

Review Article

Animal Visits and Test Performance in Clinical Nurses: A Randomized Research Study

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Documentation**Abstract**

As healthcare facilities across the country transition to electronic documentation, nurses from diverse backgrounds and in all settings are responsible for learning new documentation systems. Learning new systems and ways of documenting and providing care can be a stressful experience for clinical nurses. Transitions to a new healthcare documentation system provides an opportunity to study ways to the test-taking environment and ways to reduce anxiety in such situations. The use of animals to calm test-takers is one way to support test performance.

INTRODUCTION

The animal-human bond has been studied since the early 1700's [1], and research supports the benefits to humans in both clinical and educational settings [2-9]. The terminology related to animal-human bonds has evolved over the years. Most recently, the term Animal Assisted Services (AAS) is a term denoting a broad category under which Animal Assisted Support Program (AASP) falls. Also included under AAS are Animal Assisted Treatment (AATx), (i.e., occupational therapy, physical therapy), Animal Assisted Education (AAE) (i.e., psychoeducation, therapeutic riding), and AASP [10]. Within this article, AASP will be used to reflect activities now categorized as AASP. The original articles may use previous terms (e.g. animal assisted interventions or animal assisted activities).

Previously called animal assisted activities (AAA), AASP is now used to describe interactive activities with animals in a variety of healthcare, educational, and community settings [10]. AASP encompasses interactions between a person and therapy animal for motivational, educational, or recreational purposes [10]. AASP is one of many professionally defined animal-assisted interventions conducted with a dog and handler [10]. In the past, such activities have been referred to, in lay terms, as Pet Therapy.

REVIEW OF THE LITERATURE

AASP serves as a complementary intervention to alleviate anxiety and fear in a variety of healthcare settings, but its use has not been extensively studied in relation to test-anxiety and performance. Approximately 925 institutions of higher education in the United States have animal programs to support students [11]. One descriptive study [12], provided summary evaluation of 68 schools in the United States of America (U.S.A.) focusing on the Southeast, Southwest and Western regions. Although programs are widespread in the U.S.A., few studies document student outcomes related to animal activities in academic settings.

Pendry, Carr, Gee, and Vandagriff, et al. [9], conducted an extensive randomized study of 349 students to evaluate outcomes related to animal intervention and/or academic stress management program. The study was conducted at Washington State University Students were randomized to receive education related to stress management, an animal visit, or both the education and the animal visit. Visits occurred over a one-month period. Multiple measures were assessed over a six-week period for each participant. Measures included mood risk, anxiety, and depression as moderators. Learning and study strategies included self-regulation and learning skills. Interactions with the animals for the active animal interventions group

included petting the animal, mediation, relaxation exercise, and discussion with peers.

Self-reported anxiety (lessening), attitude and motivation about academic performance changed in groups associated with animal interaction. Differences were statistically different from baseline for those students in the animal interaction and education group, or in the animal interaction only group, when compared to those students who had education only. This difference was sustained at the six-week follow up visit ($B = -0.880$, $p < 0.001$). Increases in motivation and self-regulation were observed in participants considered high risk for anxiety and depression [9]. This study supports the value of animal activities to reduce anxiety in an academic setting.

In a study conducted early, also conducted at Washington State University by Pendry and Vandagriff, et al. [13], a decrease in cortisol levels of students having a hands-on- visit with cats or dogs was observed. This study compared a ten-minute live visit with a dog or cat to watching others with the animals, a slide show of animal images or a waitlist for animal interaction. Cortisol levels decreased significantly in the hands-on group when compared to other groups. The difference with the waitlist group was ($B = .152$, $p = .033$). This study provides support for animal interaction to reduce stress as measured physiologically by cortisol levels.

Anxiety

Anxiety is defined as an uneasiness or worry related to an individual's sense of self [14]. Thus, anxiety impacts both psychosocial and physical domains. Test performance (doing well on a test) may impact one's self-concept, if test performance is important to the individual. The negative impact of anxiety on multiple aspects of health supports the importance of identifying interventions to reduce test-anxiety. Test-anxiety is an important topic for research and of key importance for educators.

To explain the value of AASP using the Roy Adaptation theory [15], one views the interaction with animals as a trigger of emotional calm in individuals and subsequently reduces anxiety [15].

The physiological reaction to anxiety includes the release of adrenaline, rapid pulse, elevated blood pressure, rapid breathing, flushing, and a sense of uneasiness. In extreme cases anxiety triggers the body's attempt to cope or regulate the stress reaction through neuroendocrine defenses. The cognator subsystem uses thought and knowledge to mediate the effect of anxiety or stress on the body (physiological symptoms). Preparedness by studying

is one mechanism that may decrease anxiety. Rest and a proper diet are other examples of ways the cognator subsystem can combat test-anxiety [14].

Multiple mechanisms to reduce anxiety have been documented in the literature [6-20], and include, but are not limited to, meditation, Jin Shin Jyutsu, aromatherapy, music, yoga, journaling, cognitive-behavioral education, and exercise. Some, but not all, of these interventions are convenient in test environments. For the participant, AASP takes no preparation or special education and can be experienced easily by most individuals. Human handlers, who are present during such interactions, are both prepared and experienced. Therefore, AASP is an efficient and relatively easy mechanism to reduce anxiety in many environments, including classroom settings. Schedule coordination with handler and dog teams as well as a safe (food free) environment is required.

Anxiety and Test Performance

The relationship between anxiety and performance has been supported in the literature [21]. Initial work done by others [2-24], related to animal interactions as an intervention to reduce anxiety, and the potential impact on test performance provides the opportunity for further exploration and development of new knowledge related to AASP as an intervention to reduce anxiety, and potential impact on test performance. The importance of reducing test-anxiety to support academic and professional growth, coupled with evidence from studies in AASP provided both the need and rationale for this randomized comparative study exploring AASP, anxiety, and test performance.

Scholars have documented the impact of animals on reducing stress and anxiety in students [2-24]. Young, et al. [24], studied the impact of animal visits on test performance in a small group of nursing students ($N=30$). Students visiting with a dog reported reduced test-anxiety (based on Spielberger Test Anxiety Index). The study provided preliminary support for the value of AASP to reduce perceived test-anxiety. Interestingly, Young's study was the only animal intervention study in an integrative review ($N=33$) of publications providing interventions to reduce test-anxiety [3]. In 2000, Pendry and others published a study measuring the success of a structured program, including AASP to reduce academic anxiety, but not limited to test-anxiety. Since that time, Khaira, et al. [6], included Anderson and Brown, et al. [2], in their systematic review identifying AASP as an intervention to reduce test-anxiety.

Garjfoner, Harte, Potter and McGuigan, et al. [22], conducted a large study ($N=132$), with students and

outcomes related to anxiety (State Trait Anxiety Inventory, STAI), well-being and mood. Participants spent time with one of three groups: an AASP (experimental group, interacting with both the dog and the handler), interacting with the dog only (control), or the handler only (control). Mean changes in anxiety were greater in both the dog and handler group, and dog only groups; the reduction in anxiety was statistically significant compared to anxiety with the handler only ($p < 0.001$). The biggest decrease in mean anxiety was observed in the dog and handler group (-13.73, $p < 0.001$). The difference between pre- and post-survey measurements was statistically significant. Interestingly, mood was improved most for participants in the dog only group. A limitation of the study was that the participants self-selected the group assignment. No measurement of test performance was included in this study [22].

In a large ($N=238$) meta-analysis, von der Embse, et al. [21], defined variables related to test-anxiety. Anxiety is negatively related to test performance. That is, the more anxious the individual is, the lower the test performance. Interestingly, von der Embse and colleagues note that females have more test-anxiety than males. This finding was also noted by Harris et al. [16], report women report test-anxiety more often than men. The nursing profession in the USA is mostly female, and medical center where the study was conducted follows that national pattern for employed nurses.

Animal Assisted Support Program (AASP) and Anxiety

The mechanism of the reduction of anxiety related to human/animal interaction is based on multiple studies [2-25]. Mechanisms of anxiety reduction related to animal visits include relaxation, diversion, and inducing a sense of calm and well-being [26]. Individuals (without allergies or fear of dogs) may simply enjoy the presence of a dog, observing or petting the dog, with little preparation.

The exposure of individuals to animals improves perceived well-being of individuals [8]. Settings that can utilize AASP include in-patient, oncology, ambulatory, residential, and behavioral health. Turner and colleagues (2020) provide an integrative review of the use of animal visits in oncology. Neeps, Stewart and Bruckno, et al. [25], conducted a large ($N = 218$) study of AASP group sessions in patients admitted for mental illness. Pre- and post-surveys were conducted at one-hour AASP sessions, or a comparative group looking at a videotape "The Joy of Stress." Changes in depression, anxiety (Burns Anxiety Inventory), and pain were reported in both groups, with

no difference between groups at baseline. However, for the AASP group, the mean decrease (pre vs. post) in anxiety was statistically significant (-2.74, $p = 0.001$).

Walker, et al. [23], conducted an interesting quasi-experimental study ($N=91$) of junior nursing students measuring anxiety (State-Trait), heart rate and cortisol levels. Interactions with the dogs reduced stress, lowered cortisol levels and heart rate ($p < 0.01$). Findings in this study supported animal interventions to reduce state anxiety. No report of test outcomes was provided. Anderson and Brown, et al. [2], also conducted a randomized comparative study in nursing students ($N=89$). The study was done in nursing students taking a medication calculation exam. Students were randomized to groups to spend time (30-45 minutes) with a dog prior to the test, or no interaction with the dogs. The Spielberger State-Trait instrument was used to measure state anxiety three times: at the time of the consent, pre-interaction with the dogs, and again post-exam. There was no difference in the number of students who passed between the groups.

THEORETICAL FRAMEWORK

This study was guided by the Roy Adaptation theory, also called the Roy Adaptation Model (RAM). A holistic theory, the Roy Adaptation theory incorporates physical, emotional, self-concept and independence aspects of adaptation, or coping, to normal daily activities, stress producing situations (such as new experiences or educational testing), and/or illness. The impact of environmental factors on the ability to adapt to stimuli is established by the theory. Perceived anxiety, for example, anxiety triggered by educational testing, is processed through the individual's thoughts (cognator system), as well as through the endocrine and physiological coping mechanisms (regulator system) [14]. Moreover, stressors may impact one or more of these interdependent categories.

Both knowledge (cognitive), emotion and physiology (regulator) systems play a role in adaptation to life events. Moreover, the physical response to stress, learning, and performance interface with both the cognitive and emotional aspects of events [14]. Interactions with dogs during AASP are calming for many; therefore, AASP may be an effective intervention to reduce anxiety and improve test performance.

An expansive search of PubMed, CINAHL, EBSCO databases, and the Sigma Theta Tau International website yielded no studies were identified with designs that incorporate all three variables of interest (animal visits, anxiety, and test scores) in a randomized controlled study

of nurses. Search terms included animal assisted services, pet therapy, anxiety, stress, test-anxiety, test performance, electronic health records, and nurses. No publications include a randomized comparative group evaluating the role of AASP and the impact on anxiety and test performance scores. This randomized study in practicing nurses provides information about AASP in test situations. This study provides self-reported anxiety, and objective test scores for comparison.

Although a few well-designed randomized studies have been conducted related to stress and AASP [2-22], only one quasi-experimental study [23], included nursing students and measured anxiety during test conditions. This study did not measure test scores. Anderson and Brown conducted a randomized study (N=89) and measured anxiety as well as pass/fail success but did not provide differences in scores. There was no trend toward significance when comparing the percent of students who passed in the Control versus the Active (dog visit) groups.

Study Purpose

The purpose of this study was to evaluate levels of self-reported anxiety and test performance between those who participated in AASP before testing, and those who did not participate in AASP. Randomized comparative groups included the AASP Group (time spent with a dog in presence of a handler) and the Control Group (no animal interaction). The current study, employing a randomized comparative design, provides additional new knowledge about the ability of AASP to reduce anxiety and improve test performance, when compared to individuals not participating in AASP.

METHODOLOGY

Design

This study was an Institutional Review Board (IRB) approved, randomized comparative study of two groups of nurses engaged in educational sessions related to the transition to an EHR. Blinding was not feasible for this study that involved one group receiving interactions with dogs (AASP) and the other group did not. Self-reported anxiety [27, 28] test results, and ability to pass the test on first attempt were the outcome measures. Anxiety was the primary outcome measure.

The population included nurses and nursing assistants employed at a single acute care facility. Thus, it was anticipated that the Control Group and the AASP Group would have similar demographics.

Sample size

Sample size was calculated based upon the expectation that the AASP Group would have a larger decrease between pre- and post- STAI score compared to the Control Group. Based on preliminary findings from a pilot study [29], conducted at an affiliated medical center, an average difference in stress score was estimated to be three, for older adults in routine bedside AASP visits. Using a pooled standard deviation of 6, 80% power, and 0.05 significance level, 64 participants per group or 128 participants total were required. IRB approval allowed for additional participants should all surveys not be completed. The randomized nature and adequate planned sample size were set to support the generalizability of the study.

The total population of clinical nurses at our facility requiring EHR education was approximately 1500. Participants were recruited from classes given during the day, when AASP was feasible (based on handler and dog team, as well as researcher availability). Timing of the visits and availability of teams limited visits, and recruitment.

Study Procedures

A description of the study was provided to all nurses scheduled to have education on specific days, which included information about the voluntary nature of the study. Individuals who were allergic to dogs or had a fear of dogs were excluded from the study. A verbal consent triggered randomization of the nurse to one of two groups on the day of class. Once verbal consent was provided, the individual was given a study number, and was randomized to a group, using a computer-generated randomization list. The computerized randomization list used a 1:1 randomization. Symbols were placed on the participants' lapel to indicate the group assignment (dog paw for the AASP group, and a circle with a red hash mark for the control group).

At the beginning of the class day, study survey materials were given to all participants (AASP Group and Control Group). Survey materials included a disclosure statement informing participants of voluntary participation, and that completion of the survey indicated consent for the study. Participant names were noted for the purpose of matching individuals to test results; no names or personal identifying information were recorded.

Regardless of group assignment, the individuals had class in the same room. The AASP visit was scheduled before the mandatory test in the afternoon, approximately six hours from the start of class. Prior to the test, participants in the AASP Group were shown the way to a large room,

at the far end of the hall, where the dogs and handlers were available for the AASP visit. The Control Group had their break elsewhere in the large facility. The survey was repeated before the mandatory test, for participants in both groups.

After the mandatory test was completed and all forms were submitted, participants in the Control Group had the opportunity to visit the dogs and handlers. Participants with allergies or fear of dogs could bypass the room without exposure to the dogs.

Findings

The participants ($N = 79$) were randomized to either the Control Group ($n = 40$) or AASP Group ($n = 39$). Groups were similar in relation to age, gender, and dog ownership. The average age of the total population was 39.5. There were more females (91.1%) than males with only seven males participating in the study. Most of the participants were dog owners, with more dog owners randomized to the control group. See Table 1 for a detailed description of the sample.

Measures

Participants in both groups completed a basic researcher-generated demographic questionnaire and the short form State-Trait Anxiety Questionnaire S-Anxiety [27]. The mean pre-anxiety score for the Control Group was 9.91 (SD 3.284) and the mean AASP Group score was slightly higher at 10.94 (3.251). The Control Group's mean anxiety increased to 10.77 (3.77) just prior to taking the test, showing no statistically significant change. Those who visited the dogs (AASP Group) had a reduced anxiety score of 8.71 (SD 2.95). The pre- to post difference in anxiety score in the AASP group was statistically significant ($p < 0.001$). The Cronbach alpha for the State-Trait Anxiety Questionnaire pre- and post-survey was .811. The Cronbach alpha scores for each question ranged from 0.729 (I am relaxed) to 0.8395 (I feel upset).

The research team accessed participants' scores on the EHR learning assessment and whether the participant achieved a passing score of 80 on the first attempt. The mean first score for the Control Group was 80 (SD 12.9), compared to a mean score of 87.5 (SD 8.67) for the AASP Group. The difference in mean score between groups approached statistical significance ($p = 0.053$) Figure 1. Forty three percent of the Control Group needed to repeat the test; while only 36% of the AASP Group needed to repeat the test. See Table 2.

Table 1: Demographic Description of Study Participants by Group

Variable	Control Group	AASP Group
<i>n</i>	40	39
Age	40 years (20-64)	31 (21-57)
Female Gender	35 (88%)	37 (95%)
Dog Ownership	37 (91%)	24 (62%)

Table 2: Comparison of Control Group and AASP Group

	Repeat Attempt <i>n</i> (%)	First Score <i>M</i> (SD)	Anxiety Pre <i>M</i> (SD)	Anxiety Post <i>M</i> (SD)
Control Group	17 (43)	80.0 (12.9)	9.91 (3.28)	10.77 (3.766)
AASP Group	14 (36)	87.5 (8.67)	10.94 (3.25)	8.71 (2.951)

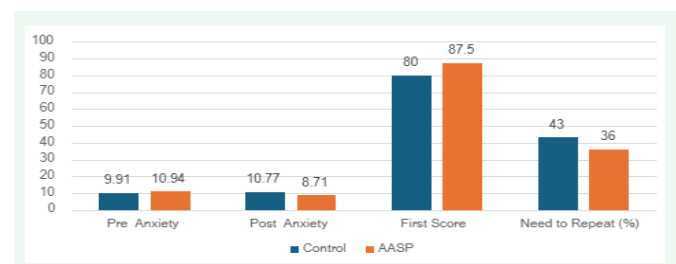


Figure 1 Graph of Results

Difference in mean Pre to Post Anxiety scores for AASP group, statistically significant, $p < 0.001$

Difference in mean first score between groups approached significance, $p = 0.053$

DISCUSSION

This study focused on test-anxiety of clinical nurses related to the implementation of a new EHR system. Test-anxiety is a reality in the academic setting [9-22], and can be a factor for professionals when learning new skills outside of a formal academic environment. While AASP is used in academic settings throughout the U.S.A., few publications thus far address objective outcomes related to test performance. The current study used a randomized study design to evaluate the value of AASP related to self-reported anxiety prior to test taking and compared to pre-test measuring using the short form STAI [27], as well as successful completion of the test on the first attempt, and first test scores.

Interestingly, a short AASP visit with dogs decreased perceived anxiety in the intervention group even though their stress levels were higher at the start of the day. The difference from pre- to post-test anxiety for the AASP group was statistically significant ($p < 0.01$). The intervention group also had higher scores on the initial test and required fewer repeat tests to obtain a passing grade.

The reduction of stress after the AASP visit is consistent with findings reported by Pendry and colleagues [1-13], who reported reduced self-reported stress and reduced cortisol levels in randomized studies with animal visits.

In addition to lowering perceived anxiety, the results of this study also yielded higher test scores for those who experienced AASP. The outcome of performance (test) results generated new knowledge related to AASP in a test environment, while supporting the link between anxiety and impaired performance. The comparison of test scores between groups trended toward significance and warrant replication to confirm the findings.

While the focus of this study was on reducing anxiety through AASP and the outcome of test performance, the value of AASP to reduce stress has multiple implications. For academic settings, the new knowledge provides evidence to support ongoing programs [9-12]. Embedding AASP in educational settings may not only enhance learning [9], but also retention and test performance.

The findings also have implications for a clinical environment where stress levels may impede cognitive function. Healthcare providers are often stressed. The value of a short AASP visit in a clinical setting to reduce stress and enhance clinical performance remains an area for further exploration.

LIMITATIONS

The original target sample size for completion was 128. This study had 79 participants. Thus, the observed trend toward improvement in test scores for the AASP group might have been significant if the targeted sample size had been achieved.

Two participants randomized to the Control Group misunderstood instructions and visited the dogs before their post-survey and mandatory exercise. Although these results were excluded from analysis, the miscommunication underscores the need for both clear direction and careful monitoring of activities for each participant.

This study sample included predominantly nurses, with some ancillary personnel. The focus on nursing staff limits the generalizability but highlights the importance of replicating the study in a wider, more diverse population. Importantly, this study is a reminder that test-anxiety can exist even after formal graduation.

CONCLUSION

The impact of AASP as an intervention to aid adaptation to stress is supported by the results of this study. AASP provides an option to reduce stress in educational settings, including those aimed at educating clinical nurses. Further, the RAM serves as a useful theoretical framework for this study.

AASP is a viable option to reduce anxiety in a test environment for nurses and ancillary personnel. With some pre-planning, AASP can be available during stressful times, including but not limited to test-taking. The applicability to other employees provides an opportunity for exploration in the future. AASP helps reduce nurses' stress during educational classes and is an option that may improve the workplace environment.

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REFERENCES

1. Chu CI, Liu CY, Sun CT, Lin J. The effect of animal-assisted activity on schizophrenia. *J Psychosoc Nurs*. 2009; 47: 42-48.
2. Anderson D, Brown S. The effect of animal-assisted therapy on nursing student anxiety: A randomized control study. *Nurse Educ in Pract*. 2021; 52: 103042.
3. Brodersen LD. Interventions for test-anxiety in undergraduate nursing students: An integrative review. *Nurs Educ Perspect*. 2017; 38: 131-137.
4. Hinic K, Kowalski MO, Holtzman K, Mobus K. The effect of a pet therapy and comparison intervention on anxiety in hospitalized children. *J Pediatr Nurs*. 2019; 46: 55-61.
5. Holder TRN, Gruen ME, Roberts DL, Somers T, Bozkurt A. A systematic literature review of animal-assisted interventions in oncology (Part I): Methods and results. *Integr Cancer Ther*. 2020; 19: 1534735420943278.
6. Khaira MK, Gopan RR, Saini SM, Isa ZM. Interventional strategies to reduce test anxiety among nursing students: A systematic review. *Int J Environ Res Public Health*. 2023; 20: 1233.
7. Kowalski MO, Smith C, Cole DA, Bersick E, Keleekai-Brapp N, Panfile P, et al. A multicenter study of animal-assisted activity and anxiety among older adults hospitalized in acute care settings. *Appl Nurs Res*. 2021; 60: 151447.
8. Machova K, Souckova M, Prochazkova R, Vanickova Z, Mezian K. Canine-assisted therapy improves well-being in nurses. *Int J Environ Res Public Health*. 2019; 16: 3670.
9. Pendry P, Carr AM, Gee NR, Vandagriff JL. Randomized trial examining effects of animal assisted intervention and stress related symptoms on college students' learning and study skills. *Int J Environ Res Public Health*. 2020; 17: 1909.
10. Johnson AB, Parish-Plass N, Kirby M, Winkle M, Skewer DP, Ackerman L, et al. Recommendations for uniform terminology in animal assisted services (AAS). *Human-Animal Interactions*. 2024; 12.
11. Crossman MK, Kazden AE. Animal visitation programs in colleges and universities: An efficient model for reducing student stress. In A. Fine (Ed.), *Handbook on animal-assisted therapy: Theoretical foundations and guidelines for practice*. 2015: 333-337.

12. Haggerty JM, Mueller MK. Animal-assisted Stress Reduction Programs in higher education. *Innovative Higher Education*. 2017; 42: 379-389.
13. Pendry P, Vandagriff JL. Animal visitation program (AVP) reduces cortisol levels of university students: A randomized controlled trial. *AERA Open*. 2019; 5: 1-12.
14. Roy C, Whetsell MV, Frederickson K. The Roy adaptation Model (3rd ed.). Prentice Hall Health. 2009.
15. Roy C, Andrews HA. The Roy Adaptation Model. Appleton Lange. 1999.
16. Harris RB, Grunspan DZ, Pelch MA, Fernandes G, Ramirez G, Freeman S. Can test anxiety interventions alleviate a gender gap in an undergraduate STEM course? *CBE Life Sci Educ*. 2019; 18: ar35.
17. Lemay V, Hoolahan J, Buchanan A. Impact of a yoga and meditation intervention on students' stress and anxiety levels. *Am J Pharm Educ*. 2019; 83: 7001.
18. Millspaugh J, Errico C, Mortimer S, Kowalski MO, Chiu S, Reifsnyder C. Jin Shin Jyutsu® self-help reduces nurse stress: A randomized controlled study. *J Holist Nurs*. 2021; 39: 4-15.
19. Quinn BL, Peters A. Strategies to reduce nursing student test anxiety: A literature review. *J Nurs Educ*. 2017; 55: 145-151.
20. Trambert R, Kowalski MO, Wu B, Mehta N, Friedman P. A Randomized Controlled Trial Provides Evidence to Support Aromatherapy to Minimize Anxiety in Women Undergoing Breast Biopsy. *Worldviews on Evid-Based Nurs*. 2017; 14: 394-402.
21. von der Embse N, Jester D, Roy D, Post J. Test anxiety effects, predictors, and correlates: A 30-year meta-analytic review. *J Affect Disord*. 2018; 227: 483-493.
22. Grajfoner D, Harte E, Potter LM, McGuigan N. The effect of dog-assisted intervention on student well-being, mood, and anxiety. *Int J Environ Res Public Health*. 2017; 14: 483.
23. Walker C. The impact of therapy dogs on precicensure baccalaureate nursing student test anxiety. *Nurs Educ Perspect*. 2023; 44: 98-104.
24. Young JS. Pet therapy: Dogs de-stress students. *J Christ Nurs*. 2012; 29: 217-221.
25. Neeps P, Stewart CN, Bruckno SR. Animal-assisted activity: Effects of a complementary intervention program on psychological and physiological variables. *J Evid-Based Complementary Altern Med*. 2014; 19: 211-215.
26. Ward-Griffin E, Klaiber P, Collins HK, Owens RL, Coren S, Chen FS. Petting away pre-exam stress: The effect of therapy dog sessions on student well-being. *Stress Health*. 2018; 34: 468-473.
27. Marteau TM, Bekker H. The development of a six-item short-form of the state scale of the Spielberger State-Trait Anxiety Inventory (STAI). *Br J Psychol*. 1992; 31: 301-306.
28. Smith C, Bixler D, George A, Fusco N, DeLuca A. A pilot study of animal assisted activity among hospitalized older adults. *Geriatr Nurs*. 2020; 41: 905-908.
29. Spielberger CD. State-trait anxiety inventory for adults self-evaluation questionnaire. Mind Garden. 1977.