Changes in Burnout, Pain Attitudes and Beliefs, and Confidence in Treating Patients in Pain Following Pain Education for Healthcare Providers

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PURPOSE: The study aimed to explore the effect of a pain neuroscience education (PNE) course on provider burnout, attitudes and beliefs about pain and confidence in treating patients with pain. SUBJECTS: 209 healthcare professionals taking a PNE course. **METHODS:** The healthcare providers were surveyed using the Oldenburg Burnout Inventory, Pain Attitudes and Beliefs Scale, and the Pain Care Confidence Scale before attending a PNE course and then at 1-week and 6-months post training. **RESULTS:** A small effect (Cohen's d = 0.180, p = 0.024) was found for females at 1-week post-training for the burnout exhaustion score; no other significant effects were found related to burnout. Pain Attitudes and Beliefs Biomedical and Biopsychosocial subscales had significant changes at 1-week ($p < 0.001$ and $p = 0.005$) and at 6-months ($p < 0.001$ and $p = 0.005$), respectively, moving toward a more biopsychological approach for care. Pain confidence scores significantly improved at both time periods ($p < 0.001$ and $p < 0.001$). **CONCLUSION:** A significant finding was that the pain education course positively changed the healthcare providers' pain attitudes and beliefs along with confidence in pain care, but with minimal to no change in burnout scores. *J Allied Health* 2025; 54(2):e191–e197.

KEYWORDS: pain neuroscience education, pain attitudes and beliefs, burnout, healthcare providers

IN RECENT YEARS, especially since the coronavirus pandemic of 2019 (COVID-19), healthcare provider burnout has become a prominent discussion in healthcare.(1–4) Burnout, classically described by Maslach, is where work starts as "*important, meaningful, and challenging work*" that over time becomes "*unpleasant, unfulfilling, and meaningless.*" Eventually, this leads to "*exhaustion, involvement turns into cynicism, and efficacy turns into ineffectiveness.*"(5) Burnout has been described to contain three distinct phases: emotional exhaustion, depersonalization in relationships with coworkers, and a sense of inadequacy or reduced personal accomplishment.(5,6)

Pre-COVID19 data indicated that nearly half of physicians experience burnout, more than any other healthcare provider, while nursing reported burnout rates around 33%.(7,8) Physical therapists (PTs) reported lower burnout rates than most other healthcare providers, around 25%, with female therapists reporting higher rates than male therapists.(9,10) More recent data amid COVID-19 showed that PTs burnout rates have increased, with multi-year industry surveys (WebPT State of Rehab Therapy Report, 2021, 2022, and 2023) reporting approximately 33%. In contrast, a recent study showed a 49% rate across various disciplines.(11) Overarching, burnout in healthcare has been shown to pertain to three distinct challenges, to varying degrees—issues pertaining to healthcare in general, organizational challenges where the healthcare provider works, and personal issues.(5,6,12,13) In the workforce, burnout has been associated with younger age, greater financial strain, poor social relations with friends and family, poor work-life balance, and decreased satisfaction with one's work and profession.(10,13–15) More recently, strong correlations to burnout in PTs have been tied to organizational ethics and burnout, productivity standards, billing/coding policy, and organizational provision of pro-bono services.(16)

Another aspect of burnout that has gained more interest specific to healthcare is compassion fatigue, described as the cost of caring for others in emotional pain.(17) The link between burnout and compassion fatigue has been explored in the literature extensively.(18,19) Compassion fatigue develops when healthcare providers provide high levels of effort and compassion over an extended period of time to their patients who are suffering. The high levels of stress from burnout add to the effort of the healthcare provider and often accelerate the compassion fatigue process.(20,21) Symptoms associated with compassion fatigue are being easily frustrated, irritable, annoyed,

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The authors report no conflicts of interest or funding related to this study.

RA2866—Received Jan 1, 2024; accepted Mar 7, 2024.

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and symptoms of depression.(17,22) Over time, this has been shown to lead to difficulty maintaining hope, feeling less alert and more restless, as well as feeling ineffective, negative, and inadequate.(17)

Compassion fatigue may be particularly interesting to clinicians working with more complex conditions, especially where emotional pain is prevalent. One such example could be chronic pain, which has increased steadily over the last 2–3 decades and has been infused by the opioid epidemic and COVID-19 pandemic.(23–25) Treating patients with chronic pain is a common place where compassion fatigue and burnout occur. The potential reasons for this can be found with the increased clinical challenge in treating this patient population due to. brain circuitry shifts from nociceptive and cognitive-dominant circuitry to more emotional parts of the brain adding to the clinical challenge.(26,27) Additionally, it has been shown that healthcare providers are not well equipped or trained in assessing and treating patients with chronic pain.(28–30) The lack of training with this patient population potentially can add to the stress of the job of working with individuals with significant suffering. These components add to the mix that may lead to burnout and compassion fatigue.

One intriguing aspect of compassion fatigue is the clinician's feeling of being "inadequate"—which may be the case for healthcare workers encountering patients with chronic pain. Preliminary studies on pain neuroscience education (PNE) have shown that healthcare providers who learn more about pain shift positively in their compassion and empathy for those with chronic pain,(31–33) which may be a potential opportunity to help healthcare workers with burnout. To date, no studies have been conducted to explore whether PNE might positively affect burnout. Therefore, this study aimed to determine if completing a continuing education course in pain neuroscience would yield any specific positive effects on burnout in healthcare workers.

Methods

Participants

A sample of convenience was utilized from licensed healthcare providers within the US attending a post-professional pain education seminar. The research project was conducted according to the Declaration of Helsinki and was approved by the University of South Dakota Institutional Review Board for research involving human subjects (IRB-20-184). All participants were fully informed of the study content before participating in this study and provided informed consent. Inclusion criteria consisted of being a licensed healthcare provider over 18 years of age and having registered and completed a PNE seminar either in-person or online. The exclusion criterion was the inability to read English.

Measures

Demographic information, including age, gender, race, previous pain education course work, years of experience, healthcare discipline, and employment status, was collected through the Qualtrics survey tool (Qualtrics, Provo, UT).

Oldenburg Burnout Inventory: The Oldenburg Burnout Inventory (OLBI) is a 16-item scale constructed and validated to assess two core dimensions of burnout: exhaustion and disengagement.(34,35) The OLBI has been further validated and shown to have acceptable test-retest reliability and internal consistency within the English translation of the original scale.(36) The scale consists of 8 items related to disengagement (OLBI-D) and 8 items directed at exhaustion (OLBI-E) utilizing a Likert scale (1=strongly agree, 2=agree, 3=disagree, 4= strongly disagree). Reverse score items were recoded to provide subscale scores in disengagement and exhaustion and full-scale scores. Higher scores are indicative of more burnout.

Pain Attitude and Beliefs Scale: The Pain Attitude and Beliefs Scale (PABS) is a self-administered questionnaire to evaluate the different treatment orientations with healthcare providers.(37,38) A "biomedical" (BM) treatment orientation is related to the provider believing that pain and disability are direct consequences of a specific tissue pathology. The "biopsychosocial" (BPS) orientation is centered around the provider's beliefs that pain is not always a sign of tissue damage and can be influenced by various psychological and social factors. The 14-item PABS was used with 7 items related to BM orientation and 7 items related to BPS orientation, each scored on a 1–6 Likert scale (1 = totally disagree, 6 = totally agree).(39–41) The higher the score in either of the subscales (BM, BPS) demonstrates more orientation to that treatment approach. The PABS has shown good internal consistency with Cronbach's α mostly > 0.6, with positive construct validity and positive reliability with ICC on biomedical factors at 0.81 and the biopsychosocial factors at 0.65.(41)

Pain Care Confidence Scale: Pain Care Confidence Scale (PCCS) is an 11-point Likert scale question (0 = no confidence and 10 = complete confidence) related to the clinician's confidence in treating patients with complex pain problems.(42) Higher scores demonstrated higher levels of confidence in their abilities. The PCCS was chosen to measure the ability of the curriculum to change student confidence levels in treating those with chronic pain.

Procedures

Upon registering for the PNE seminar, the healthcare providers pre-coursework electronic paperwork included an invitation to participate in the study looking at healthcare providers' burnout along with their attitudes,

TABLE 1. Participant Demographics

	Before Education (n = 359)	1-Week Post Education (n = 209)	6-Months Post Education (n = 33)	p-Value
Mean age (yrs) (SD)	38.1 (10.7)	38.1 (11.1)	37.3 (10.3)	0.919
Gender, female (%)	268 (74.7%)	161 (77.0%)	27 (81.8%)	0.582
Race, n (%)				0.709
Indigenous American	4 (1.1%)	3 (1.4%)	0	
Asian	29 (8.1%)	10 (4.8%)	1 (3.0%)	
Black/African American	11 (3.1%)	3 (1.4%)	1 (3.0%)	
Hispanic/Latinx	17 (4.7%)	9 (4.3%)	2 (6.1%)	
Middle East	1 (0.3%)	1 (0.5%)	0	
Pacific Islander	2 (0.6%)	1 (0.5%)	1 (3.0%)	
White/Caucasian	291 (81.1%)	181 (86.6%)	27 (81.8%)	
Other	4 (1.1%)	1 (0.5%)	1 (3.0%)	
Previous pain education, yes (%)	209 (58.2%)	126 (60.3%)	23 (69.7%)	0.423
Mean years of experience, (SD)	10.8 (10.2)	10.9 (10.6)	10.6 (9.6)	0.982
Healthcare discipline, n (%)				0.993
ATC	14 (3.9%)	8 3.8%)	0	
MD	4 (1.1%)	2 (1.0%)	0	
Nurse	5 (1.4%)	2 (1.0%)	0	
OT	25 (7.0%)	10 (4.8%)	2 (6.1%)	
COTA	1 (0.3%)	1 (0.5%)	0	
PT	243 (67.7%)	149 (71.3%)	25 (75.8%)	
PTA	49 (13.6%)	27 (12.9%)	5 (15.2%)	
Other	18 (5.0%)	10 (4.8%)	1 (3.0%)	

ATC = athletic trainer certified, MD = medical doctor, OT = occupational therapy, COTA = certified occupational therapist assistant, PT = physical therapist, PTA = physical therapist assistant.

beliefs, and confidence in treating patients with chronic pain. Upon consent, the clinicians completed an online survey (Qualtrics, Provo, UT) gathering participant demographics and initial assessment of burnout (OLBI), pain attitudes and beliefs (PABS), and confidence (PCCS). After completing the PNE course, participants were electronically notified to finish a follow-up survey containing the burnout inventory, pain attitudes and beliefs scale, and confidence scale 1-week post-seminar and again at an approximate 6-months follow-up time. Participants were allowed to utilize the information gained in the seminar at their discretion within their clinical practice.

Data Analysis

Qualtrics survey data was exported into an Excel file with all data analyzed for completeness. Participants with missing data were excluded from the analysis. All statistics were performed using IBM SPSS Statistics for Windows, version 27.0 (IBM Corp., Armonk, NY, USA) using the significance threshold of <0.05. Descriptive statistics of means, standard deviations (SD), and frequencies were calculated for the sample participants. One-way ANOVA was used to compare means for demographic data of age and years of experience between the groups at the three time points (before education, 1-week post-education, and 6-months post-education) of data collection. A Pearson chi-square analysis was used to compare frequencies of demographics for gender, race, previous pain education, and healthcare discipline between the respondents at each time point of data collection. A paired samples t-test was completed to compare the differences between burnout inventory, pain attitude and beliefs, and confidence for the clinicians who took the before education with 1-week post-education surveys and those who took the before education with 6-months post-education surveys. Normality was assessed with the Shapiro-Wilk test along with assessing for skewness and kurtosis z-scores > 1.96, for the sample size < 100.(43) If the assumption for normality was violated, a non-parametric Wilcoxon signed-rank test was run. Between-group differences were also measured based on gender and previous PNE training attendance. Cohen's d was calculated to estimate the effect size (0.2 = small, 0.5 = medium, 0.8 = large effect size).(44)

Results

Initially, 359 clinicians filled out questionnaires before the educational event, 209 of those completed the follow up questionnaires at 1-week post-education, and 33 completed the 6-months post-education questionnaires. There was no difference between groups related to demographic variables (Table 1).

Before Education to 1 Week Post Education

The changes in burnout, pain attitudes and beliefs, along with treatment confidence are provided in Table 2 comparing scores before education to the 1-week post-

TABLE 2. Burnout, Pain Attitudes and Beliefs and Confidence Scores Before Compared to 1-Week Post-Education

	Before Education, mean score (SD)	6-Months Post-Education, mean score (SD)	p-Value	Cohen's d
OLBI	34.1 (8.5)	33.8 (8.8)	0.720	0.025
OLBI-E	18.0 (1.9)	17.1 (4.6)	0.014	0.172
OLBI-D	16.1 (4.3)	15.5 (4.3)	0.094	0.116
PABS-BM	18.7 (6.7)	14.5 (5.6)	<0.001	0.624
PABS-BPS	29.9 (6.8)	30.8 (8.4)	0.005	0.195
PCCS	4.8 (1.9)	6.9 (1.4)	<0.001	1.258

OLBI = Oldenburg Burnout Inventory, OLBI-E = Oldenburg Burnout Inventory–Exhaustion, OLBI-D = Oldenburg Burnout Inventory–Disengagement, BAPS-BM = Pain Attitude Beliefs Scale–Biomedical, BAPS-BPS = Pain Attitude Beliefs Scale–Biopsychosocial, PCCS = Pain Care Confidence Scale.

education. When sub-analyzing the data based on gender, it was found that the only significant change in burnout was with OLBI-E for females, $t(160) = 2.3$, $p = 0.024$, Cohen's $d = 0.180$. OLBI and OLBI-D did not significantly change for females, and none of the OLBI measures changed for males. There were significant changes for males in both the PABS-BM and PABS-BPS scales, whereas females only had a significant change in PABS-BM. For PABS-BM, the males' mean change was 2.3 points less after education, $t(47) = 2.3$, $p = 0.012$, Cohen's $d = 0.336$; females had a larger mean change of 4.8 points less after education, $t(160) = 9.1$, $p < 0.001$, Cohen's $d = 0.718$. The males mean change for PABS-BPS was 3.5 points more after education, $t(47) = 3.3$, $p = 0.002$, Cohen's $d = 0.481$. The PCCS score change was significant ($p < 0.001$) for both males and females with similar changes in scores, 2.2 and 2.1 points better, respectively.

When comparing those who previously had completed a pain education course to those who had not, it was found that confidence score changes were both significant ($p < 0.001$). However, those who did not have a previous course showed a larger effect in their change in PCCS, scoring 2.6 points higher than those with a prior course with a 1.8 points higher rating (Table 3). In the area of burnout, those without a previous pain course had significant changes in OLBI-D ($t(82) = 2.2$, $p = 0.034$) and OLBI-E ($t(82) = 2.8$, $p = 0.007$), but not with the total score ($p = 0.130$). Those with a previous pain course did not show any significant changes in their burnout scores 1-week post-education. The PABS scores showed similar significant changes between those who previously had a pain course and those who did not. The large differences were in the starting BM scores and the mean change for BM scores (Table 3).

Before Education to 6 Months Post Education

The assumption for normality was violated for the before education OLBI-E and 6 months post-education for PABS-BM ($p = 0.007$ and 0.022, respectively). Wilcoxon signed-rank tests were done for these two variables in comparing results for before to 6 months post, the other comparisons were done with paired sample t-test.

When comparing before education scores for burnout, there were no significant changes with the 6-months scores. However, there were significant changes in pain attitudes and beliefs and confidence scores (Table 4). When looking at gender differences, no significant differences were found in burnout scores for either gender. Similar changes were found with PABS-BM scores between genders, with males seeing a larger change, 8.0 points lower PABS-BM mean change compared to females, 4.4 points lower. However, men started at a higher mean score (24.7) than females (19.3)

TABLE 3. Pain Attitude and Beliefs and Pain Care Confidence Scale Scores Comparing Those Who Had a Previous Pain Course and Those Who Did Not, Before and 1-Week Post-Education

	Before Education, mean score (SD)	1-Week Post-Education, mean score (SD)	Mean Change (SD)	p-Value	Cohen's d
PABS-BM					
No pain course	21.3 (5.9)	15.4 (6.0)	–6.0 (7.5)	<0.001	0.799
Pain course	17.0 (6.7)	13.9 (5.3)	–3.1 (6.1)	<0.001	0.510
PABS-BPS					
No pain course	28.5 (5.8)	30.4 (8.8)	1.9 (8.4)	0.044	0.225
Pain course	29.5 (7.4)	31.1 (8.1)	1.7 (9.3)	0.048	0.178
PCCS					
No pain course	4.0 (1.8)	6.7 (1.4)	2.6 (1.6)	<0.001	1.616
Pain course	5.4 (1.8)	7.1 (1.4)	1.8 (1.6)	<0.001	1.090

BAPS-BM = Pain Attitude Beliefs Scale–Biomedical, BAPS-BPS = Pain Attitude Beliefs Scale–Biopsychosocial, PCCS = Pain Care Confidence Scale.

TABLE 4. Burnout, Pain Attitudes and Beliefs and Confidence Scores Before Compared to 6-Months Post-Education

	Before Education, mean score (SD)	6-Months Post-Education, mean score (SD)	p-Value	Cohen's d
OLBI	35.1 (5.6)	35.3 (5.5)	0.721	0.063
OLBI-E	18.5 (3.2)	18.1 (3.1)	0.472	0.089
OLBI-D	16.6 (3.3)	16.5 (3.4)	0.785	0.048
PABS-BM	20.3 (5.0)	15.2 (3.5)	<0.001	0.551
PABS-BPS	30.8 (2.5)	32.7 (3.1)	0.005	0.530
PCCS	4.8 (1.7)	7.0 (1.2)	<0.001	1.211

OLBI = Oldenburg Burnout Inventory, OLBI-E = Oldenburg Burnout Inventory–Exhaustion, OLBI-D = Oldenburg Burnout Inventory–Disengagement, BAPS-BM = Pain Attitude Beliefs Scale–Biomedical, BAPS-BPS = Pain Attitude Beliefs Scale–Biopsychosocial, PCCS = Pain Care Confidence Scale.

before the pain educational session. Both of these changes were significant for males and females, $t(5) = 8.6$, $p < 0.001$, Cohen's $d = 3.5$ and $t(26) = 4.4$, $p < 0.001$, Cohen's $d = 0.855$, respectively.

The PABS-BPS demonstrated a similar finding, with males having a greater change 3.3 points higher compared to the female change of 1.6 points higher. Both had similar starting scores this time, with males at 30.3 and females at 30.9. Both of these were significant for improvement in scores, males $t(5) = -7.7$, $p < 0.001$, Cohen's $d = 3.2$ and females $t(26) = -2.1$, $p = 0.044$, Cohen's $d = 0.407$. The PCCS scores also continued with positive shifts, with males changing 2.0 points and females 2.2 points on the scale and both being significant $t(5) = -7.7$, $p < 0.001$, Cohen's $d = 3.162$ and $t(25) = -5.7$, $p < 0.001$, Cohen's $d = 1.114$, respectively. Comparisons for previous pain courses and those who did not have a previous course found no differences in burnout scores for either group. Both groups had significant changes in PABS and PCCS scores (Table 5).

Discussion

When exploring changes in burnout for healthcare professionals attending a PNE course, it was found that there was little change in their burnout scores beyond a change in exhaustion, primarily with females immediately after taking the course. This change did not continue into the 6-months time period. Interestingly, the scores of this group of participants differed from previous healthcare worker scores with the OLBI. Demerouti and Bakker (35) found OLBI-E scores with a mean of 20.24 and OLBI-D mean score of 19.04 with their sampling of healthcare workers. Another study looking into burnout with psychiatric residents found low burnout OLBI scores to be less than 44.(45) Demonstrating this current sample had low burnout scores, thus a floor effect may have been evident with the measurement tool's ability to find changes.

Despite the limited change in burnout scores, there were significant changes in the clinicians' attitudes and beliefs around pain. Significant changes were found in decreasing biomedical viewpoints and increasing biopsychosocial viewpoints after the training 1-week post-training, with that change continuing into the 6-months. The changes in males were greater for both of these measures. Still, additional differences were noted, with the males having different starting scores and returning them closer to the female scores after the training. Interestingly, it is known that males generally have lower empathy than females,(46,47) but it is unknown if the attitude and beliefs scale correlates with empathy scores. Previous research on nurses found that female nurses had higher biopsychosocial scores than

TABLE 5. Pain Attitude and Beliefs Scores and Confidence Scores Comparing Those Who Had a Previous Pain Course and Those Who Did Not, for Before and 6-Months Post-Education

	Before Education, mean score (SD)	1-Week Post-Education, mean score (SD)	Mean Change (SD)	p-Value	Cohen's d
PABS-BM					
No pain course	22.6 (4.5)	15.2 (3.3)	–7.4 (5.2)	0.002	1.420
Pain course	19.3 (5.0)	15.3 (3.7)	–4.0 (4.6)	<0.001	0.887
PABS-BPS					
No pain course	29.9 (3.2)	32.9 (2.8)	3.0 (3.1)	0.013	0.982
Pain course	31.2 (2.1)	32.6 (3.3)	1.4 (3.7)	0.084	0.377
PCCS					
No pain course	4.1 (1.3)	6.7 (1.3)	2.6 (2.1)	0.006	1.236
Pain course	5.1 (1.7)	7.1 (1.2)	2.0 (1.6)	<0.001	1.195

BAPS-BM = Pain Attitude Beliefs Scale–Biomedical, BAPS-BPS = Pain Attitude Beliefs Scale–Biopsychosocial, PCCS = Pain Care Confidence Scale.

their male counterparts but no differences with the biomedical scale.(48) Another interesting finding was the differences between those with previous pain education coursework. Larger shifts in scores were noted with those with no previous pain education coursework. Although those with previous coursework continued to shift their beliefs further with the addition of another course. These shifts lasted through the 6-months measurement.

Lastly, in the area of confidence, we found PNE led clinicians to gain significant confidence in treating patients with chronic pain. Large effect sizes were noted at the 1-week post-education that continued into the 6-months period. Similar changes were found in both males and females. In addition, even those with previous pain education courses found large shifts in confidence levels.

Limitations

The most significant limitation was the drop-out of individuals who initially signed up to do the surveys on burnout, pain attitudes and beliefs, and treatment confidence. While the groups did not demonstrate statistical differences in demographic data between the three reporting periods, care should be taken when interpreting the results. Another limitation is that most of the clinicians were in the physical therapy profession, and differences in burnout and pain attitudes and beliefs are potentially different between professions. Thus, the scores may be biased toward the physical therapy profession based on the participants who attended the training. Another limitation is the smaller sample size in the 6-month data comparison, especially when subdividing and comparing gender results. In addition, other factors such as workplace setting, age, length of employment, and other potential confounding variables were not controlled for or analyzed.

Conclusion

Using a pain education course did not significantly change burnout for a population of healthcare workers. However, this population already had lower burnout scores compared to other groups. A significant finding was that the PNE course positively changed the healthcare workers' pain attitudes and beliefs along with confidence in pain care.

Disclosure statement: AL: works for company where research was completed; KZ: has contracts with company where research was completed; JD: no potential conflict of interest.

References

1. Abd-Elsayed A, Rupp A, D'Souza RS, et al. Interventional pain physician burnout during the COVID-19 pandemic: a survey from the American Society of Pain and Neuroscience. Curr Pain Headache Rep. 2023;27(8):259-67.
2. Burrowes SAB, Casey SM, Pierre-Joseph N, et al. COVID-19 pandemic impacts on mental health, burnout, and longevity in the workplace among healthcare workers: a mixed methods study. J Interprof Educ Pract. 2023;32:100661.
3. Carpi M, Bruschini M, Di Vito A, Burla F. Burnout and perceived stress among Italian physical therapists during the COVID-19 pandemic: a cross-sectional study. Psychol Health Med. 2023:1-13.
4. Taranu SM, Stefaniu R, Rotaru TS, et al. Factors associated with burnout in medical staff: a look back at the role of the COVID-19 pandemic. Healthcare (Basel). 2023;11(18).
5. Maslach C. What have we learned about burnout and health? Psychol Health. 2001;16(5):607-11.
6. Maslach C, Schaufeli WB, Leiter MP. Job burnout. Annu Rev Psychol. 2001;52:397-422.
7. Rothenberger DA. Physician burnout and well-being: a systematic review and framework for action. Dis Colon Rectum. 2017;60(6):567-76.
8. McHugh MD, Kutney-Lee A, Cimiotti JP, et al. Nurses' widespread job dissatisfaction, burnout, and frustration with health benefits signal problems for patient care. Health Aff (Millwood). 2011;30(2):202-10.
9. Bruschini M, Carli A, Burla F. Burnout and work-related stress in Italian rehabilitation professionals: A comparison of physiotherapists, speech therapists and occupational therapists. Work. 2018;59(1):121-9.
10. Sliwinski Z, Starczynska M, Kotela I, et al. Life satisfaction and risk of burnout among men and women working as physiotherapists. Int J Occup Med Environ Health. 2014;27(3):400-12.
11. Pugliese M, Brismée J, Allen B, et al., eds. Mentorship and self-efficacy are associated with lower burnout in physical therapists in the United States. American Academy of Orthopaedic Manual Therapy; 2022; San Diego, CA.
12. Shanafelt TD, Noseworthy JH. executive leadership and physician well-being: nine organizational strategies to promote engagement and reduce burnout. Mayo Clin Proc. 2017; 92(1):129-46.
13. Brewer EW, Shapard L. Employee burnout: A meta-analysis of the relationship between age or years of experience. Hum Resource Dev Rev. 2004;3(2):102-23.
14. Scutter S, Goold M. Burnout in recently qualified physiotherapists in South Australia. Aust J Physiother. 1995;41(2):115-8.
15. Pustulka-Piwnik U, Ryn ZJ, Krzywoszanski L, Stozek J. Burnout syndrome in physical therapists - demographic and organizational factors. Med Pract. 2014;65(4):453-62.
16. Cantu R, Carter L, Elkins J. Burnout and intent-to-leave in physical therapists: a preliminary analysis of factors under organizational control. Physiother Theory Pract. 2022;38(13):2988-97.
17. Figley CR. Compassion fatigue: psychotherapists' chronic lack of self care. J Clin Psychol. 2002;58(11):1433-41.
18. Delgado N, Delgado J, Betancort M, et al. What is the link between different components of empathy and burnout in healthcare professionals? a systematic review and meta-analysis. Psychol Res Behav Manag. 2023:447-63.
19. Potter P, Deshields T, Divanbeigi J, et al. Compassion fatigue and burnout. Clin J Oncol Nurs. 2010;14(5).
20. Zhang YY, Han WL, Qin W, et al. Extent of compassion satisfaction, compassion fatigue and burnout in nursing: A meta analysis. J Nurs Manag. 2018;26(7):810-9.
21. Slatten LA, Carson KD, Carson PP. Compassion fatigue and burnout: What managers should know. Health Care Manager. 2011;30(4):325-33.
22. van Mol MM, Kompanje EJ, Benoit DD, et al. The prevalence of compassion fatigue and burnout among healthcare profession-

als in intensive care units: a systematic review. PLoS One. 2015;10(8):e0136955.
23. Shah A, Hayes CJ, Martin BC. Characteristics of initial prescription episodes and likelihood of long-term opioid use—United States, 2006-2015. MMWR. 2017;66(10):265-9.
24. Louw A. Chronic pain tidal wave after COVID-19: are you ready [letter]? Physiother Theory Pract. 2020;36(12):1275-8.
25. Clauw DJ, Hauser W, Cohen SP, Fitzcharles MA. Considering the potential for an increase in chronic pain after the COVID-19 pandemic. Pain. 2020.
26. Hashmi JA, Baliki MN, Huang L, et al. Shape shifting pain: chronification of back pain shifts brain representation from nociceptive to emotional circuits. Brain. 2013;136(Pt 9):2751-68.
27. Smallwood RF, Laird AR, Ramage AE, et al. Structural brain anomalies and chronic pain: a quantitative meta-analysis of gray matter volume. J Pain. 2013;14(7):663-75.
28. Latimer J, Maher C, Refshauge K. The attitudes and beliefs of physiotherapy students to chronic back pain. Clin J Pain. 2004;20(1):45-50.
29. Louw A, Louw Q, Crous L. Preoperative education for lumbar surgery for radiculopathy. SA J Physiother. 2009;65(2):3-8.
30. Cox T, Puentedura E, Louw A. An abbreviated therapeutic neuroscience education session improves pain knowledge in first year physical therapy students but does not change attitudes or beliefs. J Man Manip Ther. 2017;25(1):11-21.
31. Louw A, Neilson B, Freund B, Cox T. Pain neuroscience education for physiotherapy receptionists. Pain Rehabil. 2019; 46(Winter):24-31.
32. Louw A, Vogsland R, Marth L, et al. Interdisciplinary pain neuroscience continuing education in the Veterans Affairs. Clin J Pain. 2019;35(11).
33. Zimney K, Louw A, Johnson J, et al. Effects of pain science education on physician assistant students understanding of pain and attitudes and beliefs about pain. S Dakota Med J. 2018 (Nov):506-11.
34. Demerouti E. Oldenburg burnout inventory. Eur J Psychol Assess. 1999.
35. Demerouti E, Bakker AB. The Oldenburg Burnout Inventory: A good alternative to measure burnout and engagement. In: Handbook of Stress and Burnout in Health Care. 2008;65(7):1-25.
36. Halbesleben JR, Demerouti E. The construct validity of an alternative measure of burnout: Investigating the English translation of the Oldenburg Burnout Inventory. Work Stress. 2005;19(3): 208-20.
37. Bishop A, Foster NE, Thomas E, Hay EM. How does the self-reported clinical management of patients with low back pain relate to the attitudes and beliefs of health care practitioners? A survey of UK general practitioners and physiotherapists. Pain. 2008;135(1-2):187-95.
38. Ostelo RW, Stomp-van den Berg SG, Vlaeyen JW, et al. Health care provider's attitudes and beliefs towards chronic low back pain: the development of a questionnaire. Man Ther. 2003;8(4):214-22.
39. Eland ND, Kvale A, Ostelo R, Strand LI. The Pain Attitudes and Beliefs Scale for Physiotherapists: dimensionality and internal consistency of the Norwegian version. Physiother Res Int. 2017;22(4).
40. Mutsaers JH, Pool-Goudzwaard AL, Ostelo RW, et al. The psychometric properties of the PABS-PT in neck pain patients: a validation study. Man Ther. 2014;19(3):208-14.
41. Mutsaers JH, Peters R, Pool-Goudzwaard AL, et al. Psychometric properties of the Pain Attitudes and Beliefs Scale for Physiotherapists: a systematic review. Man Ther. 2012;17(3):213-8.
42. Helms JT, Mayhew TP, Zimney KJ. The effectiveness of active learning approaches in a pain education curriculum within a physical therapy program. J Phys Ther Educ. 2021;35(3):218-26.
43. Fagerland MW. t-tests, non-parametric tests, and large studies—a paradox of statistical practice? BMC Med Res Methodol. 2012;12(1):78.
44. Brydges CR. Effect size guidelines, sample size calculations, and statistical power in gerontology. Innov Aging. 2019;3(4):igz036-igz.
45. Tipa RO, Tudose C, Pucarea VL. Measuring burnout among psychiatric residents using the Oldenburg burnout inventory (OLBI) instrument. J Med Life. 2019;12(4):354.
46. Chen W, Lu J, Liu L, Lin W. Gender differences of empathy. Adv Psychol Sci. 2014;22(9):1423.
47. Han S, Fan Y, Mao L. Gender difference in empathy for pain: an electrophysiological investigation. Brain Res. 2008;1196:85-93.
48. Prem V, Karvannan H, Chakravarthy R, et al. Attitudes and beliefs about chronic pain among nurses–biomedical or behavioral? A cross-sectional survey. Indian J Palliat Care. 2011; 17(3):227.

Published online 1 June 2025
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