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The Effects of Dog Therapy as an Intervention for Stress in University Students

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Abstract

Non-pharmacological interventions such as dog therapy have become increasingly popular in treatment efforts to reduce stress among university students. The purpose of this pre-test/post-test exploratory research designed study was to assess the effectiveness of a university's biweekly therapy dog program as a non-pharmacological intervention to help reduce stress levels of undergraduate students. Specifically, this study focused on measuring the blood pressures and pulse rates of undergraduate students as physical indicators of stress, and stress level perceptions as psychological indicators before and after attending a dog therapy session to evaluate any changes. Pulse rates and systolic blood pressure readings significantly decreased after interacting with the dogs, but no statistically significant difference was found between diastolic blood pressure readings. There was also a statistically significant decrease in students' reported stress levels after interacting with the therapy dogs. Findings from this study highlight the benefits of having dog therapy sessions as an effective non-pharmacological intervention to acutely reduce indicators of stress among undergraduate university students.

Introduction

The transition from high school to college has been acknowledged as one of the most stressful life events that one can experience. Many students may feel anxious and overwhelmed as they adjust to college environments. Over the past twenty-five years, there has been a significant increase in the stress levels of university students. This trend has caused many universities to consider the use of animal-assisted therapy as a stress reducing technique for students [1]. Animal-assisted therapy is a non-pharmacological intervention that involves human and animal interactions [2]. Past research has demonstrated how interactions with animals can lower blood pressures and heart rates, while also providing feelings of happiness [3]. Additionally, healthcare professionals have tested cortisol levels, a stress hormone, after interacting with dogs and found a significant decrease in both cortisol levels and blood pressure readings [4]. University students have many stressors, whether it be personal, work-related, or academic based such as exams. As a result, universities have begun implementing therapy dog sessions on their campuses to reduce stress levels and boost the wellbeing of students [5]. More evidence is needed however to support these findings to validate the effectiveness of this intervention. Therefore, the purpose of this pre-test/post-test exploratory research designed study was to assess the effectiveness of a university's biweekly therapy dog program as a non-pharmacological intervention to help reduce stress levels of undergraduate students. Specifically, this study focused on measuring the blood pressures and pulse rates of undergraduate students as physical indicators of stress and stress level perceptions as psychological indicators before and after attending a dog therapy session to evaluate changes.

Literature Review

A review of the research literature regarding the use of therapy dog sessions to reduce stress among university students was conducted to provide evidence to support the purpose and findings of this study. One study conducted by Wood and associates [2] examined the feasibility of measuring stress levels in college students after a brief 10-to-15-minute encounter with therapy dogs. The study participants consisted of 131 college students who attended a session with therapy dogs. Stress was measured by taking Blood Pressures (BP) and using the State Trait Anxiety Inventory (STAI) before and after the brief interaction with the therapy dogs. All measures (systolic BP, diastolic BP, and STAI levels) decreased after just 10-15 minutes with dogs, showing that interacting with therapy dogs was effective at reducing stress in college students.

Another study at a Canadian university conducted over the course of three semesters assessed stress-reducing effects of a weekly drop-in dog therapy program and how long students stayed to reduce their stress [1]. There were 1,960 students from the university who participated. Length of stay was documented and both pre and post stress levels were measured using a visual analog scale where students rated stress levels from 1 = no stress at all to 5 = very stressed. On average students spent 35.19 minutes with the dogs and self-reported stress levels significantly dropped from ($M = 4.47, SD = 2.91$) to ($M = 1.73, SD = 1.45$) after interacting with the dogs ($t(1,959) = 71.91, p = .00$) [1].

Delgado and colleagues [6] evaluated the effects of therapy dog sessions during finals week with 48 students. This was done by measuring both physiologic and psychological aspects to determine stress levels before and after a 15-minute one-on-one session with a therapy dog. Psychological measures included the Perceived Stress Scale (PSS) and four Visual Analog Scales (VAS) for rating mood. Physiologic measurements included blood pressures, heart rates, and cortisol levels from salivary specimens. All psychological and physiologic measures were significantly decreased after pet therapy, with only diastolic blood pressure having a statistically insignificant change [6].

Finally, a study conducted by Jarolmen and Patel [7] assessed the blood pressures of 86 students who had an exam that day and were assigned to either an experimental or control group. After the initial blood pressure screening, students in the control group were prompted to sit behind a privacy screen for 15 minutes, which was the same amount of time the experimental group were allowed to interact with the dogs after their initial screening. The authors found statistically significant decreases in both systolic and diastolic blood pressures in the experimental group who interacted with therapy dogs, while there was no statistically significant change for students in the control group. Although these studies have demonstrated positive physiological and psychological effects of therapy dog sessions on stress levels in college students, further research evidence to support these findings are needed. This study provides data that contributes to the quantity of empirically based evidence into how dog therapy works on both physiological and psychological levels and further enhances the current body of knowledge regarding its effectiveness as a therapeutic intervention.

Method

To analyze the effectiveness of dog therapy on stress levels in undergraduate university students, a pre-test/post-test exploratory research designed study was conducted to determine if there was a statistically significant difference in blood pressure readings, pulse rates, and students' perceptions of their current stress levels before and after interacting with the therapy dogs. Participants were included in the study if they were undergraduate students between the ages of 18-30 and attended a bi-weekly therapy dog session. Participants were excluded if they were not undergraduate students, between the ages of 18-30, and were not interested in attending the bi-weekly therapy dog session.

Procedures

Institutional Review Board (IRB) and the Recreation, Fitness, and Wellness Center (research site) approvals were obtained prior to initiating this study. Potential participants were first approached as they entered the dog therapy session areas and asked if they were here to interact with the dogs and if they had time to participate in a study. If they reported an interest, potential participants were taken behind a portable screen for privacy where they were given a written consent form to read, understand, and sign the consent form if they were willing to participate. They were then asked to answer demographic questions on the data collection tool regarding their age, gender, class status, whether commuters or living on campus, any events during the week that may be impacting their stress levels (exam, personal life, work, etc.), and their current stress level on a scale of 1 to 10. Participant blood pressures and pulses were then taken. Blood pressures were taken with a cuff and stethoscope, and manual palpation of the radial pulse for one minute, which is located on the wrist just below the thumb. This information was recorded on the data collection tool. They were then able to interact with the therapy dogs and the time they enter the session was recorded. When they were finished visiting with the dogs, the time was recorded and their blood pressure and pulse retaken, which ended their participation in the study. All research was conducted in compliance with the COVID-19 requirements at the time of data collection. Additionally, all members of the research team were compliant with the vaccine mandate.

Data Analysis

Data in this study were analyzed using SPSS Version 22.0. Descriptive statistics were computed that included frequency distributions, means, and standard deviations. Bivariate correlations were computed to determine if there were any statistically significant relationships between study variables. Paired t-tests were used to compare if there were any statistically significant differences in blood pressure readings, pulse rates, and stress levels before and after participants interacted with the dogs. The level of significance was pre-set at $p = .05$.

Results

Participants

The researchers attended three dog therapy sessions: two from 6pm-8pm and one from 12pm-2pm. A total of 54 people consented to participate but only 44 sets of data could be used. Ten people were excluded from the study because three were graduate students, three were not university students, one student was outside of the age range set for the study, two participants did not return to be evaluated after interacting with the therapy dogs, and one consent form was not signed although the person verbally consented.

Out of the 44 participants, the mean age of the sample was approximately 20 years (SD = 1.87, range 18-26). Majority of students identified as female (n = 31, 70.1%), were in the freshman class standing (n = 19, 43.2%), lived on campus (n = 28, 63.6%) and were attending the dog therapy sessions for the first time (n = 24, 54.2%). The most common cause of stress was found to be tests (n = 27, 61.4%) (Table 1).

Variable	n (%)	Mean	Standard Deviation	Range
Age		19.74	1.87	18-26
Gender				
Male	9 (20.5)			
Female	31 (70.5)			
Other	4 (9.1)			
Year	19 (43.2)			
Freshman	6 (13.6)			
Sophomore				
Junior	6 (13.6)			
Senior	13 (29.5)			
Commute	16 (36.4)			
Live on Campus	28 (63.6)			
Pets at Home				
Cats	16 (36.3)			
Dogs	29 (65.9)			
Turtles	2 (4.5)			
Attend Sessions				
First time	24 (54.2)			
Rarely	13 (29.5)			
Sometimes	3 (6.8)			
Frequently	4 (9.1)			
Stressors				
Tests	27 (61.4)			
Classes	14 (31.8)			
Extracurricular Activities	4 (9.1)			
Personal	6 (13.6)			
Work	13 (29.6)			

Table 1: Description of the Sample, (N = 44).

Blood Pressures and Perceptions of Stress Levels Before and After Visitation

A paired t-test was conducted to determine if there was a statistical difference in the students' blood pressures and pulse rates before and after interacting with the dogs. In this study, blood pressures were recoded as pre/post-systolic and pre/post diastolic. There was a statistically significant difference in systolic blood pressure levels before (M = 120.23, SD = 9.64, range = 100-140) and after (M = 116.64, SD = 9.10, range = 96-134) the students interacted with the dogs (t(43) 4.192, p = .00). Systolic blood pressure levels significantly decreased after interacting with the dogs. No statistically significant difference between the diastolic blood pressure levels was found before (M = 74.91, SD = 7.44, range = 50-90) and after (M = 73.84, SD = 6.34, range = 52-82) the students interacted with the dogs test (t(43) 1.351, p = .09). In addition, a statistically significant difference was found between pulse rates before (M = 77.73, SD = 9.26, range = 60-100) and after (M = 74.59, SD = 7.13, range = 60.88) interacting with the dogs (t(43) 2.396, p = .01). Pulse rates had statistically decreased after interacting with the dogs (Table 2).

Variable	Mean	Standard	Range Deviation
Pre-Systolic	120.23	9.64	100 - 140
Pre-Diastolic	74.91	7.44	50 - 90
Pre-Pulse	77.73	9.26	60 - 100
Pre-Stress Levels	5.57	2.18	01-Oct
Time Spent with Dogs (minutes)	26.11	21.25	5 - 100
Post-Systolic	116.64	9.1	96 - 134
Post -Diastolic	73.84	6.34	52 - 82
Post -Pulse	74.59	7.13	60 - 88
Post -Stress Levels	4.14	2.01	01-Sep

Table 2: Means, Standard Deviations, and Ranges of the Time Spent with Dogs, Pre/Post Blood Pressures, Pre/Post Pulse Rates, and Pre/Post Stress Levels, (N = 44).

A paired t-test was also used to determine statistical differences in the students' perceived stress levels before and after interacting with the dogs. Statistically significant differences between the students' perceived stress levels before (M = 77.73, SD = 9.26, range = 60-100) and after (M = 74.59, SD = 7.13, range = 60-88) interacting with the dogs was found ($t(43) 7.300, p = .00$). The undergraduate students' perceptions of their stress levels significantly decreased after interacting with the dogs.

Bivariate Correlations

Bivariate correlation analysis was computed to determine whether the time spent with the dogs influenced the students' perceptions of their stress levels after interacting with the dogs and if any statistically significant relationships were found between the other study variables. Students spent on average 26.11 minutes (SD = 21.25, range = 5 - 100). No statistically significant relationship was found between the amount of time spent interacting with the dogs and the students' post perception stress levels ($r = -.12, p = .45$).

Other interesting bivariate correlations were found between the study variables. Participants age ($r = -.40, p = 0.01$) and academic year ($r = -.35, p = 0.05$) were found to be statistically significant to gender. Male students in this study were older and higher in academic year than the female students. Participant age was also found to be statistically significant to living off campus ($r = -.40, p = 0.01$). Older students reported living off campus more often than the younger students. Students who did not live on campus also reported higher levels of stress before ($r = -.39, p = 0.01$) and after interacting with the dogs ($r = -.42, p = 0.01$).

To include a variable in the correlation matrix regarding the number of stressful events the students were experiencing during the week of data collection, a total number of stressful events were computed. A statistically significant relationship between academic year and the total amount of stressful events was found ($r = .31, p = 0.04$). Students who were in the higher academic years reported more stressful events they were dealing with during the week than those students in the lower academic years.

Discussion

The purpose of this study was to analyze the effectiveness of dog therapy sessions as an intervention for stress in undergraduate university students. Statistically significant reductions in both systolic blood pressure readings and pulse rates found in this study indicate that interactions with the therapy dogs were effective in decreasing the stress levels of the participants. These findings are relevant because blood pressure and stress are directly related to each other through two stress hormones; adrenaline and cortisol. Adrenaline and cortisol cause the heart to beat faster and constrict blood vessels resulting in increased blood pressure (American Heart Association, n.d.). Findings from this study also support Odendaal and Meintjes [4] who found a significant decrease in both cortisol levels and blood pressure readings after participants interacted with therapy dogs for as little as five minutes.

One of the statistically significant correlations found in this study was participants who reported being higher in academic years reported more stressful events that they were dealing with during the week than those students in the lower academic years. Because male participants were older, they were more likely to be in a higher class standing. This indicates that they may have been experiencing higher stress levels and therefore may explain why the male participants had higher pre-systolic blood pressures than the female participants. According to Maranon and Reckelhoff [8], one of the most important risk factors that raise blood pressure is the activation of the sympathetic nervous system that releases adrenaline into the blood stream, which is a major response to stress. Conversely, research has shown that males have higher reported blood pressure ratings than women until women reach menopause [8,9]. In addition to the physiological indicators of stress in this study, the psychological indicator also demonstrated a statistically significant decrease in the students' perceived stress levels after interacting with the therapy dogs. This finding supports other research evidence that suggest therapy dog sessions are an effective nonpharmacological intervention for stress reduction [1,2,5,6].

Other interesting correlations found in this study was most of the participants were freshmen and reported living on campus, which makes sense because two out of three sessions took place in the evening from 6-8pm, with only one during 12-2pm when most undergraduate courses are offered. Older students who reported higher academic standing, not living on campus, and more stressors also reported higher levels of stress before and after interacting with the dogs. According to Bouchrika [10], 45% of college students report more than an average amount of stress related to lack of sleep, grades, exams, being away from home, meeting new people, and finances. Thirty percent of American college students also report feeling “homesick” in comparison to 69% of freshmen. Based on these statistics, one would assume that freshmen would then report higher levels of stress. In this study, older students who lived off campus reported higher levels of stress before and after interacting with the therapy dogs. This finding contradicts the evidence that suggests freshmen report higher levels of stress related to homesickness. One explanation could be that those students living off campus may have families to support and are employed along with attending college. This assumption however was not tested in this study. Further research with more demographic information is needed to answer this question.

What is noteworthy to consider is the time spent with therapy dogs. It was suspected that more time spent with the dogs would increase the benefits, but this was not found. There was no significant relationship between the amount of time spent and stress reduction, therefore one can conclude that benefits occur no matter how much time one spends interacting with therapy dogs.

In previous studies Wood, et al. [2] found stress was reduced between 10 and 15 minutes, Binfet, et al. [1] in approximately 35 minutes, and Delgado et al [6] in 15 minutes. These findings suggest that it does not take a large time commitment to reap the benefits of attending dog therapy sessions.

Limitations

Although the results supported our hypotheses, this study still contained some limitations. This study only included undergraduate students who were between the ages of 18 and 30 and attended a biweekly dog therapy program at one university. Because of this and the small sample size, the generalizability of the findings is a major limitation. Future studies should consider looking at several universities from different regions and/or countries to determine if the results can be considered beneficial for a larger sample size. Additionally, our sample was recruited on a voluntary basis, so the results could be less representative of the population than if a simple random sample method had been utilized. The participants may also be biased towards dogs since they volunteered to join the study, which would increase the likelihood of positive results.

Another limitation this study had was the method for measuring subjective stress levels. Subjective information in healthcare is considered a good measure of a patient’s feelings and there are research tools that could more thoroughly assess participant stress levels. These tools include the State-Trait Anxiety Inventory (STAI) Wood, et al. [2] and Perceived Stress Scale (PSS) Delgado, et al. [6] that have been used in previous studies. Utilizing a published measure that is more valid and reliable would be beneficial to obtain a more accurate measure of stress levels.

Implications for Practitioners

Findings from this study demonstrate that the use of dog therapy is an effective nonpharmacological method for reducing stress without side effects, unlike most pharmacological methods. Statistically significant reductions in blood pressure readings, pulse rates, and perceived self-reported stress levels were found after interacting with the therapy dogs. This evidence is not only useful in promoting wellness for university students, but it also provides the healthcare field with a safe and effective treatment method for reducing stress for patients in hospitals, nursing homes, and other healthcare facilities. According to the World Health Organization (WHO), stress can be defined as a natural human response that leads to state of worry or mental tension caused by having to cope with difficult situations that are perceived as challenges or threats to oneself. Everyone experiences stress to some degree and the way one responds to stress has either positive or negative consequences to overall wellbeing. Experiencing a small amount of stress has been found to be beneficial and assists people with daily activities. Experiencing multiple challenges and threats to oneself, however, can lead to physical and psychological health problems.

Physical signs of stress involve multiple human body systems (American Institute of Stress, n.d.). This study focused on the relationship between stress and the nervous system where the body perceives a threat, and the “fight or flight” response is initiated through the sympathetic nervous system signaling the adrenal gland to release adrenaline and cortisol. These hormones then raise one’s blood pressure and heart rate, which return to baseline after the perceived threat subsides. In the case of university students, this threat could last for days as students prepare for exams or writing papers. Spending just a short amount of time with the therapy dogs significantly reduced their blood pressure and pulse rate indicating a reduction to their normal baseline. Evaluating the longitudinal benefit of this was not tested in this study but may have implications for allowing students who have difficulty coping with university life the ability to have a therapy dog on campus. Universities may also consider having therapy dogs on campus every day during final exam week where students experience taking multiple exams and when final papers are due. Dog therapy programs should be made available at more universities, and students should be encouraged to attend whenever possible to aid in stress reduction and promotion of health and wellness. In addition, the well-being of patients in any health care institution can also experience the stress reducing benefits of interacting with therapy dogs.

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