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Reducing Anxiety in Elementary School Children by Implementing Yoga

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Abstract

Anxiety is a major disorder that has significant negative impact on a child's behavior in the classroom, their ability to focus, their overall physical health and well-being. The purpose of this study is to determine the impact of 10 minutes of daily yoga on the anxiety of children in Kindergarten through 3rd grade over a 16 week period. Three categories of anxiety were tested: total anxiety, general anxiety disorder and social anxiety. The study found that 10 minutes of daily yoga practice in the classroom had a significant impact on the anxiety levels of children. There was a statistically significant decrease in total anxiety and general anxiety disorder after 16 weeks of practicing yoga, however there was no significant improvement in Significant School Avoidance scores. Yoga could be implemented into elementary schools as an intervention to decrease anxiety levels.

The purpose of this study is to attempt to reduce anxiety levels in children by implementing Yoga into elementary school classrooms. Anxiety is a major disorder that has significant negative impact on a child's behavior in the classroom, their ability to focus, their overall physical health and well-being (Weaver & Darragh, 2015). Yoga has been shown to decrease anxiety in children and will be used as the intervention in this study (Vohra et al., 2016). In order to assess anxiety levels in children, the Screen for Child Anxiety Related Emotional Disorders (SCARED) will be administered to participants in the beginning, middle and end of the research process. The hypothesis is that by including 10 minutes of yoga at the beginning of every school day, anxiety levels in children will decrease.

Background and Significance

An increased level of anxiety is being seen in elementary school children around the United States and has been shown to be a significant factor that impedes a child's ability to focus and absorb knowledge (Weaver & Darragh, 2015). Many trial therapies for children have been executed in various settings with hopes to reduce anxiety levels. As early as 2009, Yoga is one therapy that was identified to be a major contributor in the reduction of anxiety in children (White, 2009). Then in 2015, it was found that implementing yoga into classrooms, children's focus may be reset, allowing them a greater opportunity to be calm, and thus, absorb more knowledge (Weaver & Darragh, 2015**).** A pilot study was conducted in spring 2017 in two rural elementary schools in Arkansas. Results from this study showed improvement in anxiety over an 8 week period. Therefore, this study examined if anxiety leveled out or continued to decrease.

Review of Literature

Anxiety is a mental illness that effects individuals of all ages, but can be especially harmful to children as they are developing cognitively, emotionally and physically. Elementary school is a crucial developmental period for an individual's future wellbeing (Voltas, Hernández-Martínez, Arija, & Canals, 2016). Weaver & Darragh (2015) detailed that multiple studies have concluded that anxiety is one of the most hindering and prevalent disorders for children, and that 50% of affected children begin showing symptoms by the age of six. In 2016, Voltas et al. (2016) noted that anxiety impedes appropriate functioning in children and deter the development of a healthy well-being. This is especially true in the classroom because it inhibits a child's ability to focus and captivate knowledge (Folleto, Pereira, & Valentini, 2016). Similarly, Weaver & Darragh (2015) suggested that individuals who have anxiety early in life have an increased risk of becoming depressed and having suicidal tendencies when compared to individuals without anxiety. Both Weaver & Darragh (2015) and Voltas et al. (2016) suggest that it is imperative to identify the presence of anxiety early in a child's development so that appropriate interventions can be implemented. Discovering useful methods to reduce a child's anxiety is beneficial for their future well-being.

The Screen for Child Anxiety-Related Emotional disorders (SCARED) is a valid and reliable screening tool for anxiety in children from 8-15 years old (Gonzalez, Weersing, Warnick, Scahill & Woolston, 2012). The child answers items on the survey by rating their response in one of three ways: 0 = not true or hardly ever true, 1= somewhat true or sometimes true, 2= very true or often true. Parents complete the surveys for children under 8. For Higher scores indicate higher levels of anxiety (DeSousa et al., 2013). Gonzalez et al. (2012) used SCARED to assess the anxiety levels in young boys aged 11-18, concluding that it is a

dependable tool for distinguishing children with and without anxiety. Similarly, a study specifically analyzing the sensitivity and specificity of SCARED for anxiety in children ages 9-18 concluded that it is a reliable and valid tool (DeSousa, Salum, Isolan, & Manfro, 2013).

Yoga is a comforting, non-competitive and gentle intervention that has been shown to reduce anxiety in individuals of all ages (Vohra et al, 2016). The practice of yoga aims to balance the mind and body by encouraging participants to focus on postures and breathing patterns at the time of the practice, while blocking out any distractions (Vohra et al, 2016).

In a systematic review, Field (2012) described that the hormone associated with anxiety, known as cortisol, is elevated when individuals experience anxiety. Field (2012) concluded that doing yoga lowers children's anxiety levels at a greater rate than engaging in cardiovascular exercise. White (2009) asserts that an increase in GABA, which is a neurotransmitter known to decrease anxiety, occurs in the brain after participating in yoga for just one month. An increase in the calming effects of GABA is significant in verifying the usefulness of yoga to decrease anxiety (White, 2009). Likewise, Beltran et al. (2016) asserts that yoga actually has the ability to alter neural processes in the nervous system, resulting in a feeling of calmness and reduced anxiety.

Research suggests that many schools are searching for interventions to help decrease a student's level of anxiety (White, 2009). Evidence shows that implementing mind body therapies in elementary school is important for physical and mental development of children (Vohra et al., 2016). As a result, many schools have begun implementing activities in classrooms to improve children's health (White, 2009). Folletto et al. (2016) focused on the motor and behavioral abilities of 16 children from ages 6 to 8. Participants completed 45 minutes of yoga, twice a week for 12 weeks. Results indicate children to be stronger physically, calmer, and better

behaved in class (Folleto et al, 2016). Additionally, a systematic review done by Weaver & Darragh (2015) focused on many studies, all of which used yoga as an intervention to reduce anxiety in children. A literature review of 14 studies found yoga to be a beneficial practice with positive effects on increasing children's ability to cope with emotional issues (Weaver & Darragh, 2015). Weaver & Darragh (2015) also described a four-year study focusing on reducing anxiety in 5th grade children by using yoga. Results showed that after fifteen 60-minute sessions, anxiety decreased significantly and emotional well-being improved; three months later, anxiety levels remained decreased (Weaver & Darragh, 2015). Based on research conducted in schools thus far, yoga has shown to have a positive impact on psychological problems in children (Folleto, 2016).

Aims

The purpose of this study is to determine the impact of 10 minutes of daily yoga on the anxiety of children in Kindergarten through 3rd grade over a 16 week period.

Aim #1: Yoga practiced as little as 10 minutes 5 days a week in the classroom setting will decrease a child's overall anxiety level.

Aim #2: For children with generalized anxiety disorder, Yoga practiced as little as 10 minutes 5 days a week in the classroom setting will decrease their anxiety.

Aim #3: For children with significant school avoidance, Yoga practiced as little as 10 minutes 5 days a week in the classroom setting will decrease their anxiety.

Research Designs and Methodology

The research was conducted in kindergarten through third grade classrooms in a rural elementary school. Subjects included a convenience sample of individuals who attended an

elementary school and had a homeroom teacher that opted to participate in the study. Inclusion criteria were individuals in participating Kindergarten through Third grade classrooms. 92 subjects participated in the yoga intervention. Only 56 completed SCARED anxiety screening at all three data collections. Participants in final data analysis included 17 kindergartners, 4 1st graders, 11 2nd graders, and 24 3rd graders. Approval from the University of Arkansas Institutional Review Board was obtained. Informed consent was collected from the parents and informed assent from the children participating. Each participant was de-identified by being given a special letter-number code that was placed on all of the forms and surveys used for the study. The codes are kept in a locked safe at the Eleanor Mann School of Nursing. All information will be kept private, in line with state and federal law and University policy.

Teachers received yoga instruction on a predetermined 8 week yoga program prior to the beginning of the study and instruction on a second yoga program after 8 weeks. Students participated in warm up and cool down routines to minimize injuries to muscles. One specific yoga routine was chosen with physical and balance limitations of this age group in mind to limit positions that increase the risk of falling or over stretching. Another yoga routine that complimented the first yoga routine was added during the second 8 weeks. Yoga positions included: Mountain, Tree, Warrior I, Warrior II, Down Dog, Plank, Table Top, Half Boat, Child's Pose, Lying Twist, and Chill Pose. Parents completed demographic information. Participants completed anxiety survey using the SCARED child survey pre, mid and post yoga intervention lasting 16 weeks. Teachers were responsible for leading the yoga 5 days a week for 10 minutes in the morning for the entire semester. All participating classrooms used the same yoga routines. The tool used to assess the effects of yoga on children's anxiety is called the Screen for Child Anxiety-Related Emotional Disorders (SCARED). It is a parent report (for

children under 8 years) or self-report questionnaire composed of 41 sentences that describe how individuals feel. It has been shown to be both valid and reliable for assessing anxiety in 8-15 year olds. The questionnaire uses sentences such as "When I feel frightened, it is hard to breathe", "I get headaches when I am at school", and "I don't like to be with people I don't know very well" to assess different aspects of anxiety in children. The answer choices for each sentence are: 0 (Not true or hardly ever true), 1 (somewhat true or sometimes true), and 2 (Very true or often true). The numbers are summed up and a total score of over 25 may indicate the presence of any type of anxiety disorder, with scores over 30 indicating a more specific anxiety disorder. Additionally, the anxiety levels are broken down into subcategories: Total Anxiety Score (TS), Panic Disorder or Significant Somatic Symptoms (PN), Generalized Anxiety Disorder (GD), Separation Anxiety (SOC), Social Anxiety Disorder (SC), and Significant School Avoidance (SSA). Each question correlates with a subcategory, however all items are randomized throughout the survey. For this specific research study, only three types were analyzed: Total Anxiety Score, Generalized Anxiety Disorder (GD), and Significant School Avoidance (SSA).

The SCARED survey was administered to the children and parents at three points during the research period: prior to the start of classroom yoga, after 8 weeks, and after 16 weeks at the conclusion of the study. Based on research, it is recommended that the clinician should explain all questions to the children or have an adult present in the room to answer any questions they may have. Therefore, in the classroom setting verbal instructions were provided to the children, each question was read aloud by the researcher and then children were given time to answer each question. For children under 8 years of age, a parent survey focusing on the same questions was sent home with the children in an envelope to give to their parent to fill out based on their perception of the child's anxiety.

Statistical Analysis

A repeated multivariate analysis of variance (MANOVA) test was used to determine if any significant differences between the categories of Total Anxiety Score (TS), Generalized Anxiety Disorder (GAD) and Significant School Avoidance (SSA). Summed scales of the raw data were used for items pertaining to each of the categories: total anxiety score (measure 1), generalized anxiety (measure 2) and significant school avoidance (measure 3). Significance between the summed totals was analyzed from the beginning of the study to the 8 week point (time 1), and from the beginning of the study to the summed data at 16 weeks (time 2).

The overall test of measure (time) was significant indicating that at least some of the measures functioned differently over time from each other, $F(6, 28) = 2.73$, $p = 0.0323$. Follow up tests were done with an alpha of 0.0083 to see where the differences were. The differences in TS (measure 1) between the first time point and the mid time point was not significant, $F(1, 33) = 5.42$, $p = 0.0262$. The differences in TS (measure 2) between the mid time point and the last time point was significant, $F(1, 33) = 9.7$, $p = 0.0038$. GAD was also significantly different between the 2nd and 3rd time point, $F(1, 33) = 8.48$, $p = 0.0064$. While the time points between 1 and 3 for both the TS and GAD measure did have noticeable differences with p values being around 0.02, it did not meet the more stringent alpha value set in order to avoid type I errors. With a larger sample size, those differences may have been significant. The SSA measure did not appear to significantly differ over any time points. The TS and GAD measures seemed to increase at time point two from their baseline, then decrease at time point 3 with the difference between time point 2 and 3 significant for both measures.

Results

The study found that 10 minutes of daily yoga practice in the classroom had a significant impact on the anxiety levels of children. Of the 92 original participants, only 56 completed SCARED anxiety screening at all three data collections. Participants in final data analysis included 17 kindergartners, 4 1st graders, 11 2nd graders, and 24 3rd graders.

The first overall test of measure indicated that at least some significance existed somewhere within all of the total data. Then, two different periods of time were tested individually (see Tables 1-6) for Total anxiety scores (measure 1), Generalized Anxiety disorder (measure 2) and Significant School Avoidance (measure 3) to test for any significance across time. The two time periods used for each measure were from week zero to week 16 (Time 1) and from week 8 to week 16 (Time 2). For these analyses, the alpha was lowered to 0.0083 to avoid type I errors due to avoid finding a false positive for the null hypothesis. For TS (measure 1) and GAD (measure 2), the statistics found that there was a greater decrease in anxiety levels from week 8 to week 16 (see tables 2 & 4). From week zero to week 16, a significant decrease in anxiety was found, however it was not significant enough to meet the stringent alpha value of 0.0083 to avoid type 1 errors. If the sample size were bigger, giving more data to be analyzed, then the decrease from week zero to week 16 may have been more significant. However, when looking across measures for all time points for Significant School Anxiety, no significant decreases were found.

The statistical analysis also showed that for Total Anxiety scores and generalized anxiety scores, there was an increase in mean scores at Time 2 from the baseline Time 1 (see table 7), then a decrease at time point 3 with the difference between time point 2 and 3 significant for both measures.

Discussion

Participants participated in one daily yoga routine lasting approximately 10 minutes led by their classroom teacher. Classroom yoga teachers participated in the Yoga for Kids Program Instructors class prior to start of yoga classes. Participants over 8 completed anxiety survey using the SCARED child survey pre, mid and post yoga intervention lasting 16 weeks. The survey was read aloud in class. During the administration of the survey, children were able to ask any questions if they were confused about what the survey was asking.

Using the SCARED survey to identify if anxiety exists in children is very important because the presence of anxiety in a child can lead to the development of more serious psychological problems in the future. It is important that coping mechanisms such as Yoga are introduced to children to provide them with a way to focus their mind and decrease their stress levels.

Based on the results of this study, implementing yoga in the classroom for 10 minutes every day for a semester decreased for Aim #1 and Aim #2 (total anxiety and generalized anxiety disorder). This indicates that overall from the beginning of the study to the completion of the study (after 16 weeks), a reduction in the total anxiety scores and generalized anxiety scores existed. This is important because anxiety in young children has the ability to interfere with their cognitive, emotional and physical development, so any therapy that has the potential to decrease their anxiety should be recognized and considered. Interestingly, scores for total anxiety levels and generalized anxiety levels actually increased from the beginning of the study to the 8-week mark (time point 2). The reason why the levels increased is inconclusive, however it is known that the data collected at week 8 was the day after a holiday. Many variables such as being excited about the holiday or attending unscheduled events such as the scholastic book fair at

school may have interfered with data collection and survey responses. Participants may have had different responses to the SCARED survey if the data were to have been collected on a regular school day.

Aim #3 did not have any significant changes from the beginning to the midpoint, or the beginning to the end. This specific subcategory had the least number of items on the SCARED survey with a total of 4 of the 41 questions pertaining to SSA. A total of 9 items pertained to the Generalized Anxiety subcategory. Therefore, significance may have been difficult to assess with a small sample size plus a lesser score to evaluate. Also, data for the participants in this sample did not indicate that Significant School Avoidance was increased from week zero. Because the data was collected from a very specific demographic, the low Significant School Avoidance scores may indicate that none of the participants feel anxious about school they feel safe in their environment. The data was collected in a region where the participants are probably familiar with the people in their school, so this specific measure of anxiety may not be a problem here at all. However, in a larger, more urban setting where children are not familiar with all of the students in their school, or if they do not feel safe in their school, Significant School Avoidance may exist. So overall, although the results showed no changes for Aim #3, with a larger sample size and higher completion of SCARED surveys, it is possible that significance might have been found.

Limitations

Many limitations for this study existed, such as a small sample size, a sample with limited range in demographics, poor student and parent completion of SCARED surveys and lack of total completion of anxiety every single school day.

Sample

The sample size was originally planned to be 92 subjects, however the sample size decreased because subjects either moved location or opted out of the study. Furthermore, only 56 completed SCARED anxiety screening at all three data collections. Data was collected at three specific time points throughout the semester, which interfered with data collection from students who were absent on those days. All other participants who were present at school completed the surveys fully. Data from students who did not complete SCARED surveys at all time points were removed from the final statistical analysis. Participants in the final data analysis included 17 kindergartners, 4 1st graders, 11 2nd graders, and 24 3rd graders. Another limitation regarding the sample is that the participants came from only one school in rural Arkansas, so it would be difficult to generalize these results to a larger population in more urban areas.

Completion of SCARED surveys

Along with the inability to obtain all SCARED surveys from the children, the parent's poor completion of surveys existed as well. This aspect of the study was especially challenging because data was collected during the school days when parents are not actually present at the school. The surveys were to be sent home with the participants and then returned to the school the next day, however there was no way to enforce this because there was no actual encounter with the parents.

TABLE 1: MEASURE 1, TIME 1
(Total Anxiety Score)

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Mean	1	752.941176	752.941176	5.42	0.0262
Error	33	4587.058824	139.001783		

TABLE 2: MEASURE 1, TIME 2
(Total Anxiety Score)

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Mean	1	921.441176	921.441176	9.70	0.0038
Error	33	3135.558824	95.016934		

TABLE 3: MEASURE 2, TIME 1
(Generalized Anxiety Disorder Score)

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Mean	1	79.5294118	79.5294118	5.39	0.0265
Error	33	486.4705882	14.7415330		

TABLE 4: MEASURE 2, TIME 2
(Generalized Anxiety Disorder Score)

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Mean	1	116.752941	116.752941	8.48	0.0064
Error	33	454.267059	13.7655971		

TABLE 5: MEASURE 3, TIME 1
(Significant School Avoidance Score)

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Mean	1	1.4411765	1.4411765	0.28	0.5978
Error	33	167.5588235	5.0775401		

TABLE 6: MEASURE 3, TIME 2
(Significant School Avoidance Score)

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Mean	1	2.94117647	2.94117647	1.64	0.2088
Error	33	59.05882353	1.78966132		

TABLE 7:
MEANS OF SUBSETS (MEASURE) BETWEEN TIME POINTS

Level of measure	Level of time	N	Mean	Std Deviation
1	1	34	21.22764706	13.86682264
1	2	34	21.61764706	14.33160252
1	3	34	16.41176471	11.63880044
2	1	34	4.41176471	3.66074713
2	2	34	4.73529412	4.12170032
2	3	34	2.88235294	3.28231908
3	1	34	1.58823529	1.98658603
3	2	34	1.67647059	1.49180769

3	3	34	1.38235294	1.59572736

Conclusion

In elementary school children, decreased anxiety could result in a greater ability to focus, increase attention span and decrease stress related to difficult educational content. From a physiological perspective, anxiety caused by increased cortisol levels can result in negative impacts on cardiovascular health. By decreasing anxiety, and in turn decreasing cortisol levels, improved heart health can have many positive outcomes for a child's physical performance (Field, 2012). Additionally, when anxiety occurs, it impedes a child's ability to think clearly, so when students practice yoga it could decrease their anxiety levels, and as a result, may increase the ability to learn and understand material in the classroom. The results of this study indicated that implementing yoga in the classroom decreased anxiety scores for a significant number of participants. Therefore, based on these results further research should be conducted due to the increasing amount of evidence suggesting that anxiety is a major impeding factor on psychological development in elementary school children.

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