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Physical therapy students' perceived levels and sources of stress during clinical education experiences

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Abstract

***Purpose*:** Stress has been linked to poor performance and mental health disorders in health professions students. Very little is known about health professions students' stress during clinical education. The purpose of this study was to explore the levels and sources of stress experienced by Doctor of Physical Therapy (DPT) students during the clinical education portion of their curriculum.
***Methods*:** In this cross-sectional, descriptive study, 925 first-, second-, and third-year DPT students from eight Midwestern colleges and universities were invited to complete an electronic survey during a clinical experience. The survey included demographic information, the 10-item Perceived Stress Scale (PSS), and the Undergraduate Sources of Stress (USOS) scale.
***Results*:** The response rate was 28% with a total of 259 returned surveys. The mean PSS score was 14.15 out of a possible 40, with a range from 0 to 30. There were significant differences in levels of stress based on program year and clinical level. No significant differences in level or sources of stress were noted based on gender or clinical setting. Academic sources were the greatest source of stress reported. Amount of student debt and percentage of responsibility for graduate education were significantly correlated with financial sources of stress.
***Conclusion*:** Participants in this study reported mean PSS scores during clinical education experiences similar to those previously reported for physical therapy. Identifying perceived stress levels, sources of stress, and mitigating factors has the potential to improve the health of students and positively impact patient care.
MeSH terms: *students*; *health occupations*; *stress*; *psychological*; *financial stress*

Keywords: *physical therapy students*; *stress levels*; *sources of stress*; *clinical education*

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While stress can have positive effects, such as improving focus and cognitive performance,[1] high levels of stress and chronic stress may lead to negative health consequences such as mental health disorders and cardiovascular disease.[2] Stress in health professions students has been correlated with poor academic and clinical performance,[3–5] poor mental health,[5] and lower quality patient care.[6]

Research suggests that students in some health professions programs experience levels of stress that are higher than those reported for the general population. The Perceived Stress Scale (PSS) is used to measure stress on a scale of 0 to 40 with higher scores indicating higher levels of perceived stress.[7] In a study of 589 students in California, the mean PSS scores among pharmacy, medical, and physician assistant students ranged from 21.9 to 22.3[8] compared to the mean PSS scores of 16.78 and 17.46 among adults in the general population between the ages of 18 to 25 and 25 to 34, respectively.[7] Two studies examining stress in physical therapist (PT) students revealed mean PSS scores that were lower than other health professions students and age-matched norms.[9,10]

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Specifically, in a study of 545 PT students at eight universities in the Midwestern United States, the mean PSS score was 15.69.[9] In a second study of 163 PT students at one university in the United States, the mean PSS scores were between 11.0 and 16.0 depending on year in program.[10] While the mean PSS scores were not as high as other health professions students, the range of scores, 0 to 34[9] and 2 to 35,[10] revealed that some PT students are experiencing higher levels of stress when compared to their peers. Other studies have used the Depression, Anxiety, and Stress Scale to measure stress in PT students and produced variable results with the incidence of moderate or severe stress ranging from 16 to 40.5% across studies.[5,11–13]

Studies examining the levels of stress experienced by health professions students, and PT students in particular, during clinical education experiences (CEEs) are limited. In a study of medical students, moderately high PSS scores were reported throughout the curriculum with no significant difference between pre-clinical and clinical phases.[14] Undergraduate PT students in Palestine[15] and South Africa[16] described high levels of perceived stress during clinical practice. One known study exploring stress levels among graduate-level PT students in the United States during CEEs found that 75% of students reported moderate, high, or very high stress levels.[17]

Evidence suggests that stress levels vary based on certain demographics, though findings are inconsistent. In a study of 545 PT students, females reported a statistically significantly higher mean PSS score of 16.66 compared to a mean score of 13.88 among males.[9] When examining the relationship between stress levels and year of study in PT students, the findings are variable. Some studies identified no difference in measures of stress based on the year in program,[9,13,18] while others reported higher levels of stress at the beginning or end of the program.[11,18]

PT students reported experiencing various sources of stress. Sources of stress included academic,[9,13,19] financial,[9,19,20] and personal stressors.[9,19,21] In a study by Dutton and Anderson,[9] PT students identified academics as the greatest source of stress. The sources of stress experienced by PT students in the clinical education setting are less well researched and have been primarily explored among PT students outside of the United States. PT students in South Africa, Palestine, and Australia reported stress related to patients, interactions with personnel, and academics.[15,16,22] In one known study conducted in the United States during clinical education, PT students reported stress caused by lack of sufficient orientation, difficult relationships with clinical instructors, and cognitive dissonance between the classroom and clinical setting.[17]

Very little research exists exploring PT student stress during CEEs. The research that does exist suggests that some PT students are experiencing higher levels of stress compared to their peers.[5,9–13] Gaining an increased understanding of the levels and sources of stress experienced by PT students is critical given the potential negative consequences of high and chronic stress on student well-being,[2,5] performance,[3–5] and patient care.[6] Furthermore, it is especially important to understand student stress during CEEs because of the critical role the clinical education setting plays in students' growth as professionals. It is in this environment that students have the opportunity to experience real-life work stressors and develop stress management skills to prepare them for professional practice. A better understanding of the levels and sources of stress that PT students experience while engaged in clinical learning will help inform clinical education curricula and guide decisions related to the potential need for and focus of student interventions. Therefore, the purpose of this study was to identify the levels and sources of stress reported by DPT students in the United States during the clinical education portion of their curriculum. The following questions were addressed:

1. What levels and sources of stress are reported by DPT students during CEEs?
2. Are there differences in levels and sources of stress based on academic program, clinical setting, clinical level, gender, age, and student debt?

Methods

This was a cross-sectional descriptive research study that utilized a survey instrument to investigate levels and sources of stress reported by PT students while engaged in full-time clinical experiences. Eligible participants included 925 first-, second-, and third-year Doctor of Physical Therapy (DPT) students from eight Midwestern colleges and universities.

Instrumentation

The survey instrument consisted of demographic questions, the 10-item PSS,[23] and the Undergraduate Sources of Stress Questionnaire (USOS).[24] The demographic portion of the survey included questions about the participant's year in school, age, gender identification, current clinical experience (e.g., length, expectations, sequence, setting), relationship status, work, finances, and living situation. Beginning clinical experiences were defined as the student's first full-time clinical experience and terminal clinical experiences included those that occurred after all didactic coursework was completed. Intermediate clinical experiences were those experiences completed between beginning and terminal experiences.

The PSS measures the degree to which an individual considers their current life circumstances to be stressful by assessing the underlying constructs of perceived helplessness and self-efficacy. The version used in this study consists of 10 questions for which respondents rate their feelings and thoughts in the last month on a 5-point Likert scale ranging

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from "0 = Never" to "5 = Very Often." Sample PSS questions include items such as, "In the last month, how often have you felt that you were unable to control the important things in your life" and "In the last month, how often have you felt nervous and 'stressed'?" The total score on this scale ranges from 0 to 40 with higher scores indicating higher levels of perceived stress. The PSS has been found to be valid and reliable across a variety of populations.[23,25]

The USOS is an 18-item instrument designed to measure the extent to which different factors have served as sources of stress. Items are rated on a 5-point Likert scale ranging from "0 = not at all" to "4 = a great deal." Sample items include questions about personal finances, health, transportation, relationships, and course work. These items comprise three subscales: academic demands, personal issues, and financial issues. The USOS demonstrated moderate to good reliability and moderate to good internal consistency for each subscale with alpha coefficients for graduate students of 0.85, 0.79, and 0.80, respectively.[24] At the end of the survey, respondents were also asked to list any other sources of stress they experienced that were not included in the USOS.

Procedure

Eight DPT programs that participated in an earlier study exploring stress during the didactic curriculum[9] were invited, and they agreed to participate in this study. These programs were located in the upper Midwest and were housed in two public and six private institutions with cohort sizes ranging from 24 to 52. The St. Catherine University Institutional Review Board approved the study and, when required, the review boards at participating institutions also provided approval prior to study initiation.

The Director of Clinical Education at participating institutions received an email with a brief description of the study, informed consent information, and a direct link to the survey. They were asked to forward these materials to students between the second and fourth week of the students' clinical experience. Surveys were sent and completed electronically between January and September 2018.

Data analysis

Data were downloaded from Qualtrics (Qualtrics, Provo, UT) into SPSS Version 24.0 (IBM Corp, Armonk, NY) for analysis.

Descriptive statistics were used to assess the characteristics of respondents and their reported levels and sources of stress as measured by the PSS and USOS. Skewness and Kurtosis z-scores for the PSS and USOS scales were examined for normality. An absolute z-value of < 3.29 was used to determine whether the sample differed significantly from normal.[26] After confirming the relative normality of the dependent variable distribution, differences in PSS and USOS scores by program, program year, clinical setting, and clinical level were assessed using one-way ANOVAs with a Tukey's post-hoc test.[27,28] Spearman's correlation coefficients were used to explore relationships between student demographics and reported levels and sources of stress. An alpha level of 0.05 was set for all statistical tests. Responses to the open-ended question were summarized.

Results

Of the 925 PT students eligible to participate in this study, 259 surveys were returned for a response rate of 28%; 73% of the respondents were identified as female and 93.4% of the respondents were between the ages of 20 and 29 years. They attended PT programs at two public (n = 38) and six private institutions (n = 221). The majority (60.2%) were in the third year of their DPT program, and 74.9% described the supervisory model for their clinical experience as one clinical instructor assigned to one student. Slightly less than half were working (45.3%) and over a third (35.5%) reported student debt equal to or greater than $90,000. Within the clinical education sequence, the number of clinical experience ranged from first to sixth and about half (50.2%) were in an outpatient orthopedic setting with a variety of other setting types represented. Complete demographic information is provided in Table 1.

Levels of stress

The mean stress level for these respondents, as measured by the PSS, was 14.15 (SD = 5.98) with a range from 0 to 30. Stress levels were significantly different by program year [F (2, 250) = 4.668, P = 0.01] with third-year students reporting significantly higher stress levels than second-year students (mean difference = 2.46, standard error [SE] = 0.853, P = 0.012). There were also significant differences reported in the stress levels between beginning and terminal clinicals and intermediate and terminal clinicals [F(2, 246) = 7.73, $P < 0.001$] with students engaged in terminal clinicals reporting higher levels of stress (Fig. 1). No significant differences in levels of stress were identified based on age, gender, clinical setting, supervisory model, or university.

Sources of stress

The greatest source of stress for students during their clinical experiences was academic (mean 1.52, SD = 0.84) followed by financial (mean 1.449, SD = 0.79) and personal (mean 1.485, SD = 0.74) sources. Financial sources of stress were positively correlated with student debt (r = 0.26, P = 0.000) and reported level of responsibility for graduate education (r = 0.24, P = 0.000). A correlation table is provided in Table 2. There were also significant differences in reported financial sources of stress based on the academic program attended, F(7, 254) = 2.91, P = 0.006. Specifically,

Table 1. Demographic data of respondents (n = 259)

Characteristic	Count (%)
Age in years	
20–24	129 (49.8)
25–29	113 (43.6)
20–35	12 (4.6)
>35	5 (1.9)
Gender identity	
Female	189 (73.0)
Male	69 (26.6)
Transgender	1 (0.4)
Year in school	
1st	33 (12.7)
2nd	70 (27.0)
3rd	156 (60.2)
Clinical experience	
1st full-time clinical experience	63 (24.4)
2nd full-time clinical experience	82 (31.8)
3rd full-time clinical experience	18 (7.0)
4th full-time clinical experience	59 (22.9)
5th full-time clinical experience	33 (12.8)
6th full-time clinical experience	3 (1.2)
Primary setting type of current clinical experience	
Acute Care	37 (14.3)
Outpatient Orthopedics	130 (50.2)
Outpatient Neurorehabilitation	16 (6.2)
Inpatient Rehabilitation (Subacute or Acute Rehab)	36 (13.9)
Home Care	4 (1.6)
Pediatrics	14 (5.4)
Other (most commonly described as general practice or mixed setting)	21 (8.1)
Supervisory model of current clinical experience	
1 clinical instructor to 1 student	194 (74.9)
1 clinical instructor to 2 students	20 (7.7)
1 clinical instructor to 3 or more students	2 (0.8)
2 clinical instructors to 1 student	36 (13.9)
Other	7 (2.7)
University (private/public and basic Carnegie classification)	
A: Private not-for-profit; doctoral/professional universities	34 (13.1)
B: Private not-for-profit; master's colleges & university: Larger programs	23 (8.9)
C: Private not-for-profit; special focus four-year: Research institution	34 (13.1)
D: Private not-for-profit; doctoral/professional universities	57 (22.0)
E: Private not-for-profit; master's colleges & universities: Small programs	36 (13.9)
F: Private not-for-profit; doctoral/professional universities	37 (14.3)
G: Public; special focus four-year: Research institution	30 (11.6)
H: Public; doctoral universities: High research activity	8 (3.1)
Clinical Level	
Beginning	63 (24.7)
Intermediate	99 (38.8)
Terminal	93 (36.5)
Hours of work per week	
0	117 (45.3)
< 5	35 (13.6)
5–10	30 (11.6)
11–15	13 (5.0)
>15	63 (24.4)
Portion of graduate education financially responsible for	
0%	16 (6.2)
1–25%	16 (6.2)
26–50%	10 (3.9)
51–75%	18 (6.9)
76–100%	199 (76.8)
Amount owed in student loans	
<15,000	35 (13.5)
$15,000–30,000	20 (7.7)
$30,000–60,000	42 (16.2)
$60,000–90,000	70 (27.0)
>$90,000	92 (35.5)

Tukey's post-hoc testing identified differences between University C and both University E (mean difference = -0.608, standard error = 0.187, P = 0.029) and University F (mean difference = -0.607, standard error = 0.187, P = 0.028) (Fig. 2). No significant differences in sources of stress were identified based on clinical setting.

The open-ended question about sources of stress not included in the USOS yielded two additional categories. The first included items related specifically to the CEEs. Examples of statements in this category included several comments related to the relationship with the clinical instructor (7/19 comments; 36.8%) and living away from home (6/19 comments; 31.6%). The second category was related to preparing for the future, and the vast majority of these comments were connected to studying for the National Physical Therapy Exam (NPTE) (24/38 comments; 63.2%) and securing a job or residency position (12/38; 31.57%).

Discussion

The purpose of this cross-sectional descriptive research study was to explore the levels and sources of stress reported by DPT students during their CEE. The mean level of perceived stress (PSS = 14.15) reported by students in this study was lower than the mean scores reported for pharmacy (PSS = 21.9), medical (PSS = 22.2), and physician assistant (PSS = 22.3) students.[8] The levels of stress reported by students in this study were similar to a cross-sectional sample of DPT students surveyed at multiple time points spanning from orientation (PSS = 13.5) to graduation (PSS = 16)[10] and those

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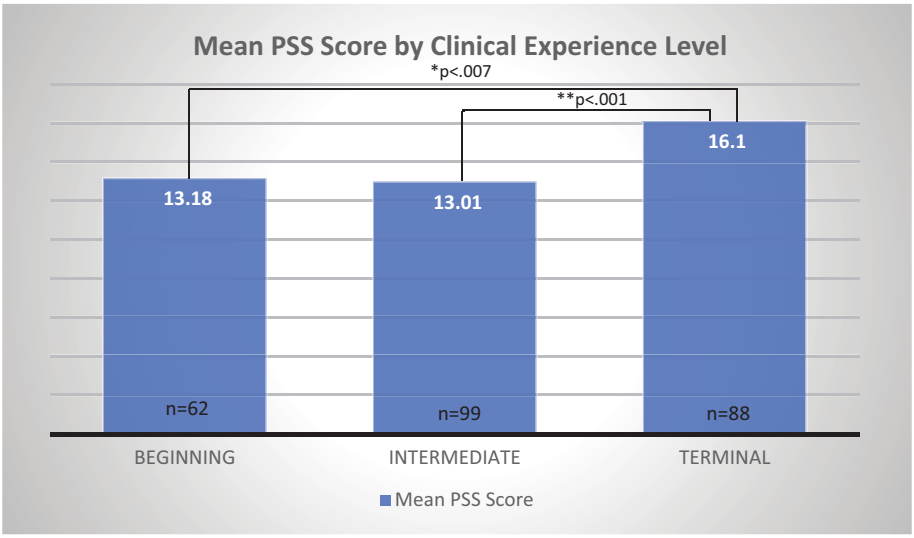

Fig. 1. Stress level by clinical experience level (n = 259).

*Tukey's post-hoc testing, mean difference = 2.92, SE = 0.963, P = 0.007.
**Tukey's post-hoc testing, mean difference = 3.09, SE = 0.852, P < 0.001.

Table 2. Correlations (n = 259)

	Age	Hours worked per week	Portion of graduate education financially responsible for	Owed in student loans	USOS Personal	USOS Financial
Age	1.000					
Hours worked per week	-0.051	1.000				
Portion of graduate education financially responsible for	0.085	0.107	1.000			
Owed in student loans	0.152*	-0.097	0.465**	1.000		
USOS personal	0.158*	0.033	0.000	0.008	1.000	
USOS financial	0.007	0.079	0.234**	0.259**	0.381**	1.000

*P < 0.05.
**P < 0.01.
USOS, Undergraduate Sources of Stress.

described by DPT students during the didactic portion of their curriculum (PSS = 15.69).[9] These findings are also similar to the steady stress levels during pre-clinical and clinical phases reported by medical students.[14] PSS scores in this sample ranged from 0 to 30, which was similar to the wide range of scores reported by DPT students previously,[9,10] indicating that some students are experiencing high levels of stress in the clinical education setting. Some studies have identified higher perceived stress levels in women when compared to men.[9] This was not the case in this study with no significant differences identified between reported stress levels based on age or gender.

Studies exploring stress level by program year have yielded mixed results with some reporting no differences by year, some reporting higher levels in the first year, and others reporting higher levels in the third year.[9–11,13,18] The findings of this study revealed a statistically significant difference based on year, with third-year students reporting higher levels of stress than second-year students. Similarly, stress levels were significantly higher during terminal clinical experiences compared to both beginning and intermediate clinicals. This may be due to the increased performance standards for terminal clinical experiences with students expected to function at entry level. This is supported, in part, by the finding in this study that the greatest source of stress for students during their clinical experience was academic. In addition, stress may be higher during terminal clinical experiences because students are coping with the reality that they will soon be practicing as new professionals without the guidance and support of their clinical instructor. Finally, students engaged in terminal clinical experiences may be experiencing additional stressors related to preparing for the NPTE and seeking residency or job placement.

In addition to academic sources of stress, financial sources of stress were correlated with student debt

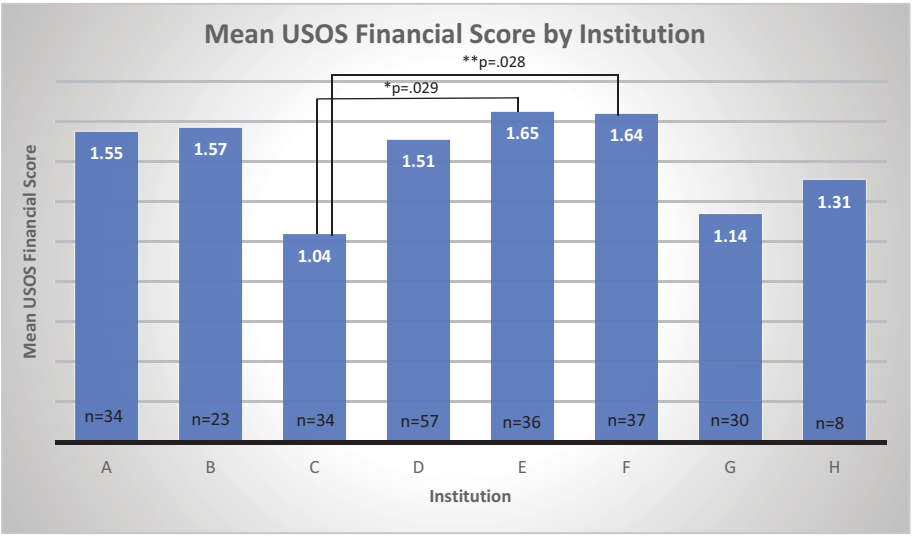

Fig. 2. Financial sources of stress by institution (n = 259).

*Tukey's post-hoc testing, mean difference = 0.607, SE = 0.187, P = 0.028.
**Tukey's post-hoc testing, mean difference = 0.608, SE = 0.188, P = 0.029.

levels and the percentage of financial responsibility for graduate education. This result aligns with the findings for first- and second-year graduate students from six health professions programs of whom 81% reported medium, large, or extreme amounts of stress related to their debt load.[20] The basis for the significant differences between financial sources of stress based on academic program is unclear. However, disparities in student demographics, such as those related to social determinants of learning (SDoL),[29] in combination with varied tuition levels may contribute to financial stress. During CEEs, students may need to reduce work hours or stop working, relocate and maintain more than one residence, and rely on public transit. These factors, in combination with differences in institutional cost and scholarship support, relate to the economic stability subcategory in the SDoL framework and may impact student stress levels.

Responses to the open-ended questions in this study further support an SDoL approach to considering student stress during CEEs. In this framework, in addition to economic stability, the SDoL subcategories of educational access and quality, neighborhood and built environment, and social and community context may be impacted during CEEs. For example, students' comments related to stress associated with clinical instructor relationships relate to educational quality and social and community context. Challenging clinical instructor relationships have also been identified by other researchers as a source of stress for PT students.[15–17,22] Living away from home as a reported source of stress is connected to social and community context and suggests that separation from support systems, both personal and academic, and short-term integration into new communities may be particularly stressful for some students. The SDoL framework provides a model for further study and consideration of how a systems approach might support healthy stress levels during CEEs.

This study is not without limitations. It is restricted to students in the Midwest, and further research is needed to confirm these findings in a sample with broader geographic representation. In addition, it is a cross-sectional study and, as such, does not provide insight into how stress changes over time for an individual student or groups of students. Additionally, a comprehensive examination of institutional characteristics that may contribute to differences in financial sources of stress was beyond the scope of this study, and thus, the interpretation of these results is limited. Further research to better elucidate institutional and SDoL factors and their relationship to student stress is warranted. Even with the addition of this study, there is a dearth of research exploring PT student stress with a focus on clinical education, and future studies that explore the identification of students at particular risk for high stress levels, as well as approaches to appropriately reduce stress during clinical education, are needed.

Conclusion

Despite the fact that clinical education typically accounts for nearly one-third of PT education program curricula,[30] this is one of only two studies to explore levels and sources of stress for PT students in the United States during CEEs. Overall, these results suggest that PT students experience stress while participating in clinical

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education with some students experiencing high levels of stress. This stress is highest for third-year students and for students engaged in terminal clinical experiences. The greatest source of stress is academic, and financial sources of stress are correlated with higher levels of debt and a greater percentage of individual responsibility for graduate education. More research is needed to investigate how a SDoL framework might be used to explore levels and sources of stress as well as develop effective interventions to mitigate stress.

Conflict of interests and funding

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Ethics statement

IRB Approval #1006.

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