



Research Article

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An Online Mindfulness Meditation Program as a Means for Mitigating Academic Stress among University Students

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Abstract

Academic stress is a significant challenge for students, influencing their performance and well-being. This study aimed to evaluate the efficacy of an online mindfulness meditation program in reducing academic stress among college students. A quasi-experimental study was conducted on a sample of 78 participants divided into an experimental group and a waiting list control group. Pre-test and post-test measurements were taken. The SISCO Academic Stress Inventory was used to assess academic stress. The experimental group evidenced statistically significant differences between study phases and groups after intervention for all examined variables ($p < 0.05$). In addition, Cohen's D score revealed a significant magnitude effect. An adequate statistical power was also found ($1 - \beta = 0.99$). Hence, implementing mindfulness meditation programs can potentially mitigate the academic stress levels experienced by university students.

Keywords: mindfulness, academic stress, university students

1. Introduction

Barraza (2009) defines academic stress as a systematic phenomenon occurring when students perceive a series of academic demands as stressors. This perception produces various symptoms indicating an imbalance; consequently, students must use coping strategies to restore balance.

Due to the enormous and rapid transition to online education, the pandemic has harmed university students' academic activities and mental health (Zhou et al., 2020). According to scholarly research, the COVID-19 pandemic has resulted in higher levels of academic stress experienced by students (Al Ateeq et al., 2020; Chandra, 2020; Son et al., 2020).

Additionally, according to the 2022 American College Health Assessment survey, a significant proportion of university students, precisely 51.7%, exhibited moderate levels of psychological distress, while 24.9% reported severe psychological distress (ACHA, 2022).

Academic stress is the main factor influencing college students' mental health (Barbayannis et al., 2022). In this sense, empirical evidence suggests that stress experienced during college may be a prognostic indicator for mental health disorders (Karyotaki et al., 2020). Indeed, research has revealed a notable positive association between anxiety, hopelessness, depressive symptoms, and academic stress (Zhang et al., 2022).

In this context, meditation practices, such as mindfulness, protect against the harmful effects of pandemics or other stress-inducing circumstances (Caratiquit, 2022). Mindfulness practice is defined as the deliberate process of non-judgmentally observing, describing, and actively participating in the present moment (Bishop et al., 2004), where meditation serves as a scaffolding mechanism to cultivate the state or ability of mindfulness (Kabat-Zinn, 2005).

Given the considerations mentioned above, the overarching objective of this research was to assess the effect of an online mindfulness meditation program to mitigate academic stress among university students. Specifically, the study assessed the program's impact on academic stressors, symptoms of academic stress, and student coping strategies, determining how mindfulness meditation enhances their effectiveness.

2. Literature Review

Furthermore, mindfulness meditation has the potential to modify the physical composition and operation of the brain via neuroplasticity, causing neurobiological changes that may contribute to favorable cognitive, emotional, and immunoreactive benefits (Lazar et al., 2005; Vestergaard-Poulsen et al., 2009).

In addition, a study on academic stress revealed that the higher the academic stress among students, the lower their self-regulation and mindfulness; the higher their mindfulness, the higher their self-regulation (Hj Ramli et al., 2018). Another study found that mindfulness-based interventions exhibit efficacy in mitigating subjective stress among medical students, both in the short-term and long-term (Hathaisaard et al., 2022). Furthermore, a study concluded that mindfulness effectively reduced stress among nursing students working on the thesis. In this sense, mindfulness interventions may be recommended to provide the first treatment to individuals who experience stress (Munif et al., 2019).

3. Research Methods

3.1 Study design and sample

The study employed a quasi-experimental research design, integrating pre-test and post-test assessments. The sample consisted of 78 individuals, who were divided into two groups of 39 participants each: the control group (CG), which served as a waiting list without treatment, and the experimental group (GE), whose participants underwent a 12-session mindfulness meditation program based on a previous study (Alvarado-García et al., 2022).

3.2 Instruments

3.2.1 SISCO:

The SISCO Academic Stress Inventory was used, which has 30 items that evaluate the dimensions of stressors, stress symptoms, and coping strategies, qualifying globally and for each dimension according to a 5-point Likert scale: 1 (never), 2 (rarely), 3 (some of the time), 4 (almost always), and 5 (always); finding intensity levels after transforming the raw scores into percentiles (Barraza, 2006). The validity and reliability coefficients for the local population were determined in a prior study (Alvarado-García et al., 2018).

3.3 Procedure

The procedure was similar to a previous study conducted by Alvarado-García et al. (2022), with some modifications. In this research, health sciences students enrolled at a Peruvian private university participated in a quasi-experimental study. A motivational seminar about the benefits of mindfulness was presented in five sections of a research course. Subsequently, students were invited to participate in our study. Based on their level of interest, members of Sections A and B were chosen to establish research groups. Section A was designated as the control group (CG), while Section B was assigned as the experimental group (EG). After the groups were established, a pretest was administered with the SISCO Academic Stress Inventory, digitized in Google Forms. The measures were designed to be taken during the exam period. Subsequently, 12 weekly sessions were scheduled, each lasting 60 minutes, and conducted using a video conferencing platform. The mindfulness meditation program was conducted under the guidance of a competent meditation instructor. Additionally, daily mindfulness meditation audio recordings and compliance report sheets were provided. After the program, the post-test was conducted on both groups using the same methodology as the initial evaluation. The duration of the program lasted for three months.

Furthermore, all participants received detailed information on the research objectives. They indicated their agreement to participate by digitally signing an informed consent form, distributed alongside the pretest via a Google form. This process ensured that the identities of the participants remained anonymous. It was also specified that the collected data would be treated with the utmost confidentiality. The research protocol received approval from the Institutional Review Board. The research followed the ethical principles in the Declaration of Helsinki (World Medical Association, 2013).

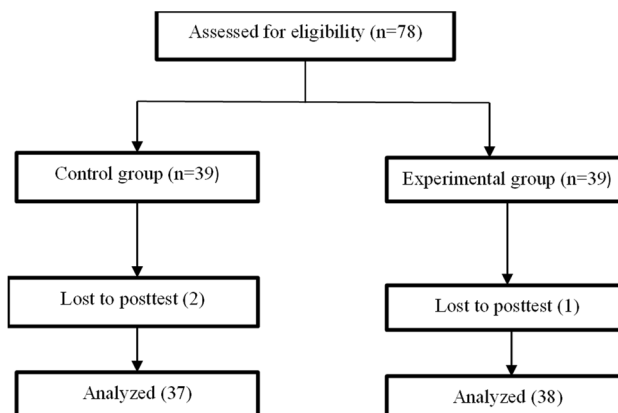


Figure 1. Flowchart of the study

3.4 Data analysis

The means and standard deviations (SD) of all variables were determined. Pearson's Chi-square and Fisher's exact tests were used to examine differences in sociodemographic and clinical data of the participants. The Wilcoxon and Mann-Whitney U tests assessed differences between study phases and groups. These tests were selected because the data did not conform to a normal distribution. In addition, Cohen's d and statistical power were calculated. All statistical analyses were performed using SPSS version 27.0 (IBM Corp., Armonk, New York, United States).

4. Results

Table 1 displays the socio-demographic and clinical data of the analyzed participants, comprising 23 (30.7%) males and 52 (69.3%) females. The CG group comprised 13 males (35.1%) and 24 females (64.9%). In contrast, the EG group included 10 males (26.3%) and 28 females (73.7%). The age distribution was as follows: 92.0% (n = 69) were aged 18–25, and 8.0% (n = 6) were aged 26–35. No statistically significant differences were observed between the groups regarding gender and age (p > 0.05). Regarding marital status, 74 respondents (98.7%) were unmarried, and one participant (1.3%) was married. Most participants (n = 75; 97.3%) received no intervention, and only two received psychological treatment (2.7%). Additionally, no individual received pharmacological treatment from a psychiatrist. There were no statistically significant differences between the groups on marital status and clinical treatment (p > 0.05).

Table 1. Participant socio-demographic and clinical data

Socio-demographic data	CG	EG	Total	p-Value
Gender				
Male	13 (35.1%)	10 (26.3%)	23 (30.7%)	0.408 ^a
Female	24 (64.9%)	28 (73.7%)	52 (69.3%)	
Age(yr)				
18-25	33 (89.2%)	36 (94.7%)	69 (92.0%)	0.376 ^a
26-35	4 (10.8%)	2 (5.3%)	6 (8.0%)	
Marital status				
Married	1 (2.7%)	0 (0.0%)	1 (1.3%)	0.232 ^b
Unmarried	36 (97.3%)	38 (100.0%)	74 (98.7%)	
Clinical treatment provided				
Psychological	2 (5.4%)	0(0.0%)	2 (2.7%)	0.090 ^b
Pharmacological	0 (0.0%)	0(0.0%)	0 (0.0%)	
None	35 (94.6%)	38(100.0%)	75(97.3%)	

^ap-value is calculated by the Pearson Chi-Square test.

^bp-value is calculated by the Likelihood-ratio test

Table 2. Group differences of academic stress variable according to SISCO inventory

ps	Pretest		Posttest		p ^b
	M	DT	M	DT	
CG					
Academic stress	94.08	±5.61	94.14	±5.01	0.771
Stressors	92.10	±7.88	92.16	±6.98	0.801
Symptoms	94.69	±4.96	94.86	±6.62	0.619
Coping strategies	86.26	±7.65	88.97	±6.08	0.326
p ^a					
EG					

Academic stress	94.03	±5.89	86.97	±6.40	0.000*
p ^a	0.955		0.000*		
Stressors	92.38	±7.43	85.13	±5.22	0.000*
p ^a	0.865		0.000*		
Symptoms	94.74	±4.06	85.35	±7.26	0.000*
p ^a	0.942		0.000*		
Coping strategies	86.15	±8.69	82.66	±4.13	0.000*
p ^a	0.821		0.000*		

*p<0.05

^ap-value is calculated by Mann Whitney U test between groups.

^bp-value is calculated by the Wilcoxon test between study phases.

Table 2 shows the mean score and standard deviations for the academic stress measure of the SISCO inventory. The pretest scores of both EG and CG did not show a significant difference ($p > 0.05$); however, the posttest scores revealed statistically significant differences between the groups for all variables examined ($p < 0.05$). Regarding the study phases, the CG showed a minor increase in all observed variables, yet no statistically significant differences were found ($p > 0.05$). On the contrary, the EG scores exhibited a statistically significant decrease in the post-test phase for all variables examined variables ($p < 0.05$).

Table 3. Cohen's d and statistical power in the experimental group

EG	D Post test	1-β
Academic stress	1.24	0.99
Stressors	1.14	0.99
Symptoms	1.36	0.99
Coping strategies	1.20	0.99

Table 3 displays the results obtained by Cohen's D, accompanied by the statistical power (1-β). Scores surpassing 0.8 indicate a large effect size, as observed in academic stress ($d = 1.24$), stressors ($d = 1.14$), symptoms ($d = 1.36$), and coping strategies ($d = 1.20$). All these measures are reinforced by robust statistical power across all variables ($1-\beta=0.99$), surpassing the desired standard set at 0.80.

5. Discussion

To achieve sustainability in higher education, understanding the factors affecting student retention and providing conducive conditions for their global success is paramount (Akram et al., 2022). In this sense, mental health students play an essential role in fostering their well-being. Nevertheless, academic stress can significantly undermine a student's academic performance and psychological health (Karaman et al., 2019). Mindfulness is cultivating self-awareness, fully accepting the present moment, and strengthening problem-solving capabilities through enhanced concentration (Munif et al., 2019). Bruin et al. (2014) suggest that mindfulness is a valuable tool for coping with the demands of modern education.

All participants in this research were university students, and their socio-demographic and clinical data is consistent with a previous investigation conducted by our team (Soto-Vásquez & Alvarado-García, 2017). These sociodemographic characteristics are widespread in the Peruvian context, in addition to the academic stress problem (Cassaretto et al., 2021). This agrees with our results, which highlight elevated levels of academic stress. Studies conducted in Latin America have shown that intrapersonal and interpersonal factors related to the academic environment contribute to increased stress among students (Caldera & Plascencia, 2016; Pozos-Radillo et al., 2015). Indeed, life satisfaction is associated with positive and negative affect and perceived quality of life (Diener et al., 2001). Additionally, the locus of control, the way individuals explain their experiences and events, is

associated with academic stress. Specifically, higher external locus of control levels correlate with elevated academic stress (Carvalho et al., 2009). Consequently, these intrapersonal and interpersonal dimensions are considered predictors of academic stress (Karaman et al., 2019).

Our investigation corroborates how mindfulness decreases academic stress scores, consistent with investigations where online methodology was also applied (Burgstahler & Stenson, 2020; O'Driscoll et al., 2019; Spadaro & Hunker, 2021). Beyond merely mitigating stress levels, mindfulness has been shown to enhance cognitive abilities in students; specifically, it augments their capacity to direct attention effectively amidst competing demands, allowing for swift and precise responses (Spadaro & Hunker, 2016). Consequently, mindfulness practice may help students develop skills that positively impact their academic performance (Vorontsova-Wenger et al., 2020).

Barraza (2006) describes academic stress as a systemic, adaptive, and predominantly psychological process triggered when students face academic demands that exceed their coping capabilities. In fact, Shapiro et al. (2006) argue that mindfulness training engenders a profound shift in one's perception of experience, a phenomenon termed *reperceiving*. This change of perspective catalyzes improvements in various domains: self-regulation, value clarification, cognitive and behavioral flexibility, and exposure; collectively, these variables decrease psychological distress.

Regarding stressors and symptoms, elevated scores were observed prior to the intervention, which is in accordance with investigations performed in the Peruvian context, where these dimensions showed moderate to high intensity (Cassaretto et al., 2021; Chavez & Peralta, 2019). After the intervention, although scores remained essentially unchanged in the CG, a decrease was noticeable in the EG. Carmody & Baer (2008) demonstrated a positive association between mindfulness practice and the behavioral propensity to apply mindfulness in daily scenarios, which subsequently acted as a mediator in diminishing stress levels and enhancing psychological well-being. Therefore, mindfulness practice can potentially mitigate stressors and alleviate stress-related symptoms. In addition, mindfulness practice develops awareness skill which is negatively inversely related to stressors and stress-related symptoms (Calvete et al., 2017). This suggests that mindfulness equips people with the ability to address stressors with a calmer and more balanced approach – essentially perceiving challenging situations as less stressful or intimidating. This could potentially lead to a decrease in stress levels and its symptoms. It is worth noting, however, that the specific mechanisms by which mindfulness influences stressors and stress symptoms can vary, often affected by individual differences and contextual elements.

Regarding coping strategies after the intervention, the CG scores indicate a slight increase, while the EG shows a decrease. Indeed, mindfulness can cultivate increased self-awareness, emotional regulation, and resilience, fostering improved stress management (Finkelstein-Fox et al., 2019). Additionally, mindfulness increases tolerance to distress by promoting adaptive coping mechanisms in the face of adversity (Donald et al., 2016). Such a mindset may lead to improved accomplishments and an enriched perceived self-efficacy when handling stress (Coffey et al., 2010). Moreover, individuals who practice mindfulness are more likely to face stressors directly and take active steps to manage them. This proactive approach manifests as an adaptive stress response and coping mechanism that wholly or partially mediates the relationship between mindfulness and well-being (Weinstein et al., 2009). It is also worth noting that mindfulness itself can serve as a coping strategy; It promotes enhanced stress processing through cognitive evaluation, amplifying resilience, strengthening social support, and fostering a sense of profound human interconnectedness, factors that are crucial for recovery in situations such as pandemics (Polizzi et al., 2020).

Finally, we found a large effect size for the variables studied with adequate statistical power. This is in accordance with various investigations where moderate-to-large effect sizes were found. (Huberty et al., 2019; Breedvelt et al., 2019). Nevertheless, evidence for a small effect is also available (Querstret et al., 2020). The time of the intervention, the different methodologies applied, and the characteristics of the sample, among other factors, may influence.

6. Conclusion

Mindfulness practices can play an essential role in reducing academic stress among university students, enhancing their cognitive abilities, and encouraging better-coping strategies. Additionally, mindfulness can significantly transform an individual's perception of their experiences, which may help view demanding situations as less stressful, reducing academic stress symptoms. So, mindfulness can be helpful in challenging situations such as pandemics. Nevertheless, the mechanisms by which mindfulness acts may vary based on individual and environmental factors. Therefore, more studies are needed to understand better the mechanism of mindfulness, the long-term effect of mindfulness practice in the academic context, and the impact on academic performance.

References

- Akram H, Bhutto MH, Chughtai MS. (2022). An analysis of business students' stressors and their coping strategies in the post-pandemic era. *Decision*, 49, 239–252.
- AlAteeq, D. A., Aljhani, S., & AlEesa, D. (2020). Perceived stress among students in virtual classrooms during the COVID-19 outbreak in KSA. *Journal of Taibah University Medical Sciences*, 15, 398–403.
- Alvarado-García PAA, Burmester J & Soto-Vásquez MR (2018). Efecto de un programa basado en la atención plena sobre los niveles de estrés académico de estudiantes universitarios. *Medicina Naturista*, 12, 35-39.
- Alvarado-García, P.A.A., Soto-Vásquez, M.R. & Rosales-Cerquin, L.E. (2022). Mindfulness-based online intervention for mental health during times of COVID-19. *Indian Journal of Psychiatry*, 64, 264-268.
- American College Health Association. (2022). American College Health Association-National College Health Assessment III: Undergraduate Student Reference Group Executive Summary Spring 2022. Silver Spring, MD: Author.
- Barbayanis, G., Bandari, M., Zheng X, Baquerizo H, Pecor KW & Ming X. (2022). Academic Stress and Mental Well-Being in College Students: Correlations, Affected Groups, and COVID-19. *Frontiers in Psychology*, 13: 886344.
- Barraza, A. (2006). Un modelo conceptual para el estudio del estrés académico. *Revista Electrónica de Psicología Iztacala*, 9, 110-129.
- Barraza, A. (2009). Estrés académico y burnout estudiantil: análisis de su relación en alumnos de licenciatura. *Psicogente*, 12, 272-283.
- Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., Segal, Z. V., Abbey, S., Speca, M., Velting, D., & Devins, G. (2004). Mindfulness: A proposal operational definition. *Clinical Psychology: Science and Practice*, 11, 230–241.
- Breedvelt, J.J.F., Amanvemez, Y., Harrer, M., Karyotaki, E., Gilbody, S., Bockting, C.L.H., Cuijpers, P. & Ebert, D. (2019). The Effects of Meditation, Yoga, and Mindfulness on Depression, Anxiety, and Stress in Tertiary Education Students: A Meta-Analysis. *Frontiers in Psychiatry*, 10, 1-15.
- Bruin, E.I., Meppelink, R. & Bögels, S.M. (2015). Mindfulness in Higher Education: Awareness and Attention in University Students Increase During and After Participation in a Mindfulness Curriculum Course. *Mindfulness*, 6, 1137–1142.
- Burgstahler, M.S. & Stenson, M.C. (2020). Effects of guided mindfulness meditation on anxiety and stress in a pre-healthcare college student population: a pilot study. *Journal of American College Health*, 68, 666–672.
- Caldera, J. F., & Plascencia, J. C. (2016). Evaluación del Estrés Académico. Un estudio comparado entre carreras universitarias. *Revista Educarnos*, 5, 11-30
- Calvete, E., Orue, I., & Sampedro, A. (2017). Does the acting with awareness trait of mindfulness buffer the predictive association between stressors and psychological symptoms in adolescents?. *Personality and Individual Differences*, 105, 158-163.
- Caratiquit, K.D. (2022). Mediating effects of protective factors on COVID-19 anxiety and academic performance of K to 12 Filipino Learners: A PLS-SEM analysis with WarpPLS. *Journal of Social, Humanity and Education*, 2, 225-243.
- Carmody, J., & Baer, R.A. (2008). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *Journal of Behavioral Medicine*, 31, 23–33.
- Carvalho, C. F., Gadzella, B. M., Henley, T. B., & Ball, S. E. (2009). Locus of control: Differences among college students' stress levels. *Individual Differences Research*, 7, 182–187.

- Cassaretto, M., Vilela, P. & Gamarra, L. (2019). Estrés académico en universitarios peruanos: importancia de las conductas de salud, características sociodemográficas y académicas. *Liberabit*, 27(2), e482.
- Chandra, Y. (2020). Online education during COVID-19: Perception of academic stress and emotional intelligence coping strategies among college students. *Asian Education and Development Studies*, 10, 229-238.
- Chavez, J.R., Peralta, R.Y. (2019). Estrés académico y autoestima en estudiantes de enfermería, Arequipa-Perú. *Revista de Ciencias Sociales*, 25, 384-399.
- Coffey, K.A., Hartmann, M., & Frederickson, B.L. (2010). Deconstructing mindfulness and constructing mental health: Understanding mindfulness and its mechanisms of action. *Mindfulness*, 1, 235-253.
- Davis, D.M. & Hayes, J.A. (2011). What are the benefits of mindfulness? A practice review of psychotherapy-related research. *Psychotherapy*, 48, 2, 198-208.
- Diener, E., Luca, R. E., & Oishi, S. (2001). Subjective well-being: The science of happiness and life satisfaction. In C. R. Synder & S. J. Lopez (Eds.), *Handbook of positive psychology* (pp. 63-73). New York, NY: Oxford University Press.
- Donald, J. N., Atkins, P. W. B., Parker, P. D., Christine, A. M., & Ryan, R. M. (2016). Daily stress and the benefits of mindfulness: Examining the daily and longitudinal relations between present moment awareness and stress responses. *Journal of Research in Personality*, 65, 30-37.
- Finkelstein-Fox, L., Park, C.L. & Riley, K.E. (2019). Mindfulness' effects on stress, coping, and mood: A daily diary goodness-of-fit study. *Emotion*, 19, 1002-1013.
- Hathaisaard, C., Wannarit, K., & Pattanaseri, K. (2022). Mindfulness-based interventions reducing and preventing stress and burnout in medical students: A systematic review and meta-analysis. *Asian Journal of Psychiatry*, 69, 102997.
- Hj Ramli, N., Alavi, M., Mehreznhad, S., & Ahmadi, A. (2018). Academic Stress and Self-Regulation among University Students in Malaysia: Mediator Role of Mindfulness. *Behavioral Sciences*, 8, 12.
- Huberty, J., Green, J., Glissmann, C., Larkey, L., Puzia, M. & Lee, C. (2019). Efficacy of the Mindfulness Meditation Mobile App "Calm" to Reduce Stress Among College Students: Randomized Controlled Trial. *JMIR mHealth and uHealth*, 7, e14273.
- Kabat-Zinn, J. (2005). *Coming to our senses*. New York: Hyperion.
- Karaman, M.A., Lerma, E., Cavazos, J., & Watson, J.C. (2019). Predictors of Academic Stress Among College Students. *Journal of College Counseling*, 22, 41-55.
- Karyotaki, E., Cuijpers, P., Albor, Y., Alonso, J., Auerbach, R.P., Bantjes, J., Bruffaerts, R., Ebert, D.D., Hasking, P., Kiekens, G., Lee, S., McLafferty, M., Mak, A., Mortier, P., Sampson, N.A., Stein, D.J., Vilagut, G., & Kessler, R.C. (2020). Sources of stress and their associations with mental disorders among college students: results of the World Health Organization World Mental Health Surveys International College Student Initiative. *Frontiers in Psychology*, 11, 1759.
- Lazar, S.W., Kerr, C.E., Wasserman, R.H., Gray, J.R., Greve, D.N., Treadway, M.T., & Fischl, B. (2005). Meditation experience is associated with increased cortical thickness. *Neuroreport: for Rapid Communication of Neuroscience Research*, 16, 1893-1897.
- Munif, B., Poeranto, S. & Utami, Y.W. (2019). Effects of Islamic Spiritual Mindfulness on Stress among Nursing Students. *Nurse Media Journal of Nursing*, 9, 69-77.
- O'Driscoll, M., Byrne S, Byrne H, Lambert S, Sahm LJ. (2019). An online mindfulness-based intervention for undergraduate pharmacy students: Results of a mixed-methods feasibility study. *Currents in Pharmacy Teaching and Learning*, 11, 858-875.
- Pozos-Radillo, B.E, Preciado-Serrano, M. L., Plascencia, A. R., Acosta-Fernández, M., & Aguilera, M. A. (2015). Estrés académico y síntomas físicos, psicológicos y comportamentales en estudiantes mexicanos de una universidad pública. *Ansiedad y Estrés*, 21, 35-42.
- Román-Mata, S., Puertas-Molero, P., Ubago-Jiménez, J. L., & González-Valero, G. (2020). Benefits of Physical Activity and its Associations with Resilience, Emotional Intelligence, and Psychological Distress in University Students from Southern Spain. *International Journal of Environmental Research and Public Health*, 17, 4474.
- Shapiro, S.L., Carlson, L.E., Astin, J.A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology*, 62, 373-386.
- Son, C., Hegde, S., Smith, A., Wang, X., & Sasangohar, F. (2020). Effects of COVID-19 on college students' mental health in the United States: Interview survey study. *Journal of Medical Internet Research*, 22, e21279.
- Soto-Vásquez, M.R., & Alvarado-García, P.A.A. (2017). Aromatherapy with two essential oils from *Satureja* genre and mindfulness meditation to reduce anxiety in humans. *Journal of Traditional Complementary Medicine*, 7, 121-125.

- Spadaro, K & Hunker, D.F. (2016). Exploring The effects Of An online asynchronous mindfulness meditation intervention with nursing students On Stress, mood, And Cognition: A descriptive study. *Nurse Education Today*, 39,163-169.
- Spadaro, K & Hunker, D.F. (2021). Experience of an 8-Week Online Mindfulness Intervention for Nursing Students Qualitative Findings. *Nurse Educator*, 46, 187-191.
- Vestergaard-Poulsen, P., van Beek, M., Skewes, J., Bjarkam, C.R., Stubberup, M., Bertelsen, J. & Roepstorff, A. (2009). Long-term meditation is associated with increased gray matter density in the brain stem. *Neuroreport: for Rapid Communication of Neuroscience Research*,20,170-174.
- Vorontsova-Wenger, O., Ghisletta, P. Ababkov, V., & Barisnikov, K. (2020). Relationship Between Mindfulness, Psychopathological Symptoms, and Academic Performance in University Students. *Psychological Reports*, 124, 459-478.
- Weinstein, N., Brown, K.W., & Ryan, R.M. (2009). A multi-method examination of the effects of mindfulness on stress attribution, coping, and emotional well-being. *Journal of Research in Personality*,43, 374-385.
- World Medical Association. (2013). Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects. *JAMA*, 310,2191-2194.
- Zhou, N., Cao, H., Liu, F., Wu, L., Liang, Y., Xu, J., Meng, H., Zang, N., Hao, R., An, Y., Ma, S., Fang, X., & Zhang, J. (2020). A four-wave, cross-lagged model of problematic internet use and mental health among Chinese college students: Disaggregation of within-person and between-person effects. *Developmental Psychology*, 56, 1009-1021.