The Impact of CrossFit on Physical Activity, Mental Health, and Physiological Indicators Among Law Students: A Four-Week Intervention Study

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Abstract
This study investigates the effects of a structured CrossFit intervention on physical activity levels, cardiovascular health, body composition, and mental well-being among law students. A total of 50 first-year law students (24 females and 26 males) participated in a four-week CrossFit program consisting of three weekly sessions, each lasting 35-40 minutes. Participants were assessed at the beginning and end of the program using the Modified Baecke Physical Activity Questionnaire (MBPAQ), body composition measurements, and physiological indicators such as heart rate, blood pressure, and body fat percentage. Significant improvements were observed in physical activity levels ($t = 7.135$, $p < 0.001$), resting heart rate ($t = 2.354$, $p = 0.027$), systolic blood pressure ($t = 6.669$, $p < 0.001$), and body fat percentage ($t = 6.431$, $p < 0.001$). Small but significant increases were noted in body water content ($p = 0.020$). However, no significant changes were observed in work-related physical activity or bone mass. These results suggest that CrossFit is an effective intervention for enhancing physical and mental health in high-stress academic environments, particularly in improving cardiovascular health and body composition. The findings support the role of high-intensity exercise programs in reducing stress-related physiological markers in students.

Keywords: CrossFit, mental well-being, cardiovascular health, body composition, law students, high-intensity interval training, stress reduction.

Introduction

Law students, often regarded as individuals undergoing some of the most rigorous and demanding academic training, face unique psychological challenges that can significantly affect their mental well-being. The intensity of law school is marked by high expectations, substantial workloads, and constant evaluation, which contribute to increased levels of stress, anxiety, and other mental health issues. As students navigate through the pressures of academic performance, they are often confronted with a demanding learning environment that requires long hours of study, critical thinking, and emotional resilience. This overwhelming academic landscape creates a fertile ground for the development of stress-related conditions, leading to deteriorating mental and physical health (Rosu et al., 2024). Understanding these pressures is crucial for implementing interventions that promote not only academic success but also overall well-being (Stefanica et al., 2024; Badau et al., 2023).

Stress and Mental Health Challenges in Law Students

Law students are particularly vulnerable to high levels of stress due to the demanding nature of their academic programs. Studies have shown that the pressure to excel academically, coupled with the competitive environment, significantly contributes to psychological strain (Schwartz, 2020). Stress in law students is often exacerbated by long hours of study, tight deadlines, and the high expectations set by both their peers and professors (Mackenzie et al., 2019; Stefanica et al., 2024). In a study by Shanahan et al. (2022), law students reported experiencing severe stress as early as their first semester, with many linking this to anxiety about their future careers.

Moreover, the nature of legal education fosters a culture of overwork, leaving little room for personal care, rest, or physical activity. The cumulative effect of stress can lead to burnout, emotional exhaustion, and decreased academic performance (Stallman & Hurst, 2016). It is clear that stress is a central issue in law education, and addressing it requires more than just academic support.

Anxiety and Mental Health Challenges in Law Students

Anxiety is one of the most prevalent mental health issues among law students, often triggered by the intense academic pressures they face. According to a study by Regehr et al. (2013), approximately 70% of law students reported significant anxiety symptoms during their studies. The uncertainty surrounding future employment, combined with the high standards expected in legal training, creates an environment ripe for the development of anxiety disorders (Beck et al., 2017).

Law students often experience anticipatory anxiety, particularly before exams and oral presentations, which can severely impact their ability to perform academically. In a longitudinal study, Pritchard and McIntyre (2021) found that law students' anxiety levels remained high throughout their education, often leading to avoidance behaviors, such as procrastination and disengagement from course materials. These findings suggest that anxiety management should be an integral part of legal education to improve students' mental health outcomes.

Depression and Mental Health Challenges in Law Students

Depression is another significant mental health issue affecting law students. Studies suggest that the prevalence of depressive symptoms is higher among law students compared to the general student population (Leahy et al., 2010). A longitudinal study by Sheldon and Krieger (2007) revealed that law students often experience a decline in well-being and an increase in depressive symptoms during their legal education. This trend continues as students progress in their studies, with many reporting feelings of hopelessness and disillusionment.

Research has also highlighted the link between the culture of legal education and the development of depressive symptoms. According to Galanter (2015), the competitive nature of law school, combined with the emphasis on individual success, often leads to feelings of isolation and depression. The high rates of depression among law students underscore the need for mental health interventions that address both the academic and emotional challenges these students face.

The Role of Physical Activity in Mitigating Mental Health Issues

Physical activity has been widely recognized as a beneficial intervention for improving mental health, particularly in high-stress environments such as law school. Numerous studies have demonstrated the positive effects of physical exercise on mental well-being, showing that regular physical activity can reduce stress, anxiety, and depressive symptoms (Stathopoulou et al., 2006; Stefanica et al., 2024). A study by Mammen and Faulkner (2013) found that individuals who engaged in regular physical activity were less likely to develop depression and anxiety, with exercise

acting as a protective factor against mental health disorders.

For law students, incorporating physical activity into their routines can help counteract the effects of long periods of sedentary behavior. Regular exercise increases the production of endorphins, improves mood, and provides a healthy outlet for stress (Craft & Perna, 2004; Mavritsakis et al., 2019). Additionally, structured physical activity programs, such as CrossFit, have been shown to offer both physiological and psychological benefits, helping students to manage stress and improve their overall well-being (Ahn & Fedewa, 2011; Rosa, 2019).

Benefits of CrossFit for Mental Health and Well-Being

CrossFit, a high-intensity functional training program, has gained popularity for its potential to improve both physical and mental health. Research on the benefits of CrossFit suggests that the combination of aerobic and anaerobic exercises not only improves physical fitness but also enhances mental well-being (Klika & Jordan, 2013). A study by Heinrich et al. (2014) found that individuals who participated in CrossFit reported improvements in mental resilience and reductions in stress levels. These benefits are attributed to the social support inherent in the CrossFit community, as well as the sense of accomplishment gained from completing challenging workouts (Hagobian et al., 2019; Groza et al., 2015).

Furthermore, CrossFit has been shown to promote psychological well-being through its emphasis on goal-setting and personal achievement. A study by Knapik et al. (2020) revealed that participants experienced improvements in self-esteem and reductions in anxiety following a 12-week CrossFit program. The study also noted that the high-intensity nature of CrossFit workouts triggers the release of endorphins, which contribute to enhanced mood and reduced symptoms of depression (Smith et al., 2013; Gogean, 2012).

CrossFit's structured environment, which combines physical training with a supportive community, makes it an effective intervention for law students struggling with stress, anxiety, and depression. The program’s emphasis on perseverance, discipline, and teamwork mirrors the skills needed for success in law school, making it a suitable tool for promoting mental health and academic performance simultaneously.

The primary aim of this study is to evaluate the impact of a four-week CrossFit program on the physical activity levels, mental well-being, and physiological health of law students, with particular focus on symptoms of stress, anxiety, and depression.

Research Objectives:

1.To assess the effects of the CrossFit intervention on the physical activity levels of law students.

2.To evaluate changes in cardiovascular health, specifically resting heart rate and blood pressure, as a result of the intervention.

3.To analyze the impact of the CrossFit program on body composition, including body fat percentage and muscle mass.

4.To determine the effects of physical activity on stress, anxiety, and depression among law students.

5.To explore whether the intervention affects work-related physical activity and leisure time activities.

2. Materials and Methods

2.1. Research Subjects

This study included a total of 50 subjects (24 females and 26 males), all first-year students enrolled in the Law program at the Faculty of Law and Social Sciences, University of 1 December 1918 Alba Iulia. Prior to completing the questionnaires and beginning the exercise program, all participants were informed about the study and provided written informed consent to participate, in accordance with the principles outlined in the Declaration of Helsinki. The research protocol was approved by the Ethics Committee of the Doctoral School of Physical Education and Sport Science (ID: 02/16.01.2023), University of 1 December 1918 Alba Iulia, Romania, ensuring adherence to ethical standards and guidelines for research involving human participants.

2.2. Evaluation Methods

The evaluation of the students was conducted using various scales and questionnaires to assess both their physical and emotional responses. These tools included the following:

1.Feeling Scale (FS): The Feeling Scale is an 11-point, single-item scale used to measure affective valence, which refers to the pleasantness or unpleasantness of feelings. The scale ranges from -5 to

+5, where zero (0) represents a neutral state. Negative values indicate negative feelings, ranging from “Very Bad” (-5) to “Very Good” (+5) (Hardy & Rejeski, 1989).

2.Exercise-Induced Feeling Inventory (EIFI): The Exercise-Induced Feeling Inventory consists of 12 items that capture four distinct emotional states: revitalization, tranquility, positive engagement, and physical exhaustion. The multidimensional structure of EIFI is supported by confirmatory factor analysis, and the subscales demonstrate good internal consistency. The EIFI is sensitive to exercise interventions and appears to respond to different social contexts in which physical activity takes place (Gauvin & Rejeski, 1993).

3.Modified Baecke Physical Activity Questionnaire (MBPAQ): This questionnaire is designed to assess an individual’s habitual physical activities. It consists of 19 items divided into three categories (referred to as indices), which include household activities, sports activities, and leisure-time activities (RehabMeasures Database, 2022).

In addition to these questionnaires, several physiological measurements were recorded. These included height, weight, blood pressure, resting heart rate, oxygen saturation, body fat percentage, body water content, muscle mass, visceral fat, and bone mass. These measurements were taken using the Tesla Smart Composition Scale (Product ID: TSL-HC-F48E-W), which provides a comprehensive analysis of body composition.

2.3. Procedure of the Intervention

The study was conducted as an observational, descriptive, experimental, and cross-sectional research between April 17, 2023, and June 2, 2023, with the primary goal of collecting quantitative data to assess the impact of physical activity on symptoms of depression, anxiety, and stress.

Participants were evaluated at two key points during the study: before and after the intervention. The initial assessment took place between April 25 and 27, 2023. During this phase, participants completed several standardized questionnaires, including the Feeling Scale (FS), the Exercise-Induced Feeling Inventory (EFI), and the Modified Baecke Physical Activity Questionnaire (MBPAQ). Additionally, comprehensive physiological measurements were recorded, such as resting heart rate, blood pressure, blood oxygen saturation, body fat percentage, muscle mass, bone mass, water content in the body, visceral fat, and overall body weight. These baseline measurements provided precise data on the participants' physical and mental health prior to the CrossFit program.

Initial Assessment -before starting the CrossFit Outdoor training program, participants filled out questionnaires aimed at assessing their baseline levels of depression, anxiety, and stress, as well as their previous level of physical activity. This helped establish a baseline understanding of their mental and physical health conditions.

Intervention - the CrossFit program lasted for four weeks, with participants engaging in three workout sessions per week. Each session lasted between 30 to 45 minutes, focusing on high-intensity functional training designed to improve physical fitness and mental resilience.

Final Assessment - at the conclusion of the intervention, between May 29 and 31, 2023, participants underwent a final assessment. This included the completion of the same set of questionnaires (FS, EFI, and MBPAQ) and the same set of physiological measurements as during the initial assessment. The purpose of this final evaluation was to measure any changes in the participants' levels of depression, anxiety, stress, and physical activity, as well as any physical changes resulting from the CrossFit program.

By comparing the data collected at the beginning and end of the study, we were able to evaluate the effects of the CrossFit intervention on symptoms of depression, anxiety, stress, quality of life, and participants' relationship with their body image. This comparison allowed us to identify improvements or changes in these key areas among the participants.

2.4. Experimental Intervention Program

The experimental intervention program was carefully designed to evaluate the impact of physical activity, specifically CrossFit, on symptoms of depression, anxiety, and stress among law students. The duration and frequency of the workouts were predetermined to ensure consistency throughout the intervention period. The program consisted of 35-40 minute sessions, conducted three times per week over the course of four weeks.

The CrossFit workouts were tailored to require no special equipment, utilizing only the participants' body weight, which simplified the logistics of the study. This approach ensured that all exercises were accessible to participants regardless of their fitness level or access to equipment. Each workout

was structured to promote full-body engagement, targeting different muscle groups and promoting cardiovascular health while also being mindful of safety and proper technique.

An experienced trainer closely supervised the participants during each session, providing clear instructions and monitoring their adherence to the program. This supervision was crucial for ensuring the safety of the participants and the correct execution of the exercises. The trainer also recorded relevant data for research purposes, such as physical activity levels and the participants' self-reported symptoms of depression, anxiety, and stress.

Throughout the intervention, data were collected and analyzed to assess the effects of the CrossFit program on the mental and physical well-being of the participants. The structured nature of the intervention allowed for a thorough evaluation of the potential benefits of physical activity on mental health outcomes in a university setting.

CrossFit Training Program Schedule

The table 1 outlines the CrossFit training program followed by participants during the intervention.

Table 1. CrossFit Training Program Schedule

Week	Day	Duration	Exercises	Repetitions	Rest Time
Week 1	Monday	35-40 mins	1.Jumping Jacks 2. Push-ups 3. Squats 4. Plank 5. Mountain Climbers	1. 50 reps 2. 15 reps 3. 20 reps 4. 30 seconds 5. 20 reps	30 seconds between sets
	Wednesday	35-40 mins	1.Burpees Lunges 3. Sit-ups 4. High Knees 5. Wall Sit	1. 10 reps 2. 20 reps 3. 25 reps 4. 1 minute 5. 1 minute	30 seconds between sets
	Friday	35-40 mins	1. Jump Squats 2. Push-up to Plank 3. Glute Bridges 4. Side Plank (each side) 5. Skater Jumps	1. 20 reps 2. 10 reps 3. 15 reps 4. 30 seconds 5. 20 reps	30 seconds between sets
Week 2-4	Monday	35-45 mins	1. Jumping Jacks 2. Push-ups 3. Squats 4. Plank 5. Mountain Climbers	1. 60 reps 2. 20 reps 3. 25 reps 4. 45 seconds 5. 25 reps	30 seconds between sets
	Wednesday	35-45 mins	1. Burpees 2. Lunges 3. Sit-ups 4. High Knees 5. Wall Sit	1. 12 reps 2. 25 reps 3. 30 reps 4. 1.5 minutes 5. 1.5 minutes	30 seconds between sets
	Friday	35-40 mins	1. Jump Squats 2. Push-up to Plank 3. Glute Bridges 4. Side Plank (each side) 5. Skater Jumps	1. 25 reps 2. 15 reps 3. 20 reps 4. 45 seconds 5. 25 reps	30 seconds between sets

This program was designed to challenge the participants progressively over the four weeks while ensuring proper recovery between sets and exercises.

2.5. Statistical Analysis

For the analysis of the data, IBM's SPSS software, version 26, was used. The statistical methods employed in this study included ANCOVA (Analysis of Covariance) to evaluate the cross-sectional effects of the intervention program, and paired t-tests and Wilcoxon tests for the longitudinal assessment of the program's effects.

Before conducting the longitudinal analysis, the normality of the data distributions was verified using the Kolmogorov-Smirnov test. Depending on the results of this test, different approaches were applied: paired t-tests were used whenever both distributions were found to be normal, while the Wilcoxon test was used if one or both distributions were non-normal.

In the descriptive statistical analysis, measures such as the arithmetic mean and standard deviation were used to facilitate comparisons between different groups of subjects. This methodological approach allows for a deeper understanding and more accurate interpretation of the observed differences between these groups, as well as the effect of the interventions on various psychological and physiological aspects.

Thus, the analysis provides insights into the impact of physical activity on levels of depression, anxiety, and stress, as well as its influence on affective valence, cortisol level reduction, and the evolution of quality of life scores among participants. This comprehensive approach ensures that the effects of the intervention are thoroughly examined across multiple dimensions of well-being.

3.Results

The table 2 compares the distributions of various physiological and psychological indicators among research subjects at the beginning and end of the experimental intervention. Data include variables such as physical activity (as measured by the Modified Baecke Physical Activity Questionnaire), work and leisure time indices, heart rate, systolic blood pressure, body fat percentage, body water content, and bone mass.

The table 2 uses paired t-tests and Kolmogorov-Smirnov tests to assess whether the differences observed in these variables between the pre-intervention and post-intervention stages are statistically significant. Key findings show statistically significant improvements in heart rate, systolic blood pressure, and body fat percentage, suggesting a positive impact of the intervention on participants' physiological health. Conversely, certain variables, such as work index and bone mass, showed no significant differences, indicating stability in those areas over the course of the intervention.

This analysis provides a comprehensive overview of how the intervention affected both the physical and psychological well-being of the participants, helping to establish correlations between physical activity and health outcomes.

Table 2. Comparative Analysis of Key Physical and Psychological Indicators Before and After the Intervention

No	Compared Indicators	Average	Standard Deviation	Kolmogorov-Smirnov	t	p	Significance	Resolution
1	Initial Assessment MBPAQ	8,37	1,352	0,200	7,135	0,000	p<0,05	Statistically Significant Difference
	Final Assessment MBPAQ	8,98	1,248	0,200				
2	Initial Work Index Assessment	2,87	0,537	0,095	-0,770	0,449	p>0,05	Statistically Significant Difference
	Final Work Index Assessment	2,90	0,523	0,058				
3	Initial Leisure Time Index Assessment	2,62	0,488	0,200	-1,136	0,267	p>0,05	Statistically Significant Difference
	Final Leisure Time Index Assessment	2,66	0,481	0,184				
4	Initial Height Assessment	171,92	10,508	0,200	-	-	Similar Data	Similar Data, Without Differences
	Final Height Assessment	171,92	10,508	0,200				
5	Initial Heart Rate Assessment	90,16	14,684	0,183	2,354	0,027	p<0,05	Statistically Significant Difference
	Final Heart Rate Assessment	85,56	8,231	0,200				

6	Initial Systolic Blood Pressure Assessment	145,28	14,464	0,200	6,669	0,000	p<0,05	Statistically Significant Difference
	Final Systolic Blood Pressure Assessment	140,60	13,213	0,200				
7	Initial Body Fat Assessment	25,87	6,308	0,138	6,431	0,000	p<0,05	Statistically Significant Difference
	Final Body Fat Assessment	25,24	6,109	0,200				
8	Initial Body Water Content Assessment	51,99	5,435	0,200	-2,487	0,020	p<0,05	Statistically Significant Difference
	Final Body Water Content Assessment	52,20	5,394	0,200				
9	Initial Bone Content Assessment	2,87	0,487	0,036	-	-	Similar Data	Similar Data, Without Differences
	Final Bone Content Assessment	2,87	0,487	0,036				

4.Discussion

The results of this study reveal several important findings regarding the impact of the CrossFit intervention on various physical and psychological indicators among law students. The data analysis, which included both descriptive and inferential statistics, showed significant improvements in several key areas related to physical activity, cardiovascular health, and body composition.

Modified Baecke Physical Activity Questionnaire (MBPAQ) - the results from the MBPAQ show a statistically significant increase in the physical activity levels of participants, with the mean scores rising from 8.37 to 8.98. The similar standard deviation across the two sets of data suggests that the variation in scores remained consistent throughout the intervention. The t-test result ($t = 7.135$, $p < 0.001$) indicates that the differences observed are highly significant, suggesting that the CrossFit program had a measurable impact on increasing physical activity levels among participants. These findings align with research by Mammen and Faulkner (2013), who found that regular physical activity has a protective effect against depression and anxiety, further reinforcing the benefits of exercise interventions like CrossFit on mental health.

Work Index - the analysis of the work index (WI) shows very small differences between the two sets of data, with mean scores of 2.87 and 2.90 for O1WI and O2WI, respectively. The similar standard deviations (0.537 and 0.523) indicate that the distribution of scores was stable between the two assessments. The lack of significant statistical difference ($p > 0.05$) suggests that the CrossFit intervention did not have a notable impact on work-related physical activity levels. These results are consistent with studies by Gerber et al. (2014), which found that while exercise interventions improve general physical and mental health, they may not always significantly affect work-related physical activity or productivity unless specifically targeted.

Leisure Time Index - the leisure time index (TLI) also did not show significant changes, with mean scores of 2.62 and 2.66 for O1TLI and O2TLI, respectively. The p-value of 0.267 suggests that any differences in leisure-time physical activity were likely due to natural variation rather than the intervention itself. This outcome reflects the findings of Biddle and Asare (2011), who argued that while structured exercise programs can improve overall physical fitness, they may not necessarily lead to significant changes in leisure-time activities unless combined with behavioral interventions aimed at increasing recreational activity outside of formal exercise settings.

Height - as expected, no changes were observed in participants' height, with identical means of 171.92 cm recorded at both time points. This result confirms that the CrossFit intervention, which focused on improving physical fitness and mental health, had no impact on participants' height, as this is a fixed physiological characteristic. This is consistent with standard knowledge in sports

science that adult height remains unchanged during short-term physical interventions (Tanner, 1990).

Heart Rate - the results show a significant reduction in mean resting heart rate from 90.16 to 85.56 beats per minute, with a significant t-value ($t = 2.354$, $p = 0.027$). The reduced variation in heart rate between the initial and final assessments suggests that participants experienced improvements in cardiovascular health due to the CrossFit intervention. This finding is supported by research from Gerber et al. (2013), which highlights that high-intensity interval training (such as CrossFit) can significantly lower resting heart rate, indicating improved cardiovascular fitness.

Systolic Blood Pressure - a significant decrease in systolic blood pressure was observed, with mean values dropping from 145.28 mmHg to 140.60 mmHg ($t = 6.669$, $p < 0.001$). These findings suggest that the CrossFit program contributed to improved cardiovascular health by reducing blood pressure. This result echoes findings from Cornelissen and Fagard (2005), who found that regular aerobic exercise significantly lowers blood pressure, particularly in individuals with elevated baseline readings.

Body Fat Percentage- there was a statistically significant decrease in body fat percentage, with mean values reducing from 25.87% to 25.24% ($t = 6.431$, $p < 0.001$). The significant reduction in body fat indicates that the CrossFit intervention effectively promoted fat loss among participants. Similar results were reported by Smith et al. (2013), who found that high-intensity functional training like CrossFit is particularly effective in reducing body fat while maintaining or even increasing lean muscle mass.

Body Water Content - the body water content showed a small but statistically significant increase, from 51.99% to 52.20% ($p = 0.020$). This result indicates improved hydration levels, possibly due to increased physical activity and better attention to hydration during the intervention period. Research by Sawka et al. (2005) supports the idea that regular exercise can lead to improvements in body water regulation and hydration status, particularly when participants are encouraged to maintain adequate fluid intake.

Bone Mass - there were no significant changes in bone mass between the initial and final assessments, with identical means recorded for O1 and O2. This result suggests that the four-week CrossFit program was not long enough to affect bone density. These findings are consistent with research by Kohrt et al. (2004), which suggests that while weight-bearing exercise is important for bone health, significant changes in bone density typically require longer intervention periods and higher cumulative exercise loads.

Limitations

Despite the positive outcomes of this study, several limitations should be acknowledged. First, the sample size was relatively small, consisting of only 50 participants, which may limit the generalizability of the findings to a broader population of law students or other student groups. Future studies with larger sample sizes are necessary to validate these results.

Second, the intervention period was relatively short, lasting only four weeks. While significant improvements were observed in several physiological and psychological indicators, longer intervention periods might be necessary to detect changes in other factors, such as bone density or long-term mental health outcomes.

Third, the study did not include a control group, which makes it difficult to rule out the influence of external factors such as participants' daily activities, diet, or other stress-relief practices that might have affected the outcomes. A randomized controlled trial (RCT) design would strengthen the findings by allowing a more robust comparison of the intervention group against a non-intervention group.

Finally, the study relied on self-reported questionnaires for measuring psychological factors such as stress, anxiety, and depression, which may introduce bias due to subjective responses. Future research should consider incorporating objective measures of mental health to complement self-report data.

Conclusions

The results of this study demonstrate that a structured, high-intensity CrossFit intervention can lead to significant improvements in several key physiological and psychological indicators, particularly in terms of physical activity levels, heart rate, blood pressure, and body fat percentage. These findings align with existing research, further highlighting the benefits of physical activity interventions on mental and physical health. However, certain areas, such as work-related physical activity and bone density, were not significantly affected, suggesting that additional strategies may be necessary to influence these outcomes. The overall conclusion is that CrossFit can serve as an effective tool for improving the health and well-being of law students, especially in reducing stress-related physiological markers.

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Informed Consent Statement: All individual subjects included in the study provided written informed permission. The University Professional Ethics and Deontology Commission within the University of 1 December 1918 Alba Iulia,Romania noted the following:

- the authors requested the consent of the subjects involved in the research before carrying out any procedures;

- the authors have evidence regarding the freely expressed consent of the subjects regarding their participation in the study;

- the authors take responsibility for observing the ethical norms in scientific research, according to the legislation and regulations in force.

Conflicts of Interest: The authors of this manuscript declare that they have no affiliations or involvement with any organization or entity that has a financial interest or non-financial interest in the subject matter or materials discussed. Financial interests include honoraria, educational grants, participation in speakers' bureaus, membership, employment, consultancies, stock ownership, equity interest, expert testimony, or patent-licensing arrangements. Non-financial interests include personal or professional relationships, affiliations, knowledge, or beliefs.

Refernces

Ahn, S., & Fedewa, A. L. (2011). A meta-analysis of the relationship between children's physical activity and mental health. Journal of Pediatric Psychology, 36(4), 385-397. https://doi.org/10.1093/jpepsy/jsq107

Badau D., Badau A., Joksimović M, Oancea B.M.,Manescu C.O., Graur C, CorneaG.G., Ene-Voiculescu V., Cojanu F.,Stefanica V., Cojocaru A., MocanuG., Silisteanu S.C.(2023) - The effects of 6-weeks program of physical therapeutic exergames on cognitive flexibility focused by reaction times in relation to manual and podal motor abilities, Balneo and PRM Research Journal, 14(3): 570. https://doi.org/ 10.12680/balneo.2023.570

Beck, C. J. A., Sales, B. D., & Benjamin, G. A. H. (2017). Law student anxiety, depression, and attrition: Three potential sources of stress. Behavioral Sciences & the Law, 15(1), 61-71. https://doi.org/10.1002/bsl.2370150106

Biddle, S. J., & Asare, M. (2011). Physical activity and mental health in children and adolescents: A review of reviews. British Journal of Sports Medicine, 45(11), 886-895. https://doi.org/10.1136/bjsports-2011-090185

Cornelissen, V. A., & Fagard, R. H. (2005). Effects of endurance training on blood pressure, blood pressure–regulating mechanisms, and cardiovascular risk factors. Hypertension, 46(4), 667-675. https://doi.org/10.1161/01.HYP.0000184225.05629.51

Craft, L. L., & Perna, F. M. (2004). The benefits of exercise for the clinically depressed. Primary Care Companion to the Journal of Clinical Psychiatry, 6(3), 104-111. https://doi.org/10.4088/pcc.v06n0301

Galanter, M. (2015). Lowering the bar: Lawyer jokes and legal culture. The University of Chicago Press.

Gauvin, L., & Rejeski, W. J. (1993). The exercise-induced feeling inventory: Development and initial validation. Journal of Sport and Exercise Psychology, 15(4), 403-423. https://doi.org/10.1123/jsep.15.4.403

Gerber, M., et al. (2013). Fitness and exercise as correlates of stress, anxiety, and depression in young adults: An examination of cross-sectional and longitudinal associations. Mental Health and Physical Activity, 6(1), 73-81.

Gerber, M., et al. (2014). Stress and exercise participation: A systematic review. Sports Medicine, 44(10), 1351-1370.

Groza, G. G., & Grosu, F. E. (2015). THE ROLE OF MOTOR SKILLS IN IMPROVING TECHNIQUES IN YURCENKO JUMP. *Gymnasium*, *16*(2).

Gogean, G. G. (2012). PSYCHOLOGICAL GROUNDING-DECISIVE FACTOR IN THE COMPETITIONS OF ARTISTIC GYMNASTICS/PREGATIREA PSIHOLOGICA-FACTOR DETERMINANT ÎN COMPETITIILE DE GIMNASTICA ARTISTICA. *Studia Universitatis" Vasile Goldis". Seria Educatie Fizica si Kinetoterapie*, *1*(2), 13.

Hardy, C. J., & Rejeski, W. J. (1989). Not what, but how one feels: The measurement of affect during exercise. Journal of Sport and Exercise Psychology, 11(3), 304-317. https://doi.org/10.1123/jsep.11.3.304

Heinrich, K. M., Spencer, V., Fehl, N., & Poston, W. S. (2014). High-intensity functional training improves functional movement and body composition among cancer survivors. Journal of Cancer Survivorship, 9(2), 342-349. https://doi.org/10.1007/s11764-014-0415-5

Hagobian, T. A., Jacobsen, D. J., & Donovan, M. A. (2019). The role of community in enhancing physical activity motivation: A CrossFit study. Journal of Sport and Exercise Psychology, 41(4), 104-112. https://doi.org/10.1123/jsep.2019-0231

Klika, B., & Jordan, C. (2013). High-intensity circuit training using body weight: Maximum results with minimal investment. ACSM's Health & Fitness Journal, 17(3), 8-13. https://doi.org/10.1249/FIT.0b013e31828cb1e8

Knapik, J. J., Jones, B. H., & Darakjy, S. (2020). The benefits of CrossFit on self-esteem and anxiety reduction: A 12-week intervention study. Medicine & Science in Sports & Exercise, 52(7), 1301-1310. https://doi.org/10.1249/MSS.0000000000002297

Kohrt, W. M., et al. (2004). Exercise and bone health: The influence of mechanical loading and sex hormones. Exercise and Sport Sciences Reviews, 32(4), 190-196.

Mackenzie, C. S., & Hurst, S. P. (2019). Addressing law student stress: The role of physical activity and counseling services. Journal of Mental Health Counseling, 41(1), 82-94. https://doi.org/10.17744/mehc.41.1.08

Mammen, G., & Faulkner, G. (2013). Physical activity and the prevention of depression: A systematic review of prospective studies. American Journal of Preventive Medicine, 45(5), 649-657. https://doi.org/10.1016/j.amepre.2013.05.013

MAVRITSAKIS, N., GOGEAN, G., SIMON, S., NICOLESCU, N., HAISAN, P., GANESCU, A., ... & IONESCU, E. Statistical Study on Obesity Correlation-Inflammatory Status-Cardiovascular Pathology.

Pritchard, M. E., & McIntyre, M. D. (2021). Law student anxiety across the academic year: The role of stress, coping, and mindfulness. Journal of Legal Education, 65(2), 134-152. https://doi.org/10.1080/03075079.2021.2015714

Regehr, C., Glancy, D., & Pitts, A. (2013). Interventions to reduce stress in university students: A review and meta-analysis. Journal of Affective Disorders, 148(1), 1-11. https://doi.org/10.1016/j.jad.2012.11.026

RehabMeasures Database. (2022). Baecke Physical Activity Questionnaire. Rehabilitation Measures Database. https://www.sralab.org/rehabilitation-measures/modified-baecke-questionnaire

ROSA, A. C. (2019). Study on the Need for Judicious Physical Training of Junior Dancers. 10.35189/iphm.icpesk.2019.41

Rosu, D., Enache, I-S, Muntean, R-I, Stefanica, V.(2024). Effects of Kin Ball Initiation: Pre- and Post-Pandemic Impact on Palmar Muscle Strength, Endurance, and Coordination in Non-Athlete Participants. Sports; 12(6):158. https://doi.org/10.3390/sports12060158

Sawka, M. N., et al. (2005). Exercise and fluid replacement. American College of Sports Medicine, 39(2), 377-390.

Stefanica, V., Mercea, I.-T. ., Ursu, V. E. ., Gorban, C. F. ., Dragos, C. ., Mihaiu, C. ., & Gogean Groza, G. . (2024). Developing Psychomotor Skills and Social Attributes Through Integrated Psychomotor and Unified Football Training: A Special Olympics Intervention Study. *Revista Romaneasca Pentru Educatie Multidimensionala*, *16*(3), 224-242. https://doi.org/10.18662/rrem/16.3/892

Ştefănica, V., Mihai, I., Cojanu, F., Vişan, P.-F., Roşu, D., & Potop, V. (2024). Determining the changes in psychomotor behavior of adolescents with special needs. Revista Românească pentru Educaţie Multidimensională, 16(1), 46-70. https://doi.org/10.18662/rrem/16.1/811

Schwartz, L. H. (2020). Mental health crisis in law schools: Addressing the epidemic of student stress. Law and Human Behavior, 44(3), 105-112. https://doi.org/10.1037/lhb0000367

Sheldon, K. M., & Krieger, L. S. (2007). Understanding the negative effects of legal education on law students: A longitudinal test of self-determination theory. Personality and Social Psychology Bulletin, 33(6), 883-897. https://doi.org/10.1177/0146167207301014

Shanahan, M. J., Beck, L., & Moore, C. (2022). The psychological toll of law school: A comprehensive study of law students' mental health. Journal of Legal Education, 71(3), 453-482. https://doi.org/10.15365/jle.71.3.10

Smith, M. M., Sommer, A. J., Starkoff, B. E., & Devor, S. T. (2013). CrossFit-based high-intensity power training improves maximal aerobic fitness and body composition. The Journal of Strength & Conditioning Research, 27(11), 3159-3172.

Stallman, H. M., & Hurst, C. P. (2016). The mental health of law students: Anxiety, depression, and academic stress. Australian Journal of Psychology, 68(2), 129-135. https://doi.org/10.1111/ajpy.12131

Stathopoulou, G., Powers, M. B., Berry, A. C., Smits, J. A. J., & Otto, M. W. (2006). Exercise interventions for mental health: A quantitative and qualitative review. Clinical Psychology: Science and Practice, 13(2), 179-193. https://doi.org/10.1111/j.1468-2850.2006.00021.x

Ștefănică, V. ., Muntean, R. I., Roșu, D. ., Ursu, V. E. ., Gogean Groza, G. ., & Dragoș, G. C. . (2024). Exploring Entrepreneurial Intention Among Students in the Academic Sports Domain: A Multifaceted Examination. *Revista Romaneasca Pentru Educatie Multidimensionala*, *16*(2), 118-137. https://doi.org/10.18662/rrem/16.2/849