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Evaluation of Pain Neuroscience Education Among Veterans with Chronic Pain

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Evaluation of Pain Neuroscience Education Among Veterans with Chronic Pain

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Abstract

Background: Chronic pain is a significant public health issue, especially among veterans. The traditional approach to chronic pain management has relied heavily on opioids, but nonopioid therapies are now recommended. Pain Neuroscience Education (PNE) aims to improve pain management by educating patients about the complex nature of chronic pain.

Objective: This project evaluates the impact of PNE on veterans' pain perception and management.

Methods: A tailored PNE program was implemented for veterans at a housing facility. Participants completed pre- and post-intervention questionnaires assessing pain knowledge, severity, and psychosocial factors.

Results: The intervention appears to have improved participants' understanding of pain, as evidenced by the increased scores in the Revised Moseley's Pain Questionnaire. However, the Pain Numeric Rating Scale scores suggest that pain levels may have increased over time. The Defense and Veterans Pain Rating Scale showed mixed results with an improvement in activity, stress and mood, but a decrease in ability to sleep. Qualitative data highlighted diverse pain origins and the need for tailored interventions.

Conclusion: PNE can enhance pain understanding, but ongoing support and multifaceted strategies are essential for effective pain management among veterans.

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Evaluation of Pain Neuroscience Education Among Veterans with Chronic Pain

Chronic pain is a leading public health issue in the United States (US) as well as at Veterans Affairs (VA) which is the largest healthcare system in the country. (Carey, 2016; Dydyk & Conermann, 2022; Wyse et al., 2021. para. 3). Since the late 1800s, the main therapy for chronic pain has been opioids and the US continues to follow this trend (CDC, 2021, Dowell et al., 2022, Jones et al., 2018). In 2017, more than 47,000 Americans died due to opioid overdose, and 1.7 million Americans were diagnosed with opioid use disorder (OUD) due to prescription painkillers (CDC, 2022b ; Liberto, 2020). The Centers for Disease Control (CDC) maintains that nonopioid therapies are the preferred treatment for chronic pain (CDC, 2022b).

As the leading cause of disability in the US, chronic pain costs between $560 to $635 million dollars annually (Louw et al., 2017a, Mills et al., 2019, Smith & Hillner, 2019, Zajacova et al., 2021). The Veterans Affairs Opioid Safety Initiative was implemented to reduce overdose deaths and improve opioid prescribing safety, but it exacerbated chronic pain in veterans (Frank et al., 2018; Gellad et al., 2017; Lin et al., 2017). The reduction of opioid use through the VA initiative was considered a success, but their solutions focus on the control of substance use and did not offer alternative pain management (Bonnie et al., 2017; Frank et al., 2018). The veteran population is a large-sized, well-documented, and representative sampling of the most vulnerable population to chronic pain and the opioid crisis (Tsai & Rosenheck, 2012; Bennett et al., 2022). This project will focus on managing chronic pain through the alternative therapy of pain neuroscience education (PNE) in the veteran population.

Background and Significance

Pain is considered the fifth vital sign (Levy et al., 2018). PNE aims to reduce pain and change correlating behaviors by teaching sufferers about the body's complex response to chronic

pain (Louw et al., 2011; Wijma et al., 2016, Malfliet et al., 2018; Watson et al., 2019, Louw et al., 2017; Volchek et al., 2023). As an alternative therapy for chronic pain, PNE has demonstrated a positive effect on pain severity, pain catastrophizing, fear-avoidance, movement limitations, pain knowledge, and healthcare utilization. (Hochheim et al., 2022; Javdaneh et al., 2021; Kohns, et al. 2020; Louw et al., 2017b; Wood & Hendrick, 2018).

Epidemiology

23.5 million Americans have severe pain while 126 million Americans have some level of pain spanning a three-month period (Louw et al., 2017; Zajacova et al., 2021). Chronic pain is 40% more common in veterans than the public, 71% of active-duty service members experience pain (Toblin et al., 2014; Vallerand et al., 2015). Veterans are disproportionately impacted by chronic pain and are considered at higher risk for comorbidities (Haun et al., 2023; Mannes et al., 2022). In 2018, the Department of Social and Health Services evaluated the housing instability among veterans in Washington state and concluded that one in 25 veterans were homeless or unstably housed (Bittinger et al., 2018; Tsai, et al., 2022). The unhoused population has a substantially higher prevalence of chronic pain (Fisher et al., 2013; Rintoul et al., 2023). The prevalence of psychiatric conditions like post-traumatic stress disorder (PTSD), major depressive disorder (MDD), and attention deficit disorder (ADHD) is higher among those suffering from chronic pain (Benedict, et al., 2020; Haun et al., 2023; Johnston & Huckins 2022). There is a higher prevalence of comorbid conditions of PTSD and chronic pain in the US veteran population (Benedict, et al., 2020; Hinkel, et al., 2023; Vallerand, et al., 2015).

Social Context

PTSD has a negative effect on health outcomes such as increasing pain catastrophizing, specifically in veterans with chronic pain (Benedict et al., 2020; Johnston & Huckins 2022). The

COVID-19 pandemic limited access to healthcare and disrupted the community support system for veterans (Archibald, 2020; Johnston et al., 2018; Krause-Parello et al., 2022; Madras, 2020). The stigma against opioid use is deeply ingrained in U.S. culture which led to harsh policies, lack of access to services, and resistance to seeking healthcare (Adams et al., 2021; Madras, 2020). The social context of the opioid epidemic is influenced by various factors requiring a reevaluation of root cause analysis by government and healthcare agencies to improve structural competency from the top down and move toward multifaceted treatments (Dasgupta et al., 2018; Dowell et al., 2022; Jalali et al., 2020).

Efficacy of PNE for Pain Reduction

Pain Neuroscience Education (PNE is an effective alternative and adjunctive therapy for pain management, including: pain severity, pain catastrophizing, and psychosocial factors (Cortes, 2023; Hochheim et al., 2022; Lepri et al., 2023; Louw et al., 2019b; Wood & Hendrick, 2018). PNE programs have shown positive outcomes for multiple types of pain, as well as when there are comorbidities like Post Traumatic Stress Disorder (PTSD) (Benedict et al., 2021; Louw et al., 2019b).

Improved outcomes were affected by the PNE program length, participant buy-in, and having more than one in-person session (Hochheim, et al., 2016; Kohns, et al. 2020; Lepri et al., 2023; Louw, et al., 2019b). Lepri et al., (2023) state that having a multidisciplinary program would aid in sustainability of outcomes. It was shown that without family support, one year post pain program, chronic pain patients were likely to have increased pain severity, higher number of pain sites, and rely heavier on medication (Jamison & Virts, 1990; Hecke et al., 2013).

Tailoring Treatment to Improve Outcomes

Tailoring education programs improves outcomes for patients (Cosio & Lin, 2013; O'Toole, et al., 2016; Kohns, et al., 2020; Zimney et al., 2023). Motivational interviewing can aid in gaining trust to elicit accurate pain stories which are crucial for tailoring a PNE program (Nijs et al., 2020; Wijma et al., 2016). O'Toole, et al. (2016) stated that tailoring a program to include social determinants of health for high-risk homeless veterans can improve outcomes. Zimney et al., (2023) explains that PNE programs should be tailored based on individual factors related to the epigenetic, neurological, endocrinological, and immunological factors of the pain experience.

Gaps in the Literature

The following gaps were found in the literature: effectiveness of PNE in veteran-specific contexts, tailoring interventions to veterans' specific needs, and long-term outcomes (Mannes et al., 2022; Rondon- Romos et al., 2020; Treichler et al., 2023). Military service injuries, access to VA healthcare services and dealing with comorbid mental health are all a part of veteran-specific contexts within healthcare (Benedict et al., 2023; Mannes et al., 2022; Reisman, 2016). Veterans may have unique needs and preferences regarding pain management interventions, including PNE (Rondon-Romos et al., 2020; Vallerand et al., 2015). Many studies on PNE focus on short-term outcomes, such as immediate changes in pain knowledge or self-efficacy (Kohns et al., 2020; Rondon-Romos et al., 2020; Wood & Hendrick, 2018). There is a need for longitudinal studies to assess the long-term effects of PNE interventions on veterans' pain severity, functional status, healthcare utilization, and quality of life over extended periods (Kohns et al., 2020; Treichler et al., 2023; Wood & Hendrick, 2018). Addressing these gaps in the literature can help advance our understanding of the role of PNE in improving pain outcomes and enhancing the quality of life for veterans living with chronic pain. It can also inform the development of

evidence-based guidelines and best practices for pain management within the VA healthcare system.

Purpose & Problem Statement

This DNP project evaluated the effect PNE has on changing a person's pain story. These individual narratives more commonly reflect the dominant cultural concept that pain is disproportionately connected to structural tissue damage (Benedict et al., 2021; Nijs et al., 2014; Richter et al., 2020, Patel & Peacock, 2008). Tailoring concepts of new information, to bridge individual patient understanding, was a key aspect of the education modules. Pain severity, psychosocial aspects, and daily function were measured to determine project success. The purpose of this DNP project was to help reduce chronic pain and corresponding maladaptive behaviors through PNE. The PICO statement was as follows: for veteran residents of Veterans Housing facility (VHF) living with chronic pain, will PNE have a positive effect on how they interpret their pain and relate their pain stories after multiple education sessions compared to no intervention.

Theoretical Framework

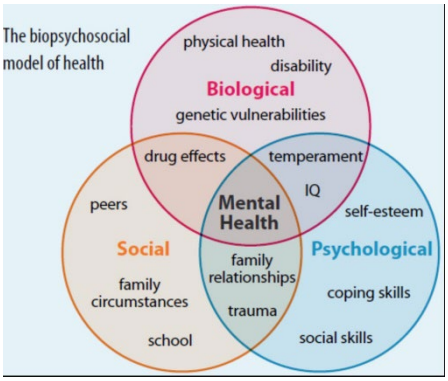
Biopsychosocial Model

The Biopsychosocial (BPS) Model (*figure 1*) offers a comprehensive approach to pain management, focusing on biological, psychological, and social environmental factors to understand and address the underlying causes of health and disease processes (Kusnanto et al., 2018; Meints & Edwards, 2018). PNE recognizes that factors beyond nociceptive tissue trauma can influence pain severity, pain catastrophizing, and social outcomes (Anamkath et al., 2018; Haun et al., 2023). This PNE program aims to improve treatment outcomes for veterans by acknowledging all pain pathways (*figure 2*), while identifying biological misconceptions. The

BPS model is a perfect foundation for the PNE program because it allows for the interconnected relationship of all factors associated with chronic pain. Studies show that improving pain knowledge reduces pain severity and improves chronic pain acceptance which overcomes social stigmas producing an increase in daily activities which then decrease severity (Benedict et al., 2021; McCracken, 2005; Simon et al. 2020).

Figure 1

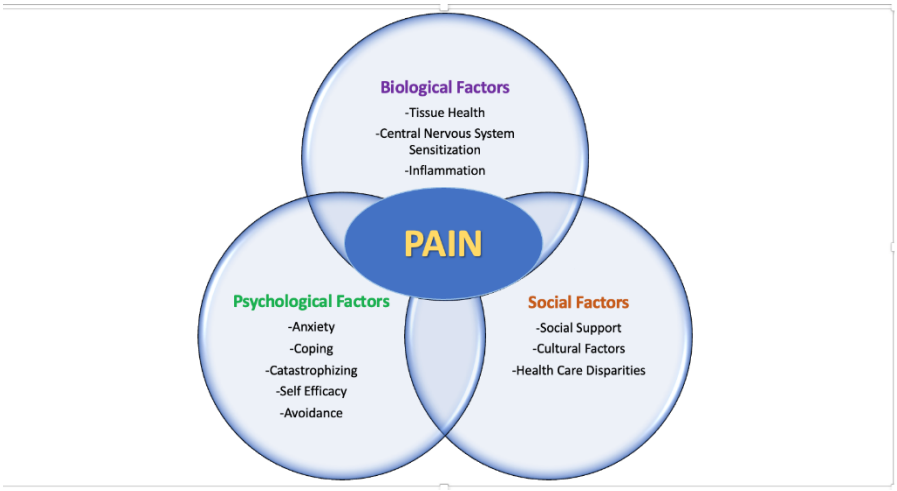
The Biopsychosocial Model of Health



Biopsychosocial model. *Physiopedia*. https://www.physio-pedia.com/Biopsychosocial_Model. In the public domain.

Figure 2

Factors Influencing Chronic Pain



Created by Tandeep Kaur based on information from Veterans Affairs. PTSD: National Center for PTSD https://www.ptsd.va.gov/professional/treat/cooccurring/chronic_pain_guide.asp. In the public domain.

Project Design

The project aims to assess the effectiveness of PNE in reducing chronic pain symptoms in veterans through the BPS model. The aims are to: 1) educate low-income veterans about Pain Neuroscience as a preventive approach to chronic pain; 2) implement and tailor PNE sessions; 3) measure pain knowledge pre- and post- PNE sessions; 4) evaluate for reduction of pain medication usage; and 5) monitor changes in pain stories.

Setting and Participants

The PNE program was held at the VHF. VHF provides 59 units as permanent housing for low-income, previously unhoused veterans and provides social services and community facilities. Presenting at the VHF residency enabled easy access for all residents.

Inclusion criteria for this project was the following: veterans living at VHF (any age, gender, and branch); history of, or diagnosis of chronic pain; use of pharmacologic measures (of any type) to control pain; a willingness to participate in three sessions of pain neuroscience education; and have ability to complete multiple questionnaires four weeks apart. Exclusion criteria was the following: non-veterans; no history of chronic pain; no interest in pain management alternatives or education; inability to attend and participate in three education sessions. The DNP project consideration met exemption criteria from Seattle University IRB.

Recruitment

Informational flyers were posted in common areas with the VHF managerial team informing residents verbally. Participant attendance will not be tracked but is inferred through completed questionnaires. To help retain participants, food and a $5 gift card will be offered at session one to every participant; VHF has offered to donate funds. A final drawing will be completed after the third session for a larger prize of two $25 Visa gift cards to aid in retention.

Intervention

This project taught pain neuroscience education based on the "Why You Hurt" education system (Louw et al., 2019; Zimney et al., 2023). This system was studied in the veteran population, who have chronic pain and PTSD like the participants in this project and was shown to have a positive effect on pain severity, pain catastrophizing, and activity improvement (Benedict et al. 2021; Benedict et al., 2023). Based on previous conversations with stakeholders, this was broken down into three 15-minute modules for easier consumption for participants (VHF Staff. *personal communication.* November 21, 2023). PNE was held in person not virtually because as evidence shows higher attendance for in person sessions and improved outcomes (Louw et al., 2019; Photopoulos et al., 2023).

PNE modules were explained verbally and in small group format using handouts. This was decided to be the best format based on discussions with VHF, which accommodates participants' needs. During PNE sessions, participants were taught their chronic pain may have less to do with their tissue health and more to do with the nervous system. Metaphors and stories were used to explain pain pathways to reconceptualize their symptoms. The information was reinforced throughout the sessions to improve information retention.

First Session of PNE

The first session started with a brief overview of the material then proceeded to informed consent, participant expectations, and project timeline. A question-and-answer period was held prior to education modules to build trust and to make sure that the focus was on the participants' needs, which was the priority of this project. Once consent was signed and questionnaires were completed each participant was given a handout of the day's material to be covered (see Appendices: C, D, E, F, J). The didactic portion included a 15-minute module. The key points

that were highlighted in the presentation included the following: 1) safety and when to seek a provider (see Appendix B) (Owen et al., 2018; Shah et al., 2023); 2) anatomy and physiology of the pain response (Louw et al., 2017b); 3) definition of pain (acute/chronic) (Bonezzi et al., 2020), 4) the fake hand story (Mohan et al., 2012); 5) healing and constant false alarm signaling during chronic pain (Bilgin et al., 2022); 6) pain associated with biological, physiological, and social factors (Bilgin et al., 2022); 7) how understanding individual pain stories will help them be better equipped to quiet their false pain signals (Fink, 2000; Louw et al., 2019a); and 8) Student facilitators gave their personal pain stories as examples.

The first exercise had the DNP student facilitators sharing their personal pain stories and then having the participants write theirs down on paper. This was to build interpersonal relationships and aid in gaining trust through shared experiences with the educators (Xie & Derakhshan, 2021; Puder et al., 2022). Mindfulness techniques in coordination with writing were used to reinforce retention of material (Blickenstaff & Pearson, 2016; Devillers-Reolon et al., 2023). Multiple studies have shown that having a physical activity, including writing, to go along with education programs helps to retain what was learned (Puder et al., 2022; Sasaki et al., 2022; Zabriskie & Heath, 2019). To establish a daily routine, the mindfulness technique was recommended to be correlated with a daily at-home regimen like showering or brushing teeth (see Appendix I). Five-dollar gift cards were given to every attendee. Food and beverages were provided by the student facilitators.

Second Session of PNE

During session two there was a brief review of the previously stated materials pairing down all of the information into four core concepts (See Appendix K): 1) pain is not a measurement of tissue damage, 2) pain modulation occurs through somatic, psychological and

social domains, 3) as pain changes to a chronic condition that pain sensation becomes a less dependable indicator of tissue health, 4) that there is a positive correlation between pain intensity and the general subconscious belief that tissues are in danger (Gilam et al., 2020; King et al., 2018; Louw et al., 2013; Martinez-Calderon et al., 2018). The same mindfulness exercise used in session one was used at the end of session two (see Appendix I).

As part of the tailoring portion of the program the second session also included in-depth interviews to understand how the material was being digested, what parts were still unclear, how the student facilitators are coming across to the participants, and what form of instruction worked best (see appendix H). Based upon responses the DNP students created the third module. Five-dollar gift cards were given to all attendees at the end of the second session. Food and beverages were provided by the student facilitators for this meeting.

Third Session of PNE

The session started with the mindfulness exercise used in session one and two (see Appendix I). A 15-minute module was presented based on information from the second session (see Appendix L). Once this was completed there was a question-and-answer period followed by time for completing questionnaires (see Appendices: C, D, E, and G). Two $25 gift cards were raffled at the end of the third session. Food was provided by the staff while beverages were provided by the student facilitators.

Methods

Data Collection

Session 1

Eleven participants signed a paper consent form (see Appendix A) using pens supplied by the student facilitators. These forms were collected and counted to make sure all attendees signed

the form but since they held patient signatures they were shredded after the first session. All other forms collected did not contain personal identifiable information. The participants were given three quantitative questionnaires: The Revised Moseley Pain Neuroscience Questionnaire (rNPQ), the Defense and Veterans Pain Rating scale (DVPRS), and the Pain Numeric Rating Scale (PNRS) (see Appendices: C, D, and E). One qualitative questionnaire was filled out (see Appendix F). These questionnaires were on paper, and they were distributed and collected before starting the module. All 11 participants completed the questionnaires. The module was a PowerPoint presentation printed as paper handouts that they could follow along and make notations while partaking in the presentation (see Appendix J). These handouts were not collected from the veterans and were theirs to use at home.

Session 2

Five participants attended the second session. Printed handouts of session 2 PowerPoint Presentation were given at the beginning of the session, and they were allowed to keep these (see Appendix K). The participants were given the in-depth interview question sheet at the beginning of class. The questions were read aloud for them by the student facilitator, and they filled out the form individually. The sheets were collected at the end of the session.

Session 3

The PowerPoint handout was given prior to presentation (see Appendix L). Five participants attended the third session, but only four filled out all the printed quantitative questionnaires and three filled out the printed qualitative questionnaires (see Appendices: C, D, E, and G). These were collected at the end of the final session.

Data Analysis

Quantitative

The quantitative questionnaires were analyzed by both students separately and then together to check accuracy of findings. Averages of all scores were calculated to compare pre- and posttests for evaluation of success.

Qualitative

All qualitative information was transferred from the paper questionnaires to a word document. The written answers were transcribed verbatim and then analyzed separately by each student. For the final qualitative questionnaires, the students used inductive, open coding for choosing themes. Once they individually chose relevant themes, the students met and created a common code table from the following topics: Managed/unmanaged, medication, physical therapy, alternative strategies, pain location, hopelessness, coping/no coping. Together, it was decided that the overarching themes from the pre-intervention and post-intervention include pain management strategies, pain perception, and pain origin.

Discrepancies in coding were addressed through inductive open coding. Students individually analyzed qualitative information from paper questionnaires using this method. They identified initial codes for written answers by closely examining the data without preconceived categories. Similar codes were grouped into sub-themes, which emerged from patterns observed in the coded data. For instance, physical therapy, yoga, and meditation formed a sub-theme related to pain strategies. The students then identified overarching themes, including Pain Management Strategies (encompassing various approaches to pain management), Pain Perception (reflecting individual interpretations of pain), and Pain Origin (exploring underlying causes). Through collaboration, they reached a consensus on these themes based on pre- and post-intervention data.

Results

The rNPQ assesses pain neuroscience knowledge and beliefs. The pretest data includes responses from 11 veterans, while the posttest data includes responses from 5 veterans. The mean score for correct answers increased from 4.8 in the pretest to 5.6 in the posttest, indicating an improvement in knowledge after the intervention. The percentage of correct answers also increased from 40% in the pretest to 47% in the posttest, also suggesting an improvement in pain neuroscience knowledge and beliefs. See Tables 1 and 2 below.

Table 1

Results of Revised Moseley Neuroscience Pain Questionnaire Pre-Test

	Correct	***Wrong***	***Uncertain***	***Total***
Question 1:	1	7	3	11
Question 2:	1	9	1	11
Question 3:	8	2	1	11
Question 4:	5	4	2	11
Question 5:	9	1	1	11
Question 6:	5	1	5	11
Question 7:	4	4	3	11
Question 8:	4	4	3	11
Question 9:	2	2	7	11
Question 10:	3	7	1	11
Question 11:	6	1	4	11
Question 12:	5	3	3	11
Total	53	45	34	132
Percentage	40	34	26	100
Mean Score	4.8	4.1	3.1	12

Table 2

Results of Revised Moseley's Pain Questionnaire Answers - Posttest

	Correct	***Wrong***	***Uncertain***	***Total***
Question 1	1	4	0	5
Question 2	1	3	1	5
Question 3	1	4	0	5
Question 4	4	1	0	5
Question 5	3	1	1	5
Question 6	4	1	0	5

Question 7	3	2	0	5
Question 8	2	1	2	5
Question 9	1	0	4	5
Question 10	2	2	1	5
Question 11	3	1	1	5
Question 12	3	1	1	5
Total	28	21	11	60
Percentage	47	35	18	100
Mean Score	5.6	4.2	2.2	12

The DVPRS was filled out by 11 veterans in the first session and three veterans in the final session. *Table 3* and *Table 4* show the results of the questionnaire. The average activity score decreased from 6.18 (pretest) to 5.67 (posttest). This suggests that pain interfered less with activity after the intervention. The average sleep score increased from 6.27 (pretest) to 7.33 (posttest). This indicates that pain interfered more with sleep after the intervention. The average mood score decreased from 7.18 (pretest) to 6.33 (posttest). This suggests that pain affected mood less after the intervention. The average stress score decreased from 7.36 (pretest) to 6.33 (posttest). This indicates that pain contributed less to stress after the intervention. The average scores for how pain interfered with activity, mood, and stress decreased in the posttest compared to the pretest. This suggests that the intervention may have helped in managing pain better. The average score for how pain interfered with sleep increased in the posttest.

Table 3

Results of the DVPRS Questionnaire

Participant number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Question 1: Circle the one number that describes how, during the past 24 hours, pain has interfered with your ACTIVITY. (scale 0-10)											
Pretest	**8**	**4**	**6**	**6**	**8**	**7**	**5**	**4**	**8**	**4**	**8**
Posttest	**8**	**4**	**5**								

Question 2: Circle the one number that describes how, during the past 24 hours, pain has interfered with your SLEEP. (scale 0-10)											
Pretest	**9**	**1**	**6**	**5**	**8**	**4**	**6**	**7**	**8**	**6**	**9**
Posttest	**10**	**5**	**7**								
Question 3: Circle the one number that describes how, during the past 24 hours, pain has interfered with your MOOD. (scale 0-10)											
Pretest	**9**	**3**	**6**	**5**	**9**	**6**	**7**	**8**	**7**	**9**	**10**
Posttest	**9**	**5**	**5**								
Question 4: Circle the one number that describes how, during the past 24 hours, pain has interfered with your STRESS. **(**scale **0-10)**											
Pretest	**9**	**4**	**6**	**3**	**8**	**9**	**7**	**9**	**6**	**10**	**10**
Posttest	**9**	**5**	**5**								

Table 4

Average Scores for DVPRS Questionnaires for Activity, Sleep, Mood, and Stress

	Activity	**Sleep**	**Mood**	**Stress**
Pretest	6.1818	6.2727	7.1818	7.3636
Posttest	5.6667	7.3333	6.3333	6.3333

The PNRS was filled out by 11 veterans in the first session and four veterans in the final session. *Table 5 and Table 6* show the results of the questionnaire. The average scores for current, usual, and best pain levels increased in the posttest compared to the pretest. This suggests that the level of pain experienced by veterans increased after the intervention. This could indicate an increase in pain levels over time or a heightened awareness and understanding of pain due to the intervention.

Table 5

Pain Numeric Rating Scale (PNRS)

1. On a scale of 0 to 10, with 0 being no pain at all and 10 being the worst pain imaginable, how would you rate your pain RIGHT NOW?											**Total**
Initial	9	2	5	6	8	8	3	4	5	2	8	60
Final	8	5	6	7								26

2. On the same scale, how would you rate your USUAL level of pain during the last week?												
Initial	7	3	6	6	7	8	4	5	5	4	7	62
Final	8	5	6	7								26
3. On the same scale, how would you rate your BEST level of pain during the last week?												
Initial	4	0	6	6	8	3	3	3	0	2	5	40
Final	7	3	4	7								21
4. On the same scale, how would you rate your WORST level of pain during the last week?												
Initial	9	4	9	8	9	10	9	7	10	6	6	87
Final	9	9	6	7								31

Table 6

Average Scores for Pain Numeric Rating Scale (PNRS)

	Current	Usual	Best	Worst
Pretest	5.45	5.64	3.64	7.91
Posttest	6.5	6.5	5.25	7.75

Qualitative

During Pre-intervention veterans reported using a variety of strategies to manage their pain, including medication (e.g., ibuprofen, pregabalin, baclofen, diclofenac cream, Aimovig injectables, sumatriptan), physical therapy, stretching, rest, exercise, and meditation. One veteran wrote “Taking Aimovig injectables, sumatriptan, and acupuncture with mixed results”. It was acknowledged by some that they had tried similar techniques previously, “The mantra used here is very similar to my own meditation techniques”. Some veterans reported that their pain was not well managed, while others reported coping with it or trying to ignore it. “Yes, oxy’s 10mg. No my pain is not well managed over the last 4 years I’ve learnt to accept it as an everyday part of my life” & “I usually try to iggnor it if possible. In most cases if I physicaly do something that

removes my attention to what I'm feeling that is the best I can hope for". The pain experienced by the veterans originated from various sources, including infections, injuries, osteoarthritis, multiple myeloma cancer, and head trauma.

When asked about what their thoughts were on the program, veteran responses included the following: "Keep coming back, good intro", "The program is very informative" and "It is engaging and presented in an interested manner. Breaking up presentation between two people keeps people engaged". When asked about what was helpful the responses were: "concepts and actions to manage pain", "mental control of your experiences about pain", "literally everything" and "all of the useful information presented". All participants answer no in various ways "nope" to identify if there was anything confusing. Lastly, when asked what format would be best, one asked for a PowerPoint "maybe a PowerPoint" and another asked for a video "Discussion, video". This is what informed the creation of the final session using videos, discussion and PowerPoint (See Appendix L).

Post-intervention, some veterans reported "keeping busy" as a strategy to manage their pain. One veteran reported that they were "still being diagnosed for treatment", indicating ongoing struggles with pain management. Veterans reported pain resulting from car crashes, bike crashes, dislocated knees, multiple head traumas, and concussions. "Multiple head trauma & concussions from childhood to present (approx 15 in lifetime). Chronic pain is pretty much the norm for myself". The themes suggest the need for tailored interventions and ongoing support to address the nature of pain experienced by veterans.

Discussion

The project identified the gap in the literature of a lack of research specifically examining the effectiveness of PNE within the unique context of veterans with chronic pain. By implementing a tailored PNE program for veterans at their housing facility, the program attempted to fill this gap by evaluating the impact of PNE on veterans' pain perception and management within a veteran-specific context. The project also recognizes the importance of tailoring PNE programs to address the specific needs, preferences, and cultural factors relevant to the veteran population. By incorporating in-depth interviews during the second session of PNE to understand how the material is being digested and what form of instruction works best, the study aimed to tailor the PNE sessions based on individual participant feedback. Lastly, while many studies on PNE focus on short-term outcomes, such as immediate changes in pain knowledge or self-efficacy, there is a need for longitudinal studies to assess the long-term effects of PNE interventions on veterans' pain severity, functional status, healthcare utilization, and quality of life over extended periods. Although not addressed in this program, the study's focus on monitoring changes in pain stories and evaluating pain severity pre- and post-PNE sessions contributes to understanding initial PNE interventions that could lead to improved long-term outcomes among veterans.

Limitations

The students’ non-veteran status, coupled with the lack of access beforehand and the inability to establish rapport with veterans prior to implementation, posed challenges in customizing the program. To instill trust in the veterans and avoid concerns with taking identifiable information, no personal data was collected, which gave them anonymity with the goal of improved participation. One factor not controlled in this project was attendance taking to avoid concerns with personal identifiable information. This means it cannot be ruled out that

different individuals attended each session. For example, the five individuals who participated in session two and provided responses for tailoring purposes may not have been identical to those present during session three.

Positionality

Both students have close family members who are veterans of their respective countries. This gives them a basic understanding of military life from which to create a bridge for connection and a better ability for empathy. One student has chronic pain from multiple injuries and a chronic illness. This lived experience gives her a better understanding of the pain perspective and a personal approach for sharing pain stories. One such story of being worried about being identified as a drug seeker during treatment was received with multiple veterans verbalizing their shared experiences. Being able to connect with the veterans in this way aided in participant engagement. These students believe future educators should have a history of chronic pain. It is also believed that having a military background would be beneficial for establishing trust, creating a veteran-centered program, and improving retention of participants.

Conclusion

Participant understanding of pain improved as evidenced by the increased scores in the Revised Moseley's Pain Questionnaire. However, the Pain Numeric Rating Scale scores suggest that pain levels may have increased over time. This could be due to a variety of factors, including the natural progression of the condition causing the pain, increased awareness and understanding of pain, or other external factors not controlled in this project. Further research is needed to understand the specific factors contributing to these changes.

The qualitative data suggests that veterans used various strategies to manage their pain, both before and after the intervention. However, some veterans reported ongoing struggles with pain management, indicating a need for more effective pain management strategies. The pain experienced by the veterans originated from various sources, highlighting the complexity of pain management in this population.

Recommendations

Future interventions should focus on improving understanding of pain and providing more effective pain management strategies, including those related to sleep. Also, it would be beneficial to control external factors that could influence pain levels to better assess the intervention's effectiveness. Interventions should also consider the diverse origins of pain and the individual pain management strategies used by veterans. More effective strategies may be needed to help veterans cope with their pain, this is where tailoring sessions should focus, in future projects.

In conclusion, the intervention appears to have resulted in less pain interference with activity, mood, and stress, but more interference with sleep. These results highlight the importance of considering multiple dimensions of pain when evaluating the effectiveness of interventions. Further research may be needed to understand why sleep was negatively impacted. Although some studies have shown efficacy in pain severity in the general population, more research is needed within the veteran population as the approach to education may not be translational.

References

Adams, Z. W., Taylor, B. G., Flanagan, E., Kwon, E., Johnson-Kwochka, A. V., Elkington, K. S.,Becan, J. E., & Aalsma, M. C. (2021). Opioid Use Disorder Stigma, Discrimination, and Policy Attitudes in a National Sample of U.S. Young Adults. The Journal of adolescent health : official publication of the Society for Adolescent Medicine, 69(2), 321–328. https://doi.org/10.1016/j.jadohealth.2020.12.142

Anamkath, N. S., Palyo, S. A., Jacobs, S. C., Lartigue, A., Schopmeyer, K., & Strigo, I. A. (2018). An Interdisciplinary Pain Rehabilitation Program for Veterans with Chronic Pain: Description and Initial Evaluation of Outcomes. Pain research & management, 2018, 3941682. https://doi.org/10.1155/2018/3941682

Benedict, T. M., Keenan, P. G., Nitz, A. J., & Moeller-Bertram, T. (2020). Post-Traumatic Stress Disorder Symptoms Contribute to Worse Pain and Health Outcomes in Veterans With PTSD Compared to Those Without: A Systematic Review With Meta-Analysis. *Military medicine*, *185*(9-10), e1481–e1491. https://doi.org/10.1093/milmed/usaa052

Benedict, T. M., Nitz, A. J., Abt, J. P., & Louw, A. (2021). Development of a pain neuroscience education program for post-traumatic stress disorder and pain. *Physiotherapy theory and practice*, *37*(4), 473–485. https://doi.org/10.1080/09593985.2019.1633717

Benedict, T., Nitz, A., Gambrel, M., & Louw, A. (2023). Pain neuroscience education improves post-traumatic stress disorder, disability, and pain self-efficacy in veterans and service members with chronic low back pain: Preliminary results from a randomized controlled trial with 12-month follow-up. *Military Psychology*. https://www.tandfonline.com/doi/full/10.1080/08995605.2023.2188046

Bennett, A. S., Guarino, H., Britton, P. C., O'Brien-Mazza, D., Cook, S. H., Taveras, F., Cortez, J., & Elliott, L. (2022). U.S. Military veterans and the opioid overdose crisis: a review of risk factors and prevention efforts. *Annals of medicine*, *54*(1), 1826–1838. https://doi.org/10.1080/07853890.2022.2092896

Bilgin, A., Kesik, G., & Özdemir, L. (2022). Biopsychosocial Factors Predicting Pain Among Individuals Experiencing the Novel Coronavirus Disease (COVID-19). Pain management nursing : official journal of the American Society of Pain Management Nurses, 23(1), 79–86. https://doi.org/10.1016/j.pmn.2021.11.001

Blickenstaff, C., & Pearson, N. (2016). Reconciling movement and exercise with pain neuroscience education: A case for consistent education. Physiotherapy theory and practice, 32(5), 396–407. https://doi.org/10.1080/09593985.2016.1194653

Bittinger,K., Soriana, A., Lucenko,B., Felver,B. (2018). Homelessness and housing instability among veterans in Washington State. https://www.dshs.wa.gov/sites/default/files/rda/reports/research-11-255.pdf

Bonezzi, C., Fornasari, D., Cricelli, C., Magni, A., & Ventriglia, G. (2020). Not All Pain is Created Equal: Basic Definitions and Diagnostic Work-Up. Pain and therapy, 9(Suppl 1), 1–15. https://doi.org/10.1007/s40122-020-00217-w

Cosio, D., & Lin, E. H. (2013). Effects of a pain education program for veterans with chronic, noncancer pain: a pilot study. *Journal of pain & palliative care pharmacotherapy*, *27*(4), 340–349. https://doi.org/10.3109/15360288.2013.846953

Devillers-Réolon, L., Temprado, J. J., & Sleimen-Malkoun, R. (2023). Mindfulness meditation and bimanual coordination control: study of acute effects and the mediating role of

cognition. *Frontiers in psychology*, *14*, 1162390. https://doi.org/10.3389/fpsyg.2023.1162390

Dowell D, Ragan KR, Jones CM, Baldwin GT, Chou R. (2022). CDC Clinical Practice Guideline for Prescribing Opioids for Pain. MMWR http://dx.doi.org/10.15585/mmwr.rr7103a1.

Fisher, R., Ewing, J., Garrett, A., Harrison, E. K., Lwin, K. K., & Wheeler, D. W. (2013). The nature and prevalence of chronic pain in homeless persons: an observational study. *F1000Research*, *2*, 164. https://doi.org/10.12688/f1000research.2-164.v1

Gellad, W., Good, C., and Shulkin, D. (2017) Addressing the opioid epidemic in the United States: Lessons from the Department of Veterans Affairs. *JAMA Internal Medicine*. May 1, 2017;177(5):611-612.

Gilam, G., Gross, J. J., Wager, T. D., Keefe, F. J., & Mackey, S. (2020). What Is the Relationship between Pain and Emotion? Bridging Constructs and Communities. Neuron, 107(1), 17–21. https://doi.org/10.1016/j.neuron.2020.05.024

Haun, J.N., Fowler, C.A., Venkatachalam, H.H. (2023). Empower Veterans Program (EVP): a chronic pain management program demonstrates positive outcomes among veterans. *BMC Health Serv Res* 23, 431. https://doi.org/10.1186/s12913-023-09327-5

Hecke, O., Torrance, N., Smith, B. (2013). Chronic pain epidemiology-where do lifestyle factors fit in? *British Journal of Pain. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4590163/*

Hinkel, H. M., Currier, J. M., Isaak, S. L., McAdams, E., & Kilpatrick,J. F. (2023). Moral injury and chronic pain among military veterans in an integrated behavioral health clinic. *Psychological trauma : theory, research, practice and policy*, *15*(1), 140–143. https://doi.org/10.1037/tra0001230

Jalali, M.S., Botticelli, M., Hwang, R.C. et al. The opioid crisis: a contextual, social-ecological

framework. *Health Res Policy Sys* 18, 87 (2020). https://doi.org/10.1186/s12961-020-00596-8

Jamison, R. N., & Virts, K. L. (1990). The influence of family support on chronic pain. *Behaviour research and therapy*, *28*(4), 283–287. https://doi.org/10.1016/0005-7967(90)90079-x

Johnston, K. J. A., & Huckins, L. M. (2022). Chronic Pain and Psychiatric Conditions. *Complex psychiatry*, *9*(1-4), 24–43. https://doi.org/10.1159/000527041

Krause-Parello, C. A., Flynn, L., Hibler, D. A., Presciutti, R. E., Pratt, B. A., Walsh, P., … Moreno, S. J. (2022). Social and Chronic Pain: Veterans Sharing a Path in Developing a Patient-Centered Response to the COVID-19 Pandemic. *Journal of Veterans Studies*, *8*(1), 266–277.DOI: https://doi.org/10.21061/jvs.v8i1.331

King, R., Robinson, V., Elliott-Button, H. L., Watson, J. A., Ryan, C. G., & Martin, D. J. (2018). Pain Reconceptualization after Pain Neurophysiology Education in Adults with Chronic Low Back Pain: A Qualitative Study. Pain research & management, 2018, 3745651. https://doi.org/10.1155/2018/3745651

Kohns, D., Urbanik, C., Geisser, M., Schubiner, H. & Lumley, M. (2020). The Effects of a Pain Psychology and Neuroscience Self-Evaluation Internet Intervention. *The Clinical Journal of Pain*, 36 (9), 683-692. doi: 10.1097/AJP.0000000000000857.

Lepri, B., Romani, D., Storari, L., & Barbari, V. (2023). Effectiveness of Pain Neuroscience Education in Patients with Chronic Musculoskeletal Pain and Central Sensitization: A Systematic Review. *International journal of environmental research and public health*, *20*(5), 4098. https://doi.org/10.3390/ijerph20054098

Liberto, J. (2020). The opioid crisis: Treating our nations veterans. VA Maryland Health Care System. Retrieved March 4, 2023, from https://www.nursing.umaryland.edu/media/son/academics/professional-education/The-Opioid-Crisis-Treating-Our-Nations-Veterans-pdf.pdf

Lin, L. A., Bohnert, A. S. B., Kerns, R. D., Clay, M. A., Ganoczy, D., & Ilgen, M. A. (2017). Impact of the Opioid Safety Initiative on opioid-related prescribing in veterans. *Pain*, *158*(5), 833–839. https://doi.org/10.1097/j.pain.0000000000000837

Louw, A. , Butler, D. S. , Diener, I. & Puentedura, E. J. (2013). Development of a Preoperative Neuroscience Educational Program for Patients with Lumbar Radiculopathy. American Journal of Physical Medicine & Rehabilitation, 92 (5), 446-452. doi: 10.1097/PHM.0b013e3182876aa4.

Louw A, Zimney K, Puentedura E (2016) Retention of pain neuroscience knowledge: a multi-centre trial. New Zealand Journal of Physiotherapy 44(2): 91-96. doi: 10.15619/NZJP/44.2.04.

Louw, A., Nijs, J., & Puentedura, E. J. (2017). A clinical perspective on a pain neuroscience education approach to manual therapy. The Journal of manual & manipulative therapy, 25(3), 160–168. https://doi.org/10.1080/10669817.2017.1323699

Louw, A., Vogsland, R., Marth, L., Marshall, P., Cox, T., & Landers, M. (2019). Interdisciplinary Pain Neuroscience Continuing Education in the Veterans Affairs: Live Training and Live- Stream With 1-Year Follow-up. The Clinical journal of pain, 35(11), 901–907. https://doi.org/10.1097/AJP.0000000000000756

Mannes, Z. L., Stohl, M., Fink, D. S., Olfson, M., Keyes, K. M., Martins, S. S., Gradus, J. L., Saxon, A. J., Maynard, C., Livne, O., Gutkind, S., & Hasin, D. S. (2022). Non-

pharmacological Treatment for Chronic Pain in US Veterans Treated Within the Veterans Health Administration: Implications for Expansion in US Healthcare Systems. Journal of general internal medicine, 37(15), 3937–3946. https://doi.org/10.1007/s11606-021-07370-8

Martinez-Calderon, J., Struyf, F., Meeus, M., & Luque-Suarez, A. (2018). The association between pain beliefs and pain intensity and/or disability in people with shoulder pain: A systematic review. *Musculoskeletal science & practice*, *37*, 29–57. https://doi.org/10.1016/j.msksp.2018.06.010

McCracken L. M. (2005). Social context and acceptance of chronic pain: the role of solicitous and punishing responses. *Pain*, *113*(1-2), 155–159. https://doi.org/10.1016/j.pain.2004.10.004

Meints, S., Edwards, R. (2018). Evaluating psychosocial contributions to chronic pain outcomes. *Progress in Neuro-psychopharmacology and biological psychiatry* volume87. doi: 10.1016/j.pnpbp.2018.01.017

Mohan, R., Jensen, K. B., Petkova, V. I., Dey, A., Barnsley, N., Ingvar, M., McAuley, J. H., Moseley, G. L., & Ehrsson, H. H. (2012). No pain relief with the rubber hand illusion. *PloS one*, *7*(12), e52400. https://doi.org/10.1371/journal.pone.0052400

O'Toole, T. P., Johnson, E. E., Aiello, R., Kane, V., & Pape, L. (2016). Tailoring care to vulnerable populations by incorporating social determinants of health: The Veterans Health Administration's "Homeless Patient Aligned Care Team" Program. *Preventing chronic disease*, *13*, E44. https://doi.org/10.5888/pcd13.150567

Owen, G. T., Bruel, B. M., Schade, C. M., Eckmann, M. S., Hustak, E. C., & Engle, M. P. (2018). Evidence-based pain medicine for primary care physicians. *Baylor University Medical Center*. 31(1), 37–47. https://doi.org/10.1080/08998280.2017.1400290

Photopoulos, P., Tsonos, C., Stavrakas, I., & Triantis, D. (2023). Remote and In-Person Learning: Utility Versus Social Experience. *SN computer science*, *4*(2), 116. https://doi.org/10.1007/s42979-022-01539-6

Puder, D., Dominguez, C., Borecky, A., Ing, A., Ing, K., Martinez, A. E., Pereau, M., & Kashner, T. M. (2022). Assessing Interpersonal Relationships in Medical Education: the Connection Index. *Academic psychiatry : the journal of the American Association of Directors of Psychiatric Residency Training and the Association for Academic Psychiatry*, *46*(6), 683–691. https://doi.org/10.1007/s40596-021-01574-0

Reisman, M. (2016). PTSD Treatment for Veterans: what's working, what's new, and what's next. *Pharmacy & Therapeutics.* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5047000/

Rintoul, K., Song, E., McLellan-Carich, R., Schejelderup, E., Barr, A. (2023). A scoping review of psychiatric conditions associated with chronic pain in the homeless and marginally house population. *Frontiers in Pain Research*. doi: 10.3389/fpain.2023.1020038

Rondon-Ramos, A., Martinez-Calderon, J., Diaz-Cerrillo, J. L., Rivas-Ruiz, F., Ariza-Hurtado, G. R., Clavero-Cano, S., & Luque-Suarez, A. (2020). Pain Neuroscience Education Plus Usual Care Is More Effective Than Usual Care Alone to Improve Self-Efficacy Beliefs in People with Chronic Musculoskeletal Pain: A Non-Randomized Controlled Trial. Journal of clinical medicine, 9(7), 2195. https://doi.org/10.3390/jcm9072195

Sasaki, R., Honda, Y., Oga, S., Fukushima, T., Tanaka, N., Kajiwara, Y., ... & Okita, M. (2022). Effect of exercise and/or educational interventions on physical activity and pain in patients with hip/knee osteoarthritis: A systematic review with meta-analysis. *Plos one*, *17*(11), e0275591.

Shah P, Thornton I, Turrin D, et al. Informed Consent. (2023). Informed Consent. *StatPearls Publishing*; https://www.ncbi.nlm.nih.gov/books/NBK430827/

Vallerand, A. H., Cosler, P., Henningfield, J. E., & Galassini, P. (2015). Pain management strategies and lessons from the military: A narrative review. *Pain research & management*, *20*(5), 261–268. https://doi.org/10.1155/2015/196025

Toblin, R. L., Quartana, P. J., Riviere, L. A., Walper, K. C., & Hoge, C. W. (2014). Chronic pain and opioid use in US soldiers after combat deployment. *JAMA internal medicine*, *174*(8), 1400–1401. https://doi.org/10.1001/jamainternmed.2014.2726

Treichler, E. B. H., Reznik, S. J., Oakes, D., Girard, V., & Zisman-Ilani, Y. (2023). Military culture and collaborative decision-making in mental healthcare: cultural, communication and policy considerations. BJPsych open, 9(5), e154. https://doi.org/10.1192/bjo.2023.516

Tsai, J., & Rosenheck, R. A. (2012). Homeless and nonhomeless VA service users likely eligible for Medicaid expansion. Psychiatric Services, 63(6), 597–599. https://doi.org/10.1176/appi.ps.201100229

Tsai, J., Szymkowiak, D., & Jutkowitz, E. (2022). Developing an operational definition of housing instability and homelessness in Veterans Health Administration's medical records. *PloS one*, *17*(12), e0279973. https://doi.org/10.1371/journal.pone.0279973

Wood L., Hendrick P.A. (2018). A systematic review and meta-analysis of pain neuroscience education for chronic low back pain: Short-and long-term outcomes of pain and disability. *Eur. J. Pain.* 2018; 23:234–249. doi: 10.1002/ejp.1314.

Xie, F., Derakhshan, A. (2021). A conceptual review of positive teacher interpersonal communication behaviors in the instructional context. *Frontiers in psychology.* doi: 10.3389/fpsyg.2021.708490

Zabriskie, H., Heath, E. (2019) Effectiveness of studying when coupled with exercise-induced arousal. *International journal of exercise science*. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6719811/

Zimney, K., Van Bogaert, W., & Louw, A. (2023). The Biology of Chronic Pain and Its Implications for Pain Neuroscience Education: State of the Art. *Journal of clinical medicine*, *12*(13), 4199. https://doi.org/10.3390/jcm12134199

Appendices

Appendix A
Informed Consent

CONSENT TO PARTICIPATE IN RESEARCH

TITLE: Evaluation of Pain Neuroscience Education Among Veterans with Chronic Pain

INVESTIGATOR: Amanda Black, DNP-FNP Student, Seattle University, 206.669.5556
Tandeep Kaur, DNP-FNP Student, Seattle University, 206.945.3017

ADVISOR: Teresa Van Winkle PhD(c) MPH, RN, CPN, College of Nursing, Seattle University, 206.714.8299

PURPOSE: You are being asked to participate in a qualitative study that seeks to investigate the effects of pain neuroscience education (describing in detail the study of and relation of pain and pain processing by the nervous system) among veterans who experience chronic pain. You will be able and invited to have a support person with you during every part of the process. This will take place during three educational sessions. The first meeting will be a 30-minute education module followed by a question-and-answer period then a 10-minute mindfulness exercise. You will be asked to complete four questionnaires prior to the educational module. The second session we will have mental exercises that introduce new ways of thinking about pain that should last approximately 20-30 minutes. We will follow-up with personal interviews on a volunteer basis. The interview will be one-on-one with the student and can include your support person. The interview questions will focus on retrieving feedback about how the course is going. anything you think was missed during the educational modules, and we will ask you to share your personal pain story. The third session will be a recap of the material and another mindfulness exercise. At the end of the third session you will be asked to complete the same four questionnaires.

SOURCE OF SUPPORT: This study is being performed as partial fulfillment of the requirements for the doctoral degree in Nursing Practice at Seattle University.

RISKS: There are no known risks associated with this study. We will be meeting in-person so the risk of cold/flu or virus is possible, we ask that those who have symptoms wear masks according to CDC guidelines. Hand sanitizer and masks will be provided.

BENEFITS: Pain neuroscience education has been shown to be effective in helping patients reconceptualize pain through understanding the

multiple neurophysiological, neurobiological, sociological and physical components that may be involved in their individual pain experience. Resulting in pain reduction, improved bodily function, decreased fear of movement, and diminished negative psychological conceptions.

INCENTIVES: For participants who complete three classes and questionnaires, a draw will be held at the end of the second meeting following the collection of the questionnaires. Upon returning the questionnaires you will receive a raffle ticket. I will randomly draw two raffle tickets from those collected and gift each winning participant with a $50 gift card. Participation in the project will require no monetary cost to you.

CONFIDENTIALITY: No personal identifiers will be on collected data. The only sheet that will have this information is the consent form with signatures and these will be destroyed at the end of the study. The consent forms will be held in a locked cabinet on Seattle University campus with access only to the DNP student investigators (Tandeep Kaur and Amanda Black) and their faculty mentor Teresa Van Winkle.

RIGHT TO WITHDRAW: Your participation in this study is *voluntary*. You may withdraw your consent to participate at any time without penalty. Your withdrawal will not influence any other services to which you may be otherwise entitled. Participation of this study is not necessary to attend.

SUMMARY OF RESULTS: A summary of the results of this research will be available to you, at no cost and sent via email to Megan Sarver and Dalwyn Dean. A summary will be available around June 2024.

VOLUNTARY CONSENT: I have read the above statements and understand what is being asked of me. I also understand that my participation is voluntary and that I am free to withdraw my consent at any time, for any reason, without penalty. On these terms, I certify that I am willing to participate in this doctoral project.

My signature on this consent form represents my consent to participate in this project. I understand that should I have any concerns about my participation in this study or if I have any concerns that my rights are being violated, I may contact Dr. Michael Spinetta, Chair of the Seattle University Institutional Review Board at (206) 296-2585.

Signature of Participant _____

Appendix B

Red Flags & When to Seek Medical Advice Form

Red Flags Information Sheet:

*****<u>When to Seek Medical Advice</u>**
Please check off anything that relates to you on this list. We recommend you listen but not participate and instead contact your medical provider if any of the following apply to you:
 You are currently experiencing fever, sweating or chills.
 You recently experienced an unexpected loss of bladder or bowel control.
 You've experienced a recent, unexplained weight loss.
 You experience new onset of pain starting within the last 3 months.
 You have never been evaluated by a medical provider for the pain you have today.
 Your pain is rapidly worsening.
 You are unable to bear weight because of your pain.
 You noticed any skin rashes in the painful region.
 Your pain began with a traumatic event in the last 3 months (such as a fall or lifting injury).

Liability Waiver

When completing our Pain Neuroscience Education please use common sense. To reduce and avoid injury, check with your doctor before beginning any movement program. By performing any fitness exercises, you are performing them at your own risk. This program does not recommend or endorse specific exercises or physical activity. You will be able to participate without physical activity. Amanda Black and Tandeep Kaur will not be liable for any injury or harm you sustain due to our Pain Neuroscience Education Program. Please listen to your body and rest when you need it. Thanks for your understanding.

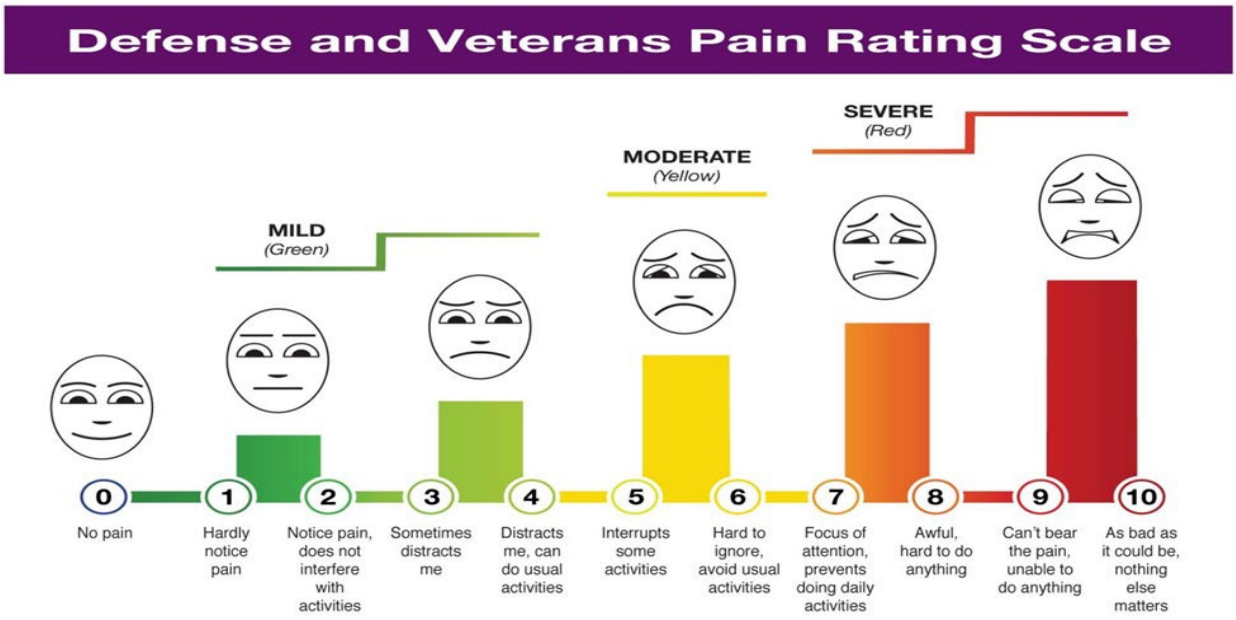
Appendix C

Revised Moseley Pain Neuroscience Questionnaire

	Revised Moseley Pain Neuroscience Questionnaire	**T**	**F**	**U**
1	It is possible to have pain and not know about it.			
2	When part of your body is injured, special pain receptors convey the pain message to your brain.			
3	Pain only occurs when you are injured or at risk of being injured.			
4	When you are injured, special receptors convey the danger message to your spinal cord.			
5	Special nerves in your spinal cord convey 'danger' messages to your brain.			
6	Nerves adapt by increasing their resting level of excitement.			
7	Chronic pain means that an injury hasn't healed properly.			
8	Worse injuries always result in worse pain			
9	Descending neurons are always inhibitory.			
10	Pain occurs whenever you are injured.			
11	When you injure yourself, the environment that you are in will not affect the amount of pain you experience, as long as the injury is exactly the same.			
12	The brain decides when you will experience pain.			

Appendix D

Defense and Veterans Pain Rating Scale



DoD/VA Pain Supplemental Questions

For clinicians to evaluate the biopsychosocial impact of pain

1. Circle the one number that describes how, during the past 24 hours, pain has interfered with your usual ACTIVITY:

0 — 1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9 — 10

Does not interfere — Completely interferes

2. Circle the one number that describes how, during the past 24 hours, pain has interfered with your SLEEP:

0 — 1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9 — 10

Does not interfere — Completely interferes

3. Circle the one number that describes how, during the past 24 hours, pain has affected your MOOD:

0 — 1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9 — 10

Does not affect — Completely affects

4. Circle the one number that describes how, during the past 24 hours, pain has contributed to your STRESS:

0 — 1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9 — 10

Does not contribute — Contributes a great deal

Appendix E

Pain Numeric Rating Scale

Pain Numeric Rating Scale

1. On a scale of 0 to 10, with 0 being no pain at all and 10 being the worst pain imaginable, how would you rate your pain RIGHT NOW.

0	1	2	3	4	5	6	7	8	9	10
No Pain										Worst Pain Imaginable

2. On the same scale, how would you rate your USUAL level of pain during the last week.

0	1	2	3	4	5	6	7	8	9	10
No Pain										Worst Pain Imaginable

3. On the same scale, how would you rate your BEST level of pain during the last week.

0	1	2	3	4	5	6	7	8	9	10
No Pain										Worst Pain Imaginable

4. On the same scale, how would you rate your WORST level of pain during the last week.

0	1	2	3	4	5	6	7	8	9	10
No Pain										Worst Pain Imaginable

Appendix F

Session 1 Qualitative Questionnaire

1. Are you taking anything for pain, if so, what? Do you feel like your pain is well managed? What have you been doing in the last 30 days for your pain?
2. What is your Pain Story?

Appendix G

Session 3 Qualitative Questionnaire

1. Are you taking anything for pain, if so, what? Do you feel like your pain is well managed? What have you been doing in the last 30 days for your pain? Have you noticed any changes in your pain management, if so, what are they?
2. Do you feel like your pain was taken seriously by the DNP students? If yes, do you think that being heard changed your perception of pain?
3. What is your Pain Story
4. Do you think your pain story has changed? How?

Appendix H

Session 2 Questionnaire – In-depth Interviews

1. What are your thoughts on the program so far?
2. What did you find helpful in this program?
3. Was there anything confusing or that you thought was not useful?
4. What would you like to focus on for the third session? What format would you like to see more of (discussion/ video/ activities/)?
5. Have you been able to use this at home is yes how? If no, what do you think would work? How can you integrate this into your daily life or what needs to change to do that?

Appendix I

Session Meditation Video & Exercise

https://www.youtube.com/watch?v=TKSB6hvlYTI&ab_channel=Pain2Possibilities

Mindfulness Exercises	Here is how it works
Step 1	Sit down: find a comfortable position sitting down
Step 2	Bring your attention to your breathing
Step 3	Breathe in and out: as you inhale and exhale, observe your belly rising and falling
Step 4	Bring your attention to your pain area: notice how you feel and whether you are experiencing any pain in that area. Continue to let your body relax as you breathe and say: My tissue has healed.
Step 5	Keep attention on your pain area: as thoughts come and go, bring your attention back to the pain area and say my tissue has healed as you take deep breaths.
Step 6	Take note of any pain you feel and what you are thinking and feeling at this moment. And say: my tissue has healed
Step 7	Shift your attention: slowly take your focus away from the pain area and say my tissue has healed
Step 8	Keep repeating: My tissue is healed.

Appendix J

Session 1 Presentation

https://redhawks-my.sharepoint.com/:p:/r/personal/tkaur_seattleu_edu/_layouts/15/Doc.aspx?sourcedoc=%7B2AC8E1F3-19DF-417F-8971-377F06D746C9%7D&file=Presentation4.pptx&action=edit&mobileredirect=true&DefaultItemOpen=1&login_hint=tkaur%40seattleu.edu&ct=171

Appendix K

Session 2 Presentation

https://redhawks-my.sharepoint.com/:p:/r/personal/amandablack_seattleu_edu/_layouts/15/doc2.aspx?sourcedoc=%7BCA550D0B-7001-4383-B060-1DC261DFC925%7D&file=PNE Presentation - Module 2 - Session 2.pptx&action=edit&mobileredirect=true&DefaultItemOpen=1&ct=1716318257203&wdOrigin=OFFICECOM-WEB.START.REC&cid=24708531-6d95-49d5-9a6b-43022d0d56f9&wdPreviousSessionSrc=HarmonyWeb&wdPreviousSession=effd5a42-d726-45d0-b2ea-4222615a5545

Appendix L

Session 3 Presentation

https://redhawks-my.sharepoint.com/:p:/r/personal/tkaur_seattleu_edu/_layouts/15/Doc.aspx?sourcedoc=%7BEFCE516C-F2FA-49E4-B23A-7806F36C70D3%7D&file=PNE%20Presentation%20-%20Module%203%20-%20Session%203.pptx&action=edit&mobileredirect=true