

The Incidence of Anxiety and Depression in Physical Therapy Students

By

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Abstract of the Dissertation

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The present study examined the incidence of anxiety and depression in physical therapy students across the United States. Eight schools were randomly chosen representing a cross section of the United States. Of 334 initial respondents, 211 subjects completed taking the Hospital and Anxiety Scale (HADS) 3 times over the course of one school semester (30% male, 70% female). Results indicate that physical therapy students in the United States do not have clinical levels of anxiety or depression. Implications for future research are discussed.

DEDICATION

This dissertation is dedicated in memory of my incredible mother who raised eight successful children while at the same time dealt with the lifelong depression and mental illness of her husband, my father.

ACKNOWLEDGEMENTS

I wish to thank several of my former students at California State University for their help with my initial literature review. In addition I want to thank my fiancé, Jim Monroe, for his patience, support and encouragement during the writing of this dissertation.

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CHAPTER 1

Introduction

Statement of the Problem

Depression is a major cause of psychological illness in the United States, affecting more than 19 million Americans (<http://www.intelihealth.com>). It is estimated that 25% of women and 10% of men will have one or more episodes of clinically significant depression i.e., requiring some form of intervention, during their lifetimes.

(<http://www.depressionclinic.com/mentalhealth/depression/causeetiology/default.htm>

). Depression affects not only the life of the person who suffers from the disorder, but also the lives of family and friends and depression ultimately affects society as a whole. It is estimated that people with depression cost the economy 30 to 44 billion dollars per year (<http://www.intelihealth.com>).

Background and Need

One of the major contributors to depression is the high stress level inherent in the American society (Clark & Zeldow, 1988). Students in professional programs such as medical school, which require especially rigorous study, have an inordinately high level of stress (Hojat, Glaser, XU, Veloski & Christian, 1999). The demanding academic training of students in other health professions, for example physical therapy, often results not only in stress, but also symptoms of burnout:

studying, excessive homework, attending uninteresting yet fast-paced classes, while taking extensive notes while at the same time having a lack of free time, and the strain placed on relationships are some of the academic stressors and cause of burnout faced by physical therapy students.

Students of the health professions are highly stressed and experience symptoms of burnout well before they graduate and enter the workforce. One physical therapy graduate student added to the factors contributing to this stress by commenting that the lack of control students have over their education, the lack of free time, the strain placed on personal relationships, the accrued financial debt, the lack of communication and connectedness, and diminished sense of personal achievement transform the educational experience into a “nullifying test of endurance rather than the engaging and appropriate entry to a profession originally chosen with enthusiasm and good faith” (DiGiacomo & Adamson, 2001, p. 231).

In addition to the stress physical therapy students endure daily with required rigorous study, they currently face the additional stress of possibly being unemployed when they graduate. With the advent of managed care and health maintenance organizations (HMO's), the medical community has experienced tremendous changes in the environment and administration of health care. The amount of care a patient is allowed to receive reflects a major shift in health care. The predominance of managed health care has resulted in fewer allowable treatment visits, and there is less available work overall for the physician and physical therapist. In the history of the physical therapy profession, unemployment has never been an issue, that is, until the advent of managed care. Students in professional physical therapy programs have grown increasingly aware that they may graduate and not be able to find full-time work. With outstanding student loans that they will begin to repay shortly after they

graduate, this fact is discouraging and demoralizing for these students.

With the effective medications now available, along with many other treatments that have been shown to be effective in treating depression and anxiety (Preston, Oneal & Talaga, 2001), subsequent anxious and depressive episodes might be preventable entirely if the condition is identified early enough. With prevention, unnecessary suffering and the high costs associated with anxiety and major depression along with the many other repercussions associated with these debilitating conditions may be reduced or eliminated.

Purpose of Study

The purpose of this study was to determine the incidence of anxiety and depression among physical therapy students.

Theoretical Rationale

In this study, the aim was to research the varying anxiety and depression levels of students enrolled in professional physical therapy programs. Physical therapy programs, like medical programs, are academically demanding. Students enrolled in physical therapy programs are often in class 40 hours a week due to the large number of units required each semester. Studying and preparing for coursework is then added to an already demanding 40 hours. Since the degree program in physical therapy is a professional study, students are expected to work independently toward contributing to their own professional development. Because so many courses are required each semester, the students often have several examinations each week. These are but a few of the many demands required of physical therapy students that can cause stress, which could then possibly result in anxiety and/or depression.

This study and others like it are instrumental in identifying the need for both anxiety and depression screening, and the concomitant need for intervention for physical therapy students. The prevention of anxiety and depression could reduce the high costs to the economy and the mental suffering associated with anxiety and major depression. There is a lack of research that has been conducted on anxiety and depression levels of students in professional programs other than medical and law school.

Professional programs are often perceived as highly stressful to the majority of the students enrolled in them. For many of these students, graduate school marks the beginning of a period of major, unavoidable life changes (Goplerud, 1980). Holmes and Masuda (1974) reported that over half of the first and second year graduate students tested on the Social Readjustment Rating Scale (SRRS; Holmes & Masuda, 1974) reported life changes that placed them in the life crisis category. This is due in part to the fact that these programs require maintaining a large course load, which in turn means more hours outside of class for study and preparation. In addition, most professional programs require a minimum of a "B" (3.0) grade point average (GPA). Although the students enrolled in the professional programs had to have superior GPAs to get accepted into their respective programs, the weight of the course load makes a high GPA still more difficult. Financial stress is another burden for many students. Many students pay for school by taking out student loans. Before a student even gains admission into a professional program, he has have already had at least a bachelors' degree for which he may owe student loans. A student who is facing the possibility that he may not pass and have to drop out of school in light of all the

money he owes can be extremely stressed. On the other hand, even if a student is able to finish his program, finding that he is unable to find work also escalates financial worries and stress. Additional stresses may include changes in living arrangements, in work, in school and in social relationships. All these stresses may ultimately lead to anxiety and depression, especially in those students who are vulnerable to mood disorders.

Hypothesis

The incidence of anxiety and depression will be greater in physical therapy students than in the general public and that incidence will be similar to that seen in medical and law students.

Research Question

Physical therapy as a professional program has not been studied in terms of connecting the stress level inherent in this course of study with resultant anxiety and depression; therefore, the question remains: what is the incidence of anxiety and depression among physical therapy students?

Literature Review

Many studies can be found in the literature that have been conducted to explore the incidence of anxiety and depression in medical students. (Aktekin, Karaman, Senol, Erdem, Erenjin & Akaydin, 2001; Becker, 1995; Clark & Zeldow, 1988; Clark & Zeldow, 1988; Hendrie, Clair, Brittain, & Fadul, 1989; Hojat, Glaser, Gang, Veloski & Christian, 1999; Lloyd & Gartrell, 1984; Lu, 1994; Mitchell, Matthews, Grandy, & Lupo, 1983; Notman, Salt & Nadelson, 1984; Parkerson, Broadhead & Tse, 1990; Russo, Miller & Vitaliano; 1985; Shapiro, Schwartz & Bonner, 1998;

Stewart, Betson Lam, Marshall, Lee, & Wong, 1997; Stewart, Betson, Marshall & Wong, 1995; Stewart, Lam, Betson, Wong & Wong, 1999; Tyssen, Vaglum, Gronvold & Ekeberg, 2001; Vitaliano, Majuro, Russo & Mitchell, 1988; Vitaliano, Majuro, Russo & Mitchell, 1989; Vitaliano, Majuro, Russo & Mitchell, 1989; Wolf, Scurria & Webster, 1998) Medical school has long been known to be quite stressful and to cause significant distress for the students (Shapiro, et al., 1998). Much of the distress experienced by these students is the result of trying to coordinate the demands of rigorous academic study while also trying to get enough sleep and, at the same time maintain interpersonal relationships. Most studies looking at the subject of medical school students anxiety, depression and stress have revealed that medical students do suffer from significant stress, anxiety and depression, more so than the general population (Hendrie, et al., 1989; Lloyd et al., 1984; Notman, et al., 1984; Parkerson, et al., 1990; Russo, et al., 1985; Shapiro, et al., 1998; Vitaliano, et al., 1988; Vitaliano, et al., 1989).

In a study of medical student distress by Vitaliano et al. (1989), measures were taken during September orientation as a baseline and repeated two weeks before May final exams. The group consisted of 196 men and 123 women who were entering the University of Washington Medical School. Distress was defined in terms of anxiety, depression, and daily stress as measured by the Symptom Checklist Anxiety Scale (Derogatis, 1977) and the Beck Depression Inventory (BDI, Beck & Beck, 1972).

It was found that depression increased in both men and women from September to May. By late in the semester of the first year, mean scores had more than doubled. For the majority of students in the study, no major life events occurred

in September or May. However, many students reported financial debt and/or change in residence to a different city in September or May. Distress was unrelated to gender in September, but by May, women reported more distress than men did. Distress in May was positively related to type A (anger suppressed) personalities. It was also found that students who were distressed in May were more likely to be distressed in September. Vitaliano's (1989) results also suggested that students who were distressed at the entrance to medical school were even more distressed at the end of their first year. Vitaliano's (1989) findings were consistent with other research (Russo, Miller & Vitaliano, 1985) in which female medical students reported more distress than male students. Certain studies suggest that this gender difference reinforces research indicating the special difficulties females have in a traditionally male-oriented medical environment (Miao, 1977).

Zoccolillo, Murphy and Wetzel, (1986) found a 12% prevalence of major depression or possible major depression during the first 2 years of medical school. The lifetime prevalence was 15%, 3 times the rate of the general population. Vitaliano's (1989) study concluded that, for a large number of students, medical school is a highly stressful experience. The study also concluded that the distress encountered was enduring rather than transitory.

In a longitudinal study conducted by Clark, Daugherty, Zeldow, Gotterer and Hedeker (1988), the authors examined the relationship between academic performance and depressed mood over a 4-year period, with a single medical school class. Their hypotheses are clearly and briefly stated; poor grades lead to depression and depression leads to poor grades.

The Beck Depression Inventory (BDI) was used to assess the severity of depressed mood. Undergraduate, first year medical school, and second year medical school GPAs, as well as third and fourth year GPAs were calculated. Also taken into account were the MCAT scores of the students. The results suggest three different types of causal relationships between depressed mood and academic performance. The inferential statistics suggest first that a better undergraduate academic performance contributed to fewer reported depressive symptoms throughout medical school in a manner that did not diminish from one year to the next. Second, a student's depressed mood as assessed under the considerable pressure of impending second year final examinations and Boards Part I (a major examination that is given after the first 2 years of academic coursework that covers all materials taught over the first 2 years of medical school) may have contributed to lower Boards scores. Finally, it suggests that students who performed less well on Boards tended to report more depressive symptoms in the months following receipt of their Boards scores.

The purpose of another study conducted by Clark and Zeldow (1988) was to determine the adverse effects of the medical education on physicians-in-training, by describing the vicissitudes, unpredictable changes in life, on depressed mood during four years of medical school. More specifically, the researchers questioned: What is the incidence of suicidal ideation? Does depressed mood vary as a function of gender? Are there markers (e.g. personality traits, family history) that predict vulnerability to depressed mood at the outset of medical school? What is the relationship between depressed mood and participation in psychotherapy? Does depressed mood diminish academic performance?

The Beck Depression Inventory (BDI) was used (N=121) as the main indicator of depression/dysphoria. Results indicated that dysphoria was lowest at initial assessment (4%), but never less than 12% thereafter during the first three years. In contrast, 25% of the class was dysphoric at the end of the second year. The results indicated that there were no significant gender differences within any assessment. However, in the fourth year, the mean neuroticism score (an abbreviated, six item adaptation taken from the neuroticism scale of the Eysenck personality Inventory, Eysenck, 1964) for males suddenly dropped. When severe depression was evaluated (BDI >21), the relationship between severe dysphoria and the act of quitting medical school was significant. The highest rate of positive response to the suicide item (N=95) was manifest at the end of the second year when 3 students yielded a score of 2 ("I would like to kill myself"). In terms of personality, men who described themselves as relatively independent, active, and competitive were less vulnerable to depressive symptoms. Women who described themselves as relatively aggressive, worldly, or not easily hurt were also less vulnerable to depressive symptoms. Familial history of depression, substance abuse, and academic performance was not found to have a significant correlation to depression. However, there was a significant association between greater dysphoria and use of psychotherapy during the first two years.

While the BDI is a valid measure of depression, the fact that not all students/subjects participated at each of the assessments begs the question of how conclusive is the data? A true baseline could not be established to determine the absolute effects of medical school "stress" on the amount of dysphoria experienced

by the subjects. The researchers did not address the comparison of dysphoria experienced by these medical students to medical students in other areas of the world, nor did they compare results from other studies to determine whether medical school is more or less stressful than, for example, law school. Therefore it is difficult to generalize the findings of the study to the general population or to future medical school students.

Chan (1991), conducted a study designed to determine the incidence of depression in Chinese medical students in Hong Kong. This study specifically aimed to identify the common depressive symptoms as assessed by the BDI, to examine the association between depression, obsessionality, and assertiveness in medical students, and compare the BDI scores of medical and non-medical students along with assessing for any gender differences on depressive symptoms.

Three-hundred-thirty-five first to fourth year medical students (239 males, 96 females) and 213 first to fourth year non-medical undergraduate students (51 males, 162 females) participated in the study. All students were between the ages of 18-29. Results showed that the BDI score distribution did not differ significantly between the two groups of students, although a greater percentage of non-medical students scored in the severe range. Since gender distribution was significantly different ($p < .001$) with male students predominating in the medical sample and female students in the non-medical sample, comparisons were made between medical and non-medical students within each gender. There were no significant differences in BDI score distribution, distribution of student severity categories and mean BDI scores separately for male and female students. In comparison to American medical

students, a comparable and possibly larger percentage of Chinese medical students scored in the depressed range as reported by Zoccolillo, et al (1986) and Clark and Zeldow (1988), although elevated scores were not specific to Chinese medical students, as Chinese undergraduates in general reported equally elevated scores. The only difference in mean BDI was the significantly higher scores of female medical students than from female non-medical students in the severely depressed category. Therefore, the findings indicate that Chinese medical students are no more vulnerable to depressed mood than Chinese non-medical students. There was some evidence that obsessiveness and non-assertiveness were associated with depressed mood among medical students to a greater degree than in the non-medical students. The findings in this study were consistent with other studies that have indicated that females in general suffer from depression to a significant degree more than males. (Russo et al, 1985; Vitaliano, 1989; Miao, 1977)

Richman and Flaherty (1985) investigated the question of whether personality and social support resources were independent or highly correlated. In addition they investigated what the relative contributions of social support resources were in protecting against depressive symptoms in beginning medical students. Medical school marks the beginning of new life stressors. Included is the experience of potential losses connected with the transition from previous educational and occupational roles to the role of medical student. Some students may experience some degree of initial uncertainty regarding one's capacity to perform effectively in a new and demanding setting. As a result, depression has been a common finding in medical students (Lloyd & Gartrell, 1984).

One-hundred-fifty-three first year students (70% male) from the University of Illinois College of Medicine were sampled during their first week of classes. Instruments assessing social supports, personality characteristics (internal-external locus of control, interpersonal dependency), and depressive symptomatology were included in the questionnaire. Social supports were measured by the Social Support Network Inventory (SSNI, Flaherty et al., 1983). Locus of control was measured by the Rottor 23-item internal-external scale (Rottor, 1966). Depression was measured by the Center for Epidemiologic Studies Depression scale (CES-D, Weissman et al., 1977). It was hypothesized that because social supports and personality resources have generally been shown to buffer the effects of stress, that social supports would be inversely related to depressed symptoms. The other assumption was that a lack of adequate internal resources would be linked with difficulties mastering the stresses related to new role demands, and therefore lead to depression. The third hypothesis was that external locus of control and interpersonal dependency would each manifest a direct relationship to depressive symptoms.

The results showed that although personality was significantly correlated with depressive symptoms, social supports played a weaker role in protecting against depressive symptoms than was hypothesized. The authors suggest that perhaps this is due to the fact that beginning medical students have not yet had time to develop support among fellow students and may not be receiving the degree of empathy they desire from current members of their social network, who are likely to be less familiar with the medical school environment. Those students best protected from depressive symptoms appeared to be those students with strong internal resources, meaning the

belief in one's capacity to shape the environment (as opposed to being controlled by it) and the capacity to function relatively autonomously (as opposed to being highly dependent on others for reassurance and esteem). The authors speculate that at a later point in medical school, when support from fellow students becomes more available, external resources may play a more significant role and perhaps compensate for a lack of strong internal resources.

In a study by Hojat, et al. (1999), 1157 medical students (743 male and 414 female) completed a set of psychosocial questionnaires measuring intensity and chronicity of loneliness, general anxiety, test anxiety, neuroticism, depression, extraversion, self-esteem, locus of control, perceptions of parents, general health, and appraisals of stressful life events. The results of the study showed that males tested higher on the intensity of loneliness, and females tested higher on general anxiety, test anxiety, and neuroticism. There was no significant gender differences observed with chronicity of loneliness, depression, extraversion, self-esteem, external locus of control, general health, or perceptions of parents. The similarities in personality traits between genders could be due to the highly selective nature of students who apply to medical school; often medical schools choose students with distinct personalities who have the ability to compete in an extremely stressful environment. In this study, stressful life events were viewed more negatively for females than for the males. It was concluded that future research would enable healthcare providers to better recognize signs and symptoms of depression among medical students, and provide intervention when and where it is appropriate.

Medical students are not the only professional students who have been studied

in reference to the incidence of anxiety and depression. Several studies have looked at law students, stress, anxiety and depression (Buick, 2000; Dammeyer, 2000; Dammeyer & Nunez, 1999; Frank, 1979; Gutierrez, 1985; Helmers, Danoff, Steinert, Leyton, & Young, 1997; Kellner, Wiggins & Pathak, 1986; McAleer, 1973; McIntosh, Keywell, Reifman & Ellsworth, 1994). Although certain personality characteristics may help students to adjust to the demands of law school, the environment definitely plays a role in the stress, anxiety and depression experienced by many (Gutierrez, 1985). Law students experience unusually high levels of stress, anxiety, and depression as a function of the nature of legal training (Buick, 2000). Psychological services, when provided, have been noted to have been used for mild depression or anxiety by law students (McAleer, 1973).

Buick (2000), conducted a study to determine the extent and manner that depression, anxiety, and psychiatric distress classification could be explained by certain demographics variables including: gender, age, ethnicity, marital status, year in law school, grade point average, full or part-time attendance, scholarship status, and employment status. Findings revealed that the majority of law students were experiencing mild depression, mild anxiety and above average distress, although the rates were not considered to be at a “clinical level.” Female law students had higher Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI) scores than male law students overall. Law students that were employed at the same time as they were in school had higher BDI scores than their non-working counterparts, and law students who had a low grade point average also scored higher on the BDI/BAI. These scores were, however, still within the normal range.

Dammeyer (2000) looked at self-reported levels of anxiety and depression among first-year law students. He hypothesized that law students would report higher levels of anxiety and depression than medical students, and that students attending law programs with high quality of life (QoL, Flanagan, 1978) ratings would report lower levels of anxiety and depression than students attending a school with low QoL ratings. Significant ($p < .001$) differences were found between law and medical students, with law students reporting greater levels of distress. No support was found for the hypothesis that law student distress is related to QoL ratings at law schools.

Dammeyer et al. (1999) reviewed the literature to evaluate anxiety and depression among law students. They found that self-reports of anxiety and depression are significantly higher among law students than among either the general population or medical students.

Another study (Helmets, et al., 1977) compared depression and stress levels of medical students, law students and graduate students at McGill University. Results showed that medical students had subjective feelings of stress that were marginally above the general population norms, but their total depression scores were below those of the general population, law students and graduate students.

A final study looking at law students and stress (McIntosh, et al., 1994) examined gender differences in first year law students' reports of stress and psychological health. Women reported greater strain and displayed more depression and physical symptoms by the end of their first year of law school.

Other than medical and law students, only a couple of additional studies were

found that looked at a relationship between graduate school in general, and incidence of stress, anxiety and depression. Goplerud (1980) reported that over half of the first and second year graduate students tested on the Social Readjustment Rating Scale (SRRS; Holmes & Masuda, 1974) reported life changes that placed them in the life crisis scale category. Factors contributing to this were changes in work, finances, living conditions, school and social relationships, which take place during the first few weeks of graduate study. Because of the substantial empirical support for links between major life changes and a long list of health and emotional disorders (Dohrenwend & Dohrenwend, 1974) graduate school marks the beginning of a period of high risk for physical and psychological problems among first year students. After freshmen, graduate students have been shown to be the most frequent users of psychiatric services in the university community (Halleck, 1966). One avenue that has been shown to help minimize the negative effects of change has been support networks during high stress transition periods. Individuals who are linked to supportive groups have been found to perform both academically and professionally better than their more socially isolated colleagues (Hall, 1969), experience less emotional and physical distress (Arnold, 1967), and suffer fewer severe physical and psychiatric illnesses than socially isolated persons (Bloom, 1975).

Goplerud looked at the effect of social interaction on 22 graduate psychology students completed the study. Students who were more socially isolated reported more stressful events, more intense events and greater cumulative stress than did socially supported subjects. The more socially isolated students also reported a greater number of emotional and health problems than the socially supported

students. Social support emerged as a major mediating variable in students' assessments of the stressfulness of events experienced during their first six months of graduate study and in the number of emotional and physical problems experienced during the same interval. Although the number of subjects in this study was small, social support appears to be a crucial variable that moderates negative consequences of the unavoidable life changes that occur during students' first year of graduate work. The author suggests that developing faculty awareness of their own critical influence on graduate students health and emotional well-being, and helping new students expand their socially supportive contacts appear to be important primary and secondary prevention strategies to reduce graduate students risk for stress-related problems.

Parker (1979) looked at sex differences in non-clinical depression of 236 graduate students. Results indicated no significant differences in depression, self-esteem, trait anxiety, neuroticism or extraversion between the sexes.

In another study (Miao, 1977), both male and female senior college students majoring in agriculture and human development showed significantly lower anxiety and depression levels when compared with male and female senior students majoring in engineering, humanities and economics. Self-perception of college achievement was significantly related to differential levels of anxiety as well as depressive reactions.

After a thorough search, no studies could be found examining physical therapy students and the incidence of distress, depression or anxiety. There was only one related study (Balogun, Helgemoe, Pellegrini & Hoerberlein, 1995) in which the

reliability of a psychometric instrument designed to measure physical therapy student burnout was assessed. Although not the purpose of the study, results indicated that senior physical therapy subjects reported lower scores on personal accomplishment (not knowing as much didactic information as they thought they would) than the junior physical therapy subjects. The authors report this finding indicates a less than expected accomplishment, is experienced by senior students during their educational training.

Summary

The literature provides evidence that graduate school training, and more specifically medical and law school training, are stress-provoking endeavors that may result in anxiety and depression. The incidence of anxiety and depression may be greater in female students possibly due both to the lack of role models and to a greater willingness to report symptoms of anxiety and depression. Professional graduate degree programs may also attract certain personality types that may be more vulnerable to feelings of anxiety and depression than the general population.

Chapter 2

Methods

Subjects

Approximately 300 physical therapy students from accredited physical therapy programs throughout the United States were recruited to participate in this study.

This number is similar to the numbers of students recruited in similar studies found in the literature. Students were selected randomly from all physical therapy programs in the United States by dividing the country geographically into the following regions: Northwest, Southwest, Northeast and Southeast. From each region, two schools were randomly selected. Each school was notified and asked to participate. All schools selected agreed to participate, so no alternative schools needed to be selected.

Outcome Measures

The Hospital Anxiety and Depression Scale (HADS) is a self-report measurement tool of depression and anxiety symptoms. It has been studied and shown to be a reliable instrument for screening clinically significant anxiety and depression. Zigmond and Snaith (1983) created the HADS to specifically assess mood for use in non-psychiatric hospital departments. The initial research was conducted in general medical outpatient clinics on over 100 adults of both genders between the ages of 16 and 65 who were being treated for a variety of complaints and illnesses. The scale was also given to clinical, secretarial and technical staff in the hospital. Data on 50 non-psychiatric patients were examined for internal consistency using Spearman correlation coefficient. For anxiety items, correlations ranged from + 0.76 to + 0.41 with a $p < 0.01$. For the depression scale, the correlations ranged

from +0.60 to -0.30 with a $p < 0.02$. Based on their ability to identify patients diagnosed with clinical depression or anxiety, scores on each of the subtests of the HADS were classified as follows: 0 to 7 were considered non-cases, 8-10 was considered doubtful, and ratings of 11-21 were considered definite cases. The reliability of this classification was then tested on the next 50 patients. To test the validity of these scores for an indication of the severity of depression and anxiety, Spearman correlations were calculated. Results were $r = 0.70$ for depression and $r = 0.74$, significant at the $P < 0.001$ level. To determine whether the anxiety and depression subscales detected different aspects of mood, patients were selected that were considered to have a distinct difference by interview assessment. When compared to subjects self-rated scores, anxiety scores had an $r = +0.54$, $P < 0.05$ and depression had an $r = +0.79$, $P < 0.01$. The authors concluded that this scale has also been shown to be a valid measure of the severity of depression and anxiety.

The HADS was used in a study (Al-Shammari, Khoja & Al-Sabaie, 1993) to compare physicians' perceptions of anxiety and depression, and patient self report of anxiety and depression on the HADS. The physicians diagnosed fewer cases of anxiety and depression than the HADS. The authors describe the HADS to be superior to physician clinical judgment for screening clinically significant anxiety and depression in many of the patients, as the incidence seen in their sample population using the HADS was close to that expected when compared to the incidence of anxiety and depression in other developing countries. Another study (Flint & Rifat, 1996) was conducted to validate the HADS as a measure of the severity of geriatric depression. The HADS Depression Scale had a high correlation (.73) to the Hamilton

Rating Scale for depression (Hamilton,1960). The HADS has been widely used since its creation in 1983 in several studies designed specifically to measure anxiety and depression. (Flint & Rifat, 1997; Geddes & Chamberlain, 1994; Herrmann, Brand-Driehorst, Buss & Rueger, 2000; Watenabe, Shiel, Asami, Taki & Tabuchi, 2000) The HADS has been translated and tested for reliability and validity in at least three languages, Chinese, German and Urdu. In a study conducted to test the validity of a Spanish version of the BDI (Suarez-Mendoza, Caballero-Urbe, Ortega-Soto & Marquez-Marin, 1997), it was found that that the BDI had a high correlation with the HADS and thus showed adequate construct validity. Results of all of these studies indicate good reliability and validity when comparing the English version to the translated version (Herrmann, Scholz & Kreuzer, 1991; Leung, Ho & Kan, 1993; Mumford, Tareen, Bajwa& Bhatti, 1991)

The HADS is a self-administered questionnaire. It has the advantage of being brief with only 7 items used to measure depression, and 7 items used to measure anxiety. The brevity of this instrument lends itself well for use in a study of this nature as it will require only 5-10 minutes of the student's time and therefore not interrupt normal class scheduling to a significant degree. Scores of 1-7 on the HADS are considered normal, 8-10 indicates borderline clinical depression/anxiety, and 11-21 indicates mild to moderate depression/anxiety.

Sampling Design and Procedure

Cluster sampling was used to sample physical therapy students in the United States. The United States was divided into four regions, Northeast, Southeast, Northwest and Southwest. From each of these regions, two physical therapy programs

were randomly selected to which the Hospital Anxiety and Depression Scale and other accompanying checklists designed to measure anxiety and depression were sent. Each school selected was telephoned and asked if they were willing to participate in the study. None of the schools selected declined to participate, so no further sampling was necessary. The goal was to survey 8 physical therapy schools and receive at least 300 responses (the total number of students enrolled all together in the eight schools was 334), at three different times during the first semester, and at least 3 different times during the 3rd semester. This translates into the first semester for students enrolled in their first year of the physical therapy program and the third semester for students in their second year of the physical therapy program. It was hope that an 80% response rate would be achieved from this same cohort of students. Three hundred students is a comparable number of subjects to similar studies performed using medical students. Packets were sent to the director of each physical therapy program and administered to first and second year students in Fall 2001, the first day of class or orientation, 1-2 weeks before midterms, and 1 week before finals. Each director was asked to make the telephone number of the on-campus psychological services available at that school in the event that participation in the study elicited a stress response.

The test administrator was sent a list of instructions on the protocol of the study (see test administrator instruction sheet). The test administrator addressed the class and asked the students to participate in the study; making it known to the students that participation was not mandatory and that they had the right to decline at any time. It was also emphasized to the subjects prior to the administration of the test that

the results of the HADS and other accompanying checklists (see appendix) were strictly confidential. Since there were minimal psychological risks involved, anyone requiring counseling services was provided with contact numbers of their on-campus psychological services. First, the students signed an informed consent form. Once the consent forms were collected, the Hospital Anxiety and Depression Scale Disclaimer (HADSD) was to be read aloud to the participating students. The disclaimer stated:

"The HADS and the other accompanying checklists are preliminary screening measures for depression and anxiety symptoms that do not replace in any way a formal psychological evaluation. They are designed to give a preliminary idea about the presence of mild to moderate depressive symptoms and anxiety that may indicate the need for an evaluation by a psychologist or psychiatrist."

After the test administrator read the HADS disclaimer to the participants, the informed consent form (ICF) was reviewed and handed to the subjects to read and sign. After all the participants signed the informed consent form, the test administrator collected this form. Following the collection of the ICF, a packet containing the HADS, the demographics questionnaire, and the newly designed anxiety/depression tool by Richard Wanlass PhD (appendix D) was provided to each subject. After all the participants received all of these items, they marked on their paper which response best described the most appropriate response for each question on the HADS and the other accompanying checklists.

After the completion of the HADS and the other accompanying checklists, the test administrator collected all of the test materials and placed the forms in a 9.5" X 12" manila envelope for eventual computation of the results. The Test Administrator was then allowed to answer any questions to further explain the study as needed, and

to provide interested students with the office phone number for Clare Lewis at California State University, Sacramento for further information.

Results

Of the 334 students who initially participated in the study, 211 students returned all 3 surveys at the designated times. Surveys from one of the schools with 12 total students were apparently lost in the mail both for the 2nd and 3rd mailings. The test administrator was contacted, and he indicated that the surveys had been sent back to the study investigator. These surveys were never received. Surveys from the second mailing from a different school with 60 total students were never received. Again the test administrator was contacted. She reported that although the surveys had been given and filled out, the school office had changed their location and address during the study period and the surveys must have been lost in the confusion. A total of 51 students from other schools did not complete one or more of the surveys after the initial mailing. This was due to absence the day the survey was administered, or decision to decline participation. One of the physical therapy schools that agreed to participate in the survey had 9 subjects who were all members of the first year class. The second year class from the same school opted to not participate in the study from the very start. No reason was given for their lack of participation.

Demographic Information

Background demographic information was obtained at the initial mailing of surveys. The following demographic information was asked for: participant's sex, age, marital status and if not married whether they had a significant other. Subjects were also asked if they had a history of depression or if they had a family member with a history of depression. Subjects were asked for the marital status of their parents, the distance that they commuted to school, and they were asked to indicate if

they were employed while they were attending classes. Approximately 28% of the subjects were male, and 69% were female. The average age was 24, with a range of 20 to 49. Approximately 75% of the subjects were married and of those that were not married, approximately 43% reported having a significant other. Only 16% reported living with their parents or family of origin. About 38% reported working while they were attending school. The number of subjects in their first year of physical therapy school versus the number in their second year of school was fairly evenly divided. The majority of students lived with a roommate (46%), the next most common living arrangement was with a spouse (20%). Ten percent of the subjects lived with a significant other, two percent lived with family and 19% lived alone. Approximately five percent of the subjects reported a personal history of depression while incidence of family depression was reported at 26%. Subjects were asked the marital status of their parents. The majority (66%) reported that their parents were still together, 17% reported that their parents were divorced, six percent indicated that their parents were remarried and the remainder fell into the “other” category. The final piece of demographic information asked was commute distance to school. The majority of students indicated that they did commute to school (67%) The range was 1 to 120 miles with 17 ½ miles the average commute. The following table gives the various mileages that the students commuted:

Table 1 Commute Distance

HOWFAR

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	.3	.4	.4
	1	9	2.7	4.0	4.5
	2	2	.6	.9	5.4
	2	14	4.2	6.3	11.6
	3	13	3.9	5.8	17.4
	4	8	2.4	3.6	21.0
	5	26	7.8	11.6	32.6
	6	5	1.5	2.2	34.8
	7	5	1.5	2.2	37.1
	8	5	1.5	2.2	39.3
	9	3	.9	1.3	40.6
	10	22	6.6	9.8	50.4
	12	3	.9	1.3	51.8
	13	1	.3	.4	52.2
	15	15	4.5	6.7	58.9
	16	1	.3	.4	59.4
	17	3	.9	1.3	60.7
	20	21	6.3	9.4	70.1
	22	1	.3	.4	70.5
	24	1	.3	.4	71.0
	25	8	2.4	3.6	74.6
	26	1	.3	.4	75.0
	27	1	.3	.4	75.4
	28	1	.3	.4	75.9
	30	18	5.4	8.0	83.9
	32	4	1.2	1.8	85.7
	33	1	.3	.4	86.2
	34	1	.3	.4	86.6
	35	6	1.8	2.7	89.3
	40	8	2.4	3.6	92.9
	44	1	.3	.4	93.3
	45	6	1.8	2.7	96.0
	56	1	.3	.4	96.4
	60	3	.9	1.3	97.8
	62	1	.3	.4	98.2
	70	1	.3	.4	98.7
	75	1	.3	.4	99.1
	86	1	.3	.4	99.6
	120	1	.3	.4	100.0
	Total	224	67.1	100.0	
Missing	System	110	32.9		
Total		334	100.0		

Treatment of the Data

A Multivariate Analysis of Variance was calculated on the data to make comparisons of the groups over 3 intervals of time. Descriptive statistics for the HADS divided up by category (anxiety first then depression) are the following:

Table 2 HAD Anxiety Scores, Time 1 2 3 by Sex

Descriptive Statistics				
	SEX	Mean	Std. Deviation	N
HAD1A	male	6.27	3.349	56
	female	8.22	3.346	163
	Total	7.72	3.447	219
HAD2A	male	6.6071	4.00308	56
	female	9.0736	3.74093	163
	Total	8.4429	3.95040	219
HAD3A	male	6.2500	4.11759	56
	female	9.3804	4.07372	163
	Total	8.5799	4.29922	219

Results of Analysis

A clinically significant level of anxiety was not reported at any of the three survey times. An examination of figure 1 reveals that a significant difference between sexes was seen with anxiety. $F(1,217) = 5.012, p < .05, \eta^2 = .023$ Figure 1 also reveals that anxiety scores did increase over time from when the first survey was taken at the beginning of the school semester (time 1) to when it was taken a second time at midterms (time 2), and a final occasion at the time final exams were given (time 3): the pattern was essentially the same between the sexes.

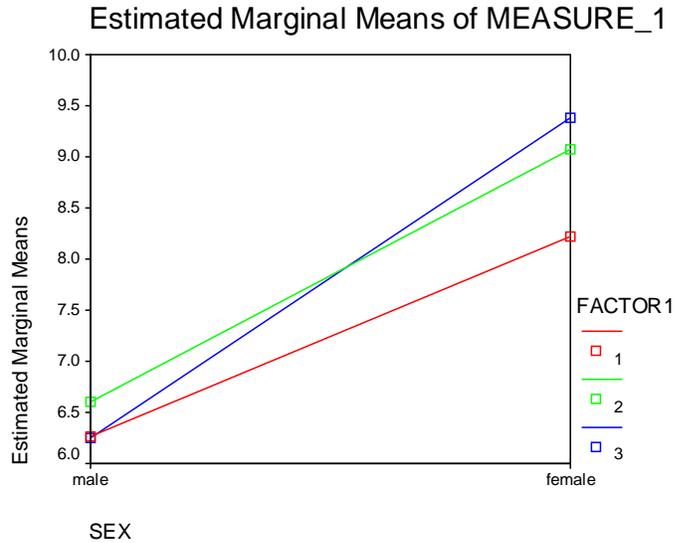


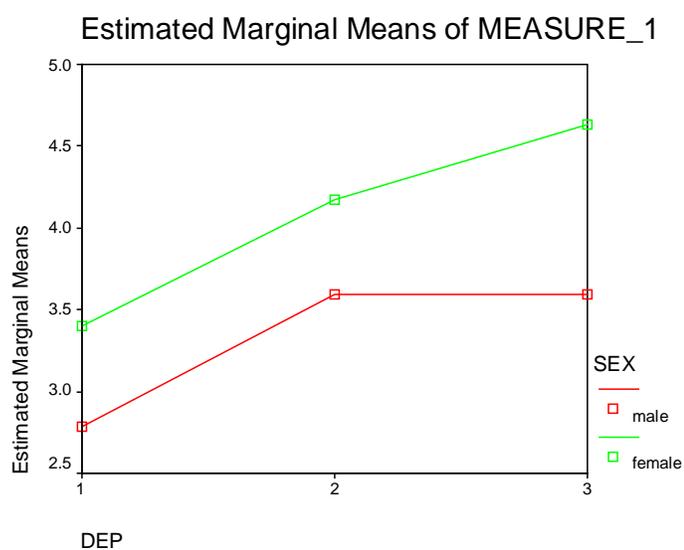
Figure 1 HAD anxiety scores time 1 2 3

Additional examination of figure one reveals that female subjects differed slightly from male subjects in that they showed a slight but insignificant increase at the time of final exams which was not seen with male subjects.

As with anxiety, the scores for depression were not at a clinically significant level at any of the three survey times. Depression scores were overall lower than anxiety scores as can be seen on examination of Table 3. A significant difference between sexes was not seen with depression. $F(1,213) = .867, p > .05, \eta^2 = .004$

Table 3 HAD Depression Scores Time 1 2 3 by Sex

Descriptive Statistics				
	SEX	Mean	Std. Deviation	N
HAD1D	male	2.79	2.302	56
	female	3.40	2.728	159
	Total	3.24	2.633	215
HAD2D	male	3.5893	3.19532	56
	female	4.1761	3.10274	159
	Total	4.0233	3.13026	215
HAD3D	male	3.5893	3.47341	56
	female	4.6289	3.52128	159
	Total	4.3581	3.53052	215

**Figure 2 HAD depression scores time 1 2 3**

Examination of Figure 2 reveals that HADS scores for depression did increase overall from time one to time two in both males and females. However, depression scores flattened out in male subjects from time two to time three. This was not the

case in the female subjects as there was a slight (but insignificant) continued increase from time two to time three.

Analysis was conducted to determine if there was a difference in HADS scores between students in their first year of physical therapy school and students in their second year of physical therapy school. Examination of figures 3 and 4 reveals that there was not a significant difference seen between anxiety and depression scores for first and second year students, although overall scores were higher in first year students for both anxiety and depression. $F(1,217) = .736, p > .05, \eta^2 = .003$ anxiety, $F(1,213) = .056, p > .05, \eta^2 = .000$ depression

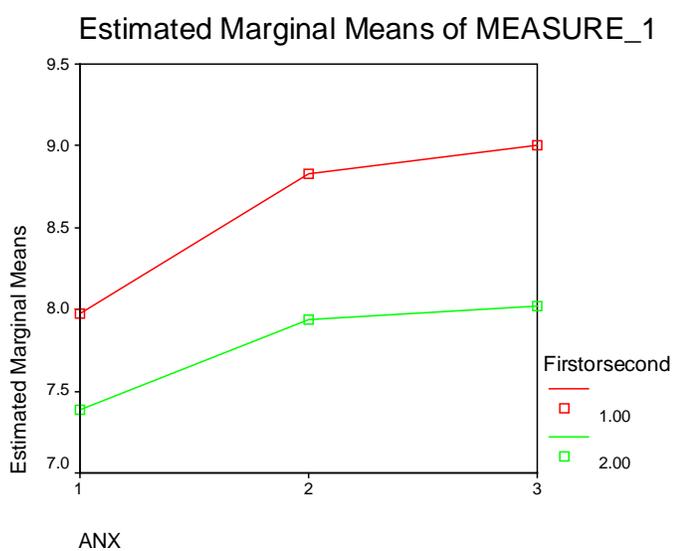


Figure 3 Anxiety 1st year versus 2nd year students

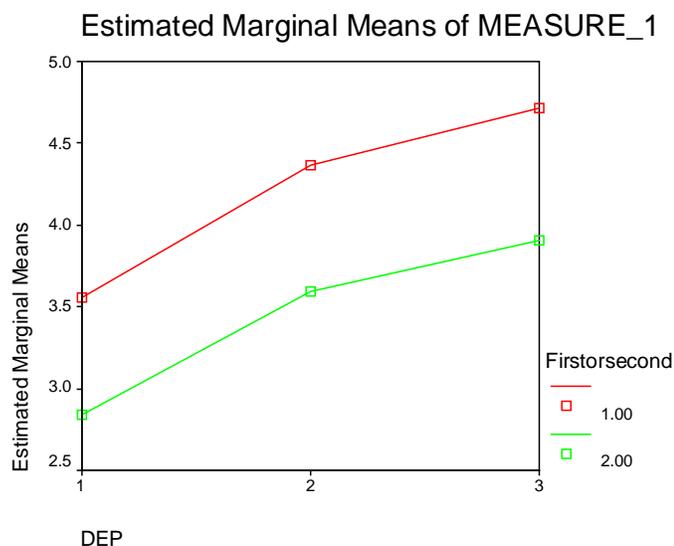


Figure 4 Depression 1st year versus 2nd year students

Analysis was next done to determine if support (being married or having a significant other) had an impact on anxiety or depression. No effect was seen on anxiety or depression for support or lack of support. $F(1,216) = .005, p > .05, \eta^2 = .002$ anxiety, $F(1,212) = .148, p > .05, \eta^2 = .003$ depression

The last comparison made was the relationship between state of residence and anxiety and depression. A positive effect was seen for anxiety and depression by state of residence. $F(5,213) = 3.933, p > .05, \eta^2 = .085$ Overall, there was not an increase in HADS scores over time for depression, however there was a general increase in HADS scores over time for anxiety. Anxiety scores went up or stayed flat from time one to time two for all states except South Dakota which actually had a

drop at time two. From time two to time three, Florida and Kentucky had a decrease in anxiety levels. Maine had significantly greater values than any of the other states for anxiety at all three times that the survey was administered (Figure 5).

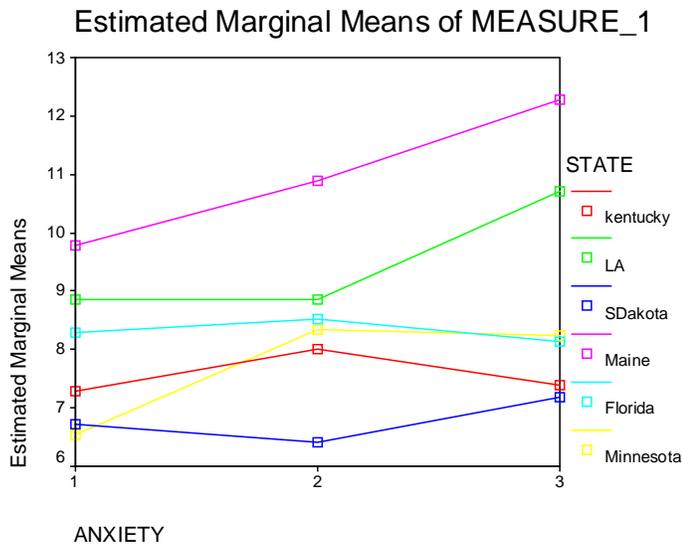


Figure 5 anxiety scores by state

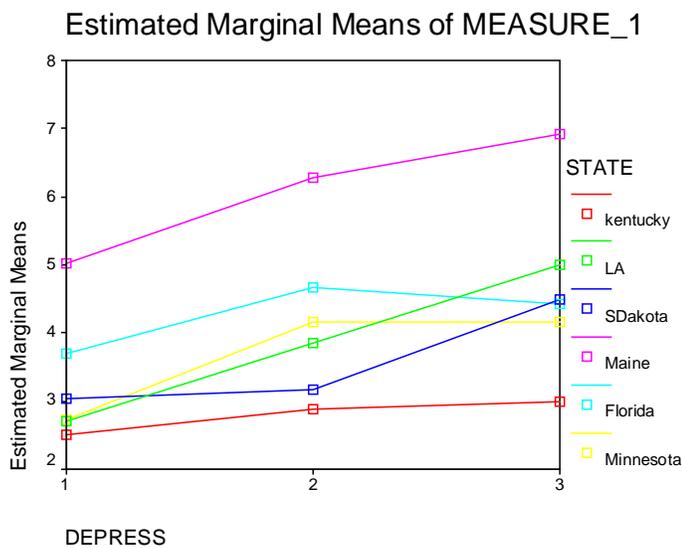


Figure 6 depression scores by state

Examination of Figure 6 reveals that depression scores by state were similar to anxiety scores. All states showed an increase in HADS scores for depression from time one to time two, although very slight for South Dakota. From time two to time three, Florida showed a slight but insignificant drop in depression scores. Again, Maine showed a higher incidence of depression scores at all three times that the survey was administered (Figure 6).

CHAPTER 4

Discussion

Depression is a major cause of psychological illness in the United States. Some consider that a major contributor to depression is high levels of stress, such as that experienced by students enrolled in professional academic programs like medical and law school. However, clinical depression was not seen in the mean scores in the subject group of physical therapy students. Symptoms of burnout have been reported in physical therapy students due to the high level of stress inherent in the academic rigor of the program (DiGiacomo & Adamson, 2001), and it was expected that anxiety and depression levels similar to what has been reported in medical and law students would be found, but this was not the case. Although physical therapy school is considered very stressful by the students enrolled and rigorous by the instructors and the accrediting agencies, perhaps the intensity of study demands is not so great as that for medical and law students. Part of this may be due to the length of the program. Physical therapy is essentially 2 years of didactic study, whereas medical school is 4 years and law school is 3 years full time or 4 years part time. Perhaps PT school is more tolerable for the students enrolled because they know they are finished in only two years, and the time goes by quickly. One to two extra years could make up part of the difference found between these groups of students. Another consideration is the environment of medical and law school compared to PT school. Physical therapy programs are generally very nurturing toward their students. The work environment of the physical therapist is generally not stressful, and the environment encourages nurturing and kindness towards the patients with whom the

physical therapist interacts. Once a student is accepted by the program, the school will do as much as it can to help ensure that their students graduate.

As a contrast to this, medical school must prepare their students for life and death situations on a daily basis. As an MD, these students will be responsible for telling their patient that they have terminal cancer, for example. Another source of stress would be the extraordinary hours expected to be put in during their early residency.

Law school is inherently adversarial in nature. This can be seen as a function of the use of the Socratic method of learning that is prevalent in American law schools, combined with the need to prepare law students for a career that regularly involves both verbal and written conflict. Some schools make only nominal efforts to help their students stay in law school once they are accepted, resulting in a sense of isolation in some students, further heightening levels of stress.

Another consideration for the difference seen in this group of subjects compared to previous studies looking at medical and law students is the measurement tool used to assess anxiety and depression. The HADS has not been previously been used to analyze anxiety and depression in studies conducted with medical and law students. Although the HADS has been shown to be a reliable and valid measurement for anxiety and depression, the difference in outcome seen in this study compared to other studies on the incidence of anxiety and depression in professional students, could be related to the different measurement tool.

Previous studies looking at the incidence of anxiety and depression in medical and law students have shown a higher incidence in females over males. This trend

was also seen in the current study, however as mentioned above, clinical levels of anxiety and depression did not exist in the mean scores of the study sample as a whole. The higher scores reported by females may be due to a greater willingness to report anxiety and depression by females. Females may also perceive physical therapy school as more stressful than males. In addition to the stresses inherent in attending school, females often have the primary responsibility for caretaking of family and home while married men or men living with a significant other often are given the flexibility they need to focus all their time and attention to the demands of school. Overall, there was a significant relationship between gender and time of the semester on anxiety results. Females had greater anxiety scores overall after administration of the first survey which coincided with mid-term exams, although male students' scores also increased after the administration of the first survey. The overall pattern of anxiety did not differ over time between males and females. Both males and females reported increased HADS scores over time conceivably due to the increase levels of stress perceived by them with the additional demands and worry of doing well on exams. Again it must be emphasized that despite these trends, the actual mean scores for both males and females were below what is considered clinically significant anxiety.

Another variable that has often been measured in previous studies looking at the incidence of anxiety and depression in medical and law students is the contribution of a support system. Students with a support network have fared better than those without. In this study of physical therapy students, having support or lack of support did not make a difference on levels of anxiety or depression. A difference

between physical therapy school and medical and law school is that once students are accepted into physical therapy school, based on personal years of personal observation, the students are no longer in competition with each other, and in fact students develop a strong camaraderie. This is often not the case in medical and law school where competition continues and relationships may remain adversarial. In physical therapy school, students often form strong relationships with classmates that include studying together and socializing together. Student relationships often become primary relationships over family, spouse or friends. These strong bonds formed between students may override other relationships and replace the need for outside relationships. Student relationships could therefore provide the support that would otherwise be provided by a spouse or significant other. This may be the reason that there was not a difference seen in the scores of subjects with or without a spouse or significant other.

One interesting finding was the significant difference seen by state. Overall the state of Maine had significantly higher levels of anxiety and depression than the other states in the study. It is difficult to explain this finding; although this was the only northeast state that participated in the study. Perhaps the proximity of Maine to New York and the events of September 11, 2001, had a more profound affect on those students living there. Although Florida is also on the East Coast, these students may have felt more removed from the tragedy in New York than the students in Maine. If one were to look at what has been reported in the popular media, this would appear to be true as people who live on the East Coast apparently have reported continued anxiety about day to day life than those who live in the Midwest or West Coast.

Another factor could be the weather. It is well known that residents of more northern geographic locations tend to suffer from seasonal affective disorder which results in depression. The study began in the Fall of 2001, but by midterms, winter was well underway, and by finals winter was in full swing. This information doesn't completely explain what was seen in Maine, however, as some of the subjects lived in Minnesota which is known for severe winters, and another group of students lived in Idaho, which also has a cold climate. Perhaps the combination of harsh weather and the geographic proximity of the New York City disaster created more anxiety and depression on the residents of Maine. Although first year students had higher overall scores than students enrolled in their second year of school, the difference was not significant, and scores were not clinically significant. First year students most likely had higher scores due to increased stress levels, compared to second year students as they had no prior experience of what to expect at midterm and final exam times. Second year students had already been through the testing process at least once and had more knowledge of what to expect and, therefore, less anticipatory stress.

Other demographic information obtained did not elicit any further pertinent information. Whether students lived with family, spouse, significant other, roommate or alone, whether they were working or not, whether they commuted or not and whether they or a family member had a history of depression had no bearing on outcomes. As a whole, this sample of physical therapy students did not suffer from clinically significant anxiety or depression.

Implications for Further Study

Since the results of this study were so different from what was expected, a study

duplicating what was done could be repeated with a different group of physical therapy students at some point in the future to establish a larger data set of results. Not only was there no overall reported clinical anxiety or depression, but other variables such as support did not correlate anxiety and depression level in this group of students as they have in studies of medical and law students.

Repeating this study could also be done using a measurement tool other than the HADS to determine incidence of anxiety and depression. Many different measurement tools have been used (for example, Beck's anxiety and depression inventories) in other studies looking at incidence of anxiety and depression in medical and law students. Using the same types of measurement tools that have been used in previous studies of medical and law students would keep the methods more in line with these previous studies.

The time frame of this study may have impacted the results as well. Perhaps these students felt that the catastrophic nature of events in the outside world during the study period made their concerns and worries seem trivial, and they may have underreported their scores. The group of physical therapy students that I teach had a similar experience. After the 9-11 disaster, I went back to class and asked the students if they were doing okay with what had just happened the day before, and would they like to spend some time discussing it. No one seemed at all upset and not one student had anything to say. Maybe they were all in shock, but none of them took me up on my offer to come talk to me in my office if they needed to discuss 9-11. Another consideration is, perhaps these students are "out of touch" with their feelings and/or reluctant to disclose their feelings.

Confounding Variables

The surveys were administered initially at the beginning of September 2001 for most of the subjects. However, one school conducted the survey September 13, 2001 and another conducted the first survey September 20, 2001 (Maine and Idaho). The relevance of this has to do with the national tragedy that occurred in our country September 11, 2001. The impact of this disaster could have a confounding affect on the results of the survey. This was apparently not the case, as anxiety and depression were never at a clinically significant level, and the trend that was seen over time appeared to do more with exams than the attack on New York City. Only one student appeared to be overtly affected by 9-11, as she wrote an unsolicited comment on her survey, questioning whether her response was being affected by what happened on September 11. When investigating her scores, however, her scores before September 11 and after September 11 were the same.

Another possible confounder was the use of the HADS. As previously mentioned the HADS has not been used in studies looking specifically at the incidence of anxiety and depression in medical and law students. Although the HADS has been determined to be a reliable and valid measure for anxiety and depression, the fact that it is a different tool than previously used in other studies could have affected study outcomes.

Conclusions and Recommendations

Clinical levels of anxiety and depression were not seen in this sample of physical therapy students when looked at as a whole. The initial hypothesis that the

incidence of anxiety and depression in physical therapy students would be similar to that seen in medical and law students was not supported in the current study sample. In addition, having an outside support system appeared to have no effect on the level of anxiety or depression that these students experienced. This result is contrary to what has been reported in medical and law students. When looking at anxiety and depression levels by state, a significant difference was seen between the state of Maine and all the other states surveyed, although mean anxiety and depression scores in Maine were not clinically significant.

Although this study indicates that physical therapy students as a whole don't suffer from anxiety and depression, it is still important for faculty to be able to recognize the signs of anxiety and depression in their students because anxiety and depression can still occur in physical therapy students. Many university students including physical therapy students utilize campus psychological services (which are fortunately provided at most universities). Despite this, many faculty have probably had a student who has attempted or committed suicide. This fact gives credence to the warning for all faculty to be mindful of their students behaviors and emotions.

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APPENDICES

Appendix A

Hospital Anxiety and Depression Scale

Appendix C
Instructions for Administration of the Survey

Appendix D
Depression and Anxiety Tool designed by Richard Wanlass PhD

Appendix E
Consent to Participate as a Research Subject Form

Appendix F
Approval from the Committee for use of Human Subjects

