Mindfulness and Healthcare-Induced Anxiety Among College Students

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Abstract

Anxiety in patients stemming from healthcare settings often leads to the avoidance of treatment. Such behavior can exacerbate pre-existing health conditions and cause physical harm by letting ailments go untreated. In order to combat this, numerous pharmacologic interventions such as sedation and general anesthesia have been studied. Although perceived loss of control has a proven role in causing mental distress among patients, behavioral interventions remain relatively unexplored. One approach that has been studied for decreasing the symptoms of generalized anxiety disorders in non-medical settings is the practice of mindfulness. In order to assess anxiety arising from medical environments, this study aims to identify if there is a relationship between the level of mindfulness in college students and their levels of healthcare-induced anxiety. Scores from the Five Facet Mindfulness Questionnaire, Modified Dental Anxiety Scale, and State Trait Anxiety Inventory were compared among 218 undergraduate students at the University of Texas at Austin. Regression analyses suggested a significant negative relationship between mindfulness and healthcare-induced anxiety, but not between mindfulness and dental anxiety. Thus, mindfulness appears to play an important role in levels of anxiety in medical environments, but not in dental environments.

Fear and anxiety in patients surrounding healthcare professionals and clinics often lead to the avoidance of care. Anxiety refers to a feeling of extreme apprehension that fails to subside even in the absence of a threatening stimulus. In a healthcare setting, anxiety is commonly associated with strained medical interactions and has health repercussions resulting from delayed visits. In dental clinics, the term "dental anxiety" refers to the distress caused by fear of dental procedures and preventative care. It affects roughly 36% of the U.S. population and is a barrier for maintaining proper oral health (Beaton et al., 2013). Similarly, "white coat syndrome" refers to the elevation of blood pressure in patients that are in the presence of a physician. Both situations can lead to the need for potentially invasive procedures like surgery contributing to the cycle of trauma induced by healthcare. When studying the various causes for this type of anxiety, perceived loss of control and fear of the unknown in medical environments prevailed (Appukuttan, 2016; see also Lerwick, 2016). In order to combat this, various methods that play a role in general anxiety reduction can be considered including mindfulness. Mindfulness will be examined in this study to see if participants who have a sense of control over their environment and state of mind experience less anxiety in healthcare settings. It is hypothesized that higher levels of mindfulness will correlate to lower levels of health anxiety and dental anxiety in college students.

Factors Inducing Anxiety in Health Settings

Though pharmacologic agents such as sedatives and analgesics can be used to relieve healthcare-related anxiety, they serve merely as symptom-driven treatments for a problem that has psychological roots. In order to effectively examine healthcare-induced anxiety, a closer look must be taken at the negative, anxiety-provoking thoughts that arise in patients. Frequently, feelings of vulnerability and powerlessness exist in patients due to a lack of choices and lack of

knowledge regarding symptoms and health (Lerwick, 2016). A doctor's elevated level of knowledge in their field can contribute to expert power that unintentionally limits patients' ability to question authority. Expert power is the use of expert knowledge or skills to get a subordinate to listen to certain rules or instructions. Hence, patients are less able to receive positive reinforcement that allows them to remain comfortable and free of anxiety. A lack of knowledge also adds to a fear of the unknown, which contributes to anxiety (Carleton, 2016). Many people also fear the procedures conducted in clinics due to the invasion of personal space and potential for pain. In fact, anxiety has been found to exaggerate the perception of pain which inadvertently leads to a more painful memory of patients' visit (Weisenberg et al., 1984). All such factors contribute to the perceived loss of control that instigates anxiety.

Anxiety Spectrum

Anxiety can manifest in various forms and severity levels. The most commonly studied forms of anxiety in hospitals are generalized anxiety disorder and health anxiety with very limited research done on healthcare-induced anxiety. Generalized anxiety disorder (GAD) plagues up to 20% of the US population and is characterized by excessive worry that lasts at least 6 months (Rowa, 2008). This is the most common form of anxiety studied perhaps because it is an established form of anxiety and can be easily identified due to its severity. Since GAD is pervasive and usually exists prior to a visit with a healthcare specialist, it is not a form of healthcare-induced anxiety and will be used as a control variable in the current study. Extensive research conducted on GAD in primary care workers and patients showed that psychotherapy sessions as well as mindfulness-based cognitive therapy had a significant impact in reducing anxiety (Alharthy et al., 2017; Kick, 1999; Porensky et al., 2009). Similar results were seen when using mindfulness-based cognitive therapy on patients with high levels of health anxiety which is

anxiety about having an undiagnosed, serious medical condition (Lovas & Barsky, 2010). Since mindfulness played a significant role in reducing other forms of anxiety, it will be considered as a variable that could potentially influence healthcare-related anxiety. Additionally, it was seen that most people with high levels of worry and anxiety do not qualify for a diagnosis of GAD (Ruscio & Borkovec, 2004). Overall, there remains a need to account for this larger population of patients and measure anxiety arising from the healthcare environment rather than other sources as seen in GAD and health anxiety. This study will aim to include college students with mild to moderate levels of anxiety measured through an anxiety assessment that puts an emphasis on situational or state anxiety.

There is also a major distinction between anxiety surrounding healthcare and phobias of healthcare: which can be misconstrued as the same problem. A phobia is an intense and irrational fear that can lead to people having a strong desire to completely avoid a certain object or situation. Treatment of phobias often includes systematic desensitization, cognitive behavior therapy, exposure therapy, and even medication under the guidance of a licensed clinical psychologist (Choy et al., 2007). Due to their severity, phobias require more resources and clinical experience. This study will exclude individuals with phobias surrounding health settings and professionals since such participants might only benefit from the inclusion of long-term treatments or therapies.

Mindfulness and Anxiety

Mindfulness refers to the practice of accepting a situation and approaching it without any preconceived notions or judgment. In order to enhance this form of self-awareness, various interventions exist including breathing exercises, guided imagery, and progressive muscle relaxation. In medical settings, mindfulness interventions reduce anxiety among healthcare

providers and improve medical decision-making (Gilmartin et al., 2017). Mindfulness-based therapies also proved beneficial for treating anxiety in general clinical populations suffering from GAD, depression, and other medical conditions (Hofman et al., 2010). However, no research exists on the benefits of mindfulness in reducing healthcare-induced anxiety in patients. Since loss of control is a factor inducing this type of anxiety, mindfulness could help anxious individuals by allowing them to feel control over their internal environment. In the general adult population, it is understood that experiencing a situation non-judgmentally (being mindful) can help curb the effects of stressors (de Bruin et al., 2012). Excessive thought about past situations or future scenarios can often lead to symptoms of anxiety and depression. Another factor discussed earlier that triggers anxiety is fear of the unknown. If the same logic of mindfulness is applied, it can reasonably be concluded that focusing on the present moment should help alleviate any worries about extraneous factors like fear of the unknown. However, this reasoning has not been studied for patients whose anxiety arises from medical environments. In efforts to explore the true extent of mindfulness and its relations to healthcare-induced anxiety, this study will aim to find a correlation between the two variables in college students. This will be done by measuring existing levels of mindfulness in college students and comparing them to levels of healthcare-induced anxiety as well as dental anxiety.

Conclusions

Prior findings show that anxiety induced by health settings is mentally debilitating and holds physical repercussions if unaddressed. Though numerous studies have shown that mindfulness-based treatments can reduce anxiety, the focus is mostly on generalized anxiety disorders (GAD) and individuals with health anxiety which is the fear of more serious medical conditions. Many people who experience similar symptoms of distress do not qualify for these

diagnoses. As a result, they are excluded from receiving behavioral interventions that could potentially benefit them. Additionally, most literature fails to identify non-pharmacological solutions that are specific to health settings. The majority of patients studied for anxiety in the past have pre-existing conditions and illnesses that also contribute to their psychological distress. These gaps in the literature will be fulfilled in the current study by examining a population of college students that experience mild to moderate levels of anxiety pertaining to the medical environment. College students are the focus in this study since this population has been linked to higher numbers of infectious diseases and medical visits due to poor hand hygiene (Prater et al., 2015). Despite the proven role of mindfulness in reducing symptoms of anxiety, little research has been done on patients with anxiety stemming from the medical environment. In order to assess if there's a correlation between the two, this study will examine if higher levels of mindfulness among college students correlate with lower levels of healthcare-induced anxiety. Additionally, levels of mindfulness will be examined in relation to dental anxiety to see if higher levels of mindfulness will predict lower levels of dental anxiety.

Methods

Design Overview

The first study hypothesis is that college students who display higher levels of mindfulness will have lower levels of healthcare-induced anxiety. The second study hypothesis is that college students who display higher levels of mindfulness will have lower levels of dental anxiety. Mindfulness levels were measured using the Five Facet Mindfulness Questionnaire. In order to measure levels of anxiety, a modified version of the State Trait Anxiety Inventory (STAI) form was used for healthcare-induced anxiety and the Modified Dental Anxiety Scale was used for dental anxiety. The primary independent variable is the level of mindfulness in college students. The primary dependent variables are the level of healthcare-induced anxiety and the level of dental anxiety which were analyzed separately.

Participants

Participants were 218 University of Texas at Austin undergraduate college students, ages 18 and above. They were recruited through an introductory psychology course. There was a section of the Qualtrics questionnaire that asks a yes or no question regarding if the student experiences any sort of stress about medical or dental visits. Participants that answered “no” to a question regarding whether they experience any stress surrounding medical or dental visits were excluded. This criteria is to ensure that the participants experience mild to moderate levels of healthcare-related anxiety. Participants were not compensated for participating in this study.

Materials and Measures

This study used one Qualtrics questionnaire containing 4 measures to assess the relationship between mindfulness and healthcare-induced anxiety, as well as dental anxiety (Appendix).

Five Facet Mindfulness Questionnaire

To measure levels of mindfulness, the Five Facet Mindfulness Questionnaire was used. This is a 39 item questionnaire rated on a 5-point Likert-like scale that measures self-awareness in individuals through the 5 facets of mindfulness: observation, description, aware actions, non-judgemental inner experience, and non-reactivity (Goldberg et al., 2016). Observation (8 items) refers to participants' tendency to notice their external and internal world which includes sensations, emotions, sights, and smells. The description facet (8 items) refers to the tendency for a participant to label what they are experiencing with words. Aware actions (8 items) refers to the tendency for participants to bring their full awareness and attention to their current state. The non-judgemental inner experience (8 items) refers to the ability of people to approach things in a non evaluative manner. Non-reactivity (7 items) is the ability for participants to let thoughts of any nature come and go without attaching any negativity or reacting to them. The scale for the answers ranges from 1 meaning "never or very rarely true" to 5 meaning "very often or always true." After reverse scoring some of the items in each section, the scores were added together in each facet by taking the sum of the numbers (on Likert-type scale). The resulting sums for each facet range from 8 to 40 except for the nonreactivity facet which ranges from 7 to 35. There is also an overall mindfulness score that can be calculated by adding the respective facet scores. This overall mindfulness score was used when correlating with anxiety levels. The FFMQ is associated with high levels of construct validity (0.65) (Montgomery., et al 2010) and reliability (0.86) (Choi, 2015).

State Trait Anxiety Inventory

The State Trait Anxiety Inventory is a 40-item survey used to measure levels of anxiety and distress in individuals (Spielberger, 1983). It can be broken into 2 sections with one

measuring trait anxiety and the other measuring state anxiety. In order to control for trait anxiety in participants, the Trait section of the State Trait Anxiety Inventory was used. Trait anxiety measures the tendency of an individual to report worry and anxiety across a number of situations. Trait anxiety was added as a control variable in the analysis. This involves 20 items measured on a 4-point scale (1= Almost Never; 4= Almost Always), so cumulatively higher scores mean more anxiety. Trait anxiety items can include statements like " I am a steady person" and "I worry too much over something that really doesn't matter." The second section of the inventory is the State section (also 20 items) which is scored in the same way as the Trait section. Items in this section include statements like "I am worried" and "I am tense." In this study, it was used to measure healthcare-induced anxiety. A beginning prompt was stated asking for answers to be chosen based on what the participant is feeling in the moment. In order to relate the state of the participant to a medical environment, this was changed to "Choose the feelings that arise when imagining going to a doctor's appointment." After adding up the scores for each section, the results range from 20 to 80 in each subtest with higher numbers indicating higher levels of anxiety. Scores of 40 or higher have been associated with clinically significant symptoms of state anxiety (Knight et al., 1983). High levels of content validity were found when compared with Cattell and Scheier's Anxiety Scale Questionnaire with a correlation of 0.85 (Cattell and Scheier, 1963). In regards to test-retest reliability, the coefficients for state anxiety proved to be lower than for trait anxiety which is expected since state anxiety reflects a more transitory state (Julian, 2011).

Modified Dental Anxiety Scale

In order to measure dental anxiety among participants, the Modified Dental Anxiety Scale (MDAS) was used (Humphris et al., 2000). The MDAS is an improved version of

Cochran's Dental Anxiety Scale because it asks about feelings towards local anesthetic injection which is a source of anxiety for many. It is a brief 5 item survey with a 5 category rating scale (ranges from 1=not anxious to 5=extremely anxious). Each item asks participants to rate how anxious they would feel if they were in various dental-related situations, such as sitting in the waiting room of a dental office. After the scores are added for each item, the final score is calculated on a range from 5 to 25 with scores of 19 or higher indicating a dentally phobic patient.

Patient Health Questionnaire 9

The Patient Health Questionnaire 9 (PHQ 9) is typically used to measure the severity of depression in patients (Levis et al., 2019). In this study, the PHQ 9 was included as a way to control for depression among participants. The scores were used as a control variable in the analysis. The questionnaire itself is 9 items and asks about how bothered a patient was with various problems in the past 2 weeks. These problems range from "feeling tired" to "trouble concentrating" measured on a 4-point scale (0=not at all, 1=several days, 2=more than half the days, 3=nearly everyday). In this study, the last item regarding suicidal or self-harming behavior was removed since any responses indicating a chance for self-harm or suicide will need immediate clinical attention. The score was determined by adding up all of the points with score ranges of 15-19 indicating moderately severe depression and 20-26 indicating severe depression. The validity and reliability of the PHQ 9 has been proven to be higher than the DSM-IV (Diagnostic and Statistical Manual of Mental Disorders, fourth edition) (Sun et al., 2019).

Procedures

Participants found all the surveys in a questionnaire on Qualtrics. The questionnaire started with an informed consent page providing information about the study and what's

expected of the participants. If participants agreed to the consent from, they were asked if they experienced stress when visiting a doctor or dentist. Additionally, the next two questions asked participants if this stress or anxiety related to the current COVID-19 pandemic. Next, participants filled out a demographics section asking about age, race, year, and major. After this page, the 4 surveys were presented in a randomized order to control for any bias that may arise. There were two attention check questions included at the beginning of the first survey and beginning of the last survey to ensure genuine answers. On the last page, participants were debriefed and thanked for their participation.

Statistical Analysis

In order to analyze if there is a significant relationship between mindfulness and healthcare-induced anxiety, a linear regression was performed. The analysis was performed using the overall mindfulness scores from the FFMQ and the state anxiety scores from STAI. Trait anxiety scores and depression scores (from PHQ 9) were included as control variables. The same analysis was conducted between overall mindfulness scores and dental anxiety scores to determine if there is a relationship between the two. The independent variable was overall mindfulness and the outcome variable was state anxiety. Another outcome variable was dental anxiety which was analyzed in an additional regression. For this regression, the cumulative scores from the MDAS were used to correlate with overall mindfulness scores. Two graphs were created with mindfulness scores on the x-axis and anxiety scores on the y-axis to examine if there is a linear relationship with an R squared value for each.

Results

The first research question concerned whether mindfulness was significantly predictive of healthcare-induced anxiety, while controlling for depression. The first regression looked into this relationship with FFMQ scores and PHQ-9 scores as covariates and State Anxiety scores as the dependent variable. Due to a collinearity problem, trait anxiety was not used as a covariate in this regression. Mindfulness was a significant predictor of healthcare-induced anxiety (β = -0.101, p = 0.048) (see Table 1). Depression was not a significant predictor of healthcare-induced anxiety (β = 0.206, p = 0.153) (see Table 1). The R squared value for the relationship between mindfulness and healthcare-induced anxiety was 0.066.

Table 1

Association between Mindfulness and Healthcare-Induced Anxiety Adjusted for Depression

Variable	Estimate	*SE*	*p*
Mindfulness (FFMQ)	-0.101	0.051	0.048*
Depression (PHQ-9)	0.206	0.143	0.153

Note. Trait anxiety was omitted as a covariate for all regressions. (*p < .05)

Figure 1 shows a visualization of the relationship between mindfulness and healthcare-induced anxiety. As apparent on Figure 1, it is evident that higher levels of mindfulness correlated with lower levels of healthcare-induced anxiety.

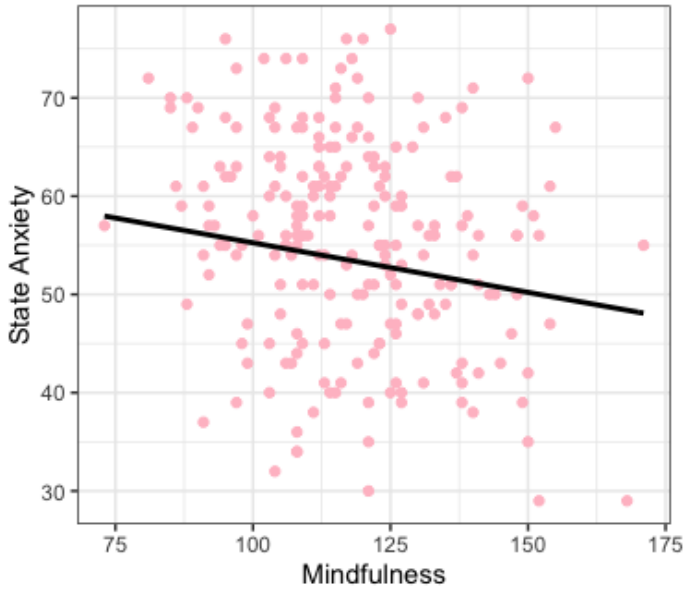

Figure 1. Relationship between Five Facet Mindfulness Questionnaire scores and State Anxiety.

The second research question concerned whether mindfulness was significantly predictive of dental anxiety, while controlling for depression. The second regression looked into this relationship with FFMQ scores and PHQ-9 scores as covariates and MDAS scores as the dependent variable. Due to a collinearity problem, trait anxiety was not used as a covariate in this regression. Mindfulness was not a significant predictor of dental anxiety (β = -0.014, p = 0.487) (see Table 2). Depression was a significant predictor of healthcare-induced anxiety (β = 0.126, p = 0.027) (see Table 2). The R squared value for the relationship between mindfulness and dental anxiety was 0.052.

Table 2

Association between Mindfulness and Dental Anxiety Adjusted for Depression

Variable	Estimate	*SE*	*p*
Mindfulness (FFMQ)	-0.014	0.02	0.487
Depression (PHQ-9)	0.126	0.057	0.027*

Note. Trait anxiety was omitted as a covariate for all regressions. (*$p < .05$)

Figure 2 shows a visualization of the relationship between mindfulness and dental anxiety. According to the graph, there is no apparent relationship between mindfulness and dental anxiety.

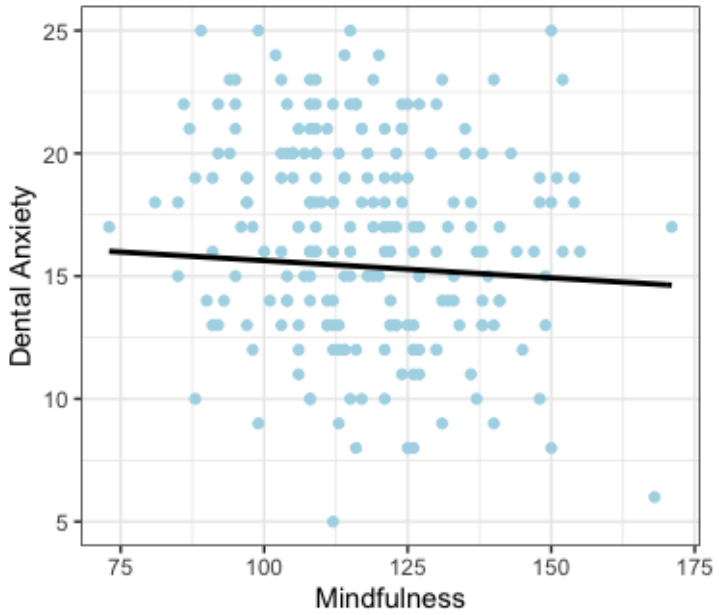

Figure 2. Relationship between Five Facet Mindfulness Questionnaire scores and Modified Dental Anxiety Scale scores.

Discussion

The purpose of this study was to examine the relationship between mindfulness and various types of anxieties that stem from healthcare settings including healthcare-induced anxiety and dental anxiety. The primary finding from the statistical analyses shows that mindfulness significantly predicts healthcare-induced anxiety when controlling for depression. However, mindfulness did not significantly predict dental anxiety while adjusting for depression. The first finding supports the theory that being more mindful might help people worry less about past pain/experiences or future problems with a healthcare provider resulting in lower amounts of anxiety.

I hypothesize that this was not the case for dental anxiety for several reasons. The scale could have added to the lack of significance since the Modified Dental Anxiety Scale was more specific in stating the exact procedures that would hypothetically be performed on the participant. For example, participants would have to react to procedures such as "having a tooth drilled on" and "having a local anesthetic injection." (Humphris et al., 2000). If individuals did not fear the stated dental procedures, but feared other more severe dental procedures like root canals or extractions which were not included, the scale would not have classified the person as dentally anxious. As a result, there might be a stronger relationship if the scale used to measure dental anxiety had a broader range of procedures including more severe procedures and interactions with the dentist.

Another explanation for the lack of significance is that mindfulness is not related to dental anxiety. There is a lack of research present studying mindfulness and dental anxiety specifically, with more studies focused on mindfulness and other situational anxieties. Despite mindfulness proving useful for generalized anxiety disorders, it is possible that mindfulness is

not linked to dental fear specifically (Hofman et al., 2010). More research should be performed in a dental clinic setting so that dental anxiety can be assessed in real time and mindfulness-based interventions can be administered to see their usefulness in combating dental anxiety.

One primary limitation of the study is the data was collected exclusively from undergraduates at the University of Texas at Austin. Therefore, region specific effects on healthcare anxieties might have been present. If students were chosen from more underserved areas, viewpoints and anxiety surrounding healthcare might be different, possibly altering the results. Additionally, due to the COVID-19 pandemic, the questionnaire was not able to be distributed to patients before seeing an actual doctor or dentist. Since the healthcare and dental scenarios were hypothetical and participants were not actually patients in these settings, the levels of anxiety might have been attenuated. If the surveys were filled out in a dental office waiting room or doctor's office, more realistic levels of anxiety might have been measured.

Generally, the study findings showed that being mindful has an effect on anxiety stemming from medical settings, but not in dental settings. Past findings have shown the efficacy of mindfulness-based interventions in treating general anxiety in healthcare; however, this study shows promise that such interventions might work in treating situational anxiety arising from healthcare settings (Gilmartin et al., 2017). This study did not find a relationship between mindfulness and dental anxiety; however, it opened doors for future studies exploring this relationship in more detail and in a real dental setting both of which might lead to different results. Recognizing anxiety and psychological stressors in healthcare settings proves vital in maintaining not only mental wellness but also physiological health. As a result, behavioral

interventions should remain a priority in addressing situational anxieties in healthcare alongside the traditional route of pharmacologic agents.

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Appendix

Healthcare-Induced Anxiety: Mind Over Matter Questionnaire Link

https://utexas.qualtrics.com/jfe/form/SV_1NYufBbJOVRqc1U