (12.3) Master, Postgraduate, MBA: 24 (11.5) Others: 20 (7)	
Weekly PE frequency	1 and 2 times: 45 (11) 3 and 4 times: 155 (37.8) More than 4 times: 80 (19.5) Not practiced: 130 (31.7)	1 and 2 times: 20 (14.3) 3 and 4 times: 40 (28.6) More than 4 times: 32 (22.9) Not practiced: 48 (3.3)	1 and 2 times: 70 (25.5) 3 and4 times: 74 (27) More than 4 times: 48 (17.5) Not practiced: 82 (29.9)		1 and 2 times: 90 (31.7) 3 and 4 times: 114 (40.1) More than 4 times: 80 (28.2)	
Mean practice time (min) ± SD (95% CI)	57.34 ± 28.85 (0–180)	66.70 ± 26.99 (20–120)	64.47 ± 26.02 (15–180)		65.18 ± 26.31 (15–180)	
Mean minutes per week (min) ± SD (95% CI)	101.95 ± 76.21 (0–360)	66.70 ± 26.99 (20–120)	64.47 ± 26.02 (15–180)		65.18 ± 26.31 (15–180)	(15–180)

Note: n, number of individuals; min, minutes; SD, standard deviation; CI, confidence interval; BMI, Body Mass Index; PE, physical exercise.

In the group with BMI <25 kg/m², the mean age of the participants was 22.13 (±2.19) years. Regarding distribution by sex, most participants were female, like the other groups, representing 79.6% of the sample. Regarding BMI, the mean BMI in this group was 21.61 (±1.89) kg/m², with a range from 16.73 to 24.84 kg/m² considered a healthy mean weight value. Regarding the level of education, it was observed that most participants had completed higher education. Specifically, 36.5% of individuals had a bachelor's degree, while 7.3% had completed a postgraduate, master's, or MBA degree, reflecting a high academic level. Regarding the frequency of PE, 29.9% of participants reported not practicing any type of PE. On the other hand, 27% indicated practicing exercise three to four times a week, suggesting a considerable division between inactive individuals and those with regular levels of PE practice. The mean practice time for this group was 64.47 (±26.02) min.

Regarding the non-exercise group, the average age was similar to what was found in the groups previously described at 22.57 years old, with a standard deviation of ±2.06 years old, maintaining the tendency towards a predominance of female participants (81.5%). The mean BMI was 24.34 kg/m², which is associated with a healthy weight value and is very close to the overweight value. Its variability was between 18.04 and 46.57 kg/m².

Table 1 presents the demographic data referring to the sample group made up of individuals who practice PE, including 284 participants. The mean age of the participants was 22.57 (±2.06) years, ranging from 18 to 25 years. Most participants are female, comprising 71.8% of the sample (n = 204), while 28.2% are male (n = 80). Regarding BMI, the mean was 24.20 (±4.93) kg/m², with a range of values of 16.73 and 52.08 kg/m². This result suggests that regarding mean weight, participants are within the weight range considered normal, although there is a wide variation that includes individuals who are underweight and those with obesity. Regarding PE practice, the weekly frequency of participants is diverse. Around 31.7% practice PE between one and two times a week, 40.1% practice PE between three and four times a week, and 28.2% practice PE more than four times a

week. The mean time dedicated to PE practice was 65.18 (±26.31) min per session, ranging from 15 to 180 min. This indicates that most participants have a regular PE routine despite significant variations in session duration.

Table 2 shows the results for the means, standard deviations, ranges, and 95% CIs for the different dimensions of the Mental Health Inventory for the total sample. The range refers to the minimum and maximum values possible for each dimension, while the CI reflects the maximum and minimum values among the participants. On this topic, it is important to emphasize that the dimensions correspond to the sums of the items (questions), as presented in the previous chapter.

Table 2. Mental Health Inventory scores of the total sample.

	Mean ± SD	Min–Max	(95% CI)
Anxiety	38.70 ± 9.86	(10–60)	(14–60)
Depression	19.40 ± 4.28	(5–29)	(6–29)
Loss of Behavioral/Emotional Control	38.55 ± 8.24	(9–77)	(12–53)
General Positive Affect	39.34 ± 9.60	(11–66)	(16–66)
Emotional Ties	12.08 ± 3.16	(3–18)	(4–18)
Psychological Distress	96.66 ± 21.27	(24–166)	(36–139)
Psychological Well-Being	51.42 ± 11.54	(14–84)	(22–83)
Total score—Mental Health Inventory	148.09 ± 31.43	(38–250)	(58–215)

Note: SD, standard deviation; CI, confidence interval.

The last variable shown in Table 2 summarizes the total sum of the scores for all the dimensions of the Mental Health Inventory, with a mean of 148.09 (±31.43) points, a range of 38 to 250, and a CI of 58 to 215, which can be characterized as a moderate value of the Mental Health Inventory. However, the wide variability of responses reflects the significant diversity in the emotional experiences of the participants.

Table 3 shows the correlations between the Mental Health Inventory variables together with age, BMI, and the mean practice time of PE per session (in minutes).

Table 3. Bivariate correlations between the variables studied for the total sample.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Age (years)	1											
2. BMI (kg/m^2)	0.186 **	1										
3. Mean practice time (min)	0.031	0.045	1									
4. Minutes per week (min)	0.083	0.033	0.520 **	1								
5. Anxiety	−0.002	0.044	0.090	0.011	1							
6. Depression	−0.049	0.019	0.115 *	0.0.35	0.861 **	1						
7. Loss of Behavioral/ Emotional Control	−0.009	−0.001	0.160 **	0.034	0.834 **	0.865 **	1					
8. General Positive Affect	−0.046	0.012	0.140 **	0.001	0.776 **	0.767 **	0.769 **	1				
9. Emotional Ties	0.045	−0.003	0.099 *	0.059	0.476 **	0.481 **	0.529 **	0.508 **	1			
10. Psychological Distress	−0.014	0.024	0.127 *	0.026	0.960 **	0.935 **	0.948 **	0.812 **	0.522 **	1		
11. Psychological Well-Being	−0.026	0.009	0.144 **	0.017	0.777 **	0.771 **	0.786 **	0.972 **	0.697 **	0.819 **	1	
12. Total score—Mental Health Inventory	−0.019	0.019	0.138 **	0.024	0.935 **	0.916 **	0.930 **	0.906 **	0.609 **	0.978 **	0.922 **	1

Notes: *, $p < 0.05$; **, $p < 0.01$.

When analyzing the bivariate correlations in the total sample (Table 3), it was possible to see that there was a small positive correlation between age and BMI ($r = 0.183$, $p < 0.01$). Besides this, there were no other significant correlations between the age variable and the others. The BMI variable did not show any significant correlation, indicating that, for the total sample, BMI had no association with the other variables.

The mean practice time variable showed small positive correlations with most of the dimensions, namely with depression ($r = 0.115$, $p < 0.05$), loss of behavioral/emotional control ($r = 0.160$, $p < 0.\ 01$), general positive affect ($r = 0.140$, $p < 0.01$), emotional ties

($r = 0.099$, $p < 0.05$), psychological distress ($r = 0.127$, $p < 0.01$), psychological well-being ($r = 0.144$, $p < 0.01$) and with the total variable ($r = 0.138$, $p < 0.01$). The minutes per week were not associated with any of the variables studied except the mean practice time ($r = 0.520$, $p < 0.01$).

Analyzing the Mental Health Inventory dimensions revealed significant moderate-to-strong correlations between all the Mental Health Inventory variables.

3.2. BMI $\geq$ 25 kg/m^2 Group

Table 4 shows the results for the means, SDs, ranges, and 95% CIs for the different dimensions of the Mental Health Inventory for the BMI $\geq$ 25 kg/m^2 group.

Table 4. Mental Health Inventory scores for the BMI $\geq$ 25 kg/m^2 group.

	Mean ± SD	**Min–Max**	**(95% CI)**
Anxiety	39.35 ± 10.06	(10–60)	(14–60)
Depression	19.58 ± 4.30	(5–29)	(6–28)
Loss of Behavioral/Emotional Control	38.79 ± 8.90	(9–77)	(12–51)
General Positive Affect	38.88 ± 10.21	(11–66)	(18–66)
Emotional Ties	11.86 ± 3.28	(3–18)	(4–18)
Psychological Distress	97.73 ± 22.21	(24–166)	(36–136)
Psychological Well-Being	50.74 ± 12.26	(14–84)	(22–83)
Total score—Mental Health Inventory	148.47 ± 32.69	(38–250)	(58–215)

Notes: SD, standard deviation; CI, confidence interval.

The total dimension showed a mean score of (148.47 ± 32.69) points, suggesting a moderate level of mental health, like that found in the total sample.

Table 5 shows the correlations between the Mental Health variables, together with age, BMI, and the mean practice time of PE per session (in minutes), using Pearson's correlation coefficient, for the group with BMI $\geq$25 kg/m^2.

Table 5. Bivariate correlations between variables in studies for BMI group $\geq$ 25 kg/m^2.

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1 Age (years)	1											
2. BMI (kg/m^2)	0.181 *	1										
3. Mean practice time (min)	0.067	−0.003	1									
4. Minutes per week (min)	0.112	−0.123	0.586 **	1								
5. Anxiety	−0.100	−0.101	0.052	−0.083	1							
6. Depression	−0.152	−0.174 *	0.010	−0.101	0.839 **	1						
7. Loss of Behavioral/ Emotional Control	−0.161	−0.166	0.085	−0.097	0.860 **	0.881 **	1					
8. General Positive Affect	−0.109	0.032	0.087	−0.155	0.732 **	0.732 **	0.779 **	1				
9. Emotional Ties	−0.025	−0.021	−0.014	−0.026	0.500 **	0.519 **	0.582 **	.525 **	1			
10. Psychological Distress	−0.140	−0.146	0.059	−0.096	0.960 **	0.927 **	0.961 **	0.786 *	0.560 **	1		
11. Psychological Well-Being	−0.098	0.021	0.069	−0.122	0.744 **	0.749 **	0.805 **	0.974 **	0.705 **	0.805 **	1	
12. Total score–Mental Health Inventory	−0.131	−0.091	0.066	−0.110	0.926 **	0.905**	0.949 **	0.893 **	0.641 **	0.975 **	0.916 **	1

Notes: *, $p < 0.05$; **, $p < 0.01$.

Analyzing Table 5, it appears that only age showed a small positive correlation with the BMI variable ($r = 0.181$, $p < 0.05$), and did not correlate significantly with the other variables. Similarly, the BMI variable showed a small negative correlation with the depression variable

($r = -0.174$, $p < 0.05$). The mean practice time variable, on the other hand, did not establish statistically significant correlations with any of the variables, indicating that for the group with a BMI ≥ 25 kg/m^2, the mean practice time does not seem to influence any of the other variables. Similarly, the minutes per week were not associated with any of the variables studied except for the mean practice time ($r = 0.586$, $p < 0.01$).

Similarly to the group analyzed above, the dimensions of the Mental Health Inventory correlated strongly and positively with each other.

3.3. BMI < 25 kg/m^2 Group

Table 6 presents the results regarding the means, SD, ranges, and 95% CIs for the different dimensions of the Mental Health Inventory for the group with BMI < 25 kg/m^2.

Table 6. Mental Health Inventory scores for the BMI < 25 kg/m^2 group.

	Mean ± SD	Min–Max	(95% CI)
Anxiety	38.41 ± 9.80	(10–60)	(16–58)
Depression	19.31 ± 4.30	(5–29)	(8–29)
Loss of Behavioral/Emotional Control	38.42 ± 7.95	(9–77)	(20–53)
General Positive Affect	39.54 ± 9.37	(11–66)	(16–61)
Emotional Ties	12.14 ± 3.12	(3–18)	(4–18)
Psychological Distress	96.15 ± 20.92	(24–166)	(49–139)
Psychological Well-Being	51.68 ± 11.27	(14–84)	(30–79)
Total score—Mental Health Inventory	147.82 ± 30.94	(38–250)	(82–215)

Notes: SD, standard deviation; CI, confidence interval.

The average of the total dimensions of the Mental Health Inventory was 147.82 (±30.94) points, with a range of 38 to 250 and a CI between 82 and 215. The high variability in this variable reflects the complexity of the participants' emotional experiences, with some scores indicating favorable levels of mental health while others reflected the opposite.

Table 7 shows the correlations between the Mental Health Inventory variables, together with age, BMI, and the mean practice time of PE per session (in minutes).

Table 7. Bivariate correlations between variables in studies for BMI group < 25 kg/m^2.

	1	2	3	4	5	6	7	8	9	10	11	12
1 Age (years)	1											
2. BMI (kg/m^2)	0.120 *	1										
3. Mean practice time (min)	−0.067	0.066	1									
4. Minutes per week (min)	0.051	−0.030	0.499 **	1								
5. Anxiety	0.044	0.007	0.078	0.045	1							
6. Depression	−0.007	0.048	0.169 *	0.093	0.873 **	1						
7. Loss of Behavioral/ Emotional Control	0.066	0.033	0.154 *	0.093	0.822 **	0.858 **	1					
8. General Positive Affect	−0.008	−0.054	0.140	0.079	0.806 **	0.791 **	0.768 **	1				
9. Emotional Ties	0.078	0.074	0.091	0.081	0.475 **	0.469 **	0.506 **	0.507 **	1			
10. Psychological Distress	0.044	0.019	0.129	0.076	0.960 **	0.940 **	0.941 **	0.832 **	0.511 **	1		
11. Psychological Well-Being	0.015	−0.024	0.142	0.088	0.801 **	0.787 **	0.778 **	0.971 **	0.698 **	0.832 **	1	
12. Total score–Mental Health Inventory	0.035	0.004	0.138	0.083	0.941 **	0.922 **	0.920 **	0.916 **	0.600 **	0.979 **	0.927 **	1

Notes: *, $p < 0.05$; **, $p < 0.01$.

Regarding the group with BMI < 25 kg/m^2, it was found that age had a small positive correlation with BMI only ($r = 0.120$, $p < 0.05$). For the BMI variable, no other significant correlations were found with the other variables. The mean practice time variable established small positive correlations with the dimensions depression ($r = 0.169$, $p < 0.05$) and

loss of behavioral/emotional control ($r = 0.154$, $p < 0.05$). The minutes per week were not associated with any of the variables studied, except for the mean practice time ($r = 0.499$, $p < 0.01$).

Similarly to what occurred in the groups already analyzed, the strongest correlations were established between the Mental Health Inventory dimensions. Moderate-to-strong positive correlations were obtained between the dimensions.

3.4. Group That Does Not Practice Exercise

Exercising was one of the variables included in this study. Therefore, it is considered pertinent for possible comparisons to include descriptive and statistical analyses of the sample members who reported not practicing exercise.

Table 8 shows the results referring to the means, standard deviations, amplitudes, and 95% CIs for the different dimensions of the Mental Health Inventory for the group that does not practice PE.

Table 8. Mental Health Inventory scores of the non-exercise group.

	Mean ± SD	Min–Max	(95% CI)
Anxiety	36.30 ± 9.93	(10–60)	(14–60)
Depression	18.33 ± 4.33	(5–29)	(6–27)
Loss of Behavioral/Emotional Control	36.26 ± 8.80	(9–77)	(12–51)
General Positive Affect	35.63 ± 8.76	(11–66)	(16–52)
Emotional Ties	12.12 ± 3.19	(3–18)	(4–18)
Psychological Distress	90.90 ± 21.85	(24–166)	(36–136)
Psychological Well-Being	47.75 ± 10.90	(14–84)	(22–70)
Total score—Mental Health Inventory	138.66 ± 31.06	(38–250)	(58–199)

Notes: SD, standard deviation; CI, confidence interval.

The sum of all dimensions (total) presented a mean value of 138.66 (±31.06) and CIs between 58 and 199, corresponding to a moderate level of mental health.

In Table 9, the correlations between the Mental Health Inventory variables, together with age, BMI, and the mean PE practice time per session (in min), are shown.

Table 9. Bivariate correlations between the variables in the studies for the group not practicing PE.

	1	2	3	4	5	6	7	8	9	10
1. Age (years)	1									
2. BMI (kg/m^2)	0.216 *	1								
3. Anxiety	0.037	−0.028	1							
4. Depression	0.030	−0.089	0.862 **	1						
5. Loss of Behavioral/ Emotional Control	0.068	−0.126	0.820 **	0.849 **	1					
6. General Positive Affect	−0.063	−0.094	0.730 **	0.717 **	0.718 **	1				
7. Emotional Ties	0.064	−0.015	0.527 **	0.469 **	0.530 **	0.568 **	1			
8. Psychological Distress	0.050	−0.082	0.956 **	0.932 **	0.944 **	0.764 *	0.546 **	1		
9. Psychological Well-Being	−0.032	−0.080	0.741 **	0.714 **	0.733 **	0.971 **	0.750 **	0.774 **	1	
10. Total score—Mental Health Inventory	0.024	−0.086	0.932 **	0.906 **	0.921 **	0.878 **	0.647 **	0.975 **	0.895 **	1

Notes: *, $p < 0.05$; **, $p < 0.01$.

Interpreting Table 9, it can be observed that only the age variable established a small positive correlation with the BMI variable ($r = 0.216$, $p < 0.05$). Apart from the association with variable age, BMI did not correlate with any other variable. As this group included only individuals who do not engage in PA, the columns related to the variable mean practice time were not included in this table. Like the previous groups, the variables related to the Mental Health Inventory dimensions established moderate-to-strong positive correlations among themselves, which was to be expected.

3.5. Group That Practices PE

Table 10 shows the results referring to the means, SDs, amplitudes, and 95% CIs for the different dimensions of the Mental Health Inventory for the group that practices PE.

Table 10. Mental Health Inventory scores for the exercise group.

	Mean ± SD	Min–Max	(95% CI)
Anxiety	39.78 ± 9.59	(10–60)	(19–58)
Depression	19.89 ± 4.15	(5–29)	(10–29)
Loss of Behavioral/Emotional Control	39.64 ± 7.76	(9–77)	(20–53)
General Positive Affect	41.01 ± 9.48	(11–66)	(23–66)
Emotional Ties	12.05 ± 3.15	(3–18)	(4–18)
Psychological Distress	99.30 ± 20.42	(24–166)	(53–139)
Psychological Well-Being	43.05 ± 11.43	(14–84)	(28–83)
Total score—Mental Health Inventory	152.37 ± 30.59	(38–250)	(82–215)

Notes: SD, standard deviation; CI, confidence interval.

The last dimension, corresponding to the total of the previous dimensions, presented a mean score of 152.37 (±30.59), with a CI between 82 and 215.

In Table 11, the correlations between the Mental Health Inventory variables, together with age, BMI, and the mean practice time of PE per session (in minutes), are shown.

Table 11. Bivariate correlations between the variables studied for the PE group.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Age (years)	1											
2. BMI (kg/m^2)	0.134 *	1										
3. Mean practice time (min)	0.014	0.024	1									
4. Minutes per week (min)	0.070	−0.007	0.337 **	1								
5. Anxiety	0.000	0.039	0.038	−0.028	1							
6. Depression	−0.067	0.046	0.104	0.014	0.854 **	1						
7. Loss of Behavioral/ Emotional Control	−0.018	0.066	0.110	−0.024	0.832 **	0.864 **	1					
8. General Positive Affect	−0.011	0.046	0.098	−0.041	0.790 **	0.781 **	0.784 **	1				
9. Emotional Ties	0.037	−0.022	0.039	−0.010	0.466 **	0.502 **	0.549 **	0.517 **	1			
10. Psychological Distress	−0.020	0.052	0.081	−0.019	0.960 **	0.933 **	0.947 **	0.827 **	0.529 **	1		
11. Psychological Well-Being	0.783 **	0.032	0.092	−0.032	0.783 **	0.786 **	0.801 **	0.972 **	0.704 **	0.832 **	1	
12. Total score—Mental Health Inventory	−0.013	0.047	0.089	−0.025	0.933 **	0.916 **	0.931 **	0.915 **	0.616 **	0.978 **	0.929 **	1

Note: *, $p < 0.05$; **, $p < 0.01$.

Finally, Table 11 shows that the age variable established two significant positive correlations, namely a small one with the BMI variable ($r = 0.134$, $p < 0.05$) and a strong one with psychological well-being ($r = 0.783$, $p < 0.01$). No significant correlations were found for the BMI and mean practice time variables. The minutes per week were not associated with any of the variables studied except for the mean practice time ($r = 0.337$, $p < 0.01$).

As was the case with the previous groups, the dimensions of the Mental Health Inventory established moderate-to-strong positive correlations with each other.

Regarding the differences between groups, there was no significant effect of group (BMI group $\geq$ 25 kg/m^2 vs. BMI group < 25 kg/m^2) on the dependent variables, $\Lambda = 0.984$, $F(5, 408) = 1.343$, $p = 0.245$, $\eta^2 p = 0.16$. Regarding the differences between groups, there was a significant effect of the type of group (non-exercise vs. exercise groups) on the dependent variables: $\Lambda = 0.972$, $F(5, 408) = 2.329$, and $p = 0.042$, $\eta^2 p = 0.28$. The results indicate the significant effect of the independent variable on the loss of behavioral/emotional control ($F(1,412) = 6.575$, $p = 0.011$, $\eta^2 p = 0.016$), general positive affect ($F(1,412) = 9.128$, $p = 0.003$, $\eta^2 p = 0.022$), psychological well-being ($F(1,412) = 9.121$, $p = 0.003$, $\eta^2 p = 0.022$), psychological distress ($F(1,412) = 5.423$, $p = 0.020$, $\eta^2 p = 0.013$), and MHI ($F(1,412) = 7.214$, $p = 0.008$, $\eta^2 p = 0.017$), with the physical exercise group showing better values in all variables, apart from Psychological well-being.

4. Discussion

The aim of this study was to verify the association between mental health, BMI, and PE in young adults. To better answer the initial objective, this study initially presented six hypotheses. Of these, the hypotheses under study were partially accepted since there was an association between mental health and PE among the young adults in the total sample, but there was an association between mental health and PE in young adults with a BMI < 25 kg/m^2.

4.1. BMI

The mean BMI for the total sample suggests that a lot of participants are near the overweight range (24.24 $\pm$ 5.05); even so, the maximum and minimum values (16.73–52.08) show a high range of weight among the participants, with some participants below a healthy weight (BMI < 18.5 kg/m^2) and others in grade 3 obesity (BMI $\geq$ 40 kg/m^2).

Regarding correlations, a small positive correlation was found between the variables of age and BMI ($r = 0.120$ to 0.216) in all groups. This result indicates that for the total sample of young adults in this study, BMI showed a tendency to increase slightly with age. In other words, as young people advance in age, there is a tendency to gain weight, which may be associated with factors such as changes in lifestyle, including less PA, changes in eating habits, and more sedentary lifestyles, which is typical of the transition to adulthood [33]. However, these factors were not controlled in the present study. This correlation was strongest in the group that did not practice PE, indicating that regular practice of PE can mitigate the increase in BMI over time. This corroborates the importance of regular exercise in controlling body weight, as it increases calorific expenditure, especially if performed with intensity, and increases the resting metabolic rate [38]. In addition, PE also has an influence on appetite control, especially regarding "emotional eating" [41]. This bad eating habit can be related to both overconsumption and poor food choices (less healthy foods) [6]. With this control of eating habits to which PE can be associated, there is also a lower probability of an increase in BMI [42].

4.2. Mental Health Inventory Dimensions

For the total dimension, which is intended to reflect the level of mental health, we found very similar score values for the groups analyzed between 138.66 ($\pm$31.06) and 152.37 ($\pm$30.59). These values can be considered moderate, considering their amplitude (38–250). The wide variability of responses reflected in the CI indicates different experiences between individuals. While some have low mental health values, near the minimum, others have values approaching the maximum.

The highest mean score for the total dimension was found in the group that practiced PE. This result is consistent with other published studies that show the psychological benefits of PE, namely its effectiveness in reducing symptoms of depression, anxiety, and stress and its contribution to psychological well-being [43]. This is due to the stimulation caused by PE that produces neurotransmitters such as endorphins, which are responsible for feelings of pleasure and well-being, and a reduction in levels of cortisol, which is responsible for stress levels [28].

On the other hand, the lowest value was found in the group that did not practice PE. These results indicate that individuals who practice PE have a better state of mental health in this study sample. The absence of PE practice can result in higher levels of psychological distress, including a greater risk of depression and anxiety symptoms [29].

Table 6, corresponding to the group with BMI $\geq$25 kg/m^2, shows a significant, although weak, correlation between the BMI and depression variables ($r = -0.174$, $p < 0.05$). Since higher values for each dimension of BMI correspond to better mental health, this negative correlation indicates that as BMI increases, depression levels tend to be higher (i.e., poor mental health). These data corroborate evidence showing that individuals who are overweight or obese tend to experience symptoms of depression more often, generating the snowball effect: obesity as a cause and consequence of mental illness [8]. This may be due to a combination of psychosocial factors such as stigma, discrimination, and body image dissatisfaction [44]. This fact indicates the need for interventions that go further than simply reducing weight and addressing emotional and social factors that affect depression [45]. Another study has shown that a focus on weight reduction in interventions can be reductive to improving physical and mental well-being and that a focus on health, rather than weight reduction, leads to better results [46].

In the group that practices PE, a strong positive correlation was found between the variables of age and psychological well-being ($r = 0.783$, $p < 0.01$), which may indicate that as young adults advance in age, they tend to show a significant increase in psychological well-being. A study by Bewick et al. [47] showed that there is a tendency for well-being to gradually increase between the ages of 18 and 25. The fact that this strong correlation was found in the group that practiced PE suggests that PE can amplify this effect. Regular PA practice is known to improve emotional regulation [35], increase levels of positive affect, and strengthen social ties, which are key components of psychological well-being [48]. Thus, PE can help improve an individual's emotional and mental state as they age. Young adults who remain physically active as they age tend to maintain a healthier lifestyle, which can include positive socializing, self-care, and eating habits [49]. In addition, the positive impact of PE on psychological well-being can be mediated by factors such as improved self-image, socialization, and stress reduction [50], thus suggesting that the psychological benefits of PE are not only direct but are also mediated by various social, emotional, and psychological factors.

4.3. Mean Practice Time

In the total sample, the high percentage of individuals who do not practice PE (31.7%) is notable. This concerns the data since PE is strongly associated with better mental health results [34].

The mean practice time was similar in all the groups analyzed except for the non-practicing group. For the total sample, the mean practice time was 57.34 ($\pm$28.85), with 31.7% not practicing PE. In the group that practiced PE, for 68.3% of the total sample, the mean practice time was 65.18 ($\pm$26.31). In groups with BMI $\geq$25 and <25 kg/m^2, the mean practice time was 66.70 ($\pm$26.99) and 64.47 ($\pm$26.02) minutes, respectively. Although there is a small difference in the mean practice time between the latter groups, it is too small to

suggest that individuals with a higher BMI spend significantly more time exercising. Both groups have very similar practice times, with a variation within the limits of the standard deviation, which indicates that the distribution of PE time between the two groups is very similar.

Regarding correlations, it was found that this variable, for the total sample and for the group with BMI < 25 kg/m^2, establishes positive correlations with Mental Health Inventory dimensions, i.e., more time spent practicing PE is consistent with a better level of mental health in these individuals. This suggests that longer PE sessions may be related to better mental health. This corroborates the study by Nakagawa et al. [25], which associated the amount of PE performed with better psychological development and well-being. In addition, the absence of PE can increase anxiety levels [29], and its regular practice is associated with the liberation of endorphins and other neurochemical substances that contribute to improving mood and reducing depressive symptoms [28].

4.4. Differences Between Groups

The results of this study indicate that physical exercise is associated with significant differences in various dimensions of mental health, suggesting a positive impact of exercise on the mental health of participants. Specifically, participants who practiced physical exercise showed higher levels of general positive affect, as well as lower levels of loss of behavioral/emotional control and psychological distress. In addition, the exercise group also showed higher scores on the general index of the Mental Health Inventory. These results reinforce the literature that points to physical exercise as a protective factor for mental health [51]. However, it is interesting to note that the group that does not exercise has more favorable psychological well-being scores, suggesting that this specific domain may be influenced by factors other than exercise [52]. This finding emphasizes the complexity of the relationship between exercise and psychological well-being, highlighting the need for future research that explores additional mechanisms, such as social support, intrinsic motivation, and perceived self-efficacy, which can mediate or moderate these effects.

4.5. Limitations

The data collected for this study were self-reported online, which may present limitations, but only in this form was it possible to obtain the required sample. The study has a limitation inherent to its cross-sectional design, in which participants were only assessed once. This may compromise the representativeness of the responses since they are conditioned to the momentary state of the participants at the time of the assessment. The use of the Mental Health Inventory, due to its length, may have contributed to potential participants giving up or not signing up to complete the questionnaire. In addition, the complexity of interpreting this instrument may have made it difficult to analyze the results. The exclusion of the shortened version of the Mental Health Inventory comprising only five questions may have been a missed opportunity to reduce the drop-out rate and increase the number of participants involved. The use of BMI as a measure of overweight and obesity can be considered a limitation, especially in a study that includes practitioners of physical exercise (PE), such as bodybuilding, for hypertrophy. In these individuals, their body composition may show high muscle mass values, which may result in a high BMI without necessarily reflecting excess fat mass. In addition, the use of declarative weight and height values can introduce bias into BMI calculations. The assessment of PE practice using self-report instruments may have introduced bias due to the subjectivity inherent in this type of methodology. This may have affected the accuracy of the results obtained. This study did not control several variables that could act as confounding factors, such as diet (eating behavior), socioeconomic status, clinical diagnoses, consultations with

psychologists, or medical records and pre-existing mental health conditions. The lack of control over these variables may have influenced the results observed.

It is recommended that future studies adopt longitudinal designs, allowing responses to be assessed over time. This would enable a more robust analysis of the relationships between variables and the identification of temporal patterns. It is also suggested that regression analyses be carried out to explore the relationships between the variables of interest, providing a more detailed understanding of the factors associated with the observed results. The use of shorter, easy-to-interpret assessment instruments, such as the short version of the Mental Health Inventory, is recommended to increase participant adherence and reduce the drop-out rate. In addition, the use of validated instruments with more robust questions could improve the quality of the data collected. For studies that include bodybuilding or hypertrophy practitioners, it is suggested that more precise measures of body composition, such as bioimpedance or densitometry, instead of BMI, are used to avoid misinterpretations related to body weight. It is recommended that qualitative methodologies be incorporated into future studies to explore participants' perceptions of the impact of physical exercise on mental health. This could provide additional insights and complement the quantitative data. Future studies should also consider controlling variables such as diet, socioeconomic status, and pre-existing mental health conditions to reduce potential confounding factors and increase the internal validity of the results.

5. Conclusions

The health benefits of PE have been recognized for a long time, and data on mental health has already been reported. This study, which is in accordance with the literature, reinforces what had already been published. In short, this study confirms the association between PE and mental health in young adults, regardless of their BMI. In addition, it was found that BMI can have an association with depressive symptoms. The results also suggest that practicing physical exercise is associated with better indicators of mental health compared to not practicing exercise.

This study highlights the relevance of regular PE practice as a crucial factor not only for weight control but also for the promotion of mental health, especially in young adults, suggesting that interventions focused on multiple dimensions of physical and psychological well-being can be effective in improving mental state.

Author Contributions: Conceptualization, T.G., D.M. and M.J.; methodology, T.G., D.M. and M.J.; software, T.G., D.M. and M.J.; validation, T.G., D.M. and M.J.; formal analysis, D.M. and M.J.; investigation, T.G., D.M. and M.J.; resources, T.G.; data curation, T.G., D.M. and M.J.; writing—original draft preparation, T.G.; writing—review and editing, T.G., D.M., R.M., P.D.-M., N.C., R.A., S.D., N.A. and M.J.; visualization, D.M., R.M., P.D.-M., N.C., R.A., S.D., N.A. and M.J.; supervision, D.M. and M.J.; project administration, D.M. and M.J.; funding acquisition, D.M., R.M., N.C., R.A., S.D., N.A. and M.J. All authors have read and agreed to the published version of the manuscript.

Funding: FCT - Portuguese Foundation for Science and Technology under the following project UI/04045.

Institutional Review Board Statement: This study was conducted in accordance with the principles outlined in the 1964 Helsinki Declaration and its subsequent revisions or comparable ethical standards. This study was approved on the 9 February 2024 by the Ethics Committee of the Polytechnic University of Leiria (approval no. 04/2024).

Informed Consent Statement: Informed consent was obtained from all subjects involved in this study. Written informed consent was obtained from the patient(s) to publish this paper.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

BMI	Body Mass Index
CI	Confidence interval
PA	Physical activity
PE	Physical exercise
SD	Standard deviation
WHO	World Health Organization

References

1. World Health Organization. *Obesity and Overweight*; World Health Organization: Geneva, Switzerland, 2022.
2. Streb, A.R.; Passos da Silva, R.; Leonel, L.D.S.; Possamai, L.T.; Gerage, A.M.; Turnes, T.; Del Duca, G.F. Effects of Nonperiodized and Linear Periodized Combined Training on Health-Related Physical Fitness in Adults With Obesity: A Randomized Controlled Trial. *J. Strength Cond. Res.* **2022**, *36*, 2628–2634. [CrossRef]
3. Dwivedi, A.K.; Dubey, P.; Cistola, D.P.; Reddy, S.Y. Association Between Obesity and Cardiovascular Outcomes: Updated Evidence from Meta-Analysis Studies. *Curr. Cardiol. Rep.* **2020**, *22*, 25. [CrossRef]
4. Mesas, A.E.; Muñoz-Pareja, M.; López-García, E.; Rodríguez-Artalejo, F. Selected Eating Behaviours and Excess Body Weight: A Systematic Review. *Obes. Rev.* **2012**, *13*, 106–135. [CrossRef]
5. Zainal Abidin, N.; Mamat, M.; Dangerfield, B.; Zulkepli, J.H.; Baten, M.A.; Wibowo, A. Combating Obesity through Healthy Eating Behavior: A Call for System Dynamics Optimization. *PLoS ONE* **2014**, *9*, e114135. [CrossRef]
6. Martinez-Avila, W.D.; Sanchez-Delgado, G.; Acosta, F.M.; Jurado-Fasoli, L.; Oustric, P.; Labayen, I.; Blundell, J.E.; Ruiz, J.R. Eating Behavior, Physical Activity and Exercise Training: A Randomized Controlled Trial in Young Healthy Adults. *Nutrients* **2020**, *12*, 3685. [CrossRef]
7. Althumiri, N.A.; BinDhim, N.F.; Alqahtani, S.A. Prevalence of Physical Inactivity and Sedentary Behaviors and Associations with Obesity among Saudi Adults. *BMC* 2020, *preprint*.
8. Forte, G.; Favieri, F.; Pazzaglia, M.; Casagrande, M. Mental and Body Health: The Association between Psychological Factors, Overweight, and Blood Pressure in Young Adults. *J. Clin. Med.* **2022**, *11*, 1999. [CrossRef]
9. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*, 5th ed.; Text Rev.; American Psychiatric Association: Washington, DC, USA, 2022.
10. European Commission. *Eurobarometer on Mental Health*; European Commission: Brussels, Belgium, 2023.
11. Lin, H.-Y.; Huang, C.-K.; Tai, C.-M.; Lin, H.-Y.; Kao, Y.-H.; Tsai, C.-C.; Hsuan, C.-F.; Lee, S.-L.; Chi, S.-C.; Yen, Y.-C. Psychiatric Disorders of Patients Seeking Obesity Treatment. *BMC Psychiatry* **2013**, *13*, 1. [CrossRef]
12. Petry, N.M.; Barry, D.; Pietrzak, R.H.; Wagner, J.A. Overweight and Obesity Are Associated with Psychiatric Disorders: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Psychosom. Med.* **2008**, *70*, 288–297. [CrossRef] [PubMed]
13. Tomiyama, A.J. Stress and Obesity. *Annu. Rev. Psychol.* **2019**, *70*, 703–718. [CrossRef] [PubMed]
14. Jung, F.U.; Luck-Sikorski, C. Overweight and Lonely? A Representative Study on Loneliness in Obese People and Its Determinants. *Obes. Facts* **2019**, *12*, 440–447. [CrossRef]
15. Karakitsiou, G.; Plakias, S.; Christidi, F.; Tsiakiri, A. Unraveling Childhood Obesity: A Grounded Theory Approach to Psychological, Social, Parental, and Biological Factors. *Children* **2024**, *11*, 1048. [CrossRef] [PubMed]
16. Megías, A.; Gómez-Leal, R.; Gutiérrez-Cobo, M.J.; Cabello, R.; Fernández-Berrocal, P. The Relationship between Aggression and Ability Emotional Intelligence: The Role of Negative Affect. *Psychiatry Res.* **2018**, *270*, 1074–1081. [CrossRef]
17. Carraça, E.V.; Encantado, J.; Battista, F.; Beaulieu, K.; Blundell, J.E.; Busetto, L.; van Baak, M.; Dicker, D.; Ermolao, A.; Farpour-Lambert, N.; et al. Effect of Exercise Training on Psychological Outcomes in Adults with Overweight or Obesity: A Systematic Review and Meta-Analysis. *Obes. Rev.* **2021**, *22* (Suppl. S4), e13261. [CrossRef] [PubMed]
18. Malm, C.; Jakobsson, J.; Isaksson, A. Physical Activity and Sports-Real Health Benefits: A Review with Insight into the Public Health of Sweden. *Sports* **2019**, *7*, 127. [CrossRef]
19. Stea, T.H.; Solaas, S.A.; Kleppang, A.L. Association between Physical Activity, Sedentary Time, Participation in Organized Activities, Social Support, Sleep Problems and Mental Distress among Adults in Southern Norway: A Cross-Sectional Study among 28,047 Adults from the General Population. *BMC Public Health* **2022**, *22*, 384. [CrossRef] [PubMed]
20. European Comission. *Special Eurobarometer 575—Sport and Physical Activity*; European Comission: Brussels, Belgium, 2022.

21. Bull, F.C.; Al-Ansari, S.S.; Biddle, S.; Borodulin, K.; Buman, M.P.; Cardon, G.; Carty, C.; Chaput, J.-P.; Chastin, S.; Chou, R.; et al. World Health Organization 2020 Guidelines on Physical Activity and Sedentary Behaviour. *Br. J. Sports Med.* **2020**, *54*, 1451–1462. [CrossRef]
22. Caspersen, C.J.; Powell, K.E.; Christenson, G.M. Physical Activity, Exercise, and Physical Fitness: Definitions and Distinctions for Health-Related Research. *Public Health Rep.* **1985**, *100*, 126–131.
23. Guddal, M.H.; Stensland, S.Ø.; Småstuen, M.C.; Johnsen, M.B.; Zwart, J.-A.; Storheim, K. Physical Activity and Sport Participation among Adolescents: Associations with Mental Health in Different Age Groups. Results from the Young-HUNT Study: A Cross-Sectional Survey. *BMJ Open* **2019**, *9*, e028555. [CrossRef]
24. Fossati, C.; Torre, G.; Vasta, S.; Giombini, A.; Quaranta, F.; Papalia, R.; Pigozzi, F. Physical Exercise and Mental Health: The Routes of a Reciprocal Relation. *Int. J. Environ. Res. Public Health* **2021**, *18*, 12364. [CrossRef]
25. Nakagawa, T.; Koan, I.; Chen, C.; Matsubara, T.; Hagiwara, K.; Lei, H.; Hirotsu, M.; Yamagata, H.; Nakagawa, S. Regular Moderate- to Vigorous-Intensity Physical Activity Rather Than Walking Is Associated with Enhanced Cognitive Functions and Mental Health in Young Adults. *Int. J. Environ. Res. Public Health* **2020**, *17*, 614. [CrossRef] [PubMed]
26. Alam, N.; Rufo, N. Fitness as a Component of Mental Health Intervention. *Health Soc. Work* **2019**, *44*, 129–132. [CrossRef] [PubMed]
27. Bernstein, E.E.; McNally, R.J. Acute Aerobic Exercise Helps Overcome Emotion Regulation Deficits. *Cogn. Emot.* **2017**, *31*, 834–843. [CrossRef] [PubMed]
28. Chen, C.; Nakagawa, S. Recent Advances in the Study of the Neurobiological Mechanisms behind the Effects of Physical Activity on Mood, Resilience and Emotional Disorders. *Adv. Clin. Exp. Med.* **2023**, *32*, 937–942. [CrossRef]
29. Blough, J.; Loprinzi, P.D. Experimentally Investigating the Joint Effects of Physical Activity and Sedentary Behavior on Depression and Anxiety: A Randomized Controlled Trial. *J. Affect Disord.* **2018**, *239*, 258–268. [CrossRef]
30. Dietz, W.H. Obesity and Excessive Weight Gain in Young Adults: New Targets for Prevention. *JAMA* **2017**, *318*, 241–242. [CrossRef]
31. Wane, S.; van Uffelen, J.G.Z.; Brown, W. Determinants of Weight Gain in Young Women: A Review of the Literature. *J. Womens Health* **2010**, *19*, 1327–1340. [CrossRef]
32. Katsoulis, M.; Lai, A.G.; Diaz-Ordaz, K.; Gomes, M.; Pasea, L.; Banerjee, A.; Denaxas, S.; Tsilidis, K.; Lagiou, P.; Misirli, G.; et al. Identifying Adults at High-Risk for Change in Weight and BMI in England: A Longitudinal, Large-Scale, Population-Based Cohort Study Using Electronic Health Records. *Lancet Diabetes Endocrinol.* **2021**, *9*, 681–694. [CrossRef]
33. Molenaar, A.; Choi, T.S.; Brennan, L.; Reid, M.; Lim, M.S.; Truby, H.; McCaffrey, T.A. Language of Health of Young Australian Adults: A Qualitative Exploration of Perceptions of Health, Wellbeing and Health Promotion via Online Conversations. *Nutrients* **2020**, *12*, 887. [CrossRef]
34. Singh, B.; Olds, T.; Curtis, R.; Dumuid, D.; Virgara, R.; Watson, A.; Szeto, K.; O'Connor, E.; Ferguson, T.; Eglitis, E.; et al. Effectiveness of Physical Activity Interventions for Improving Depression, Anxiety and Distress: An Overview of Systematic Reviews. *Br. J. Sports Med.* **2023**, *57*, 1203–1209. [CrossRef]
35. Edwards, M.K.; Rhodes, R.E.; Mann, J.R.; Loprinzi, P.D. Effects of Acute Aerobic Exercise or Meditation on Emotional Regulation. *Physiol. Behav.* **2018**, *186*, 16–24. [CrossRef] [PubMed]
36. World Medical Association. World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects. *JAMA* **2013**, *310*, 2191–2194. [CrossRef] [PubMed]
37. Faul, F.; Erdfelder, E.; Buchner, A.; Lang, A.-G. Statistical Power Analyses Using G*Power 3.1: Tests for Correlation and Regression Analyses. *Behav. Res. Methods* **2009**, *41*, 1149–1160. [CrossRef] [PubMed]
38. Petridou, A.; Siopi, A.; Mougios, V. Exercise in the Management of Obesity. *Metab.-Clin. Exp.* **2019**, *92*, 163–169. [CrossRef]
39. Pais-Ribeiro, J. Mental Health Inventory: A Study of Adaptation to Portuguese Population. *Psicol. Saúde Doenças* **2001**, *2*, 77–99.
40. Cohen, J.; Cohen, P.; West, S.G.; Aiken, L.S. *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*, 3rd ed.; Routledge: New York, NY, USA, 2013; ISBN 978-0-203-77444-1.
41. Blundell, J.E.; Gibbons, C.; Caudwell, P.; Finlayson, G.; Hopkins, M. Appetite Control and Energy Balance: Impact of Exercise. *Obes. Rev.* **2015**, *16*, 67–76. [CrossRef]
42. Sarwar, S.; Qamar, I.; Malik, H.; Sarfraz, F.; Jamil, H.; Mehfooz, Q. Correlation of Eating Habits and Physical Activity with BMI. *Pak. J. Med. Health Sci.* **2022**, *16*, 416. [CrossRef]
43. Li, Z.; Li, J.; Kong, J.; Li, Z.; Wang, R.; Jiang, F. Adolescent Mental Health Interventions: A Narrative Review of the Positive Effects of Physical Activity and Implementation Strategies. *Front. Psychol.* **2024**, *15*, 1433698. [CrossRef]
44. Puhl, R.M.; Heuer, C.A. Obesity Stigma: Important Considerations for Public Health. *Am. J. Public Health* **2010**, *100*, 1019–1028. [CrossRef]
45. Renna, M.E.; Quintero, J.M.; Fresco, D.M.; Mennin, D.S. Emotion Regulation Therapy: A Mechanism-Targeted Treatment for Disorders of Distress. *Front. Psychol.* **2017**, *8*, 98. [CrossRef]

46. Bacon, L.; Bacon, L. *Health At Every Size: The Surprising Truth About Your Weight*, 2nd ed.; BenBella Books: Dallas, TX, USA, 2010; ISBN 978-1-935618-25-6.
47. Bewick, B.; Koutsopoulou, G.; Miles, J.; Slaa, E.; Barkham, M. Changes in Undergraduate Students' Psychological Well-being as They Progress through University. *Stud. High. Educ.* **2010**, *35*, 633–645. [CrossRef]
48. Gander, F.; Proyer, R.T.; Ruch, W. Positive Psychology Interventions Addressing Pleasure, Engagement, Meaning, Positive Relationships, and Accomplishment Increase Well-Being and Ameliorate Depressive Symptoms: A Randomized, Placebo-Controlled Online Study. *Front. Psychol.* **2016**, *7*, 686. [CrossRef] [PubMed]
49. Nagata, J.M.; Vittinghoff, E.; Pettee Gabriel, K.; Garber, A.K.; Moran, A.E.; Rana, J.S.; Reis, J.P.; Sidney, S.; Bibbins-Domingo, K. Moderate-to-Vigorous Intensity Physical Activity from Young Adulthood to Middle Age and Metabolic Disease: A 30-Year Population-Based Cohort Study. *Br. J. Sports Med.* **2022**, *56*, 847–853. [CrossRef] [PubMed]
50. Gualdi-Russo, E.; Rinaldo, N.; Zaccagni, L. Physical Activity and Body Image Perception in Adolescents: A Systematic Review. *Int. J. Environ. Res. Public Health* **2022**, *19*, 13190. [CrossRef]
51. Grasdalsmoen, M.; Eriksen, H.R.; Lønning, K.J.; Sivertsen, B. Physical Exercise, Mental Health Problems, and Suicide Attempts in University Students. *BMC Psychiatry* **2020**, *20*, 175. [CrossRef]
52. Chhatre, A.; Pharaskhanewala, N. Physical Exercise And Psychological Well-Being: A Comparative Study In Adulthood Population. *Prev. Med.* **2022**, *30*, 17–25.