

## **Effects of Mindfulness Training in Reducing Anxiety Levels for College Students**

### Authors:

Vanessa M Reddin, PhD <sup>1</sup>

Associate Professor

Daniel Lee PT, PhD, DPT <sup>2</sup>

Associate Professor/Chair for Department of Physical Therapy

Ofra Pottorf, PT, PhD, DPT <sup>1</sup>

Assistant Professor

### Affiliations and Work Attributions:

<sup>1</sup> Hofstra University Donald and Barbara Zucker School of Medicine/Northwell, and Department of Allied Health and Kinesiology.

<sup>2</sup> Stony Brook University, Department of Physical Therapy.

### \*Corresponding Author:

Ofra Pottorf, PT, PhD, DPT, OCS

[Ofra.pottorf@hofstra.edu](mailto:Ofra.pottorf@hofstra.edu)

C: 516-380-9646

O: 516-463-5188

222C Hagedorn Hall

119 Hofstra University, Hempstead, NY 11549

### Sponsoring Information:

This research has not been sponsored, funded, or supported by any organization.

Conflict of Interests: The authors have no conflict of interest to report.

## Abstract

College students experience significant levels of stress at all levels of education. The purpose of this study was to investigate the effect of a Mindfulness Meditation Program on anxiety levels of physical therapist students using the State and Trait Anxiety Inventory (STAI). This study used a pretest-posttest quasi experimental design. Fifty-seven participants met exclusion criteria. One half of the participants received 4-weeks of a guided Koru Mindfulness Meditation Program while the others did not receive any mindfulness training. All participants completed STAI at baseline and following the time of completion for the Mindfulness training program. The respective pre and posttest STAI scores for the group that received the Mindfulness Meditation program were 44.3(8.6) and 34.2 (11.9),  $p < .001$ (State); and 43.8(8.7) and 37.6 (9.0),  $p = .001$  (Trait). The respective pre and posttest STAI scores for the group that did not receive the Mindfulness Meditation program were 41.0 (9.6) and 39.0 (9.8)  $p = .10$  (State); and 41.2(9.6) and 40.3(9.2),  $p = .38$  (Trait). The group that received the Mindfulness Meditation program had a statistically significant decrease in their reported anxiety levels when comparing their pre and posttest STAI scores for both the State and Trait areas. The group that did not receive the Mindfulness Meditation program had no statistically significant difference in the reported anxiety levels when comparing their pre and posttest STAI scores for both State and Trait Areas.

**Key words:** mindfulness, meditation, anxiety, mental health, students

## 1. INTRODUCTION

In recent years there has been an upward trend in college students reporting depression, anxiety, and mental health issues (Lipson et al., 2022). In addition, stress amongst college students is greater than that of the average population (Evans et al., 2018). In the past decade, mental health symptoms have nearly doubled in college student populations nationally, with a significant increase in rates of suicide attempts occurring annually (Duffy et al., 2019). Mental health service utilization has also had a marked increase across colleges over the last decade (Lipson et al., 2019). These recent trends have brought increased attention to the need to address the “mental health crisis” (Abrams, 2022; Ziao et al. 2017). However, there is a gap on why there has been a steep decline in mental health and how to support students in managing stressors leading to depression and anxiety.

Often when performance demands are placed on college students, such as standardized examinations, college students must learn to perform under pressure to successfully complete their degree requirements (Galante et al., 2016). While some students can leverage the stress of having to perform in a beneficial way (Schonfeld et al., 2017), other students’ stress levels may intensify to great proportions resulting in taxation of the student’s existing coping strategy (Galante et al., 2016). Thus, these stressors have an influence on the physiologic responses of student behaviors, moods, and health, and can also affect the students’ ability to perform on examinations, and hinder their performance (Bamber et al., 2016; Frank et al., 2005).

Higher levels of stress are correlated to anxiety (Kurebayashi et al., 2012). Anxiety has been defined as a mental state characterized by an intense feeling of tension, worry or apprehension, relative to something adverse that may happen in the future (Saviola et al., 2020). Anxiety

negatively influences memory, concentration, academic performance, and problem-solving abilities (Blanco et al., 2008; Gaultney, 2010; Harvey, 2008; Salzer, 2012). While there is a healthy level of stress that can benefit students (Schonfeld et al., 2017), abundant stress levels can lead to illness, rumination, avoidance, and depression (Beeoe et al., 2004; Walsh et al., 2010).

There are a variety of pharmacological and cognitive-behavioral interventions currently available to manage anxiety and depression (American Psychologist, 2017). While these extant interventions may be beneficial for some individuals, there are alternatives that are growing in popularity such as interventions that address mindfulness. Koru Mindfulness (KM) is a mindfulness meditation program that was developed specifically for college students and Emerging Adults (Arnett, 2000). A randomized control trial of the KM program demonstrated that college students who performed mindfulness meditation showed a decrease in stress and improved sleeping habits (Greeson, 2014). While KM has demonstrated benefits in reducing anxiety among college students, it is still unclear if this form of mindfulness can be used in college students to decrease stress and anxiety. The purpose of this study was to investigate the effects of a KM meditation program in reducing anxiety levels for college students.

## **1. METHODS**

Ethical approval was granted by the Institutional Review Board (IRB) from Touro University. Participation in the study was voluntary and informed consent was obtained prior to commencing the study. A convenience sample of 57 volunteers met exclusion criteria for this study. Participants were physical therapy students that were matriculated in an entry-level Doctor of Physical Therapy (DPT) program. Participants were excluded from this study if they were taking any medications to treat depression and/or anxiety at the time of data collection, if they were less than 18 years old, if they could not understand multi-step instructions in the English language, or if they did not have access to a computer with internet access. The control group did not receive the KM meditation program and consisted of 29 participants (16 who identified as male and 13 who identified as female), with Mean  $\pm$  Standard Deviation for age =  $24.2 \pm (1.9)$  years. The experimental group did receive the KM meditation program and consisted of 28 participants (7 who identified as male and 21 who identified as female), with Mean  $\pm$  Standard Deviation age =  $24.6 \pm (2.5)$  years.

### **2.1 Instrument**

The State and Trait Anxiety Inventory (STAI) is a 40-item self-reported measure that was developed to distinguish between anxiety that may be transient (State) versus anxiety that is more stable (Trait) (Spielberger et al., 1983). State anxiety evaluates the current state of anxiety being experienced by an individual. Items on the State subscale measure subjective feelings of apprehension, tension, nervousness, worry, and activation/arousal of the autonomic nervous system. The Trait anxiety subscale evaluates the degree of persistent anxiety, including general states of calmness, confidence, and security (Julian, 2011). Each subscale of the STAI is ranked from 20-80, with 80 indicating higher levels of anxiety.

The STAI has been shown to be a valid and reliable test for anxiety studies in research and clinical settings (Spielberger et al., 1983), and thus was selected as the dependent variable for this

study. For the Trait subscale the reliability coefficients ranged from 0.65 to 0.86. while the reliability coefficients for the State subscale ranged from 0.16 to 0.62 ((Spielberger et al., 1972).

## 2.2 Intervention

The KM program was developed at Duke University by Holly Rogers and Margret Maytan in 2012 (Rogers, 2013). Koru Mindfulness entail classes that are held weekly for four-weeks in 1-hour long sessions by a KM certified teacher. Each week different meditation techniques are taught, with participants meditating at home for ten minutes a day. Techniques include breathing awareness, belly breathing, body scanning, gatha poetry, walking meditation, guided imagery, labeling thoughts, and eating meditation (Rogers, 2013). Koru Mindfulness is effective at reducing symptoms of stress while enhancing psychological wellbeing and sleep patterns (Greeson et al., 2014).

## 2.3 Procedure

Participants were given a brief synopsis of the KM program including any risks and benefits. Participants chose to participate in either the KM program or the control group. The KM program was scheduled in anticipation of the Objective Structured Clinical Exam (OSCE), which students must pass at the end of their first three didactic semesters to prove their competency to begin their clinical education experiences. The several weeks prior to this exam is a high anxiety time for the students and thus was selected as a time frame to administer the KM meditation program. Participants in the KM group engaged in a four-week guided KM program led by a certified instructor. Participants in both the experimental and control group were required to complete the STAI scales at baseline and after the intervention period. Participants attended a weekly hour-long group session of mindfulness training and practiced guided mindfulness for 10 minutes daily. A daily meditation log was maintained through the KM smartphone application that was developed by the Center for Koru Mindfulness. The meditation log includes the date, time, and duration of the meditation, as well as a short reflection on the experience. Participants in the control group did not participate in the KM meditation program.

## 2.4 Data Analysis

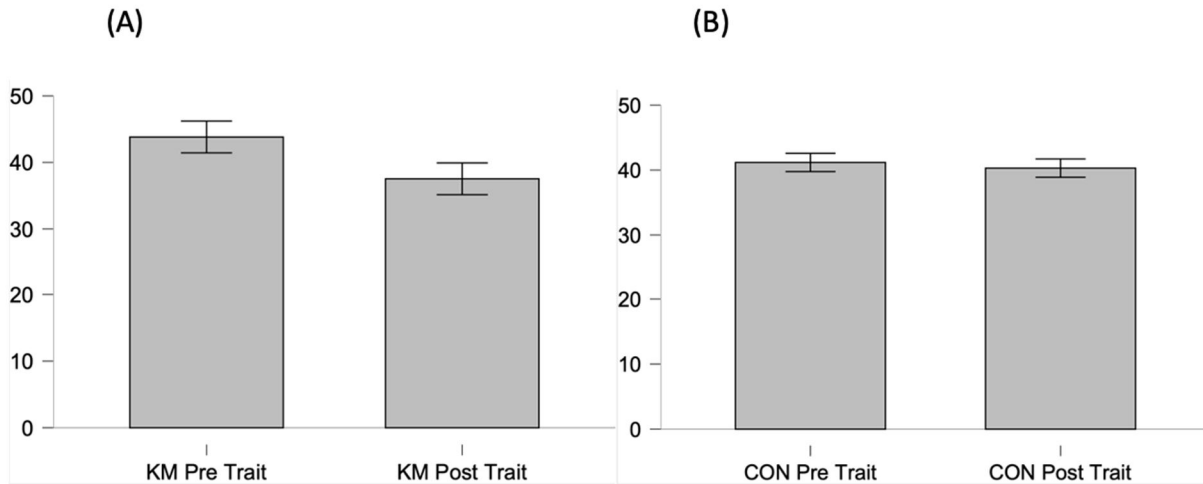
All data were analyzed using IBM's SPSS Statistics 25 (Armonk, NY). Data were analyzed for Normality using Levene and Shapiro Wilk tests. Normal data were analyzed using an independent t-tests for between-groups comparisons while paired t-tests were used for within-groups comparisons. Alpha was set to .05 and corrected for the number of tests (6) to .008.

## 2. RESULTS

Table 1 summarizes the outcomes within and between groups. Within-groups, significant differences between pre and post State ( $t=5.02$ ;  $p<.001$ ) and Trait ( $t=3.82$ ;  $p=.001$ ) scores were found for the KM group (Figures 1 and 2, respectively), but not in the control group. Effect size for the KM intervention was found to be large ( $r=.84$ ) for the State and moderate ( $r=.74$ ) for the Trait sub-scales. There were no statistically significant differences between-groups for any of the STAI

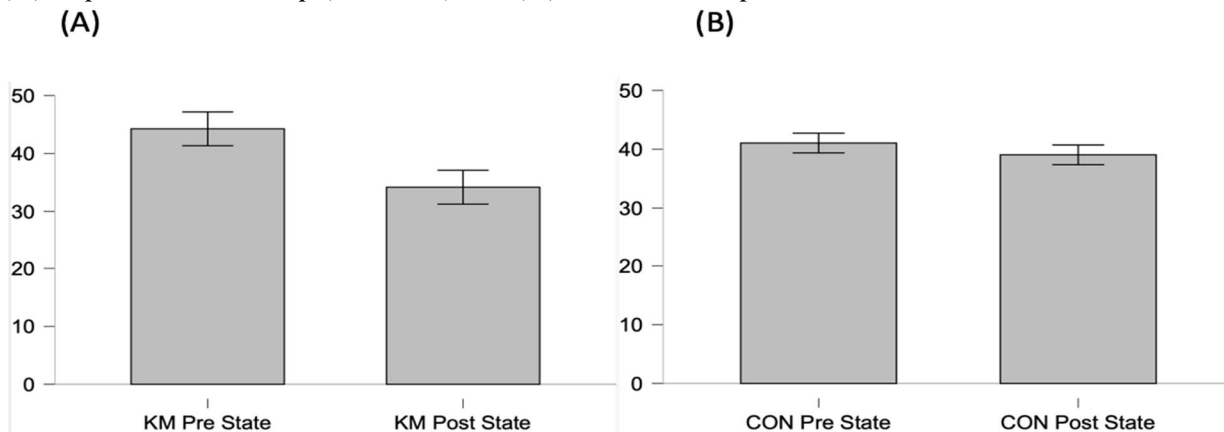
variables (Figure 3). Between groups, the respective pre and posttest STAI scores for the group that received the Mindfulness Meditation program were 44.3(8.6) and 34.2 (11.9),  $p < .001$ (State); and 43.8(8.7) and 37.6 (9.0),  $p = .001$  (Trait). The respective pre and posttest STAI scores for the group that did not receive the Mindfulness Meditation program were 41.0 (9.6) and 39.0 (9.8)  $p = .10$  (State); and 41.2(9.6) and 40.3(9.2),  $p = .38$  (Trait).

**Figure 1.** STAI State Score comparison Within-Groups for Pre and Post Mindfulness Training for (A) Experimental Group ( $p = .001$ ) and (B) Control Group.



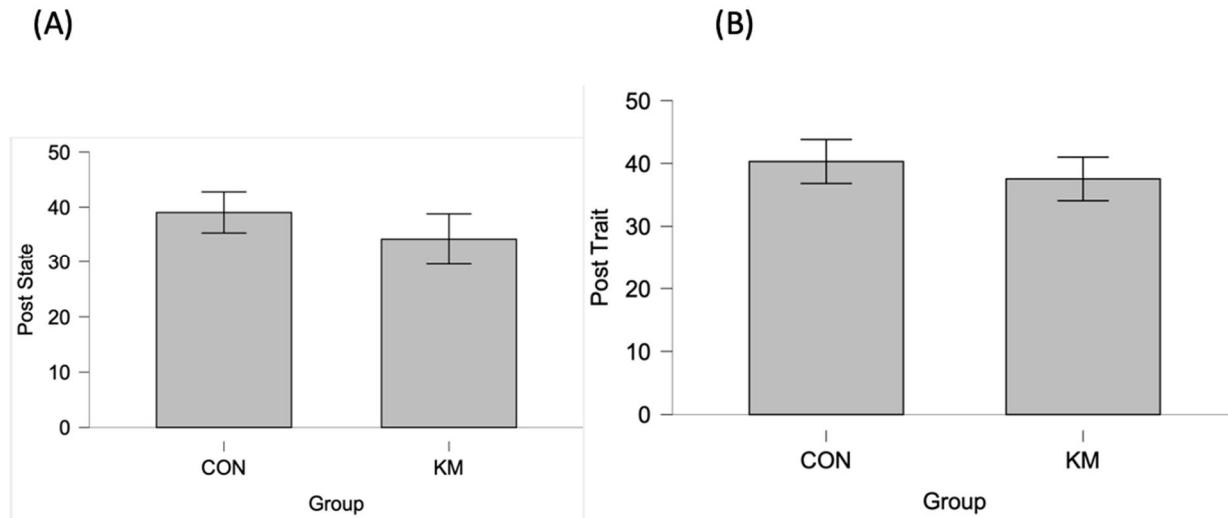
**Note.** Significant improvement between pre and post intervention STAI state scores in the experimental group. No Significant improvement between pre and post- intervention STAI state scores in the control group.

**Figure 2.** STAI Trait Score Comparison Within-Groups for Pre and Post Mindfulness Training for (A) Experimental Group ( $P < .001$ ) and (B) Control Group.



**Note.** Significant improvement between pre and post- intervention STAI trait scores in the experimental group. No Significant improvement between pre and post- intervention STAI trait scores in the control group

**Figure 3.** STAI Between Group Score Comparison Post-KM Program for Control Group and Koru Mindfulness Group (A) State Score and (B) Trait Score.



**Note.** No significant difference between control and experimental STAI scores (state) post-KM Program No significant difference between control and experimental STAI scores (trait) post-KM Program

**Table 1.** Summary of Results.

STAI		Control Group	Experimental Group	Significance
<b>State</b>	Pre-test	41.0 (9.6)	44.3 (8.6)	p = .19
	Post-test	39.0 (9.8)	34.2 (11.9)	p = .97
	Significance	p = .10	p < .001	
	Effect Size (r)		r = .84	
<b>Trait</b>	Pre-test	41.2 (9.6)	43.8 (8.7)	p = .28
	Post-test	40.3 (9.2)	37.6 (9.0)	p = .25
	Significance	p = .38	p = .001	
	Effect Size (r)		r = .74	

### 3. DISCUSSION AND RECOMMENDATIONS

The purpose of this study was to investigate the effects of a KM meditation program in reducing anxiety for college students. Results from this study indicate that KM lowered anxiety levels in physical therapy students after engaging in a four-week KM meditation program. Additionally, results from this study demonstrated that both State and Trait outcomes were significantly lower than peers in their cohort, which is consistent with previous literature (Greesonet al., 2020; Kindel et al., 2020; Wojciechowski, 2017).

Mindfulness meditation has been shown to be effective in decreasing anxiety levels in college students. A systematic review of literature by Bamber (2016) concluded that mindfulness-

based stress reduction has shown significant decreases in overall stress scores of college students in 73% of studies considered. Mindfulness meditation programs have also been effective in reducing perceived levels of stress among college students while increasing forgiveness and decreasing rumination levels (Arnett, 2000). Greeson et al. (2014) conducted a randomized control trial of a university student body and utilized KM as an intervention versus a control group of students. Like the study presented in this manuscript, they found a significant decrease in stress, as measured by the Perceived Stress Scale (PSS), sleep quality, and significantly improved self-compassion than the controls.

Kindel et al. (2020) conducted a mixed-methods, two group, repeated measures prospective cohort research design that was used to compare outcomes of physical therapy students who were taught a six-week mindfulness curriculum on their perceived stress and level of mindfulness immediately following intervention, and again eight weeks later. Mindfulness was assessed using the Five Factor Mindfulness Questionnaire and stress with the Perceived Stress Scale. The results showed improvements in student's perceived stress, mindfulness, and was reported to be perceived as a favorable experience by participants. Costa (2015) reported positive effects of self-care programs such as KM on managing stress within the occupational therapy profession was highlighted during a presentation at the American Occupational Therapy Association Student Conclave by Donna Costa. Mindfulness meditation has also been found to show strong benefits against job burnout amongst healthcare professionals and teachers, as well as stress and anxiety amongst students within the medical field (Costa, 2015). Similarly, a randomized control study by Song (2015) reported a significant decrease in stress and anxiety following the practice of mindfulness meditation in a small cohort (n=50) of Korean nursing students. These students were instructed to practice mindfulness meditation for two hours each week for eight weeks. After eight weeks, there was a significant decrease in stress and anxiety in the mindfulness group compared to that of the control. While this study did not specifically use the KM program as an intervention, many of the techniques used (body scanning and breath awareness) are used in KM.

Although our study demonstrated positive results, it is recommended that future studies use randomized control trials to determine the effects of KM on the anxiety levels of college students. Another recommendation is to recruit a larger sample size from several colleges or universities to improve generalizability. It would also be beneficial to collect data at baseline, post intervention, and several months after participation in the KM program to obtain insight about the longevity of the mindfulness training.

There were several limitations to this study. Allowing students to self-select to their own group introduces an inherent selection bias to the groups. However, a conflict of interest was identified for students who wished for the intervention and may not have received it. It was also not feasible to use a cross-over design due to curricular restrictions impacting prolonged participation in the study. Another limitation was the lack of consideration for covariates, prior experience with mindfulness, equipoise towards meditation, and usage of pharmaceutical interventions were not controlled for. These covariates may have an impact on the results and should be examined in future studies.



#### 4. CONCLUSIONS

Koru Mindfulness can be an effective technique to lower anxiety in physical therapy students. Given the similar demographics found in other graduate health science programs (occupational therapy, speech therapy, pharmacy, physician, physician assistant), KM may be of benefit to college students outside the realm of physical therapy. These results suggest that incorporating short programs of mindfulness training into education may decrease student anxiety levels. Further research into the effects of KM on lowering anxiety is needed to understand the generalizability of the results. Mindfulness programs can be an effective technique to lower anxiety in college students. Results from this study suggest that incorporating short programs of mindfulness training into education may decrease student anxiety levels. However, further research into the effects of specific meditation programs on lowering anxiety is needed to understand the generalizability of the results.

#### References

- Abrams, Z. (2022). Student mental health is in crisis: Campuses are rethinking their approach. *American Psychological Association*, 53(7), 60.
- American psychiatric association (2017). *Anxiety disorders sb, (1<sup>st</sup> ed.)*. American Psychiatric Association Publishing: Washington, DC.
- Arnett, J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist* 55(5), 469.
- Bamber, M., D., & Schneider, J. (2016). Mindfulness-based meditation to decrease stress and anxiety in college students: A narrative synthesis of the research. *Educational Research Review*, 18, 1-32.
- Blanco, C. et al. (2008). Mental health of college students and their non-college-attending peers: Results from the national epidemiologic study on alcohol and related conditions. *Archives of General Psychiatry* 65(12), 1429-1437.
- Beddoe, A. & Murphy, S. (2004). Does mindfulness decrease stress and foster empathy among nursing students?. *Journal of Nursing Education* 43(7), 305-312.
- Costa, D. *Mindfulness Based Interventions for Millennial Students* [Conference Presentation]. AOTA 2015 Conference, Nashville, TN.
- Duffy, M., Twenge, J., & Joiner, T. (2019). Trends in mood and anxiety symptoms and suicide-related outcomes among US undergraduates, 2007–2018: Evidence from two national surveys. *Journal of Adolescent Health* 65(5), 590-598.
- Evans, T. M., et al. (2018). Evidence for a mental health crisis in graduate education. *Nature Biotechnology* 36(3), 282-284.



- Galante, Julieta, et al. "Protocol for the mindful student study: a randomised controlled trial of the provision of a mindfulness intervention to support university students' well-being and resilience to stress." *BMJ open* 6.11 (2016): e012300.
- Gaultney, Jane F. "The prevalence of sleep disorders in college students: impact on academic performance." *Journal of American College Health* 59.2 (2010): 91-97.
- Greeson, Jeffrey M., et al. "A randomized controlled trial of Koru: A mindfulness program for college students and other emerging adults." *Journal of American College Health* 62.4 (2014): 222-233.
- Harvey, Allison G. "Insomnia, psychiatric disorders, and the transdiagnostic perspective." *Current Directions in Psychological Science* 17.5 (2008): 299-303.
- Kindel, H. & Rafoth, M. (2020). The effects of teaching mindfulness on stress in physical therapy students—A randomized controlled trial. *Health Professions Education*, 6(2), 142-152.
- Kurebayashi, L et al. (2012). Correlations between stress and anxiety levels in nursing students. *Journal of Nursing Education and Practice*, 2(3), 128-134.
- Lipson, S. et al. (2019). Increased rates of mental health service utilization by US college students: 10-year population-level trends (2007–2017). *Psychiatric services*, 70(1), 60-63.
- Lipson, S. et al. (2022). Trends in college student mental health and help-seeking by race/ethnicity: Findings from the national healthy minds study, 2013–2021. *Journal of Affective Disorders*, 306, 138-147.
- Lynn M. & Cassady, L. (2005). Health and wellness in entry-level physical therapy students: are measures of stress, anxiety, and academic performance related? *Cardiopulmonary Physical Therapy Journal*, 16(4), 5-13.
- Oman, D. et al. (2008). Meditation lowers stress and supports forgiveness among college students: A randomized controlled trial. *Journal of American College Health* 56(5), 569-578.
- Rogers, H. & Maytan, M. (2019). *Mindfulness for the next generation: Helping emerging adults manage stress and lead healthier lives*. Oxford University Press.
- Salzer, M. (2012). A comparative study of campus experiences of college students with mental illnesses versus a general college sample. (2012). *Journal of American College Health*, 60(1), 1-7.
- Rogers, H. (2013). Koru: Teaching mindfulness to emerging adults." *New Directions for Teaching and Learning*, 134, 73-81.
- Saviola, et al. (2020). Trait and state anxiety are mapped differently in the human brain. *Scientific Reports*, 10(1), 1-11.
- Schönfeld, P. & Margraf, J. (2017). Costs and benefits of self-efficacy: Differences of the stress response and clinical implications. *Neuroscience & Biobehavioral Reviews*, 75, 40-52.
- Song, Y. & Lindquist, R. (2015). Effects of mindfulness-based stress reduction on depression, anxiety, stress, and mindfulness in Korean nursing students. *Nurse Education Today*, 35(1), 86-90.
- Spielberger, C. (1972). Anxiety as an emotional state. *Anxiety: Trends in theory and research*, 23-49.

- Spielberger, C. & Gorsuch, R. (1983). *State-trait anxiety inventory for adults: Sampler set: Manual, Test booklet and scoring key*. Consulting Psychologists Press.
- Walsh, J. M., et al. (2010). Sources of stress and psychological morbidity among undergraduate physiotherapy students. *Physiotherapy* 96(3), 206-212.
- Julian, L. (2017). Measures of anxiety. *Arthritis care & research* 63(0), 11.
- Wojciechowski, M. (2017). Mindfulness: How it can help patients, PTs, and students. *PT In* (2017).
- Xiao, H. et al. (2017). Are we in crisis? National mental health and treatment trends in college counseling centers. *Psychological Services* 14(4), 407.