Meditative Drawing as an Intervention to Reduce Anxiety among Medical Students

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Abstract

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Medical students are highly vulnerability to stress and anxiety disorders. Interventions to reduce stress and anxiety levels among students may be beneficial. Zentangle is a meditative art-based practice that focuses on calm basic strokes, with use of minimal resources. It was expected that participation in Zentangle would result in student reports of reduced anxiety. This study evaluated the impact of participation in a workshop using the Zentangle Method® for a period of two hours. Participants included a convenience sample of 30 medical students. Participant's level of anxiety was measured with the Beck Anxiety Inventory (BAI) before and after a two-hour Zentangle workshop. Results indicated that following participation in the workshop, students experienced a significant decrease in self-reported anxiety. These findings support implementation of art-based activities for medical students as a potentially helpful means to support overall wellness.

Introduction

Anxiety disorders are one of the most prevalent mental health disorders affecting individuals worldwide. Epidemiological studies indicate that anxiety disorders effect approximately 7.3% of the world population during a lifetime (Baxter, Scott, Vos, & Whiteford, 2013). Medical students appear particularly vulnerable to anxiety disorders, with rates of anxiety amongst medical students and residents up to eight times higher than age-matched controls (Mousa, Dhamoon, Lander, & Dhamoon, 2016). Stress associated with various facets of medical education appear to increase the incidence of anxiety in this population, which extends after completion of education for a period of up to two years (Moutinho, Lucchetti, Ezequiel, & Lucchetti, 2019). High rates of anxiety among medical students has been found to have a negative impact on learning and retention (Abdulghani, HM. Et al., 2011). The stress could be due to a number of causes, ranging from fear of standardized exams to courses, to concerns about the future (Garg, K., Agarwal, M., Dalal, PK., 2017). Traditional first-line treatments of anxiety disorders include psychotherapy and pharmacotherapy. However, art-based therapy techniques are emerging as potentially useful treatment options (Abbing, Ponstein, Hooren, Sonneville, Swaab, & Baars, 2018).

Among the general population, findings suggest that mindfulness training can decrease negative mood, anger, exhaustion, and anxiety in the careers of these future health care providers while increasing self-acceptance, compassion, and empathy (Escuriex & Labbé, 2011). Systematic reviews have suggested that these benefits can generalize to medical students. Of the studies reviewed by Daya & Hearn (2018), four indicated significant decreases in anxiety, two indicated no significant changes, and one indicated an increase in anxiety of medical students following mindfulness-based interventions (Daya & Hearn, 2018). Among those studies, art-

based mindfulness therapies were found to have one of the greatest effect sizes for treating generalized anxiety disorder in students. Significant decreases in anxiety are suggested to continue to be sustained at least three months post-intervention (Winzer, Lindbery, Guldbrandsson, & Sidorchuk, 2018).

Zentangle is a meditative drawing technique that requires minimal materials or training. The technique was founded in 2003, with significant growth over a short period of time. There are currently over 3,000 Certified Zentangle Teachers (CZT) in over 40 countries (About the Zentangle Method, n.d.). The Zentangle Method® involves using non-representational, unplanned, and structured pattern drawing to enter a state of mindfulness and flow. However, research has yet to examine the effectiveness of this practice. This study investigated how participation in a Zentangle activity may have impacted self-reported symptoms of anxiety among first- and second-year medical students.

Methods

Participants

A convenience sample of 30 medical students were recruited enrolled by social media and specialty student organization postings at a medical school. Announcements were posted in the following locations: campus weekly news, Wellness Counseling Center, Academic Support Center, student Facebook page, and different student interest groups on campus. Participation in the study was voluntary. A total of 35 students signed up to be part of the workshop, with 30 students present on the day of the workshop. All participants were enrolled in their basic medical sciences courses (year 1 and 2) of medical school. Informed and voluntary consent was obtained from all of the subjects participating in the study.

Intervention

The Zentangle Method® was used in the workshop and was led by a Certified Zentangle Teacher (CZT). The teacher was trained through seminars taught by Zentangle, Inc., to allow consistency between methods that focus on the meditative and mindful aspects of Zentangle rather than the art form.

A two-hour session was facilitated by the certified teacher. The Zentangle Method® consists of 8 steps. A detailed explanation of each step can be found in Appendix B. (Gratitude and Appreciation, Corner Dots, Border, String, Tangle, Shade, Initial and Sign, and Appreciate). Each participant received a Zentangle kit at the start of the workshop and were able to personally keep these kits to continue to tangle on their own time after the session as a stress-reduction tool. Two Zentangle tiles were constructed by each participant with the instructions given by the Zentangle teacher.

Measures

Anxiety was measured with the Beck Anxiety Inventory (BAI). The inventory contains 21 items rated, in which a Likert scale rated from 0 (not at all) to 3 (severely) was completed by the participants, with a total possible score of 63 points. The items reflected psychological and physiological symptoms of anxiety such as "fear of worst happening" or "heart pounding/racing," respectively. Higher total scores indicated more severe subjective self-ratings of anxiety. The BAI has been used in clinical settings as a tool to measure anxiety, and has high internal consistency and test-retest reliability (Beck, Epstein, Brown, & Steer, 1988).

Results

A paired *t*-test was performed to determine if there was a significant difference between anxiety reported before and after participating in the activity. The total number of participants was n = 30. Pre-test data yielded a mean of 13.43 and a standard deviation of 11.71. Post-test data yielded a mean of 2.30 and a standard deviation of 2.292. The *t*-test comparison results determined significance: t(29)= 5.726, *p* < 0.0001. Anxiety values of 7.156 to 15.110 were within the 95% confidence interval; i.e., it was 95% certain that the true anxiety mean of the population (n=30) was within the interval. Analysis from the paired *t*-test is listed in Table A.1. Additional analysis and hypothesis from the study can be found in Appendix A.

Discussion

Conclusions

The current study found a reduction in self-reported anxiety among medical students after participation in a Zentangle activity for a period of two hours. The Zentangle Method® could be compared to mindfulness techniques, with a similar focus on the here and now. Similar to the current findings, earlier studies have found that mindfulness techniques can reduce distress in high-stress conditions (e.g., depression, CAD, and PTSD), and has helped improve awareness of cognitive processes (Jang, SH., Lee, JH., Lee, HJ., Lee, SY, 2011). Similarly, participants in the current study reported fewer symptoms of distress following participation in the workshop. That a calm mind common among those that engage in the Zentangle Method® is also similar to an attentive mindset that has been established by Gupta, Sharat (2016) in doodling experiments, in which doodling was found to improve their focus in classrooms among undergraduate students.

Implications

As medical schools provide counselling centers and wellness initiatives, the findings imply that alternatives to traditional forms of psychotherapy should be explored. Integration of art into student activities, stress reduction activities and general outreach may result in a reduction of anxiety among the student population. Students resistant to the commitment of traditional mental health services may engage in art-based practice for relaxation to prevent the development of psychopathology and/or decreased capacity to learn. Such methods may be efficient and cost effective tools.

Limitations

Recruitment methods may have resulted in a placebo effect that could overestimate the impact of the Zentangle Method®. In a similar study that measured mindfulness-based stress-reduction in medical students, results showed lower scores on satisfaction and usefulness in the group of participants for which the workshop were mandated. Whereas, the group consisting of volunteered students scored higher in terms of satisfaction and usefulness of the workshop (D. Aherene, et al., 2016). Thus, the current study participants may have wished or hoped to have a specific outcome from participation, creating a placebo effect.

An additional limitation of the current study is the possibility of measurement error. The Beck Anxiety Inventory is created to measure symptoms of anxiety over the past month, as opposed to the current state of anxiety before and after the intervention. It is recommended that follow-up studies utilize the State-Trait Anxiety Inventory, for a more accurate assessment of anxiety states.

Future Research

  With the obtained value of significance, there is much potential for further analysis within the same study. Structurally, the State-Trait Anxiety Inventory for future studies would give even more intimate understanding of anxiety reduction with Zentangle. It would be beneficial to implement a similar course or workshop using the Zentangle Method® in undergraduate programs to alleviate stress and anxiety levels, and increase direct exposure to meditative art-based mindful practices. Other studies could explore utilization of the method in hospital settings among clinical populations.

  Demographic factors that may have impacted the findings were not measured by the current study. It is recommended that future studies record demographic factors such as the participant's gender, overall academic performance, and mental health functioning. As the activity is not a clinical intervention, participations with severe and persistent mental disorders or suicidal ideation should be excluded from the study.

  It is recommended that follow-up studies control for external factors that may have impacted student reports of anxiety. For example, caffeine intake prior to the workshop, time frame between the workshop and next examination, and hours of sleep before the workshop may be relevant factors among medical students. Future studies can control for these factors by employing a control-group design.

  Future studies can also closely examine the mechanisms by which meditative art-based mindful practices reduce anxiety and potentially improve academic performance. Measures of cognitive efficiency, working memory and attention could also be incorporated into future study designs. Outcome measures, such as test performance and overall academic success, may also

be beneficial to include. These future study designs, especially with significant positive results, may further increase the rational for institutional funding to support implementation and sustainability of meditative art-based interventions.

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Appendix A: Results from Beck Anxiety Inventory

Paired Samples Test

			Paired Differences		95% Confidence ...
		Mean	Std. Deviation	Std. Error Mean	Lower
Pair 1	preSum - postSum	11.133	10.650	1.944	7.156

Paired Samples Test

		Paired ... 95% Confidence Interval of the ...			
		Upper	t	df	Sig. (2-tailed)
Pair 1	preSum - postSum	15.110	5.726	29	.000

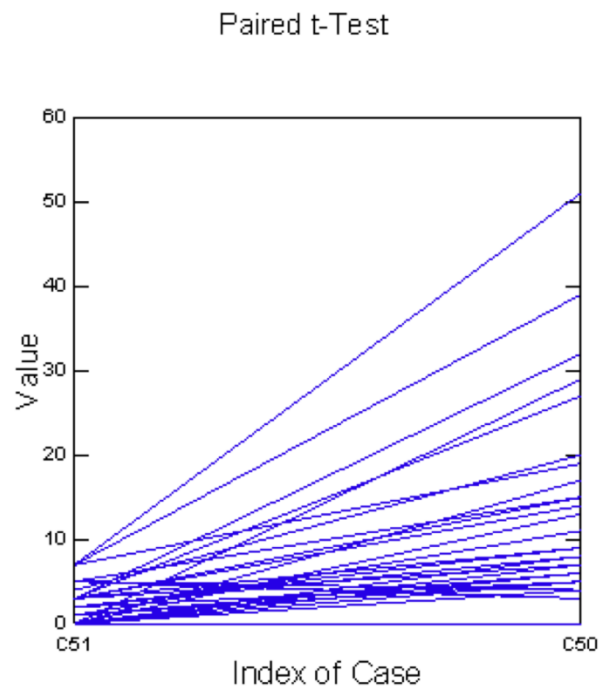**Table A.1:** Paired Sample T test on pre-intervention and post-intervention group.

Figure A.1: Paired t-test and obtained values from the BAI. $X \sim N(\mu, \sigma^2)$

Null and Alternative Hypothesis:

H0: $\mu_1 - \mu_2 = 0$

H1: $\mu_1 - \mu_2 \neq 0$

The null hypothesis states that the difference in the mean of the two sample is equal to zero. Therefore, there is no difference in mean for weight gain in the control group and the cognitive therapy group. The alternative hypothesis states that there is a difference in the two samples, the difference is not equal to zero.

Null Distribution:

If, $X \sim N(\mu, \sigma^2)$ and Ho is true. Then, $t = [(x_1 - x_2) - d] / SE \sim t_{n-1}$

X1-X2= 11.133

SE = 10.650

$\alpha = 0.05$

Tobs = 5.725

p obs = 0.002

P obs $< \alpha$ (0.002 < 0.05), therefore we reject the Null hypothesis. There was significant different between the two groups. After the two- hour mindfulness Zentangle workshop, there was a significant reduction in anxiety levels among medical students.

Appendix B: Zentangle Workshop Steps

Step 1: Gratitude and Appreciation

Get comfortable, take a few deep breaths and feel gratitude and appreciation – for this beautiful paper, for these wonderful tools, for this opportunity to create something beautiful.

Step 2: Corner Dots

We teach beginning Zentangle Method with beautiful museum grade cotton paper, 3.5 inches (89 mm) square. To answer a familiar question of what to put on this beautiful paper, place a light pencil dot in each corner, about a pen's width from the edges. Now it's no longer a blank piece of paper.

Step 3: Border

Connect those dots with a light pencil line, straight or curvy, to create a square. This is your border.

Step 4: String

Inside the border, draw a light pencil line or lines to make what we call a "string." The string separates your tile into sections, in which you draw your tangles. A string can be any shape. It may be a curvy line that touches the edge of the border now and then, or series of straight lines that go from one side of the border to the next.

Step 5: Tangle

A tangle is a predefined sequence of simple strokes that make up a pattern. Draw your tangles in pen inside (usually) the pencil strings and borders. Tangle is both noun and verb. Just as you dance a dance, you tangle your tangles. Draw your tangles with deliberate strokes. Don't worry about what it's going to look like. Just focus on each stroke of the pen as you make it. Trust that you'll know what to do next when the time to do it comes. There is no up or down to Zentangle

art so feel free to rotate your tile in any direction that is most comfortable for your hand as you draw.

Step 6: Shade

Add shades of gray with a graphite pencil to bring contrast and dimension to your tile. The black and white two-dimensional tangles transform through shading and appear three dimensional. You can also use a tortillion (a paper blending stump) to soften and blend the graphite.

Step 7: Initial and Sign

This is art you created. You should sign it. Put your initials on the front (many people create a unique monogram or chop for this step). On the back, place your name, date, comments and observations.

Step 8: Appreciate

Hold your tile at arm's length. Turn it this way and that. Appreciate what you just created.