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Move More, Stress Less: Exploring the Relationship between Physical Activity and Test Anxiety in Undergraduate Nursing Students

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Move More, Stress Less: Exploring the Relationship between Physical Activity
and Test Anxiety in Undergraduate Nursing Students

An Honors Thesis
Presented to
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by

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ABSTRACT

The purpose of this study was to determine the relationship between physical activity and test anxiety in undergraduate baccalaureate nursing students. Participants (N=69) were first, second, and third year undergraduate nursing students at a small, private university in the southeastern United States. The Westside Test Anxiety Scale was administered along with questions regarding the type of physical activity performed each week and the number of minutes of physical activity performed each week. A Pearson r correlation coefficient and descriptive statistics were analyzed. Results were inconclusive regarding the relationship between physical activity and test anxiety. Survey results indicated 97% of students have moderate to high levels of test anxiety. Based on the anxiety scale, fear of failure and the inability to recall information were predominant worries of prelicensure nursing students. No conclusions were drawn about which exercises may cause a lower test anxiety. Although the relationship between physical activity and test anxiety was not significant, it is meaningful and interventions need to be implemented to combat test anxiety.

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TABLE OF CONTENTS

INTRODUCTION

Significance.....	8
Purpose.....	8
Theoretical/Conceptual Framework.....	8
Thesis Question or Hypothesis	10
Definition of Terms.....	10
Summary.....	11

LITERATURE REVIEW

Anxiety in Students.....	12
Exercise and Anxiety	16
Reducing Test Anxiety	20
Anxiety and Test Performance.....	21

METHODOLOGY

Study Design.....	27
Setting and Sample	27
Design for Data Collection	28
Measurement Methods.....	28
Data Collection Procedure	29
Protection of Human Subjects	29
Data Analysis	30

RESULTS

Sample Characteristics32

Major Findings32

Summary36

DISCUSSION

Implication of Findings37

Application to Theoretical/Conceptual Framework39

Limitations40

Implications for Nursing40

Recommendations41

Conclusion42

REFERENCES43

APPENDIX

Appendix A: Westside Test Anxiety Scale46

List of Figures

Figure 1. Conceptual-Theoretical-Empirical Diagram10

Figure 2. Minutes of Exercise vs. Total Anxiety Score without Outliers33

Figure 3. Exercises Performed by Undergraduate Nursing Students35

List of Tables

Table 1: Westside Test Anxiety Scale Questions and Answers34

Table 2: Level of Anxiety and the Percentage of Students Who Have Anxiety.....35

INTRODUCTION

Significance

Nursing students are under considerable stress due to their major. Students are under pressure with lecture examinations and clinical examinations to ensure they are competent enough to fulfill the role of a nurse. Examinations in nursing school are high-stakes, and poor performance can lead to failing a class and consequently being dismissed from the nursing program. Alizadeh, Karimi, Valizadeh, Jafarabadi, Cheraghi, and Tanomand (2014) determined that of the nursing students sampled, 30.5% had mild test anxiety, 43.1% had moderate test anxiety, and 26.4% had severe test anxiety; likewise, Dawood, Ghadeer, Mits, Almutary, and Alenezi (2016) concluded that a significant percentage of nursing students who participated in their study experience mild to moderate levels of test anxiety, and some do experience severe test anxiety. Students who suffer from high test anxiety have been found to score significantly lower than their low test anxiety peers (Mashayekh & Hashemi, 2011). Interventions are necessary to reduce levels of test anxiety in nursing students, so that they can adequately prepare for tests without excessive anxiety.

Purpose

The purpose of this honors thesis was to determine the relationship between physical activity and test anxiety in prelicensure nursing students enrolled in a baccalaureate program. Exercise has been found to reduce levels of stress, so the goal was to see whether or not increased levels of exercise help with test anxiety.

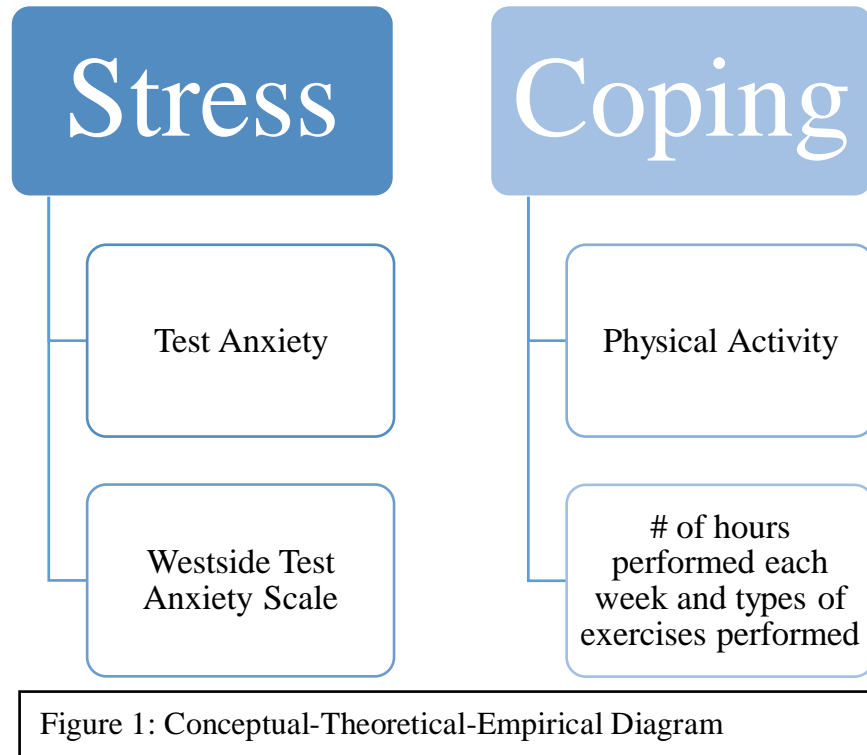
Theoretical or Conceptual Framework

The Transactional Model of Stress, Appraisal, and Coping was used to guide this thesis. Lazarus and Folkman created this theory, in which they believed coping to be a

dynamic process specific to a situation and stage of encounter (Mitchell, 2004). The ability of an individual to cope with stress depends on their cognitive appraisal of that stress. Lazarus and Folkman view psychological stress as a relationship between the individuals and how they appraise their environment. Three appraisals make up the cognitive appraisal process. The primary appraisal is where the individual determines whether a situation he/she encounters is irrelevant, benign-positive, or stressful. Stressful situations can either be a harm/loss (damage has already been done), a threat, or a challenge. Secondary appraisal then occurs. In this phase, the individual evaluates the positives and negatives of a specific coping strategy. Lastly, a reappraisal occurs after the coping strategy has been implemented to further evaluate the situation (Mitchell, 2004).

Lazarus and Folkman (as cited in Mitchell, 2004) defined coping as “constantly changing cognitive and behavioral efforts to manage specific external and internal demands that are appraised as taxing or exceeding the resources of the person.” Coping is how a person chooses to handle a specific situation, and it does not remain the same in every situation. There are two forms of coping that an individual can use: emotion-focused and problem-focused. Emotion-focused coping is when an individual alters his/her response to a situation through strategies such as avoidance or wishful thinking. Problem-focused coping is when an individual attempts to alter the stressor through action, such as learning new skills. How an individual appraises the stress will determine how he/she chooses to cope (Mitchell, 2004).

For this thesis, the stressful situation is test anxiety and coping is physical activity (Figure 1), a form of problem-focused coping.



Thesis Question or Hypothesis

The question being explored by this thesis was: What is the relationship between physical activity and test anxiety in undergraduate nursing students enrolled in a baccalaureate program? The hypothesis was that physical activity and test anxiety share an inverse relationship. Variables in this study included levels of physical activity and levels of test anxiety.

Definition of Terms

The terms physical activity and exercise are used interchangeably in this thesis. Merriam-Webster defines exercise as: “bodily exertion for the sake of developing and maintain physical fitness; something performed or practiced in order to develop, improve, or display a specific capability or skill (n.d).” The terms emotionality and worry are used to describe test anxiety in one study. Emotionality is the emotional response to test anxiety,

while worry is the cognitive reactions to test situations (Zhang & Henderson, 2014). The terms trait anxiety and working memory are also seen in an individual study. Working memory is the cognitive ability to maintain task specific information. It is the ability to retain information and then use it to produce an output (Owens, Stevenson, Hadwin, & Norgate, 2014). Trait anxiety is a person's innate tendency to be anxious, which can predispose them to emotional disorders (Grupe & Nitschke, 2013).

Summary

Nursing school is a high stress environment due to the demands put on nursing students to ensure that they will become a competent nurse. This stress needs an outlet in order for students to adequately prepare and test. The purpose of this study was to determine whether or not there was a relationship between exercise and test anxiety in undergraduate nursing students enrolled in a baccalaureate program. The researcher hypothesized that physical activity and test anxiety had an inverse relationship.

LITERATURE REVIEW

The purpose of this research was to determine the relationship between physical activity and test anxiety in undergraduate nursing students obtaining a Bachelor of Science in Nursing. A review of literature was conducted to learn more about physical activity and test anxiety. The sources used included the university's library database and Google Scholars. Keywords used were "students," "anxiety," "test anxiety," "test performance," "physical activity," "exercise," "mental health," and "nursing." Fifteen sources were found ranging from the years 2005-2017. Not all sources related to nursing students. The goal of the literature review was to learn more about anxiety, interventions done to reduce anxiety, and if exercise was a good way to reduce anxiety in general, as well as in relation to nursing students.

Anxiety in Students

Baghurst and Kelley's (2014) study addressed research on stress in college students and interventions for stress reduction. It also discussed implications for health promotion in postsecondary settings. The study took place over the course of a semester and involved 531 students broken up in to four different groups. Three groups took courses that focused on stress management, cardiovascular fitness, or generalized physical activity. The fourth group served as the control group. All students completed a Perceived Stress Scale, a Test Anxiety Survey, and a Personal Burnout Scale the first week of the semester and the last week of the semester. Results showed that both the stress management and physical activity groups had lower levels of perceived stress, test anxiety, and personal burnout at the end of the semester. The fitness groups had lower perceived stress, but higher personal burnout. Test anxiety was not significant. Researchers concluded that psychological skills training, although being

effective, may not be as practical for implementation on college campuses; however, physical activity classes are just as good at reducing stress. (Baghurst & Kelley, 2014). Strengths of this study include a large sample size and consideration of variables such as race and current exercise level. Weaknesses of this study include: a population from a Midwestern university, which may not represent the general population; the fact that the researchers did not determine how interested each student was in the class he/she was placed in; and the student investment and outcomes of each class may have been dependent on the multiple instructors teaching the course.

Shapiro (2014) conducted a systemic review of all literature covering test anxiety among nursing students. Twelve relevant studies were analyzed. Keywords included: test “anxiety,” “exam anxiety,” and “examination anxiety.” Each of these keywords was paired with the keyword “nursing students.” Test anxiety was studied as a dependent variable in almost all studies and was usually measured with the use of Spielberger’s Test Anxiety Inventory (TAI). Out of the 10 quantitative studies used, five of them reported descriptive statistics, and a majority of the researchers used statistical tests. The interventions analyzed in these studies included hypnotherapy, aromatherapy, relaxation training, music therapy, and test taking strategy management. Hypnotherapy has had mixed reviews on its effectiveness towards the treatment of test anxiety. Aromatherapy, especially with the use of lavender oil, was shown to be effective in reducing test anxiety among nursing students in two smaller studies. The studies that looked at relaxation training and test taking strategy education showed mixed results. In a small music therapy study, *lento* music therapy was proven to be effective. Based on these results, it seems that relaxation training, music therapy, and test-taking education strategies may be effective in reducing test anxiety with further research.

Researchers concluded recognizing test anxiety and implementing effective interventions quickly can have a positive impact on nursing students (Shapiro, 2014). Strengths of this literature review centered on the fact that most of the studies were quantitative and either experimental or quasi-experimental. That being said, only having one qualitative study was a weakness, because little knowledge is gained about how nursing students live with test anxiety and its impact on their education. Major weaknesses of the articles analyzed in this literature review include small sample size and the fact that very few of the researchers reported reliability and validity statistics for the anxiety tests used. Lastly, to completely understand the population being researched, studies should include accurate demographic information.

Dawood et al., (2016) examined how test anxiety can affect academic achievement in undergraduate nursing students in the Kingdom of Saudi Arabia. Two hundred and seventy-seven undergraduate nursing students of all academic levels from the College of Nursing, King Saud bin Abdul-Aziz University of Health Sciences participated in this study. Each student completed a demographic background and Spielberger's TAI. Results showed that a large majority of the nursing students suffered from mild to moderate test anxiety. However, there was no statistically significant relationship between test anxiety and grade point average for undergraduate nursing students. There was no statistically significant relationship between nursing student's age and level of test anxiety either, but test anxiety did decrease with participant's age. Lastly, there was a statistically significant negative relationship between test anxiety and academic year. Researchers concluded that since test anxiety is not directly affecting academic achievement, anxiety in exams must act as a motivating factor. However, it is still necessary for schools and students to work together to lower anxiety

levels in students with severe test anxiety. They also determined as academic year progresses test anxiety levels decrease (Dawood et al., 2016). A strength of this study is that it involved a large sample size, which provides a better representation of undergraduate nursing students in Saudi Arabia. However, a weakness is that this study may only represent undergraduate nursing students in Saudi Arabia.

Edelman and Ficorelli (2005) looked specifically at the reality of nursing students who experience test anxiety. This was a phenomenological study in which eight nursing students were asked open-ended unstructured questions. All interviews were recorded and transcribed word for word to learn how nursing students feel about anxiety. Results focused on three themes: the feelings of anxiety, the fears associated with failing an exam or the nursing program, and ways to deal with test anxiety. Researchers discovered that most students had the perception that test anxiety was a unique and solitary experience; they did not realize that they were not alone. Students commonly related test anxiety to headaches, sweaty palms, “knots in the stomach,” frustration, and an inability to concentrate. Many students also noted a desire to overcome their test anxiety and that the academic implications test anxiety could have motivated them to overcome it. Others felt that their anxiety helped enhance their cognitive abilities. Researchers concluded that nursing programs need to work with students to incorporate measures for reducing test anxiety through activities like diaphragmatic breathing, proper note taking, taking practice exams, etc. (Edelman & Ficorelli, 2005). The main strength of this study is also its weakness. Very few studies examined how nursing students with anxiety actually feel. This study provided good insight in to the life of an anxiety ridden nursing student; however, there is no way of knowing whether their feelings reflect other nursing students throughout the world. A strength of this

study was that all interviews were recorded and transcribed as a way to demonstrate results were not altered.

Quinn and Peters (2017) completed a systemic review of literature to identify interventions successful in reducing the test anxiety of prelicensure nursing students. The Preferred Reporting Items for Systemic Reviews and Meta-Analysis (PRISMA) guidelines were used to direct the systemic review process. After examining inclusion and exclusion criteria, seven studies were found to be relevant for review. Results of the literature review indicated two categories of interventions: environmental adjustments and student behavior modification. All studies, whether they were research based or discussion based, showed either statistical or subjective improvement in test anxiety. Interventions used included: magic pencils, essential lemon oil, classical music, biofeedback-assisted relaxation techniques, guided reflection, animal therapy, and progressive muscle relaxation. Researchers concluded that test anxiety will forever be a part of nursing programs as long as high-stakes testing and rigorous academic progression policies are in place. This means nursing faculty and students must implement interventions to alleviate test anxiety in the students. (Quinn & Peters, 2017). This systemic literature review's main weakness was its restrictive inclusion criteria, which created a limited number of studies to review; however, this could also be a strength, because it focused purely on studies/reports dealing specifically with interventions for nursing student test anxiety.

Exercise and Anxiety

Anbarasu and Chandramohan (2015) embarked on a study to determine the effectiveness of Yoga in the management of anxiety among students. Three hundred students, ranging in ages 15-18, took the State Test Anxiety Index (STAI) to determine their level of

anxiety. From there 20 women and 20 men found to have anxiety were divided in to a control and an experimental group. Each of the two groups had 10 men and 10 women. The experimental group took part in yogic exercises twice a day, for 30 minutes, for one month. Yogic exercises were performed at each student's own school, and the men and women were placed in to different Yoga classes. The STAI test was then re-taken at the end of the intervention. Comparison of the mean pre-test and post-test scores show a significant difference of $P < 0.0001$, demonstrating that the experimental group was better than the control group in the management of anxiety. Both the men and women were shown to have significant reduction in anxiety levels. Researchers concluded that Yoga is one of the more economical, less time consuming, and most effective method of treatment of anxiety among students. Positive effects of yogic intervention were noted even three months after interventions were completed (Anabarasu & Chandramohan, 2015). The major weakness of the study is the small sample size of forty students. A strength of the study was that both the control group and experimental group had the same number of men and women. The set-up of the study was its other strength. Doing a pre-test, intervention, and then post-test is a good way to determine whether or not the intervention was truly effective.

Zobairy, Aliabadi, and Zoabyri (2013) proposed a study that examined the relationship between anxiety in high school female students and leisure time activities. One hundred and thirty-six female high school students were randomly chosen in Sanandaj, Iran. Students answered a questionnaire regarding how they spend their leisure time, and a 28 Item General Health Questionnaire was used to assess anxiety. Based on the results of the leisure time questionnaire, two different leisure time groups were determined. Eighty-five of the students watched T.V. and played digital games in their leisure time. The other 51 students

did physical activity in their leisure time. Results of an independent t-test showed anxiety levels in the physical activity group were lower than those who were in the sedentary activity group. Researchers concluded that higher frequency of leisure time physical activity was associated with lower levels of anxiety (Zobairy et al., 2013). The most noticeable weakness of the study is that the Leisure Time Questionnaire was validated by the academic professors, not by any reliable validity tool. Strengths of the study include a fairly large sample size and a sample population of just females. These factors make the study a reliable indicator of test anxiety levels of inactive and active high school girls. The study took place within the last five years making it relatively current.

Nasiri, Mirkhan, Jahanmahin, and Khademi (2015) completed a study to examine the effects of regular physical activity on test anxiety and procrastination in college students, as well as the relationship between the two in non-athlete and athlete students. One hundred and twenty male students and 120 female students were chosen through random sampling. One hundred of these were chosen from the physical education and sports sciences department, while the other 140 were from other departments within the University of Guilan, in Iran. These two groups were labeled athletes and non-athletes for the purpose of the study. Marital status, age, and education status was determined to learn about the characteristics of the population being studied. The students then completed the Abolqasemi anxiety test scale and the Takman procrastination scale. The average age of participants was between 23-27 years of age. Almost three fourths of the students were unmarried. Over three fourths of the students were working on their bachelor of science, while the other students were working on their masters. Test anxiety was determined to be significantly lower in athletes, but there was no difference in athlete and non-athlete procrastination. A significant

and positive relationship was found between procrastination and test anxiety. Researchers concluded that promotional and incentive programs to encourage students to perform regular exercise should be considered, as today's society is far more sedentary due to technology and industrialization (Nasiri et al., 2015). This study took place two years ago, making it current. Its large sample size of both athletes and non-athletes makes it more representative of active and inactive college students. The main weakness noted is the study did not explain what their requirements for being considered an athlete were. It did say those who partook in regular physical activity were considered athletes, but the researchers did not define what regular physical activity was.

Stults-Kolehmainen and Sinha (2014) completed a review of literature investigating the influence of stress on indicators of physical activity and exercise. One hundred and sixty-eight studies were found that examined the effect of stress on physical activity. Results of this literature review demonstrated that 72.8% of the studies had an inverse relationship between stress and physical activity, while 20.1% had no relationship, and 17.2% had a positive relationship. Researchers concluded that for the majority of the population, physical activity levels decrease when under stress; however, there are some who use physical activity to cope with stress (Stults-Kolehmainen & Sinha, 2014). A strength of this literature review was the rigorous process of narrowing down studies to be reviewed. Another was that both studies supporting and negating their hypothesis were analyzed. The main weakness of this literature review is that a substantial number of the studies looked at dealt with very specific events, life transitions, or distinct experiences of trauma. As a result, those studies may not be generalizable.

Reducing Test Anxiety

Educational Testing Services (2005) created a guide to help test takers overcome and understand their test anxiety. This guide was designed specifically for Praxis test takers but may be useful for anyone who has to take a test. According to the article, test takers should disregard any rumors heard about the test and not waste time on “beat the test” strategies. In order to succeed each test taker must properly prepare, stay organized with their study plan, and practice for the test. The guide then goes on to describe signs of test anxiety in the test taker’s head and body including but not limited to mental blank-out, negative thoughts, faintness, dry mouth, etc. The eight causes of test anxiety and a discussion on how to treat each cause is then discussed. The eight causes of test anxiety are: being unfamiliar with the test, feeling that you have not mastered the material, having negative thoughts, believing certain myths about tests, exhibiting signs of anxiety, tension building up, allowing the test environment to get on your nerves, and the mind wandering. The cures, as recommended by the ETS, for each cause of test anxiety in the same order are: learning about the test, making an organized study schedule, countering negative thoughts with positive thoughts and actions, learning the truth about tests, taking care of your body to benefit your mind, practicing tension-release exercises, tuning out distractions, and staying focused. Lastly, the guide tells test takers to find a coach, if necessary, to help them prepare (Educational Testing Services, 2005).

Mashayekh and Hashemi (2011) created an article that discusses recognizing, reducing, and coping with test anxiety. The article discusses how test anxiety can affect the test taking process. Those who suffer from high test anxiety were found to score twelve percentile points below their low test anxiety peers. The article then gives a simple definition

of anxiety: “your body’s way of telling you that there is something in the environment in need of your attention” (Mashayekh & Hashemi, 2011, p. 2150). They also go on to define test anxiety as a type of performance anxiety, a feeling one might get if performance is everything or the pressure to do well is high. After defining test anxiety, the article describes what test anxiety feels like. Symptoms of test anxiety include nervousness, dread, yawning, inability to concentrate, feeling irritable, etc. Symptoms after the test can include mock indifference, guilt, anger, blame, or depression. Ways to reduce test anxiety to manageable levels were then discussed. Proper health, exercise, diet, and rest are some of the best ways to reduce test anxiety, because it can be caused by poor mental or physical health. Creating a positive self-image, having motivation towards test preparation, and confidence in oneself and ones abilities are also factors that help combat test anxiety. Many tips are listed that parents, teachers, etc. can use to help a student improve their self-image. Other strategies that can be used to help combat test anxiety include paying attention and listening, practicing with test samples, and knowing test content and procedure. Lastly, the article looks specifically at ways to physically and mentally prepare for a test. Researchers concluded that in order to properly combat test anxiety, a person has to change how he/she approaches test taking. The ways a person thinks about himself/herself and his/her abilities has to change from thoughts of failure to thoughts of success. Since tests have remained and will remain basically the same, it is up to test takers to implement strategies in order to combat test anxiety (Mashayekh & Hashemi, 2011).

Anxiety and Test Performance

DordiNejad, Hakimi, Ashouri, Dehghani, Zeinali, Daghighi, and Bahrami (2011) completed a study that examined the relationship between test anxiety and academic

performance in 150 university students attending a medical university in Iran. Eighty females and 70 males were randomly sampled with the criteria that they had to have passed at least one semester at university. Students answered the Sarason Test Anxiety questionnaire between their midterm test and final test. Demographic questions including age, gender, marital status, degree, semester of education, grade point average (GPA), and major were also asked. Forty-four percent of the participants had low test anxiety, 35.3% of the students had moderate test anxiety and 20.7% of the students had high test anxiety. Females had a mean test anxiety level of 15.2 with a standard deviation of 6.35, while males had a mean test anxiety level of 13.34 with a standard deviation of 6.23. A negative correlation was found between test anxiety and GPA (academic performance). However, a positive correlation was seen between levels of test anxiety and the age of the student. Semester of study as well as marital status were found to have no relationship with test anxiety levels. Researchers concluded that there are different factors that play in to the relationship between test anxiety and test performance (DordiNejad et al., 2011). Strengths of this study include a good sample size and a fairly even ratio of females to males in the study. A weakness was that, although the study said it asked about majors, the majors of the participants were not stated in the study. This makes it hard for anyone trying to use the study to look at a specific major.

Alizadeh, Karimi, Valizadeh, Jafarabadi, Cheraghi, and Tanomand (2014) set out to evaluate the relationship between test anxiety and academic performance in 216 Iranian nursing and midwifery students. One hundred and fifty-seven of the students were female, while 59 were male. These students were chosen by simple random sampling. Sarason's Anxiety Inventory was completed between midterms and end of term. Demographic information on age, school location, sex, marital status, course, and year of entry to

university were collected. Current term average and past semester average were also obtained. Results showed that the mean semester average was 17.06. Courses being taken by these students included nursing, medical emergency, health, and midwifery. Of all the students surveyed, 30.5% of students had mild test anxiety, 43.1% of students had moderate test anxiety, and 26.4% of students had severe test anxiety. Based on the results of the one-variable analysis significant relationships were found between city, current semester score, and course of study variables when compared with test anxiety levels. Students of Maragheh were found to have lower test anxiety levels than students of Tabriz. Levels of anxiety were found to decrease the higher the current semester average. Nursing courses and health courses had lower levels of test anxiety than midwifery courses. The multivariable analysis also examined the same relationships between city and current semester score variables when compared to level of test anxiety. However, there was no significant relationship between course of study and test anxiety. Researchers concluded that there is an inverse relationship between test anxiety and academic performance (Alizadeh et al., 2014). This study was performed within the last five years and had a large sample size, making it relevant to now and generalizable to other schools in Iran. Weaknesses include the fact that this is not necessarily generalizable to the United States, since all participants came from Iran.

Owens, Stevenson, Hadwin, and Norgate (2014) tested an interaction hypothesis in which they believed a combination of high anxiety and low working memory capacity (WMC) would cause a variance in cognitive test scores. Their study involved 96 adolescents from three schools in the United Kingdom, ranging from 12-14 years of age. Participants completed the Spielberger trait anxiety form and two cognitive tests: The Math's Computation test within the Wide Range Achievement Test (WRAT), and the Raven's

Standard Progressive Matrices (SPM). Both the Automated Working Memory Assessment (AWMA) and the Cambridge Automated Neuropsychological Test Battery (CANTAB) were used to assess working memory. Forwards and backwards versions of the spatial span test on the CANTAB were used to test spatial WMC. Forwards and backwards digit recall tests from the AWMA were used to measure verbal WMC. Results showed that there was significant variance in cognitive test performance due to the interaction between anxiety and WMC. Trait anxiety was unrelated to cognitive test performance when WMC scores were average. Conversely, trait anxiety was negatively related to cognitive test performance when WMC was low and was positively related to cognitive test performance when WMC was high. Researchers concluded that anxiety has a differential association with cognitive test performance depending on levels of WMC. Given a strong WMC, high anxiety levels can actually facilitate test performance (Owens et al., 2014). A weakness of the study was the small sample size. Another weakness is that they did not screen the children to ensure that there were no other reasons, such as a death in the family, which may have contributed to anxiety or poor performance. This study was published within the past five years, making it relevant to research going on today. Another strength was that there were relatively even numbers of males and females participating in the study: 52 males and 44 females.

Zhang and Henderson (2014) looked directly at test anxiety and its effects on the academic performance of chiropractic students. One hundred and sixty-six third-quarter chiropractic students taking the same two courses taught by the same instructor partook in this study. Demographic data including sex, academic degree, age, and ethnicity were taken. The Test Anxiety Inventory (TAI) was given to all participants. This test yields a total anxiety score as well as two subscale scores that measure emotionality and worry.

Emotionality and worry are two components of test anxiety that reflect emotional responses and cognitive reactions to test situations, caused by stress. The total scores from their written examinations and objective structured clinical examinations (OSCE) were used as variables. Results showed a small but statistically significant negative relationship between TAI scores and written examinations. However, there was not a statistically significant relationship between TAI scores and OSCE scores. Mean total anxiety scores and emotionality scores were significantly higher in females than males, but worry scores were not. Sixty-seven percent of the chiropractic students were found to have moderate levels of test anxiety, while 15% had low levels of test anxiety and 19% had high levels of test anxiety. Researchers concluded that replacing TAI total anxiety scores with worry and emotionality scores was much more effective at indicating test performance. The total TAI score was found to be a weak predictive model (Zhang & Henderson, 2014). Weaknesses of this study surround study design and sample. Researchers assumed that chiropractic students generally reflect those of students in other professional health care training programs. Furthermore, the study only assessed chiropractic students in a very specific portion of their schooling in two specific classes. This study was written in the last five years, making it current. It was also the only study to date focusing on test anxiety and academic performance in chiropractic students. Another strength is that the researchers did multiple regressions to determine whether or not total TAI scores or TAI subscales were better at predicting exam results.

Strengths and Limitations of Literature

The literature provided evidence that students, especially nursing students, experience test anxiety (Edelman & Ficorelli, 2005; Quinn & Peters, 2017), exercise can reduce anxiety (Anabarasu & Chandramohan, 2015; Baghurst & Kelley, 2014; Nasiri et al., 2015; Zobairy et

al., 2013), and there is no significant relationship between test anxiety and grade point average (Dawood et. al., 2016; DordiNejad et al., 2011), however, there may be other factors that associate anxiety with academic performance (Alizadeh et al., 2014; Zhang & Henderson, 2014). Limitations of the literature included the lack of randomization, small sample sizes (Dawood et. al., 2016; Edelman & Ficarelli, 2005; Anabarasu & Chandramohan, 2015; Owens et al., 2014), and lack of generalizability in regard to ethnicity, culture, and other variables (Dawood et. al., 2016; Anabarasu & Chandramohan, 2015; Zobairy et al., 2013; Nasiri et al., 2015; DordiNejad et al. 2011; Alizadeh et al., 2014; Owens et al., 2014).

METHODOLOGY

The purpose of this thesis was to determine the relationship between physical activity and test anxiety in students obtaining their Bachelor of Science in Nursing. Findings of the literature review support the need to understand ways to reduce test anxiety. Many therapies have been found to work, and physical activity has been shown to decrease anxiety and stress. There was not substantial information specifically related to physical activity reducing test anxiety in nursing students, indicating a gap in current literature.

Study Design

This was a quantitative, correlational study, utilizing a survey to determine the relationship between the self-reported amount of physical activity and test anxiety. Variables for this study included levels of physical activity and levels of test anxiety. Descriptive statistics were also performed on the data collected.

Setting and Sample

The survey was administered in a classroom setting. The time in which the survey was given was based on professor preference to allow for minimal interruption of class time. The fourth year gerontology students took the survey in the first 20 minutes of their class, while the second year fundamentals, and third year obstetrics/pediatrics students took their survey in the last 20 minutes of class.

The population being studied was undergraduate nursing students enrolled in a baccalaureate program. The participants for this study were chosen by convenience sampling. The sample consisted of 69 undergraduate bachelor of nursing students. Twenty-six fourth year gerontology students, 17 third year obstetrics and pediatrics students, and 26 second

year fundamentals students were surveyed. A majority of the students surveyed were Caucasian females.

Design for Data Collection

The participants began by reading over an informed consent form letting them know what the survey was for, that they did not have to complete it, that risk was minimal, etc. They were to read over the form and ask any questions upon finishing. All participants then completed a test anxiety survey, in which they rated 10 statements from extremely or always true, to not at all or never true. The participants also answered two questions pertaining to the type and level of physical activity they participate in on a weekly basis.

Measurement Methods

The Westside Test Anxiety Scale (Appendix A) was used to measure levels of test anxiety in the participants of this study. It is a 10-statement questionnaire that measures levels of anxiety from low to very high. This survey is free and open to use for educational purposes. The Westside Test Anxiety Scale was created with the use of two other published and validated scales. It has high face validity, because it includes highly relevant cognitive and impairment factors, while omitting the marginally relevant over-arousal factor. Scale validity, based on the average of two attained correlations weighted by the number of subjects in each study, was calculated as $r=0.44$ (Driscoll, 2007).

Students were also asked to self-report the number of minutes of exercise performed each week and the types of exercises they normally perform. Examples of exercise include: Zumba, running or jogging, taking walks, yoga, Pilates, cross fit, step aerobics, swimming, participating in an athletic events or practice, playing tennis, hiking, bike riding, weight training.

Data Collection Procedure

In order to run a correlation coefficient to determine the relationship between physical activity and test anxiety in undergraduate nursing students, data was needed on anxiety and physical activity levels of nursing students. Data were obtained from 69 willing students with the use of a survey. The researcher passed out the survey at either the beginning or end of the participant's class time, depending on professor preference. A box was also placed at the front of the room. The participants were given time to read over the informed consent that was stapled on to the front of the survey and ask any questions. The informed consent did not have a signature line, but stated "by choosing to answer the survey questions, participants give their informed consent for participation." Participants were then instructed to place their surveys in to the box at the front of the room upon completion of the survey. Upon completion of the survey, participants were asked to remain in the room to ensure that anonymity of the responses was maintained. The researcher left the room to maintain confidentiality and anonymity of participants. When all participants finished completing the survey, the instructor of the class came and got the researcher who obtained the box and thanked the volunteers for their time.

Protection of Human Subjects

This survey did involve the use of human subjects and therefore needed approval by the school of nursing's Research and Evidence-Based Practice Council and the university's Institutional Review Board. This research involved no deception of any kind. Incentives for participating in the research was not given. Participation in the study posed minimal risk. If students were to report psychological stress from participation in the study, they would be referred to counseling services.

Participants were protected throughout the implementation of the study. In the beginning, participants were informed verbally and through informed consent that participation in the study was optional. Participants were informed that if they did not wish to participate in the study, they could place a blank survey in to the box at the front of the room. There was no information on the survey that could link any of the participants to the study. The different surveys were stapled together so that both the physical activity and anxiety scale for each person could be compared. Surveys were coded with a random number from 1-71 in the top right corner so they could be matched, in the event that the papers became separated. The surveys were passed out face down so the researcher could not determine which person had which number. The researcher also remained outside of the room during the survey process, to avoid knowing the order in which surveys were turned in.

Steps were taken to ensure participants were protected throughout the dissemination of results as well. All information provided was kept on a password protected computer only accessible by the researcher and nursing school faculty. All paper copies of the research, including the surveys, will be kept in a secure area in the Hunt School of Nursing for three years following completion of the research study. If any of the participants had questions or concerns regarding the study or their own personal protection, they were notified in the informed consent to contact the researcher.

Data Analysis

Survey numbers, participant numbers, the answers participants gave to the ten statement anxiety scale, their total anxiety scores, the minutes of exercise they participate in each week, and the types of physical activity they do were all logged in to Excel by the researcher. Total anxiety scores were measured using a five point Likert scale and were

determined by adding the numerical answers given for each of the 10 statements. The results were then averaged. Data analysis involved completing a Pearson r correlation coefficient to determine if there was a relationship between the total anxiety score and the minutes of exercise performed each week. The assumption was that an inverse relationship would exist between exercise and test anxiety. A p -value was then calculated to determine if the relationship was significant.

Additional survey results were also reported with the use of descriptive statistics. The number of nursing students that do specific exercises was analyzed by using the types of exercises each nursing student reported. The total anxiety scores were taken and broken down in to moderate high to extreme high test anxiety, normal to high normal test anxiety, and low test anxiety, based on the Westside Test Anxiety Scale. Low test anxiety was considered a score of 1-1.9. Normal to high normal test anxiety was a score from 2-2.9. Moderate high to extreme high test anxiety was a score of 3-5. Percentages were taken of these three sections to determine the percent of nursing students facing each type of anxiety. The number of participants who chose 1, 2, 3, 4, or 5 was also determined for each statement, and converted to a percentage of the total response for the statement, to determine similarities of responses for items which may/may not cause anxiety. Answer choices with less than 5% response or greater than 40% response were analyzed to determine themes with anxiety-provoking activities. Lastly, the number of nursing students that do each type of exercise was ascertained. The different exercises were then compared to the total anxiety scores to determine if certain exercises were better or worse at lowering test anxiety levels.

RESULTS

The purpose of this research study was to determine the relationship between physical activity and test anxiety.

Sample Characteristics

The final sample size of the study was 69 undergraduate nursing students. All students responded to the survey; however, only 66 of the 69 students were able to be a part of the main analysis: minutes of physical activity related to total anxiety score. Three of the participants did not correctly answer the question: How many minutes per week do you spend exercising? Instead of giving a number, they gave a range and therefore were removed from correlational data analysis. Of the 69 participants, the majority were Caucasian and female. Twenty-six of the participants were fourth year gerontology students, 17 were third year obstetrics and pediatrics students, and 26 were second year fundamentals students.

Major Findings

A Pearson r correlation coefficient was used to analyze the information obtained from the participants regarding amount of physical activity performed each week and total anxiety levels. Nursing students who exceeded 1,000 minutes of exercise each week were not used, as they were statistical outliers. This eliminated three participants from the statistical test, leaving a total of 63 nursing students in the analysis. The correlation coefficient was -0.20 , indicating a small negative correlation (Figure 2). The p -value was not significant, $p = 0.134$.

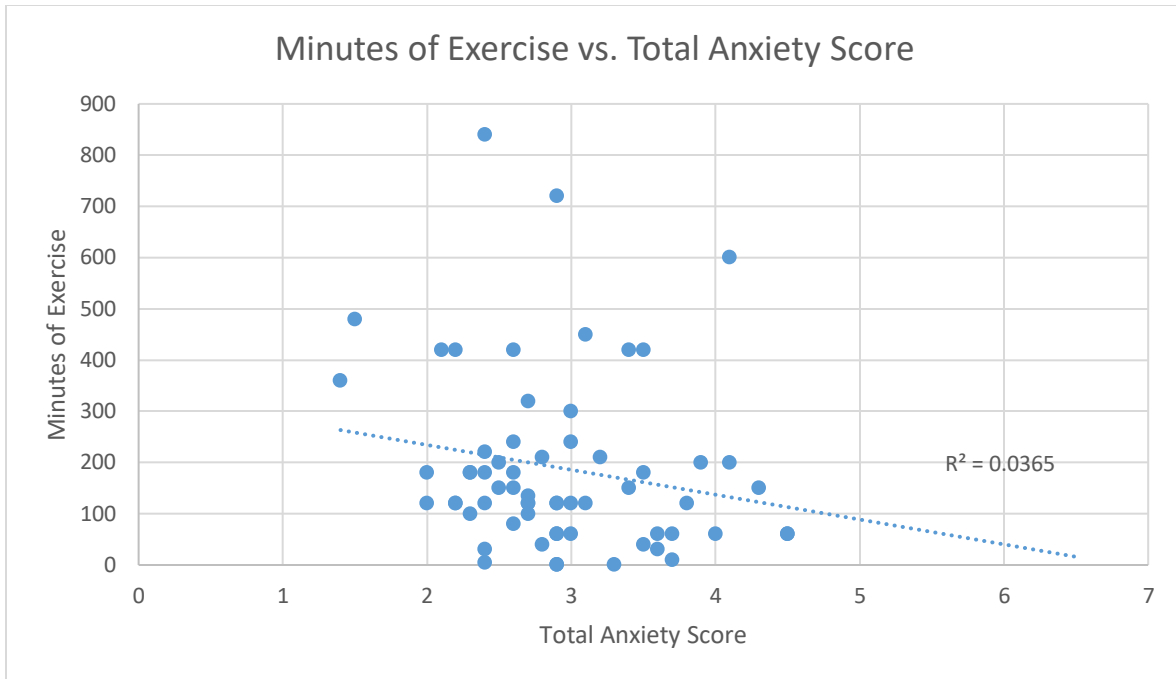


Figure 2: Minutes of exercised performed weekly by undergraduate nursing students versus their total anxiety score, with outliers removed.

Descriptive statistics were then performed on the statements from the Westside Anxiety Scale. The percentage of people who chose either 1, 2, 3, 4, or 5 was calculated for each statement. Results showed that very few to no nursing students chose 1 (not at all or never true) for the following statements: Statement 2 “When I study, I worry that I will not remember the material on the exam;” Statement 3 “During important exams, I think that I am doing awful or that I may fail;” and Statement 9 “After an exam, I worry about whether I did well enough.”

Greater than 40% of nursing students chose 2 (slightly or seldom true) for the following statements: Statement 4 “I lose focus on important exams, and I cannot remember material that I knew before the exam;” Statement 5 “I finally remember the answer to exam questions after the exam is already over;” and Statement 6 “I worry so much before a major

exam that I am too worn out to do my best on the exam.” Less than 5% chose 2 (slightly or seldom true) for Statement 9 “After an exam, I worry about whether I did well enough.”

Lastly, 62.32% of nursing students chose 5 (extremely or always true) for Statement 9 “After an exam, I worry about whether I did well enough,” while less than 5% of nursing students chose 5 for Statement 4 “I lose focus on important exams, and I cannot remember material that I knew before the exam,” and Statement 6 “I worry so much before a major exam that I am too worn out to do my best on the exam.” A table with all of the percentages is shown below (Table 1). The Westside Test Anxiety Scale can be found in Appendix A.

Answers	Westside Test Anxiety Scale Questions									
	1	2	3	4	5	6	7	8	9	10
1	18.84%	1.45%	1.45%	13.04%	10.14%	17.39%	18.84%	13.04%	0.00%	26.09%
2	27.54%	10.14%	20.29%	49.28%	42.03%	40.58%	31.88%	27.54%	4.35%	27.54%
3	24.64%	31.88%	37.68%	24.64%	26.09%	31.88%	28.99%	33.33%	7.25%	23.19%
4	15.94%	31.88%	21.74%	8.7%	14.49%	7.25%	10.14%	20.29%	26.09%	15.94%
5	13.04%	24.64%	18.84%	4.35%	7.25%	2.9%	10.14%	5.80%	62.32%	7.25%

Table 1: The percentage of students that selected either 1, 2, 3, 4, or 5 as their answer for each question of the Westside Test Anxiety Scale. Percentages are rounded to two decimals, so the sum of each column may not be exactly one hundred.

Descriptive statistics were also used on the total test anxiety scores. The percentage of students who had a low test anxiety level, normal to high normal test anxiety level, and moderate high to extremely high test anxiety level were also calculated. Results showed that almost all undergraduate nursing students have some form of normal to high test anxiety levels. Results of these analysis are found in the tables below (Table 2).

Level of Anxiety	Percentage of Students
Moderate High – Extreme High Test Anxiety	42.03%
Normal - High Normal Test Anxiety	55.07%
Low Test Anxiety	2.9%

Table 2: The percentage of students that were found to have each level of test anxiety.

Lastly, types of exercise were examined to determine how many individuals partook in each exercise. Results of these analysis are found in the figure below (Figure 3).

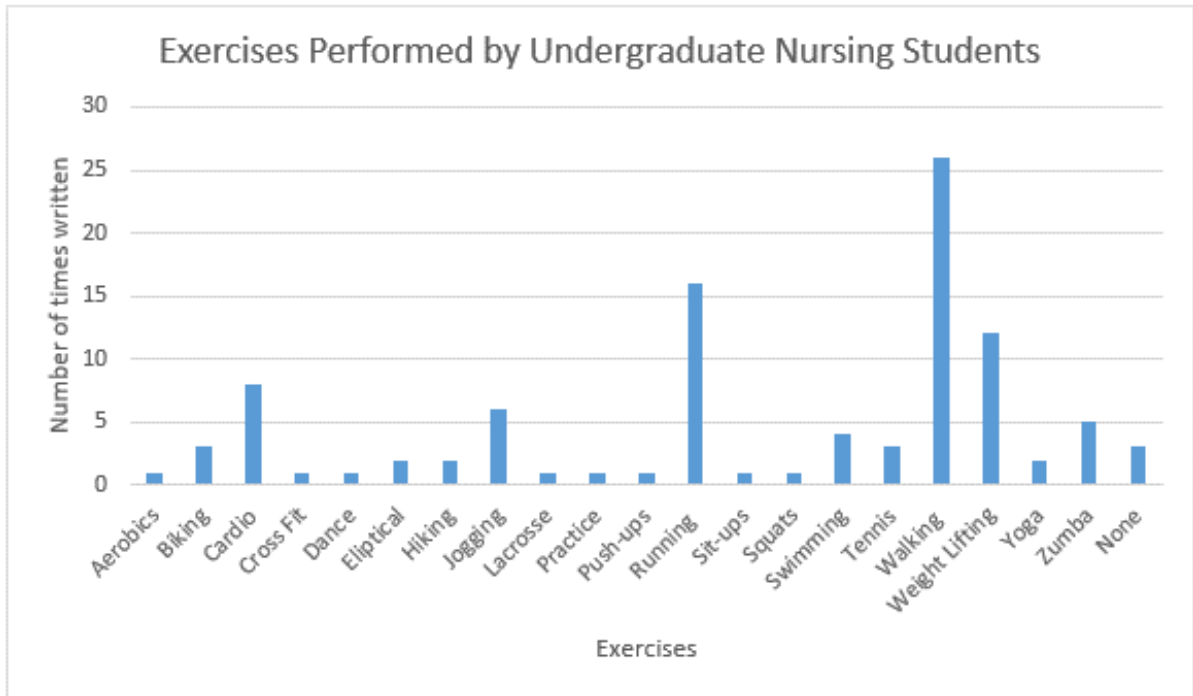


Figure 3: Depicts the types of exercises performed by the undergraduate nursing students who took part in this study, and how many students partake in each one.

Analysis was conducted to determine if certain exercises were better at lowering test anxiety scores by looking at each participant’s total anxiety score in comparison to the exercises they partook in. No conclusions could be made with this analysis.

Summary

Although the Pearson r correlation coefficient depicted a small negative relationship between minutes exercised and test anxiety, the p-value was too large to be statistically significant ($p > 0.05$). The study shows that most nursing students have normal to high levels of test anxiety. Based on the percentages of students who chose 1, 2, 3, 4, or 5 for each question, it is apparent certain perceptions and activities invoke more anxiety than others. Lastly, a variety of exercises are used by undergraduate nursing students, but no conclusions can be drawn as to which exercises are best for lowering test anxiety.

DISCUSSION

The purpose of this research was to determine if there was a relationship between test anxiety levels and physical activity levels in undergraduate nursing students enrolled in a baccalaureate program. The goal was to determine if higher levels of physical activity were related to reduced levels of test anxiety.

Implication of Findings

A Pearson r correlation coefficient was calculated, leaving out three statistical outliers. Analysis showed a weak negative correlation between physical activity and test anxiety. Therefore, the hypothesis of the study (increased levels of physical activity would reduce levels of test anxiety) was observed. However, the p value was $>.05$ and therefore statistically insignificant. This differs from Anbarasu and Chandramohan (2015) who determined that yogic exercise was statistically significant in managing anxiety among students, which may have to do with the fact that their research looked specifically at one intervention instead of at physical activity in general. It may also be because they implemented an experiment, instead of just surveying students.

Results on the number of nursing students suffering from test anxiety were surprising when related to the literature. Ninety-seven percent of the nursing students surveyed in this study suffer from moderate test anxiety to extreme high test anxiety. Dawood et al. (2016) concluded that a large majority of students suffer from mild to moderate levels of test anxiety, not severe. Alizadeh et al. (2014) results showed a more balanced field, where a considerable amount suffered from mild, moderate, and severe test anxiety. It is unusual that this study showed such high levels of severe test anxiety and such low levels of mild test

anxiety. There could be multiple reasons for these results, including the anxiety testing tool used and the fact that surveys were administered the week before final exams.

Reviewing specific percentages of students who chose either 1, 2, 3, 4, or 5 for each question, helped determine additional information about anxiety related to test taking in nursing school. Less than 5% of nursing students are not worried about remembering the material when it comes time to take the exam. Whether to a moderate or large extent, the nursing students are fearful they will forget what they have been studying. Less than 5% of the nursing students polled have confidence in themselves while taking the exam. It is a fear whether moderately or severely, that they are doing badly or that they may fail. Over 40% of the students polled believe that they rarely lose focus on exams, to the point where they cannot remember material. This coincides with the fact that less than 5% believe that they always forget material they knew before the exam. This statistic in particular is reassuring, because even though many fear that they will forget what they are studying, very few actually do. Over 40% of students polled determined that they do not normally remember the answer to exam questions after the exam is over. It seems like questions they do not know on exams has more to do with not knowing the material rather than nerves. Greater than 40% of students also believe that their level of worry before an exam rarely wears them out enough to impede their exam performance. This corresponds to the fact that less than 5% of the students stated that their worry always wears them out to the point of not adequately performing. Lastly, less than 5% of the nursing students never worry about whether they did well or not and less than 5% of students rarely worry about whether they did well or not. These two statistics correspond with the fact that over 40% of students say they always worry about whether they did well or not after the exam is over. Looking at the Westside Test

Anxiety Scale by percentages of students answering high or low was similar to Edelman and Ficorelli (2015); even though different questions were asked, both studies gave an inside look at the inner workings of nursing students, and how their anxiety is portrayed.

The last analysis was an attempt to determine whether or not specific types of physical activity were better at reducing test anxiety than others. No conclusions could be made by looking at the types of exercises used for each individual and their total anxiety score. There were far too many different types of exercises listed to draw any conclusions. The main exercises done (i.e. walking, jogging) ran throughout the different levels of anxiety. Also, it was hard to differentiate between some exercises, because some participants would write cardio, which technically could be walking, running, dancing, etc. Only one of the studies examined compared types of physical activity. The study completed by Baghurst and Kelley (2014) looked at cardiovascular fitness versus generalized physical activity. The cardiovascular fitness group performed both aerobic and anaerobic fitness with a focus on improving physical fitness over participating in a sport. The generalized physical activity group played a wide variety of sports with skill development as the goal, rather than fitness. Results of the study showed that the physical activity group had lower levels of perceived stress and test anxiety, while the fitness group only showed lower levels of perceived stress. Test anxiety was insignificant for the fitness group.

Application to Theoretical/Conceptual Framework

Although the results of this honors thesis were not statistically significant, there was a small inverse relationship between physical activity and test anxiety that does support The Transactional Model of Stress, Appraisal, and Coping. Lazarus and Folkman's model was appropriate for this thesis, because it discusses how individuals view their stress and then

choose to cope with it. The stress used in this thesis was test anxiety, and although the thesis did not specifically look at whether nursing students viewed the stress as a threat, challenge, or harm/loss, it did reveal whether the problem-focused coping mechanism of physical activity was beneficial.

Limitations

This study did have considerable limitations. The most obvious limitation is that this thesis was restricted to the nursing students of one small, private university in the southeastern United States. Therefore, the size of the population for the study was small. Even if results had been significant, the study may not have been generalizable due to its size. Studies with larger populations need to be conducted to conclusively determine whether physical activity has an effect on test anxiety. Another limitation to the study is that no questions were asked about whether some of the nursing students were on sports teams. Being a member of a sports team may explain why some students had over 1,000 minutes of exercise each week.

Lastly, the study examined levels of test anxiety, which commonly occurs before a test and on the day of the test. However, the physical activity component of the study dealt with minutes of exercise each week in general. No questions were asked about levels of physical activity leading up to the test.

Implications for Nursing

Although the results of the study were not statistically significant, physical activity does have a small negative correlation with test anxiety in prelicensure nursing students at a small private university. More research needs to be done to determine whether or not physical activity is a good form of test anxiety reduction. Regardless, it is increasingly

obvious that test anxiety is an issue in nursing school. Furthermore, research shows that there are moderate to high levels of test anxiety in nursing school in general. Implementing interventions to counteract the negative effects of test anxiety are needed to help nursing students succeed in such a high stakes environment. Studies thus far have shown many interventions that reduce test anxiety, such as music therapy, yoga, and aromatherapy (specifically lavender oil).

Recommendations

Further study on the effects of physical activity on test anxiety, specifically in the area of nursing students, would be beneficial. For others attempting to complete a study on the same topic, an experiment implementing physical activity in conjunction with test anxiety might show different results. The researcher would be able to compare levels of test anxiety before and after an exercise regime was performed. This could give a more accurate representation of whether or not physical activity decreases test anxiety, rather comparing test anxiety to the amount of weekly physical activity performed. Another recommendation would be to specifically look at one type of exercise like walking, jogging, or lifting, and how it impacts test anxiety, instead of looking at physical activity in general.

Other recommendations include not giving a test anxiety survey before an upcoming test, specifically if anxiety is being analyzed at one point in time. There is no way of knowing if this is their normal anxiety level or if it is higher due to the upcoming test. For this reason, taking repeated measures would also be a good idea. In this way, researchers can see how anxiety changes in relation to exams and over the course of the semester.

Also, a greater population size may show a significant correlation between physical activity and test anxiety. A larger population from multiple sites would be even better,

because a significant result would be more generalizable than a significant result at one large university. Lastly, an interesting concept to study would be comparing test anxiety results between athlete nursing majors and non-athlete nursing majors, to see if there was a significant difference in test anxiety levels.

Conclusion

In conclusion, there was not a statistically significant relationship between physical activity and test anxiety in undergraduate baccalaureate nursing students. This means that the small inverse relationship seen between physical activity and test anxiety in this research may or may not have occurred by chance. However, results did show that most nursing students in this undergraduate BSN program have normal to high levels of test anxiety. The Westside Test Anxiety Scale showed that many students are worried they will forget what they have been studying and consequently perform poorly. In actuality, many students are able to maintain focus throughout the exam, and therefore remember what they studied. Lastly, the anxiety scale showed that a majority of the students believe their anxiety beforehand does not mentally drain them enough to impede their performance, and that they do not generally remember the answers to questions after the exam is over. No one exercise was associated with a low anxiety level in this study. Although the main analysis requires further research, much can be learned about test anxiety in nursing students from this honors thesis.

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Appendix A

Westside Test Anxiety Scale

Rate how true each of the following is of you, from extremely or always true, to not at all or never true. Use the following 5 point scale.

5	4	3	2	1
extremely or always true	highly or usually true	moderately or sometimes true	slightly or seldom true	not at all or never true

- ___ 1) The closer I am to a major exam, the harder it is for me to concentrate on the material.
- ___ 2) When I study, I worry that I will not remember the material on the exam.
- ___ 3) During important exams, I think that I am doing awful or that I may fail.
- ___ 4) I lose focus on important exams, and I cannot remember material that I knew before the exam.
- ___ 5) I finally remember the answer to exam questions after the exam is already over.
- ___ 6) I worry so much before a major exam that I am too worn out to do my best on the exam.
- ___ 7) I feel out of sorts or not really myself when I take important exams.
- ___ 8) I find that my mind sometimes wanders when I am taking important exams.
- ___ 9) After an exam, I worry about whether I did well enough.
- ___ 10) I struggle with writing assignments, or avoid them as long as I can. I feel that whatever I do will not be good enough.

_____ Sum of the 10 questions

_____ Divide the sum by 10. This is your Test Anxiety score.

What does your test anxiety score mean?

- 1.0—1.9 Comfortably low test anxiety
- 2.0—2.5 Normal or average test anxiety
- 2.5—2.9 High normal test anxiety
- 3.0—3.4 Moderately high (some items rated 4=high)
- 3.5—3.9 High test anxiety (half or more of the items rated 4=high)
- 4.0—5.0 Extremely high anxiety (items rated 4=high and 5=extreme)

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