Physical Therapists Knowledge of and Attitudes Toward Treating Chronic Pain

by

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Abstract

Physical Therapists' Knowledge of and Attitudes Towards Treating Chronic Pain is an investigation into physical therapists' knowledge and perceptions of treating patients with chronic pain. Chronic pain is a major health issue affecting nearly 100 million Americans and costing between $560 and $635 billion per year (Smith & Hillner, 2019). Chronic pain has been linked to restrictions in functional daily activities, dependence on opioid medications, anxiety, depression, and poor quality of life (Redfield et al., 2018). The National Institute on Drug Abuse reports that deaths due to opioid overdose have sharply risen in recent years, with 21,089 deaths reported in 2010 and increasing to 80,411 deaths reported in 2021 (National Institute on Drug Abuse, 2023). In 2020, the rate of overdose deaths in the United States was 31% higher than in 2019 (Hedegaard et al., 2020). In 2017, the U.S. Department of Health and Human Services declared that opioid misuse had progressed to become an epidemic. While the causes of this epidemic are multifactorial, this problem has developed in response to high patient demand for medications and quick fixes, limited reimbursement for alternative treatment options, and poor treatment outcomes in pain management (Wenger et al., 2018). The American Physical Therapy Association (APTA) has developed an initiative to reach those patients suffering from chronic pain, offering physical therapy as viable alternative to opioid medication use (American Physical Therapy Association, 2023a). Very little research has been conducted to examine physical therapists' knowledge or attitudes towards treating patients with chronic pain. A study conducted in 1991 by Wolff, Michel, Krebs, and Watts purported that only 49.6% of physical therapists met the knowledge criterion score on the Chronic Pain Knowledge/Attitude Test and only 7.8% met the attitudes criterion score. This research indicated that physical therapists' knowledge and attitudes towards treating chronic pain were poor at the time of the study (Wolff et al., 1991).

Since that time, the profession of physical therapy has undergone significant changes, including doctoring of the profession as well as advances in research regarding pain science.

This study was conducted to examine the current knowledge and attitudes of physical therapists towards treating patients with chronic pain. Current practicing physical therapists who were members of the Academy of Orthopedic Physical Therapists, a section of the American Physical Therapy Association, were invited to participate in a research survey. Each subject completed a 41-item questionnaire testing their knowledge and attitudes towards treating patients with chronic pain. All participating subjects (n=266) received a knowledge and attitude score. Total scores, means, and frequencies were calculated for each pain knowledge and attitude objective. Frequencies were calculated for demographic and pain education information questions. Correlations between responses for select demographic and test questions were also tabulated. This data was compared to the information gathered in the 1991 study by Wolf, et al.

In the 1991 study, physical therapists' knowledge scores were below the adequate score (mean = 77.8%). However, the current study showed an increase in knowledge scores (mean = 80%), demonstrating a 2.2% overall increase. When comparing the attitude scores of the participants in the original study with those of the participants in the current study, it was found that attitude scores improved but were still significantly lower than the passing threshold as set by the original authors. The original attitude scores were very low (mean = 56.9%) but in the current study those scores improved by 8.1% (mean = 65%). While the more updated score demonstrated a large increase, attitude scores were still 15% below the passing threshold of 80% as determined by Wolf et al. in 1991. The results of this study indicate that while attitudes related to treating patients with chronic pain conditions are improving, there is still much progress to make in this area. Participants' degree level and years of experience treating patients

had no bearing on their knowledge or attitude scores. Overwhelmingly, participants did not believe that their entry level physical therapy education prepared them to treat patients with chronic pain, however the majority of subjects were satisfied with their current level of chronic pain knowledge. Interestingly, those participants with higher knowledge scores were less satisfied with their current level of pain knowledge. However, these same subjects had much poorer attitude scores than subjects who rated themselves as more satisfied with their current knowledge of pain. Overall, continuing education continues to be the most utilized method for increasing knowledge of chronic pain for physical therapists, although use of scholarly research increased by 8.9% compared to the original study. This research provides insight into the current knowledge levels and attitudes of physical therapists who treat patients with chronic pain. While average knowledge scores have improved to an acceptable level, the research is clear that attitudes continue to be poor and there are many reasons for physical therapists' frustrations when managing patients with complex pain issues.

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CHAPTER 1

INTRODUCTION

Background Information

The field of Adult Education encompasses a rich variety of areas of study and is inherent in every aspect of life. When adults are pursuing new knowledge, skills, beliefs, and values, they are choosing to engage in the practice of Adult Education. Adult Education can occur in many forms, including traditional institutional means of education as well as workplace education and learning for personal fulfillment. In the early 1970s, Malcolm Knowles noted that adult learners differ in many ways than younger learners, and he popularized the term andragogy to describe this type of learning (Knowles, 2020). The term was originally coined by Alexander Kapp in 1833 but was not widely used until Knowles' extensive work in the field of adult education years later (Knowles, 1989). Typically, when adult learning occurs, the mature learner has a desire to learn and is driven by forces that compel them to gain a new understanding of important concepts. This compelling force to learn and grow may be especially evident in the healthcare professions. Medical providers often feel the need to gain knowledge and skills to help their patients heal faster and live a more fruitful life. One particular area of health care, the field of physical therapy, is comprised of many professionals who have a desire for lifelong learning and growth as an expert in their field of study. However, physical therapists can become frustrated when their patients are not progressing well. When a patient experiences chronic pain, the physical therapist may feel pessimistic about their ability to improve patient outcomes, which impacts their own self-confidence in their ability to provide effective care (Synnott et al., 2015). Often, the physical therapist will further their knowledge and skills through various means of

education to increase their ability to help their patients recover better and live a more meaningful life.

Physical therapists treat patients who struggle with chronic pain daily. Chronic pain is a major health issue affecting nearly 100 million Americans and costing between $560 and $635 billion per year (Smith & Hillner, 2019). While the causes of this epidemic are multifactorial, this problem has developed in response to high patient demand for medications and quick fixes, limited reimbursement for alternative treatment options, and poor treatment outcomes in pain management (Wenger et al., 2018).

Chronic pain disability is a developmental process that occurs over time. There are many factors that can contribute to the development of chronic pain, and underlying psychological factors are typically inherent in the progression of chronic pain (Linton et al., 2018). Chronic pain has been linked to restrictions in functional daily activities, dependence on opioid medications, anxiety, depression, and poor quality of life (Redfield et al., 2018).

The Opioid Epidemic

In 2001, The Joint Commission in the United States put in place standards for health care facilities to recognize pain as the fifth vital sign, which subsequently required health care providers to be more intentional with documenting their patients' level of pain. Concurrently the pharmaceutical industry was reassuring the medical community that opioid medications were not addictive in nature. As a result, many healthcare professionals began prescribing these medications at high rates, and significant levels of misuse began to occur (Mintken et al., 2018).

In 1990, opioid use disorders were ranked as the 11th leading cause of DALYs (Disability Adjusted Life Years). However, in 2016, opioid use disorder moved to the 7th leading cause of DALYs, representing a 74.5% change (Murray et al., 2018) . The DALY is a

way of evaluating the global or regional burden of diseases and can indicate how many years of value in future years may be lost due to disease or injury (Fox-Rushby & Hanson, 2001). This major shift in DALYs in the United States indicates that opioid use is an increasingly significant factor impacting many Americans' health and quality of life.

By 2017, opioid misuse was declared an epidemic by the U.S. Department of Health and Human Services. They developed a five-point strategy to address the problem (*Combating Opioid Misuse and Abuse*, 2021) . The five strategies, as outlined by the federal government included:

- Improvement of access to treatment and recovery services
- Increasing the availability and promotion of the use of overdose-reversing drugs
- Improving public health surveillance to increase understanding of the epidemic
- Increasing support for research on pain and addiction
- Advancing practices to improve pain management

Today, approximately 2.7 million people report suffering from opioid use disorder (OUD), and overdose caused by opioids is a leading cause of death (in the category of injury-related deaths) in the United States (Centers for Disease Control and Prevention, 2022). Deaths caused by overdose of an opioid medication have sharply risen in recent years as well. In 2010, approximately 21,089 people died from an overdose of opioids, and that number rose to 47,600 in 2017 when the opioid crisis was identified as an epidemic. In 2021, the number of deaths due to opioid overdose increased to 80,411 (National Institute on Drug Abuse, 2023).

Health Issues in the South

In the Southeastern United States, health issues are more prevalent that in other parts of the nation (Weinstein et al., 2017). High rates of obesity, which is associated with chronic

disease, death, and decreased well-being, are more concentrated in the South and Midwest regions of the United States (Weinstein et al., 2017). Rural residency and low socioeconomic status (SES), which are also conditions that are prevalent in the south, are associated with increased likelihood of developing chronic pain (Day & Thorn, 2010).

Physical Therapists' Role in Treating Pain

Physical Therapists treat patients that are experiencing pain on a daily basis. In recent years, physical therapists and other health care providers have become more aware of the multifactorial nature of pain (Gatchel et al., 2007). Medical practitioners have realized the impact that chronic pain has on the evaluation, treatment, and management of health conditions. The healthcare world is beginning to understand the importance of these complex biobehavioral factors, including the role of biological, environmental, and psychological influences that contribute to pain and disability (Gatchel et al., 2007). Despite recognition of the importance of these factors, very little information is available to help practitioners translate this knowledge into to direct patient care within physical therapy practice (Feuerstein & Beattie, 1995).

In 2016, the American Physical Therapy Association (APTA) launched a large public relations campaign to educate the public on the dangers of opioid addiction and the benefits of physical therapy as an alternative. They have utilized the slogan "Move Forward" as well as the Twitter hashtag #ChoosePT to promote their efforts (American Physical Therapy Association, 2023a).

Considering the recent increase in opioid use and chronic pain in the United States, one must ask if physical therapists are prepared to be the answer to this major public health crisis. To provide adequate treatment, physical therapists should have a good understanding of the complex mechanisms of chronic pain as well as the biopsychosocial model of chronic pain

management. Physical therapists should also have a strong understanding of the issues related to opioid use, and the strategies utilized by other health care professionals to manage pain (Wenger et al., 2018). After examining current literature, there appears to be a lack of research regarding physical therapists' knowledge and attitudes toward pain. Also, there is very little information in the literature regarding what factors contribute to the level of knowledge and attitudes towards treating chronic pain that physical therapists possess.

In a study by Wolff et al. (1991), seventy-two percent of physical therapists believed that the pain management and theory that they were taught in their entry-level education was very inadequate or less than adequate to manage patients with chronic pain in an orthopedic setting. In their study, they examined physical therapists' knowledge and attitude levels regarding the treatment of patients with chronic pain. They found that the physical therapists' pain knowledge scores were low (mean score of 35.8/46 points = 77.8%), and scores on positive attitudes toward treating patients with chronic pain were even lower (mean score of 20.5/36 points = 56.9%) (Wolff et al., 1991). No recent similar studies were found in a literature review that examines these factors in physical therapists. When this study by Wolff et al. was conducted in 1991, the profession of physical therapy did not yet require the Doctor of Physical Therapy (DPT) degree for entry-level physical therapists graduating from an accredited institution. Since that time, much information has been discovered regarding pain science and the profession of physical therapy has grown tremendously. However, since the doctoring of the profession, no new information has emerged in the literature examining physical therapists' knowledge regarding the treatment of patients with chronic pain or their attitudes towards these concepts. The factors contributing to physical therapists' knowledge and attitudes have not been examined in relation to the treatment of patients suffering from chronic pain.

Physical Therapy Education and Continuing Education

While some recent literature examines the efficacy of continuing education on physical therapists' knowledge of pain (Karvonen et al., 2015; Cleland et al., 2009; Peterson et al., 2022), no studies were identified that examine physical therapy programs methods for teaching these concepts. The Commission for Accreditation of Physical Therapy Education (CAPTE) determines the academic standards that physical therapy programs must meet to maintain accreditation. The CAPTE does mention pain in one of the required standards, 7D19, which is related to administering tests and measures appropriately (Commission on Accreditation of Physical Therapy Education (CAPTE), 2020). However, this is the only location in the accreditation standards where pain is listed as an important element for teaching and learning.

The Federation of State Board of Physical Therapy (FSBPT) is responsible for administering the National Physical Therapy Examination (NPTE) for all candidates who have graduated from an accredited institution in physical therapy. The FSBPT publishes examination content topics that schools should cover in their respective programs (FSBPT- Federation of State Boards of Physical Therapy, 2018), but pain is not mentioned as a specific topic that is addressed on licensure examination. However, pain is inherent with many of the conditions that physical therapists treat, and many therapeutic interventions that physical therapists employ are used to address pain.

The International Association for the Study of Pain (IASP) has made great strides towards setting guidelines for how information regarding pain should be structured within various health care curricula, and they have published physical therapy guidelines to assist programs in ensuring that proper information has been addressed (Slater et al., 2018). These guidelines can be used to develop the concepts of pain throughout a physical therapy curriculum,

however there is no data to suggest how physical therapy programs are currently utilizing this information for teaching and learning.

Conceptual/Theoretical Framework

The theoretical framework utilized in this study was the Biopsychosocial Model, including the ICF (International Classification of Function) as adopted by the World Health Organization. This framework includes biological, individual, and social factors when examining function and disability in a person (World Health Organization, 2002).

Statement of the Problem

Currently, there is very little information available in the literature regarding physical therapists' knowledge of chronic pain or regarding physical therapists' attitudes toward the treatment of patients with chronic pain. The research is abundant with information regarding various types of treatments for treating chronic pain, many of which include physical therapy interventions. Chronic low back pain interventions, in particular, have been extensively studied in the literature due to the prevalence of this problem and the high costs associated with treatment of chronic low back pain (Knezevic et al., 2017; Maher, 2004; Assendelft et al., 2003). Multiple studies exist that examine the different options for interventions, and the physical therapy profession seems to be searching for the magic bullet to rid patients of their pain. Despite the extensive literature related to chronic pain interventions, the answer to the question of how to treat chronic pain in a manner that is effective for all people is still a mystery. While the problem and management of chronic pain has been extensively investigated in the literature, very little attention has been placed on the physical therapist's knowledge level related to understanding the concepts related to pain science. The attitudes of the practitioner are also important in the

course of treatment for the patient, and very little attention has been given to the attitudes of physical therapists when treating patients with chronic pain.

Purpose of the Study

The purpose of this study was to determine physical therapists' knowledge of concepts related to chronic pain and physical therapists' attitudes regarding causes and treatments of chronic pain. Factors that may affect physical therapists' knowledge and attitudes towards treating patients with chronic pain were also examined.

Research Questions

The following research questions were explored in this study:

1. What do physical therapists in the U.S. know regarding causes of and treatments for chronic pain?

2. What are physical therapists' attitudes towards treating chronic pain in the U.S.?

3. Does degree/educational level increase the knowledge or attitude scores of physical therapists who treat patients with chronic pain?

4. Does years of experience treating patients increase the knowledge or attitude scores of physical therapists treating patients with chronic pain?

5. Does the type of practice setting increase the knowledge or attitude scores of physical therapists treating patients with chronic pain?

6. Do physical therapists believe they were well equipped in their entry level training to treat patients with chronic pain?

7. Are physical therapists confident/satisfied in their current level of knowledge of chronic pain?

7a. Do those physical therapists with higher knowledge scores feel more confident/satisfied with their current level of knowledge of chronic pain?

7b. Do those physical therapists with higher attitude scores feel more confident/satisfied with their current level of knowledge of chronic pain?

8. What types of post-graduate education do physical therapists deem to be most helpful in increasing knowledge and attitudes towards treating patients with chronic pain?

Significance of the Study

Chronic pain is an extremely serious issue in the United States, and the opioid crisis has reached epidemic proportions (Chesebro, 2019; *Combating Opioid Misuse and Abuse*, 2021; Mintken et al., 2018; Toll et al., 2018; Wenger et al., 2018). The problem is broad in scope and is multifactorial in nature. In the Southern portion of the United States in particular, chronic pain is a major issue due to the increased prevalence of health problems, such as cardiovascular disease and diabetes. Physical therapists are in a unique position to address issues with patients' pain, and it is vital that physical therapists have high level knowledge regarding causes and treatments for pain. If physical therapy is to be the answer to the opioid epidemic, physical therapists must be equipped with the proper knowledge and tools to meet the challenge. This study explored physical therapists' knowledge and attitudes regarding these issues related to treating patients with chronic pain. Many factors that contribute to physical therapists' knowledge and attitudes related to chronic pain were investigated. This study is not only important to the physical therapy profession but also holds significance for the country as a whole in addressing this major public health issue.

Limitations

The following limitations apply to this study:

1. Ethnic diversity of the participants was lacking due to limited responses from African Americans, Hispanic/Latinos, and Native Americans, with the vast majority of

respondents identifying as White/Caucasian. According to the American Physical Therapy Association Physical Therapist Demographic Profile (2019), the total population of physical therapists primarily identify as White/Caucasian (88.5%), however in this study approximately 92% of the respondents identified as White/Caucasian while other races were underrepresented (American Physical Therapy Association, 2019).

2. The small sample size can limit generalizability of results in this type of study. The sample in this study represents 1.63% of the total members of the AOPT and 0.085% of the total population of physical therapists in the United States.
3. Individual differences in group sizes may impact findings when comparing the results of this study with the original comparison study. These differences could potentially impact the ability to reliably compare findings. For example, in the original study (Wolff et al., 1991), approximately 33% of respondents had ten or more years of experience. However, in the current study, 63.9% of respondents had ten or more years of experience practicing physical therapy. These differences may be related to an aging workforce nationwide and may potentially limit the ability to compare findings between the two studies.
4. Data were collected during a time of global pandemic due to the COVID-19 virus. While the complete implications of this fact are unclear at this time, it is generally believed that the responses of the participants could be affected due to the stressors of this major event in history.
5. Data collection for the current study occurred approximately thirty years after the original data were collected (Wolff et al., 1991). Many changes occurred during this period, including advances in pain neuroscience knowledge as well as doctoring of the profession of physical therapy, which could influence the ability to compare the studies. Societal

changes as well as the advent of the internet could also impact the ability to compare results.

Assumptions

The following assumptions were made regarding this study:

1. Subjects understood all questions and were honest with their answers.
2. Sample size was representative of the physical therapy community as a whole.
3. The instrumentation was valid and reliable.

Definitions

The following operational definitions were utilized throughout this study:

Chronic Pain: pain that lasts longer than the expected healing time or pain that impacts daily function. The Institute for Chronic Pain (ICP) defines chronic pain as pain that lasts longer than six months and that has become independent of the original injury or illness (McAllister, 2015).

Physical Therapist/Physiotherapist: a health care professional who provides therapy to preserve, enhance, or restore movement and physical function that are impaired or threatened by disease, injury, or disability (American Physical Therapy Association (APTA), 2023; Merriam-Webster Dictionary, n.d.).

Epidemic: a widespread occurrence in a community at a particular time (Columbia University Mailman School of Public Health, 2021).

Opioid: a class of drugs that include the illegal drug heroin, synthetic opioids such as fentanyl, and pain relievers available legally by prescription, such as oxycodone (OxyContin®),

hydrocodone (Vicodin®), codeine, morphine, and many others (National Institute on Drug Abuse (NIDA), n.d.).

Disability-Adjusted Life-Years (DALYs): a summary metric of population health. DALYs represent a health gap and, as such, measure the state of a population's health compared to a normative goal. DALYs are the sum of 2 components: years of life lost (YLLs) and years lived with disability (YLDs) (Murray et al., 2018).

Organization of the Study

The intent of this research was to broadly examine how concepts related to chronic pain are disseminated in the physical therapy profession. Considering the opioid epidemic, physical therapists must be armed with all information and tools necessary to try to decrease pain and improve quality and function in life. Chapter 1 introduced and described the problem of chronic pain and the opioid crisis in the United States. The role of physical therapists in treating chronic pain was examined and the issue of lack of information regarding physical therapists' knowledge, attitudes, and implementation of pain interventions was discussed. The purpose of the study, research questions, limitations, assumptions, and operational definitions were outlined. Chapter 2 will provide a literature review, further expanding upon these issues. The literature review will present a thorough examination of the problem of chronic pain and the opioid epidemic in the United States, as well as the role of the physical therapist in treating these problems. Research related to physical therapists' knowledge and attitudes in the treatment of chronic pain will be explored along with current interventions for treating chronic pain. The role of the physical therapist as an adult learner and adult educator will be explored, and adult learning theories will be outlined. In Chapter 3, a detailed description of methods of data collection, sample of participants, an explanation of the instruments used in this study, and

review of statistical analysis will be provided. Next, in Chapter 4, the findings of the study will be presented, and finally Chapter 5 will provide conclusions of the research and implications for use. Recommendations for future research and practice will be presented as well.

CHAPTER 2

LITERATURE REVIEW

Chapter 2 is a review of the current research related to the knowledge and attitudes of physical therapists as it relates to chronic pain management. This chapter describes the field of adult education and how physical therapists function as adult learners. The history of the physical therapy profession is explored along with the role of the physical therapist in treating patients with chronic pain. The problem of chronic pain is also explored, including the prevalence, the economic burden, as well as the recent history related to the opioid epidemic. A summary of health disparities that influence patients with chronic pain is also explored. Current research regarding chronic pain and neuroscience is presented and the educational process of how physical therapists learn about these pain related concepts is outlined. Research related to physical therapists' knowledge and attitudes towards treating chronic pain is presented along with widely utilized treatment options that are available for patients with chronic pain. An understanding of the multifactorial nature of chronic pain, along with the medical, professional and societal influences, is vital to understanding the rationale for this research.

Statement of the Problem

Currently, there is very little information available in the literature regarding physical therapists' knowledge of and attitudes toward the treatment of patients with chronic pain. The research is abundant with information regarding various types of treatments for treating chronic pain, many of which include physical therapy interventions. Chronic low back pain interventions, in particular, have been extensively studied in the literature due to the prevalence of this problem and the high healthcare costs associated with the medical management of chronic low back pain (Knezevic et al., 2017; Maher, 2004; Assendelft et al., 2003). Multiple studies

exist that examine the different options for interventions, and the physical therapy profession seems to be searching for the magic bullet to rid patients of their pain. Despite the extensive literature related to chronic pain interventions, the answer to the question of how to treat chronic pain in a manner that is effective for all people is still a mystery (Maher, 2004). While the problem and management of chronic pain has been extensively investigated in the literature, very little attention has been placed on the physical therapist's knowledge level related to understanding the concepts related to pain science. The attitudes of the practitioner are also important in the course of treatment for the patient, and very little attention has been given to the attitudes of physical therapists when treating patients with chronic pain.

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4. Does years of experience treating patients increase the knowledge or attitude scores of physical therapists treating patients with chronic pain?

5. Does type of practice setting increase the knowledge or attitude scores of physical therapists treating patients with chronic pain?

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7. Are physical therapists confident/satisfied in their current level of knowledge of chronic pain?

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7b. Do those physical therapists with higher attitude scores feel more confident/satisfied with their current level of knowledge of chronic pain?

8. What types of post-graduate education do physical therapists deem to be most helpful in increasing knowledge and attitudes towards treating patients with chronic pain?

Adult Education

Adult education is a wide and varied area of study where different learning theories abound. Many propounders and interpreters of various learning theories have published ideas about how a person truly learns, such as Pavlov, Skinner, Piaget, Maslow, and Bloom to name a few. Most of these theories are based on observations of the child as a learner, or what is termed conventional learning. However, it was the work of Malcolm Knowles in the 1970s and beyond that focused on the adult learner and sparked an interest in a new kind of adult learning theory in the United States (Knowles et al., 2020) . Prior to Malcolm Knowles' work in the field of adult education, Eduard Lindeman began laying the groundwork for the future pillars of adult education established by Knowles.

As early as 1926, Lindeman recognized that five different key assumptions must be in present for the adult learner. They are as follows:

1. Adults become motivated to learn as they identify needs and interests that the process of learning will satisfy.
2. Adults' orientation to learning is centered in life experiences; therefore, situations in life are the units for learning and individual subject areas become less important.
3. Experience is the best resource for learning as an adult.
4. Adults must be self-directed learners; therefore, the instructor becomes less of a provider of knowledge and transitions to become a partner in mutual inquiry with the learner.
5. Adult learners are unique, and therefore the factors related to learning (style, time, place and pace) may need to be customized to their individual needs (Lindeman, 1961).

Malcolm Knowles built upon these assumptions for adult learners and expanded upon the adult learning theory known today as andragogy. To fully understand the concept of andragogy, one must first understand its predecessor, pedagogy. Pedagogy is the model used with children wherein the teacher is the primary decision maker, and the student is passive. The teacher assumes full responsibility of the content, style, and timing of information presented, while the learner plays a submissive role. In contrast, andragogy focuses on the transactional nature of learning for adults wherein the following assumptions can be made about the adult learner. Knowles (1972) stated, "We have finally really begun to absorb into our culture the ancient insight that the heart of education is learning, not teaching, and so our focus has started to shift from what the teacher does to what happens to the learners" (p.33). Knowles expounded on these ideas as he developed an integrated theoretical framework that serves as the basis for adult education today. The concepts associated with andragogy were becoming popular as early as the

1970s, as Knowles noted that the theory began to make a difference in the way adult education programs were being organized and operated, the way teachers were being trained, and the way adults were learning (Knowles, 1978).

The theoretical basis behind Knowles teachings was that learning should eventually be self-directed, with the learner taking responsibility (Knowles, 1973). Knowles states that early on, pedagogical strategies may be necessary, especially if the content is extremely new to the learner or health and safety is at risk. However, there should be a gradual building of a foundational knowledge until the learner is confident about carrying out their own learning projects (Knowles, 1989).

One major construct of Knowles' theory of adult education is grounded in the learner's need to know. The learner needs to know why they should learn something before they can effectively take on the task of learning. This idea is in sharp contrast to the pedagogical method of learning where the learner is focused on what they need to know to pass, and they do not relate the concepts to their own life (Knowles, 1984).

The idea of self-concept and self-direction is another important theme in the andragogical learning theory. Learners have a responsibility for their own decisions and lives, and they have autonomy over what they learn. Knowles states that a child is dependent on others but eventually, he begins to decide things for himself. There is a psychological change from dependency to autonomy, and at this point the person becomes an adult learner (Knowles, 1968). The adult learner is responsible for their own life, and they need to be treated as capable of self-direction (Knowles, 1973, 1984).

Adult learners also bring with them their own personal experiences, which have an impact on the way they learn (Knowles, 1989). The adult learner has a great volume and quality

of life experiences from which to draw as compared to the younger learner. The instructor's life experiences become less important as the learner is able to apply their own unique experiences during the learning process (Knowles, 1973, 1984).

Another important construct of andragogical learning is readiness to learn. The adult learner demonstrates a readiness to learn that is grounded in the need for knowledge to cope with real life situations (Knowles, 1973). In the pedagogical method, learners become ready to learn when the teacher wants them to learn, and their ability to demonstrate learning is based on academic pressure. As the learner matures, there is more of a desire to learn to cope with the social expectations and tasks that they must achieve (Knowles, 1973, 1984, 1989). Similarly, the adult's orientation to learning is another major concept of andragogical learning theory. Adult learners are more life and task centered in their orientation to learning, as opposed to subject centered (Knowles, 1973, 1968).

The final major construct of Knowles andragogical learning theory lies with the learner's motivation to learn. Adult learners are more interested in life situations when learning and they are more responsive to internal motivators than factors that are derived externally (Knowles et al., 2020). Pedagogical principles rely on teacher or parent approval as the source of motivation. However, adult learners are motivated by a combination of external and internal motivators. External motivators such as higher pay, promotions, or better jobs can be strong motivators. However, internal motivators such as increased self-esteem, job satisfaction, and quality of life are more potent motivators for the adult learner (Knowles, 1984).

Physical Therapists as Adult Learners and Adult Educators

It is clear from the work of Malcolm Knowles and others before him that the field of adult education is broad and far reaching. Adult education can impact all people and is

applicable in every specific area of life. Andragogical principles can be applied to all occupations and areas of interest, including the profession of physical therapy. In this study, the role of adult education is explored as it relates to the field of physical therapy (Plack & Driscoll, 2017). Specifically, ideas about the knowledge and attitudes possessed by physical therapists are studied with a particular focus on the physical therapist's treatment of patients with chronic pain (Simmonds et al., 2012; Wolff et al., 1991). Physical therapists are lifelong adult learners who are continually growing and improving their craft. A vast array of knowledge is required by the physical therapist to allow them to be successful in treating patients and making good functional progress. Physical therapists are constantly learning and responding based on feedback from the patient to produce optimal patient outcomes. The physical therapist's role as a continuous adult learner is the key to professional success. Many physical therapists would argue that treating a patient with chronic pain is the one of the biggest challenges encountered in their profession, and the ability to continue to learn more about the causes of and treatments for chronic pain is central to the success of the physical therapist.

The physical therapist also serves as an adult educator in many capacities. Often, the majority of a physical therapy session may be comprised of educational aspects, including teaching patients about their physical condition and setting expectations for their course of treatment. Physical therapists may teach patients how to perform functional tasks or exercises, perform gait training to teach a patient how to walk after they've had a stroke, or how to don a brace after sustaining a knee injury. Almost every patient that receives physical therapy services will receive an individualized home exercise program, and the physical therapist often spends significant amounts of time teaching the patient how to perform these exercises. The physical

therapist must be well versed in educational theories in order to make progress with teaching patients these important concepts (Plack & Driscoll, 2017).

There are many learning theories that apply to the physical therapist, both in the role of the adult learner as well as in the role of the adult educator. B.F. Skinner developed the concept of behaviorism to reinforce behaviors that were deemed to be effective and to minimize ineffective behaviors. According to this learning theory, learning often occurs due to a stimulus, which signals a response, and the learner becomes conditioned to behave in a certain manner (Plack & Driscoll, 2017). In this type of teaching or learning, the physical therapist creates an environment that facilities appropriate change of behavior and breaks down difficult tasks into smaller parts. The PT provides clear instructions and provides the patient with frequent feedback as well as positive reinforcement. This type of learning in a physical therapy setting may be best employed with psychomotor tasks, such as the PT teaching a patient how to get out of a wheelchair. This task can be broken down into smaller parts and the PT can isolate certain aspects of the task that prove to be more difficult for the patient. Similarly, when the PT is in the adult learner role, the therapist may learn complicated psychomotor skills by breaking down the steps and practicing the skills, which are reinforced by instructor reinforcement or positive patient outcomes. An example of this type of learning might occur when a PT is learning how to perform spinal manipulation on a patient with chronic lower back pain.

Another important learning theory that is applicable to the practice of physical therapy includes the concepts associated with constructivism. With this theory, learners make sense of their environment based on their prior experiences, including their beliefs, values, skills, knowledge and previous learning opportunities (Plack & Driscoll, 2017). The learner engages in problem solving activities and works alongside the teaching to come up with solutions. A PT

who employs this type of adult learning theory might be careful to set up the clinic in a manner that is safe and away from the crowd. The PT might have the patient strategize to determine ways to approach the task of locking a wheelchair and rising up from the chair. The PT equips the patient with a safe environment to take risks and solve functional problems. An example of constructivist learning might occur with the PT as the adult learner during a roundtable discussion of a difficult case study where a patient is not improving. The PT is actively engaged and reflecting on the difficult case, synthesizing previous experiences and knowledge to help solve the challenging problem.

Another important theoretical concept for physical therapists is the Social Determinant Theory, as proposed by Ryan and Deci (2017). In this theory, intrinsic motivation is created by helping the learner feel connected or related to the instructor. The learner must feel as though they are competent and possess the appropriate self-efficacy to be successful in learning the knowledge or skill. The learner also must develop autonomy, which allows the learner to engage in activities that are personally meaningful and valuable to them (Ryan & Deci, 2017) . These concepts are vital when a physical therapist is teaching a patient about the important aspects of their treatment plan as well as when the physical therapist is learning new skills or knowledge to improve their practice. Both the PT and the patient must develop strong intrinsic motivation as they learn new concepts. When PTs do not feel competent or that they have the self-efficacy to address the needs of patients suffering from chronic pain, the PT can become frustrated and lack motivation to continue learning.

The Ecological Systems Theory proposed by Bronfenbrenner is another important aspect of learning and development that is important for physical therapists to understand. In this learning theory, development is shaped by the individual and how they interact with their

environment. While biology is an important influence in the potential of the learner, other outside influences such a parents, friends, work, school, and culture can determine the learning outcomes (Mcleod, 2020). This learning theory can be compared to the Biopsychosocial Model of Pain, which is proposed as the ideal theoretical model to utilize when treating patients with chronic pain. This framework takes into account the various biological, individual, and social factors when examining function and disability in a person (World Health Organization, 2002).

History of the Physical Therapy Profession

Physical therapists are an altogether different type of adult educator, adult learner, and healthcare provider. Some physical therapists may even come to specialize in chronic pain management, which requires significant education. Physical therapists improve movement and prescribe exercise as a way to decrease pain and improve functional capacity in their patients (McAllister, 2015). According to the American Physical Therapy Association (2023), physical therapists (PTs) are "movement experts who improve quality of life through prescribed exercise, hands-on care, and patient education. Physical therapists diagnose and treat individuals of all ages." (para. 2). PTs perform an examination on each patient and develop an individualized treatment plan to improve movement and function, reduce pain, and prevent disability (American Physical Therapy Association (APTA), 2023).

Physical therapists practice in a wide variety of settings, including hospitals, outpatient clinics, private homes, schools, sports facilities, workplaces, and nursing homes. In order to legally practice as a physical therapist in the United States, candidates must earn a Doctor of Physical Therapy (DPT) degree from an institution that is accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE). They must also pass a national boards examination as well as undergo the process of state licensure in most states. Typically, a

professional DPT program is three years in length. Once a student completes a four-year undergraduate degree, the student can then apply to an accredited institution to obtain a DPT. According to the American Physical Therapy Association,

> Primary content areas in the curriculum typically include, but are not limited to, biology/anatomy, cellular histology, physiology, exercise physiology, biomechanics, kinesiology, neuroscience, pharmacology, pathology, behavioral sciences, communication, ethics/values, management sciences, finance, sociology, clinical reasoning, evidence-based practice, cardiovascular and pulmonary, endocrine and metabolic, and musculoskeletal. Approximately 80% of the DPT curriculum is classroom (didactic) and lab study and the remaining 20% is dedicated to clinical education. (American Physical Therapy Association (APTA), 2023, Physical Therapist Education and Licensure para 2)

Evolution of the Field of Physical Therapy

The practice of the concepts in physical therapy dates back as far as 460 BC when Hippocrates introduced the concept of manual manipulation to treat ailments of the body (Das, n.d.). Since that time, physical therapy (which is often called physiotherapy) has progressed from simple hands-on massage techniques to a complex array of various treatments and exercises. In 1813, the Royal Central Institute of Gymnastics was founded in Sweden by Per Henrik Ling where ill people received massage, manipulation, and exercise (Das, n.d.). These ideas spread to Great Britain where in 1894 the Chartered Society of Physiotherapy was formed.

By 1917, physical therapy became widely utilized as a number of soldiers were injured in World War I. The treatments utilized were called rehabilitation therapy at that time. By the 1920s, the outbreak of polio led to an increased demand for the services of physical therapists

(American Physical Therapy Association, 2023a). In March of 1921, Mary McMillan (who is often considered to be the mother of physical therapy) founded the American Women's Physical Therapeutic Association (American Physical Therapy Association, 2023a). This organization later became the American Physical Therapy Association (APTA). During this time, most of the services of physical therapists were performed in hospitals and inpatient clinics. However, after World War II, there was a need for continued specialized care for wounded soldiers, which resulted in the advent of outpatient physical therapy services. This signaled an increase in popularity and an immediate demand for physical therapy services in the United States (American Physical Therapy Association, 2023a; Das, n.d.).

Physical therapy knowledge and services were becoming more specialized, which led to the formation of the Orthopedic Section of the APTA in 1974 for those PTs who had special interest and ability in orthopedic injuries and conditions (Das, n.d.). From there, the profession continued to add specializations including cardiopulmonary, wound care, neurological, sports, women's health and many others which have been recognized by the APTA (American Physical Therapy Association (APTA), 2023; Das, n.d.).

Physical Therapy Education

The educational level of physical therapists has also evolved significantly in recent years. In 2005, the APTA House of Delegates passed the Vision Statement for Physical Therapy 2020 (Vision 2020) which outlined the goal for physical therapy to develop into an autonomous profession (Massey, 2003). The development of autonomous practice in physical therapy involves many aspects of global professional growth, including increased regulation through licensure, continued growth of professional associations, achieving direct access in practice, and educational/knowledge advancement. In support of this vision, all entry level physical therapy

degrees are now required to be awarded at the doctoral level. The first transitional Doctor of Physical Therapy (DPT) degree was offered in 1992, and the first entry-level DPT began in 1993. By 2015, all entry-level physical therapy programs were required to offer the DPT degree, and the bachelor's or master's degree was no longer an option (Johnson & Abrams, 2005).

Physical Therapists' Role in Treating Chronic Pain

Today, patients require the services of physical therapists for a wide range of physical needs and conditions. Physical therapists treat all conditions and illnesses, including lower back pain, osteoarthritis, Parkinson's disease, joint sprains, muscle strains, stroke, fibromyalgia, burns and wounds, rheumatoid arthritis, and many other conditions (American Physical Therapy Association (APTA), 2023). Due to the comprehensive nature of the field of physical therapy, PTs often treat patients with longstanding chronic pain that is quite intense in nature. These conditions can be frustrating for the patient and the PT and can require a multidisciplinary approach beyond what can be provided by the physical therapist alone.

In the field of physical therapy, chronic pain can be an especially challenging problem for PTs to address. Patients often become frustrated with their pain, and the PT may find it difficult to find treatments that minimize the patients' pain. Due to the multifactorial nature of chronic pain, patients often resort to using opioid medications to treat their pain. Opioid prescription use has reached epidemic proportions in the United States in recent years, which has become a major concern for healthcare professionals and legislators alike (Chesebro, 2019; Dowell et al., 2016; Wenger et al., 2018).

#Choose PT initiative

In 2016, the American Physical Therapy Association (APTA) launched a large public relations campaign to educate the public on the dangers of opioid addiction and the benefits of

physical therapy as an alternative. They have utilized the slogan "Move Forward" as well as the Twitter hashtag #ChoosePT to promote their efforts. The goal of the #ChoosePT campaign was to minimize patients use of opioid medications and surgery by maximizing mobility, managing pain, and improving physical function and fitness through physical therapy treatment (American Physical Therapy Association, 2023b).

Physical Therapists' Role in Addressing the Opioid Epidemic

Because of the knowledge and skills that a physical therapist possesses, PTs are able to have a positive effect on those suffering from chronic pain. PTs often spend more time with patients than most other healthcare providers, which provides opportunities to impact their conditions more readily. Physical therapists are in a unique position to provide skilled treatments and prevention strategies that promote positive lifestyle changes for those suffering from chronic pain. Mintken, et al. (2018) state, "Physical therapists possess advanced knowledge and strategies across key domains of prevention and health promotion, such as sleep, physical activity, and nutrition that have been shown to contribute to acute and chronic pain syndromes" (p.351).

While physical therapists have a high level of anatomical knowledge and training, there is still much to learn regarding the appropriate management of patients with complex chronic pain conditions. The physical therapist's role in managing patients with chronic pain syndromes such as low back pain is vital, and many options are available for treatment. Learman et al. (2014) found that physical therapists exhibited varying levels of understanding of the clinical practice guidelines and recommendations associated with treatment of chronic low back pain. In particular, those practitioners who recommended that a patient remain as active as possible during an acute exacerbation of low back pain displayed better patient outcomes and

improvement management of pain in their patients (Learman et al., 2014; Simmonds et al., 2012). These types of studies indicate that there is a wide variety in physical therapists' knowledge and ability to manage these challenging conditions.

Emerging Biopsychosocial Model of Pain Management

Throughout modern history, the dominant model of disease recognition and treatment utilized by healthcare providers has been termed the medical model. In this framework, molecular biology is the basis of scientific knowledge, and the sum of all medical problems can be accounted for by examining deviations from normal biological variables. The medical model has been criticized, however, due to its lack of holistic treatment of the patient (Gatchel et al., 2007; Roush & Sharby, 2011). For example, a healthcare provider ascribing strictly to the medical model would not take into account the social, psychological and behavioral dimensions of illness or disease. The typical medical model separates the mental from the physical aspects of disease, and attributes those mental conditions in full to a biochemical or neurophysiological problem.

In the 1970s, many healthcare providers began to recognize that the medical model that was so prevalent in modern medicine was not working to address the full nature of patients' conditions. A new paradigm for healthcare began to emerge to address the need for a more holistic way to treat patients. The Biopsychosocial Model began to develop to meet these needs (Gatchel et al., 2007; Roush & Sharby, 2011). Healthcare providers began to recognize that some people with positive laboratory findings were being told that they needed treatment, when in reality they felt quite well. Conversely, those that were feeling sick were being assured that they were disease free based on similar laboratory findings. In the Biopsychosocial Model of

medicine, patient personal factors as well as biological markers of illness are considered (Engel, 1977).

Physical therapists, along with other medical providers, have grown and evolved from strict utilization of the medical model to a tendency to embrace the Biopsychosocial Model in recent years. PTs are recognizing the psychosocial risk factors are, in fact, predictors of long-term disability and chronicity of pain and illness (Overmeer et al., 2011). While there has been good progress towards the utilization of a model of treatment that takes into account psychosocial factors of illness, physical therapists and many other healthcare providers still lack the knowledge and skills to address the factors. Morin Chabane et al. (2020) determined that physical therapists appear unsure of how to interpret severe pain when minimal objective findings are present in the examination. They determined that PTs may benefit from further training on the psychosocial factors that can often be associated with chronic pain syndromes (Morin Chabane et al., 2018).

Chronic Pain

Chronic Pain Defined

Pain has been defined by the International Associated for the Study of Pain (IASP) as "An unpleasant sensory and emotional experience associated with or resembling that associated with actual or potential tissue damage" (Malik, 2020, p.481). Chronic pain is a problem that affects millions of people throughout the world. According to a 2017 study in the *Journal of Pain Research*, it is predicted that at least 10% of the world's population suffers from chronic pain and the numbers are increasing each year (Raffaeli & Arnaudo, 2017). They contend that in the United States, chronic pain affects more Americans than the very prevalent conditions of diabetes, heart disease, and cancer combined. For many years, chronic pain has been defined as

pain that lasts longer than the typical course of an acute injury or condition of disease. Chronic pain, as traditionally defined, typically lasts for months or even years and can impact all aspects of a patient's life. Chronic pain can contribute to physical and emotional dysfunction, financial difficulties, sleep problems, and disruptions of personal relationships (Neville et al., 2008).

Some experts in the field of medicine believe that the term chronic should be abolished, as there is no clinically proven time frame in which a patient's pain changes from acute to chronic in nature. Many experts believe that, instead, pain should be classified as peripherally driven or centrally driven (Loeser, 2019). These researchers believe that there is no evidence that acute pains transition into chronic pain, and that no specific event occurs at three months, six months, or a year after the onset of a painful condition. Peripherally driven pain is generally easier to address with typical treatments, while centrally driven (nervous system) pain is more of a challenge. Many challenging conditions to treat are centrally driven and may often be referred to as mysterious central pains. Some examples of these conditions are fibromyalgia, migraine, irritable bowel syndrome, some failed back surgeries, and noncardiac chest pain. These conditions are often thought to be the body's response to the internal and external events of life (Loeser, 2019).

Prevalence of Chronic Pain

Chronic pain results in restrictions in daily function and normal activities for many people. This type of pain can be linked to dependence on opioid medications, anxiety and depression, and poor perception of quality of life. The Centers for Disease Control estimate that 20.4% (50 million) adults in the United States may suffer with a condition that would qualify as chronic pain (Dahlhamer et al., 2018). According to the State of U.S. Health Report from 1990-2016, low back pain is a condition that continually is ranked as the number one cause of

disability, with major depressive disorder ranked just behind at number two. Opioid use disorders rank at number eight on the list. In 1990, opioid use disorders were the 11th leading cause of Disability Adjusted Life Years (DALYs). In 2016, however, opioid use disorders moved to the 7th leading cause of DALYs, representing a 74.5% change (Murray et al., 2018). This data indicates that chronic pain, originating from either somatic or psychological roots, is a significant cause of disability in the United States today.

Cost of Chronic Pain

Many Americans live with chronic pain and are burdened financially by the costs associated with treatment. Due to the many definitions of chronic pain, the exact cost of chronic pain can be difficult to pinpoint. Gaskin and Richard (2012) contend that persistent pain impacts up to 100 million adults in the United States each year and costs between $560 to $635 billion dollars annually. According to Mintkin et al. (2018), approximately 116 million Americans live with chronic pain, which costs over $600 billion per year. This estimate equates to roughly $2000 per person per year. Clearly, these numbers indicate the far-reaching effects of chronic pain on the American population and the huge economic burden of these conditions.

Recent History of the Opioid Epidemic and the Role of the Pharmaceutical Industry

In 2017, President Trump made the official declaration that the opioid epidemic was a national emergency in the United States. The opioid epidemic has been deemed as one of the deadliest and the most preventable public health threats in recent history. As of 2017, nearly 600,000 Americans had already died, with an average of 150 more dying each day (Hodge et al., 2017).

The pharmaceutical industry has been implicated in perpetuating the opioid crisis in the United States (Dwyer, 2017). In 2017, the state of Ohio sued five major pharmaceutical

manufacturers (Purdue Pharma, Endo Health Solutions, Teva Pharmaceutical Industries, Johnson & Johnson, and Allergan) due to their role in the opioid epidemic. This lawsuit accused the pharmaceutical companies of promoting a marketing strategy that downplayed the risk of addiction of the opioid medications they sold and exaggerating the benefits of the pharmaceuticals in patients that suffered from chronic pain. The lawsuit claimed that these drug companies purposely misled physicians regarding the dangers of the opioids they produced in order to increase sales (Dwyer, 2017). This example is one of many that highlights the propagation of the opioid crisis by the pharmaceutical industry.

As these lawsuits continue to be brought forth, more information begins to arise about the opioid epidemic. The outcomes of these lawsuits could be helpful in decreasing the effects of the opioid crisis in several ways. Litigation may decrease the devastating effects of the opioid epidemic by changing pharmaceutical industry practices and increasing public awareness. Pharmaceutical companies may be required to modify their marketing and distribution practices. These lawsuits may shed light on harmful, unethical, and possibly illegal business practices that influence public opinion of opioid manufacturers. Patients may begin to become more educated about the medications that their doctor prescribes. These lawsuits also build the case for increased regulation of pharmaceutical companies as well. Haffajee et al. report, "Win or lose, lawsuits that very publicly paint the opioid industry as contributing to the worst drug crisis in American history put wind in the sails of agencies and legislatures seeking stronger oversight. Together, litigation and its spillover effects hold real hope for arresting the opioid epidemic" (Haffajee & Mello, 2017, p. 2305).

The Rising Toll of the Opioid Epidemic

Opioid drug misuse has become a public health crisis with devastating effects, such as addiction, death due to overdose, and neonatal abstinence syndrome (due to opioid use and misuse during pregnancy). The Centers for Disease Control and Prevention (CDC) estimates the total economic cost of prescription opioid misuse is approximately $78.5 billion per year. They estimate that 21- 29% of patients that are prescribed opioid medications for chronic pain will misuse them. Subsequently, approximately 8-12 percent will go on to develop an opioid use disorder. Also, approximately 4-6 percent of patients who misuse prescription opioids will eventually move on to using heroin (National Institute on Drug Abuse, 2023).

Addressing Chronic Pain in the Midst of the Opioid Epidemic

Most researchers agree that pharmacological mass production and marketing along with over-prescribing of opioids for pain relief has contributed to the opioid epidemic, especially in the most vulnerable of populations (Chesebro, 2019; Dwyer, 2017; Haffajee & Mello, 2017; Hodge et al., 2017). Those patients who suffer from mental health disorders, economic burdens, and those who are injured on the job are the most likely to become addicted to opioid medications (Toll et al., 2018). Due to the rising prevalence of opioid misuse and the development of opioid use disorders, the CDC recommended in 2016 that health care practitioners move away from prescribing opioid medications and that other routes of nonpharmacological therapies should be more thoroughly explored (Chesebro, 2019). This transition has proven to be a difficult one for patients and practitioners. All medical providers, including physical therapists, must have a good understanding of the complex mechanisms of chronic pain, as well as the associated biopsychosocial components. Physical therapists must be aware of the issues related to opioid use, and their options for pain management strategies if they

are to be successful at treating these patients non pharmacologically (Dowell et al., 2016; Wenger et al., 2018).

Health Disparities: The Impact of Race/Ethnicity, Low-income, and Rural Residency on Chronic Pain

Prevalence of Health Disparities in Patients with Chronic Pain/Opioid Use

Health disparities occur in all areas of healthcare, but differences appear to be particularly prevalent in the case of chronic pain and opioid use (Kapoor & Thorn, 2014). There is still a limited understanding of the psychosocial factors that affect opioid use in individuals that experience the highest level of health disparities, such as African Americans, those with low income, and those with rural residency. Research shows that rural residency and low-income account for greater reports of pain levels (Day & Thorn, 2010; Kapoor & Thorn, 2014). This would typically mean that there would be an increase in utilization of health care services in this population, but rural residency places barriers on receiving health care. Kapoor et al. (2014) found that in rural residents in medically underserved counties, approximately thirty percent of subjects had a diagnosis of depression and other comorbidities were also highly present. Depressive symptoms increased the likelihood of patients to receive prescription opioids as a treatment in this study (Kapoor & Thorn, 2014).

Relationship Between Demographics/Psychosocial Variables and Chronic Pain

Day et al. (2010) found that in a low-literacy, low-socioeconomic status rural population, race was also highly important in the perception of pain. Race was found to be significantly associated with pain intensity, and African Americans reported higher pain scores than Caucasian Americans. The characteristic of pain catastrophizing was associated with pain level and perceived level of disability as well (Day & Thorn, 2010) . Studies of this nature shed light

on the importance of examining the psychosocial aspects of pain in particular demographic groups, especially those typically involved in health disparities. Kim et al. (2016) also agreed that racial and ethnic minorities experience more adverse effects caused by chronic pain, such as lower quality of life, higher pain anxiety and depressive symptoms, more limitation of activity and work, and higher levels of disability. Health disparities have been documented in the United States related to racial minorities receiving lower quality of pain care than non-Hispanic whites. In their 2017 study, they found that African Americans, Asians, and Hispanic subjects had higher pain sensitivity, lower pain tolerance, and higher pain ratings when compared to non-Hispanic white subjects (Jun Kim et al., 2016).

Low socioeconomic status has an impact on chronic pain levels, opioid use, and health care utilization in the United States as well. Newman et al. (2018) found that race/ethnicity, previous opioid prescription utilization, and depressive symptoms were associated with increased utilization of healthcare for patients with chronic pain in a group of subjects with low-income status.

The National Academies of Sciences recognizes that health disparities are a major issue in the United States, especially as it relates to the management of chronic pain. These issues are multifactorial in nature and problems like poverty, unemployment, poor education, inadequate housing, and several other social determinants all play a role in these health disparities. Their report focuses on a community wide strategy for promoting equity in health and what individuals can do to address these health disparities (Weinstein et al., 2017) .

Understanding the Problem of Chronic Pain: Recent Research

The Etiology of Chronic Pain from a Psychological Perspective

The causes of chronic pain are not yet well understood. Current research has increased understanding of the important processes that drive the development of chronic pain, but this information is not always easily accessible to practicing physical therapists and other clinicians (D. S. Butler & Matheson, 2000; Louw, Louie, et al., 2016; Louw, Puentedura, et al., 2016; Louw, Zimney, et al., 2016). Chronic pain appears to have no benefit to the patient and the treatments that are often helpful to an acute (peripheral) injury are no longer helpful with chronic pain and can often be harmful. For example, when a person experiences an acute injury, rest is often prescribed and can contribute to healing. However, for an individual with chronic pain, rest can be detrimental to living a fruitful life and experiencing meaningful activities.

Linton et al. (2018) developed four tenets to help explain why some individuals experience chronic pain while others do not. The first tenet is that chronic pain is developmental and cyclic in nature. Chronic pain develops over time and can ebb and flow at times; chronic pain does not merely appear one day and remain with the individual. The patient may experience several recurrences of pain with intermittent bouts of recovery in between. Pain triggers negative emotions and catastrophizing thoughts, which compound the physiological response of the body. The second tenet describes the contextual cues that trigger appropriate responses of patients to their pain. Those that recognize that the body is healing and apply appropriate stresses and movement do not seem to develop chronic pain. However, those who continue to rest, guard, and protect the area tend to develop longer lasting pain. The third tenet describes how transdiagnostic processes can drive chronic pain. For example, depression, sleep disturbances, and anxiety disorders are very common comorbidities associated with chronic pain. The idea is that treating these psychological conditions concurrently will help decrease the severity of chronic pain. From a psychological perspective, it is vital to understand that catastrophizing and avoidance are

underlying psychological processes that contribute to the development of chronic pain, and addressing these concerns can be vital for treatment. The fourth tenet involves the fundamental role of learning. In this tenet, researchers recognize that learning can steer the development of behavior over time, especially as it relates to pain responses. Classical and operant conditioning are important factors in learning behaviors and can be applied to an individual's pain response. For example, in classical conditioning, a person is exposed to a conditioned stimulus (such as the buzzing of a bee) followed by a painful stimulus (a sting). This results in muscle contractions and fear, and the buzzing sound can now cause a physiological and psychological response for the individual. In the case of chronic pain, environmental and emotional stimuli can similarly cause a painful response, and these memories cannot be simply erased. In the case of operant conditioning, a person learns about the association between a behavior and its consequences. For example, an individual learns that when they grimace in pain when lifting a heavy object, someone else often comes to their rescue and lifts for them. These pain behaviors are reinforced by the consequences of the behavior (Linton et al., 2018).

Biobehavioral Factors Affecting Pain and Disability

Patients who suffer from chronic pain associated with low back pain and disability represent a major challenge for physical therapists (Feuerstein & Beattie, 1995; Knezevic et al., 2017). Physical therapists understand that the causes of chronic pain are multifactorial, but how this understanding translates into clinical practice is often not well understood. Often, when symptoms have persisted beyond the predictable time of tissue healing, a patient may report significant pain, limitations in function, and disability that is not proportional to the pathology and physical impairment. In situations such as these, the typical medical model will not suffice for devising an appropriate treatment plan.

Feuerstein and Beattie (1995) outlined the biobehavioral factors that influenced pain and function in those with chronic pain. These are classified in to three broad categories: cognitive-perceptual, environmental-behavioral, and psycho-physiological factors. The cognitive-perceptual processes explain why one person responds to a stimulus as relatively innocuous while another person might consider that stimulus disabling. These are the thought processes and interpretation of stimuli that provide meaning or significance to the bodily sensation. When an individual experiences cognitive-perceptual bias, this can result in amplification of normal body sensations and misinterpretation of these sensations. Often, the individual will interpret these stressors in terms of physical sensations rather than emotional consequences, which explains the heightened reactivity to pain and other sensations. Environmental-Behavioral factors focus on the stimuli in the environment that facilitate certain behaviors as well as those pain behaviors that have an impact on the patient's environment. Psychophysiological factors are related to the individual's physiological response to stressors. For example, in those with chronic low back pain, increased paraspinal muscle electromyographic responses or delayed recovery of these responses following environmental stressors may be noted. Also, heightened autonomic nervous system responses of the sympathetic nervous system can contribute to reduced ability to tolerate pain. Therefore, psychological stressors lead to a physiological response of the body that can be problematic and decrease functional level (Feuerstein & Beattie, 1995) .

The Gate Control Theory of Pain

Throughout human history, people have been seeking help to relieve pain, which is a normal human experience (Louw, Puentedura, et al., 2016). Religious and spiritual beliefs guided ancient practitioners in the earliest treatments for pain. For hundreds of years, pain was

seen as a spiritual or religious problem. During the Renaissance period, thoughts regarding pain began to shift, and the focus of understanding pain moved from a religious perspective to something worthy of research and study from a biological perspective (Louw, Puentedura, et al., 2016). At this time, scientists discovered pain receptors and sensors in the body that signaled pain to the brain. These beginnings of the scientific study of neurobiology led to the understanding that pain was an overstimulation of pain receptors in the body. Since that time, much research has been devoted to how the body experiences pain. In the 1960s, Melzack and Wall were the pioneers of what is known and accepted in literature as the Gate Control Theory of Pain (Melzack & Wall, 1996). Melzack and Wall purported that the spinal cord acts as a type of neurophysiological gate that opens or closes, which allows or blocks pain signals from reaching the brain. If the pain signals are blocked, then the brain is never allowed to interpret the sensations as pain. They theorized that non-painful input (such as rubbing the skin) closes the gates and prevents painful sensations from traveling to the brain. This theory serves as the basis for the use of electrical stimulation modalities and other techniques to minimize pain after an injury (Melzack & Wall, 1996).

Advances in Neuroscience: Central Sensitization, Peripheral Sensitization, and Neuroplasticity

Gate control theory of pain served the scientific community well in understanding the mechanisms of pain for many years. Then in the 1990s, functional brain scans were invented which led to another major shift in our understanding of pain. Since that time, there has been a dramatic increase in our understanding of how pain is experienced in the body. The complex ideas of central sensitization, peripheral sensitization, and neuroplasticity have been further explored. Glial cell activation, cytokine signaling, as well as endocrine changes are topics of

recent research as well (Louw, Puentedura, et al., 2016). This improved physiological understanding, coupled with the parallel growth in understanding the psychological components of pain, including fear avoidance and catastrophization of pain has led to a major increase in availability of knowledge regarding pain neuroscience (Louw, Puentedura, et al., 2016). While it is beyond the scope of this article to explore these complex concepts in depth, there are some major recent advancements that bear mentioning.

Recent advancements in technology and research have led to modern researchers and pain educators coming to the forefront of our understanding of neuroscience. David Butler and Lorimer Moseley have become leading authorities on understanding pain in the body. Butler has written several landmark texts in the world of neuroscience, including *Explain Pain* (D. Butler & Moseley, 2013) and *The Sensitive Nervous System* (D. Butler & Matheson, 2000). Butler states that his goal is to write and convey information about pain that is understandable to all people. He pioneered the establishment of NOI (Neuro Orthopaedic Institute Australasia) which provides courses and continuing education on neurodynamics and other effective treatments for the nervous system (D. Butler & Matheson, 2000). Similarly, Dr. Lorimer Moseley wrote a book of humorous stories and images to explain the complex nature of pain. Titled *Painful Yarns: Metaphors and Stories to Help Understand the Biology of Pain*, Moseley used understandable metaphors to discuss important aspects of the brain's biology as it is associated with pain (Moseley, 2007). These resources are of key importance in helping the general population understand the complicated concepts related to chronic pain.

In recent years, Adriaan Louw has become known as a lead researcher in the field of pain science. Louw has published a number of research articles outlining the mechanisms of pain in the body and how it is processed individually (Louw, Louie, et al., 2016; Louw, Puentedura, et

al., 2016; Louw, Zimney, et al., 2016). Louw highlights the importance of physical therapists understanding pain neuroscience and being able to educate patients on their pain from a biological and physiological standpoint. Louw points out that despite the growing body of knowledge associated with pain neuroscience, there has not necessarily been improved clinical application or patient outcomes thus far. Louw has proposed the importance of helping patients understand that pain is a normal and natural part of the human experience, to a degree. He stresses the importance of setting goals, pacing of activities, and gradual exposure to movement in the presence of pain which will allow the patient to increase their activity level and support their return to an improved quality of life. In his 2014 study, he compared two groups of patients that underwent surgical procedures for lumbar radiculopathy. One group received Pain Neuroscience Education (PNE) along with standard procedures, and one group only received standard procedures. While the PNE group and non PNE group had similarly ongoing pain and disability levels, the PNE group demonstrated 45% less expenditures on health care after surgery compared to the group that did not receive PNE. This finding is significant in that it shows that the PNE group had a better understanding of their pain and they realized that pain after lumbar surgery was normal and expected. Many studies have shown that when PNE is combined with a movement and manual based approach of physical therapy, the outcomes are far superior in reducing pain levels and increasing functional ability in patients (Louw, Puentedura, et al., 2016).

Physical Therapist's Pain Education

The body of research related to understanding pain is growing daily, and there is now a much greater understanding of why people experience pain differently (Louw, Puentedura, et al., 2016; McAllister, 2015; Moseley, 2007). Pain neuroscience is a complicated topic and it is of

vital importance that physical therapists have a grasp on these concepts to successfully treat patients suffering from chronic pain. Therefore, the education that physical therapists receive must be at a high level. In order for a person to become a physical therapist, they must attend an institution that is accredited by The Commission for Accreditation of Physical Therapy Education (CAPTE) and obtain the degree of Doctor of Physical Therapy. Most Doctor of Physical Therapy (DPT) programs require the applicant to have completed a bachelor's degree and a list of prerequisite coursework (among other requirements) prior to being admitted into the DPT program. Upon graduation from a CAPTE accredited institution, the candidate must sit for the National Physical Therapy Examination (NPTE) in order to be a board-certified physical therapist. From there, the physical therapist must apply for licensure or registration in their state to practice physical therapy legally in most states. The individual states set the guidelines for maintenance of the physical therapy license, which often includes varying amounts of continuing education to be completed annually. Therefore, the profession of physical therapy sets high educational standards for physical therapists to obtain and maintain their ability to practice. These are necessary to ensure that physical therapists have the required knowledge and expertise to manage patients with chronic pain and disability.

Physical Therapy Accreditation Standards

The Commission for Accreditation of Physical Therapy Education (CAPTE) determines the academic standards for physical therapy programs that must be met to maintain accreditation. The CAPTE mentions pain in one of the required standards, 7D19, which is related to administering tests and measures appropriately:

> 7D19: Select, and competently administer tests and measures appropriate to the patient's age, diagnosis and health status including, but not limited to, those that assess: a. Aerobic

Capacity/Endurance b. Anthropometric Characteristics c. Assistive Technology d. Balance e. Circulation (Arterial, Venous, Lymphatic) f. Self-Care and Civic, Community, Domestic, Education, Social and Work Life g. Cranial and Peripheral Nerve Integrity h. Environmental Factors i. Gait j. Integumentary Integrity k. Joint Integrity and Mobility l. Mental Functions m. Mobility (including Locomotion) n. Motor Function o. Muscle Performance (including Strength, Power, Endurance, and Length) p. Neuromotor Development and Sensory Processing **q. Pain** r. Posture s. Range of Motion t. Reflex Integrity u. Sensory Integrity v. Skeletal Integrity w. Ventilation and Respiration or Gas Exchange. (Commission on Accreditation in Physical Therapy Education, 2020, p.30)

While the term pain is not specifically utilized elsewhere in the accreditation document, standard 7D27 outlines the interventions that are required elements of the curriculum in a physical therapy program. Many of these interventions either directly or indirectly address pain in the patient. Standard 7D27 reads as follows:

Intervention 7D27 Competently perform physical therapy interventions to achieve patient/client goals and outcomes. Interventions include: a. Airway Clearance Techniques b. Assistive Technology: Prescription, Application, and, as appropriate, Fabrication or Modification c. Biophysical Agents d. Functional Training in Self-Care and in Domestic, Education, Work, Community, Social, and Civic Life e. Integumentary Repair and Protection f. Manual Therapy Techniques (including mobilization/manipulation thrust and nonthrust techniques) g. Motor Function Training (balance, gait, etc.) h. Patient/Client education i. Therapeutic Exercise. (Commission on Accreditation in Physical Therapy Education, 2020, p.31).

As noted in the standard, the physical therapist is required to address the patient/client's goals by implementing specific interventions. Often, the patient suffering from chronic pain will describe reduction in pain as one of the major goals to be addressed in physical therapy. Therefore, much of the coursework in physical therapy education centers around either directly or indirectly influencing pain in the patient (Commission on Accreditation in Physical Therapy Education, 2020).

Board Certification Testing for Physical Therapists

The National Physical Therapy Examination (NPTE) is the boards examination that must be successfully passed prior to becoming a licensed physical therapist. The examination is designed to test the knowledge required of an entry-level physical therapist. Examination questions include information regarding safe and effective patient care, including current best evidence related to the safety and efficacy of physical therapy interventions (FSBPT- Federation of State Boards of Physical Therapy, 2018). While many of these questions may address knowledge of pain theory and interventions to address pain, the content outline for the NPTE only mentions pain once in the System Interactions portion, which reads as follows:

> SYSTEM INTERACTIONS: Foundations for Evaluation, Differential Diagnosis, & Prognosis. This category refers to the interpretation of knowledge about diseases/conditions involving system interactions according to current best evidence, in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan…. Dimensions of **pain** that impact patient/client management (e.g., psychological, social, physiological, neurological, mechanical). (FSBPT- Federation of State Boards of Physical Therapy, 2018, p.10)

Again, many of the interventions utilized in physical therapy will either directly or indirectly influence a patient's pain. While the term pain or chronic pain is not emphasized in the Content Outline document, there is an inference that the physical therapist will address patient goals, with decreasing pain being a commonly referenced patient goal.

Curriculum Guidelines for Teaching Pain in Physical Therapy Education

In a groundbreaking report, the U.S. Institute of Medicine stated that a major barrier to adequate pain relief in patients was due to limited access to clinicians who have appropriate levels of knowledge about pain. They stated that there was a prevalence of outdated knowledge and attitudes regarding pain and a lack of evidence-based practice related to the treatment of chronic pain (Hush et al., 2018). Major educational recommendations were made related to expanding and redesigning educational programs and curricula. The advance would, in turn, lead to an increase in the number of health professionals with advanced expertise in pain management.

The International Association for the Study of Pain (IASP) has emerged as a leader in the healthcare industry regarding recommendations for pain management. The IASP has developed curriculum guidelines for many healthcare related fields, including physical therapy, in order to make proper recommendations of what should be taught in the various programs. Physical therapy education programs are encouraged to embed specific patient education and training in the curriculum based on the IASP guidelines (Slater et al., 2018). According to the IASP website,

> Pain is one of the most common reasons people seek care from physiotherapists/physical therapists… What is not well understood is why following an initial injury, pain can persist or become recurrent in some people and not in others… Knowledge alone is

> insufficient: therapists also require competencies that underpin the effective and safe delivery of contemporary pain assessments and evidence-based pain treatments and management. (Slater et al., 2018, para 2)

One important question to consider is whether physical therapy education programs are implementing these IASP guidelines to instruct future physical therapists about pain knowledge and pain management. According to a study conducted in 2001, the modal amount of time spent on pain in 169 accredited Doctor of Physical Therapy (DPT) programs was four hours. By the year 2012, this number had increased to a mean of thirty-one hours. While the amount of time spent teaching pain in physical therapy curriculum appears to be improving, there are still questions concerning the adequacy of this education. Also, there is little evidence in the literature to suggest that physical therapy programs are implementing the IASP guidelines to teach pain theory and management in physical therapy education programs (Hush et al., 2018). In a 2015 study, less than 50% of DPT programs were aware of the Institute of Medicine report on pain or the IASP guidelines for pain education in a physical therapy program (Hoeger et al., 2015).

There is some evidence that indicates that the addition of IASP based elective coursework in a physical therapy curriculum is successful in improving students' pain neurobiology knowledge as well as improving their attitudes and beliefs towards pain. In one study, students improved their average scores on Neurophysiology of Pain Questionnaire (NPQ) from 79% to 86% after taking IASP based elective coursework. Beliefs about pain also showed a significant change in the expected direction on the Pain Attitudes and Beliefs Scale for Physiotherapists (PABS-PT) with an improvement in biopsychosocial scores and a decrease in a bias towards biological pain sources (Bareiss et al., 2019).

Post-graduation Continuing Education

Continuing Education is an important aspect of professional development for many healthcare providers, including physical therapists. Physical therapists are required to participate in varying amounts of continuing education hours depending on the state in which the therapist is licensed or registered. Continuing education often consists of a few days of intense, hands-on training in a location that is different from the physical therapist's typical clinical environment. Other options for continuing education opportunities include online training modules, in-house educational sessions, audits with feedback regarding clinical performance, as well as many other options.

Overall, there is a lack of evidence to demonstrate that continuing education for physical therapists translates into better patient outcomes. This is likely due to the wide variety of differences in the continuing education coursework as well as the characteristics of the physical therapists that attend the sessions (Cleland et al., 2009). Most physical therapists will agree that continuing education is a helpful practice and that they often feel more confident in their knowledge and skills following continuing education sessions, but there is minimal research that has been done to demonstrate true learning or improved patient outcomes that can be attributed to continuing education opportunities.

According to an article published by Devonshire and Nicholas (2018), relatively little has been published regarding the role that continuing professional development plays in the progression of physical therapists' knowledge specifically regarding pain management (Devonshire & Nicholas, 2018). Many physical therapists may be participating in continuing education opportunities that increase their knowledge and management skills in treating chronic pain, but there is no evidence to demonstrate which courses or types of continuing education opportunities are the best options for improving these skills.

Continuing education has been rigorously studied in the field of adult education as well, and the importance of continuing education to the adult learner cannot be overstated. Brockett and Darkenwald (1987) reported that the "key to building a solid future knowledge base on adult learning is to be found in sustained efforts to pursue inquiry on topics relevant to the broad field of continuing education" (p.30). In the field of adult education, continuing education has been studied, including formal, nonformal, and informal learning opportunities. Many critics of modern continuing education principles propose that the certification and licensure requirements by occupations, corporations, national and state governmental agencies has transformed continuing education from voluntary to mandated, which is contrary to the adult education theories and their focus on self-directed, autonomous learning. The increase in the credentialing and certification requirements has caused learning to no longer be an individual choice but an external requirement (Ross-Gordon et al., 2017). Some critics, such as Merriam, Caffarella, and Baumgartner, even go so far as to describe this type of constraint and requirement for learning as a method of societal control (Ross-Gordon et al., 2017). The profession of physical therapy, much like other health care professions, has formal education requirements, credentialing mandates, and licensure requirements that must be met in order to continue to practice.

There is a strong correlation between the learner's history of formal education and their rates of participation in continuing education, either formal or nonformal in nature. Therefore, those with more educational background tend to pursue continuing education to a higher degree than those without formal education history. Cross (1980) indicated that learning seems to be addictive in nature for the adult, and learners that have more education tend to pursue even more learning opportunities (Cross, 1980). This theory may explain the tendency of many physical therapists to rely heavily on continuing education as their sole source of self-directed learning.

There has been a noted increase in partnerships in recent years between the health care and adult education sectors to address the problems associated with continuing education for health care providers (Imel & Ross-Gordon, 2011) .

Physical Therapists' Knowledge and Attitudes Towards Treating Chronic Pain

Physical Therapists Knowledge of Chronic Pain

Relatively little research has been conducted to specifically address physical therapists' knowledge and attitudes towards treating acute or chronic pain. However, more research has been published in nursing and other healthcare professions. Arumugam et al. (2018) examined physicians, nurses, occupational therapists, physical therapists and psychologists who were involved in a pain management clinical setting in regards to their knowledge and attitudes towards evidence-based practice. They found that all of the professional groups had less than optimal implementation of evidence-based practice regarding their knowledge and attitudes towards pain management (Arumugam et al., 2018). Similarly, in a study looking at Physicians, Nurses, Physical Therapists and Midwives knowledge of complementary medicine to address chronic pain, a total of 84.3% of the 1247 respondents felt that they lacked the knowledge to inform their patients about these options (Aveni et al., 2016).

In a 2015 study conducted regarding physical therapists' perceptions about identifying and managing low back pain, researchers discovered that many therapists felt under-skilled in addressing patients with chronic pain (Synnott et al., 2015). Therapists often stigmatized patients with low back pain as demanding, attention-seeking and poorly motivated when they presented with these challenging cases. In fact, researchers stated that "Physiotherapists perceived that neither their initial training, nor currently available professional development training, instilled

them with the requisite skills and confidence to successfully address and treat the multidimensional pain presentations seen in low back pain" (Synnott et al., 2015, p.68).

Simmonds et al. (2012) conducted research regarding how physiotherapists' knowledge, attitudes, and intolerance of uncertainty influence their decision-making processes in treating patients with low back pain. In this study, only twelve percent of the 108 physical therapists studied were familiar with published clinical practice guidelines that provide the best evidence related to treating low back pain. This study also examined the differences between physical therapists with a biomedical approach versus a behavioral approach to clinical decision making and how those approaches influence outcomes (Simmonds et al., 2012).

Ross et al. (2014) conducted a study comparing physical therapists and family practitioners' knowledge of low back pain management when treating patients in the Air Force. The study results indicated that physical therapists were more likely to utilize patient encouragement and explanation than family practitioners when treating patients with low back pain. Additionally, physical therapists demonstrated significantly higher knowledge of optimal management strategies in treating patients with low back pain when compared to family practitioners (Ross et al., 2014).

Knowledge of pain management and use of opioids in a pediatric population was explored in a study by de Freitas et al. (2014). Pain management and opioid knowledge was assessed in professionals including physicians, pharmacists, physiotherapists, nurses, nursing technicians, and nursing assistants. The average score was 63.2 percent, indicating the need for investing in continuing education of these health care professionals and a need for protocol development in children experiencing pain at the institution (De Freitas et al., 2014).

In one study by Childs, et al. (2005), physical therapists' knowledge related to management of musculoskeletal conditions was compared to physical therapy student knowledge and physician interns' knowledge. The physical therapist group averaged a score of 75.9% with an overall pass rate of 67% of the group. Physical therapy students averaged 66.2% average score with an overall pass rate of 24%. Comparatively, physician interns scored 60%, with an overall pass rate of 18%. This research highlights the emphasis placed on treating musculoskeletal conditions and pain in the physical therapy profession. The authors purport that there has been a de-emphasis on musculoskeletal management in medical school curricula, and that physical therapists may be more knowledgeable about these conditions (Childs et al., 2005).

Physical Therapists' Attitudes Towards Treating Patients with Chronic Pain

The attitude of a healthcare practitioner is of great importance when delivering effective care. Physical therapists' perceptions regarding the causes and treatments for chronic pain can greatly impact the level of care that they provide to their patients. The biopsychosocial model of pain management involves implementing an understanding of the cognitive, psychological, and social influences associated with pain into the treatment plan. The attitudes and beliefs of the physical therapist can impact their ability to effectively implement this model, especially if the physical therapist feels like these issues are beyond their scope of practice (Synnott et al., 2016). Jeffrey and Foster (2012) noted through structured interviews with physical therapists that three themes emerged regarding PTs feelings about treating patients with chronic lower back pain. First, physical therapists believed that back pain must have some kind of underlying mechanical cause that was recurring in nature. Also, they believed that their role was to empower patients to exercise and self- manage their pain. Physical therapists often felt tension between the treatment

and advice that they offered their patients in comparison to the patient's own beliefs and attitudes (Jeffrey & Foster, 2012).

A study by Arumugam et al. (2018) examined the knowledge, attitude and behaviors of health care professionals who regularly were involved in pain management situations as they related to their evidence-based practice application. These professions included physicians, nurses, occupational therapists, physical therapists, and psychologists. This study demonstrated that while knowledge related to chronic pain management scores were fairly high for all professions (83-87% scores), attitude scores were low (57-59%) and did not differ across professions (Arumugam et al., 2018). Research such as this is interesting because if the level of chronic pain knowledge is high in healthcare practitioners, then how are their poor attitudes explained? One might assume that an increase in knowledge and confidence in skills might lead to improved attitudes towards treating patients with chronic pain. However, studies such as these suggest otherwise.

Some research makes an attempt to pinpoint the reasons behind practitioners' poor attitudes and beliefs regarding the treatment of chronic pain (Jette et al., 2003; Simmonds et al., 2012; Synnott et al., 2016; Wolff et al., 1991). In one study, physical therapists' attitudes towards treating patients with chronic low back conditions were examined. Synnott et al. (2015) determined that physiotherapists in the study indicated a preference for treating the mechanical aspects of lower back pain, and did not feel comfortable confronting the cognitive, psychological, or social factors that many patients possess when dealing with chronic pain. The physiotherapists in this study did not feel that their initial educational training nor the professional continuing education opportunities available provided the skills needed to address the multifactorial aspects of chronic pain. In fact, physical therapists often stigmatized patients

with chronic low back pain as “demanding, attention-seeking, and poorly motivated” when they presented with these psychosocial aspects (Synnott et al., 2015, p.68). Studies such as this indicate that the attitudes of many physical therapists may not be sufficient to address chronic pain in patients from a biopsychosocial standpoint.

The lack of definitive biomedical evidence of injury may be a factor in physical therapists’ poor attitudes towards treating chronic pain. In a study by de Ruddere et al. (2014), researchers discovered that when general practitioners and physiotherapists were presented with patients that lacked clear medical evidence for why they were experiencing pain and when they encountered patients with complicated psychosocial factors, the patient’s pain was taken less seriously. Both groups of health care providers indicated feeling less sympathy, lower expectations for treatment impact, and less self-efficacy in their ability to manage the patients’ pain when a biomedical diagnosis was lacking and when the patients had obvious psychosocial involvement (de Ruddere et al., 2014). Physical therapists may have difficulty determining how to interpret pain when objective findings are lacking, according to a study by Morin Chabane et al. (2018). Physiotherapists in this study were unsure how to treat patients with severe pain when there was little to no biomedical explanation for the pain. The authors of this study concluded that physical therapists may benefit from biopsychosocial training to manage patients with chronic pain (Morin Chabane et al., 2018).

In a study by Wolff et al. (1991), physical therapists’ knowledge and attitudes towards treating chronic pain were studied. Overall, only 4% of the respondents preferred to work with patients that have chronic pain. Scores related to pain knowledge were low (35.8 out of 46 points), and scores related to positive attitudes toward treating patients with chronic pain were even lower (20.5 out of 36 points). The majority of the participants in the study (72%) felt that

their entry-level education in pain management was less than adequate to treat patients with chronic pain (Wolff et al., 1991).

The type of training that health care providers receive can impact the beliefs and attitudes related to chronic pain. In a study by Domenech et al. (2011), two different educational models were provided to physical therapy students, one more geared towards the biomedical model and the other geared more towards the biopsychosocial model. The physical therapy students who attended the biopsychosocial training exhibited improvements in recommendations provided to patients regarding activity and work behaviors. However, the biomedically trained students resulted in inadequate activity recommendations and excessive maladaptive beliefs. Therefore, the researchers concluded that an excessively biomedical form of training can propagate negative attitudes and beliefs regarding treatment of patients with lower back pain (Domenech et al., 2011).

One study explored the role of intense biopsychosocial training (Cognitive Functional Therapy, CFT) in managing cognitive, psychological, and social aspects of chronic lower back pain. In this study, thirteen physical therapists received CFT and expressed increased confidence in their ability to handle the biopsychosocial aspects related to managing chronic low back pain following training. Therapists reported changes in current practice including utilization of new assessments, an alteration in modes of communication with patients, and utilization of a more functional approach to treatment. This study highlights the importance of utilizing a functional approach to the treatment of chronic pain and the need for an understanding of the biopsychosocial factors that influence pain (Synnott et al., 2016).

Relationship Between Knowledge, Attitudes, and Behaviors

The relationship between knowledge and attitudes has been examined in physical therapy and healthcare related literature (Arumugam et al., 2018; Bareiss et al., 2019; Bernhardsson et al., 2014; Jette et al., 2003; Simmonds et al., 2012; Wolff et al., 1991). The adult education field has also researched this connection and the reflection of a learner's attitude that is modeled by his or her behavior. Azjen (2011) describes the theory of Planned Behavior to highlight the relationship between motivation to learn and behavior. The theory outlines the connection between intentions, ability, and external variables during the learning process (Ajzen, 2011). Carre (2000) developed a model of motivation that outlines ten motives for participation in adult learning, which can be broken down into two groups (intrinsic and extrinsic motivators) (Carré, 2000). This research found that participation in learning as an adult may differ due to variations in motives. Simply having a positive attitude towards learning does not necessarily mean that a person will take action, and there may be significant barriers that prevent learning (Kitiashvili & Tasker, 2016). Cross's model (1981) identifies three different types of barriers that may prevent learning. First, situational barriers such as lack of time or money, work responsibilities, or lack of transportation may be a factor that prevents learning. Secondly, dispositional barriers, such as negative attitudes or poor perceptions of the educational process may be in play. Low self-esteem or poor performance in the past may also hinder the process of taking action to learn. Thirdly, institutional barriers can also occur, such as administrative issues, scheduling inconveniences, or lack of information provided for learning opportunities (Cross, 1981).

Bettinghaus (1986) found that there is a positive but small correlation between knowledge, attitudes, and behaviors (Bettinghaus, 1986). From a health promotion standpoint, it has long been believed that if information is provided to people, their attitudes about that subject will change which will lead to behavior changes. However, in examining mass marketing

campaigns directed towards changing health behaviors, lasting effects on health behaviors are not achieved and that any positive effects are very weak (Bettinghaus, 1986). This type of information further reinforces the belief that human motivation is complicated and predicated on many internal and external factors (Carré, 2000; Kitiashvili & Tasker, 2016; Knowles, 1984).

Many physical therapists tend to be high achievers who could be considered globally motivated (Taylor, 2021) to learn more and become better physical therapists. However, many factors can affect the level of immediate motivation (Taylor, 2021) during entry level education and continuing education opportunities. A continuum exists between student engagement and a resistance to learn, and a learners' level of engagement can be impacted by several factors. Therefore, it is not enough for a student to be globally motivated to learn the complex concepts related to the treatment of chronic pain. The instructor must facilitate the creation of motivational immediacy to support learner engagement and to help minimize distractions or resistance to learning (Taylor, 2021). The reasons that learners may be resistant to learning are multifactorial and are difficult to analyze. Also, it is important to understand that some forms of resistance to learning can be positive and can combat the tendency for the learner to become a passive placeholder in the classroom (Taylor, 2021). Illeris (2011) studied the ways in which people learn and determined that if learning is enjoyable or if the learner has enough will to learn the subject matter, information is typically easier to recall and apply to new situation. However, if there is a lack of interest or a reluctance on the learner's part, the information fades away. Illeris outlines the two major processes of learning, including the external interaction process between social, cultural and material environment, as well as the internal psychological process of acquiring knowledge (Illeris, 2011). These important connections between motivation,

attitudes, and knowledge can help to explain the various levels of subject matter knowledge related to chronic pain principles.

The implications of this information are far reaching in terms of how the physical therapist is viewed as an adult educator and adult learner. Physical therapists must continue to be lifelong learners in order to keep up with the latest research in the field, and the physical therapist's knowledge, attitude, and behaviors towards learning will ultimately impact patient outcomes. There is much to learn related to treating patients with chronic pain and research is growing exponentially (Butler & Matheson, 2000; Louw, Puentedura, et al., 2016; Louw, Zimney, et al., 2016). The physical therapist has many options related to the appropriate interventions to address chronic pain, and the physical therapist's knowledge, attitudes, and behaviors towards learning will impact their ability to provide excellent patient care.

Current Interventions for Treating Pain

For many years, health care practitioners have attempted to control or decrease pain using several different strategies. Carlesso et al. (2014) examined the common intervention strategies of 360 physical therapists and chiropractors in treating neck pain and found that many different interventions were utilized regularly in practice. The top five most frequently utilized categories of treatment interventions were as follows: Exercise prescription (98%), manual therapies (98%), Ergonomic advice (83%), Work related interventions (73%), and thermal agents (73%) (Carlesso et al., 2014).

Educational and Psychological Interventions

A large study by Carlesso et al. (2015) was conducted to determine how frequently pharmacological, psychological, and patient education interventions were typically utilized by physical therapists and chiropractors to treat patients with neck pain. The researchers determined

that patient education and relaxation therapies were the most common interventions utilized to treat chronic neck pain by both sets of health care practitioners, however physical therapists utilized patient education significantly more often than chiropractors. Pharmacological interventions and many psychological interventions were felt to be out of the scope of practice for both sets of practitioners (Carlesso et al., 2015).

Patient education has been utilized as a treatment strategy to help patients understand the multifaceted aspects of their pain. Educational interventions such as the Swedish Back School have been utilized since 1969 to teach patients about spinal structures, anatomy related to the spinal disc, and ergonomic principles associated with spinal protection. Later, exercises were added to help patients incorporate movement and restore function (Brox et al., 2008) . Traditionally, the biomedical approach has been utilized to help patients understand the anatomical and biomechanical aspects related to their pain. Louw, et al (2016) proposed that while these educational strategies can be helpful in the acute phase of the pain experience, those experiencing chronic pain find these strategies less useful or applicable (Louw, Zimney, et al., 2016). The biomedical model does not take into account the complex neuroscientific issues associated with chronic pain, such as peripheral and central sensitization. Other issues that must be considered include facilitation and inhibition, neuroplasticity, immune and endocrine responses, along with other factors. These issues contribute to the complex and persistent nature of chronic pain states that can be difficult to explain from an anatomical perspective. To address these limitations, the educational model of teaching patients about their pain has been termed therapeutic neuroscience education, Explain Pain, and Pain Neuroscience Education. The founding principle of teaching patients about their pain was introduced in the 1990s by physical therapist Louis Gifford. Gifford was frustrated by his inability to address his patient's persistent

pain with biomedical and manual therapy interventions. He developed a method of teaching patients about the physiological aspects of their pain (Louw, Louie, et al., 2016). These approaches strive to address the biological and physiological processes involved in pain while removing the focus from the actual anatomical structures of the body. In a study conducted by Louw, Zimney et al. (2016), Pain Neuroscience Education was found to be effective for musculoskeletal disorders in reduction of pain levels, increasing patient knowledge of their pain, decreasing disability and pain catastrophizing, improving fear-avoidance scales, and improving attitudes and behaviors regarding pain. Patients also improved levels of physical movement and decreased healthcare utilization as a result of the interventions. The study was limited, however, due to the heterogenous nature of the educational and physical interventions studied in this systematic review (Louw, Zimney, et al., 2016).

The psychological component of pain is now being studied to understand how the mind impacts the chronic pain state. One psychological intervention that has been examined to manage chronic pain is Cognitive Behavioral Therapy (CBT). CBT includes activities such as relaxation and activity pacing along with pleasurable activity scheduling. While many physical therapists expressed an interest in CBT, only a minority of PTs utilized these techniques due to concerns with their skill level, time constraints and reimbursement issues (Beissner et al., 2009). One systematic review examined the different types of psychological treatments utilized in the management of chronic pain, and the researchers determined that CBT is, indeed, a useful approach for managing chronic pain. However, more research is needed to determine which particular components of CBT are most effective for certain patient populations (Williams et al., 2012). One form of CBT has been utilized with some success in addressing chronic pain, which is termed Acceptance and Commitment Therapy (ACT). In a 2012 study examining the effects of

Acceptance and Commitment Therapy (ACT) on chronic pain in patients in their seventies and eighties, researchers found that patients exhibited significant improvements in physical disability, psychosocial disability, and depression following three to four weeks of ACT sessions. This treatment did not attempt to decrease pain in the patients but served to increase psychological flexibility by helping the patients change or persist with behavior in an open, accepting fashion to cope with their pain (Mccracken & Jones, 2012).

Exercise and Movement

Exercise is, by far, the most frequently utilized treatment for many forms of chronic pain, especially in low back pain (Barker et al., 2014; Bennell & Hinman, 2011; Geneen et al., 2017; Häuser et al., 2010; van Middelkoop et al., 2010). Van Middlekoop et al. (2010) conducted a large study examining the effectiveness of exercise for chronic low back pain determined that exercise therapy is effective in reducing pain and improving function in patients with chronic low back pain (van Middelkoop et al., 2010). However, one particular type of exercise was not identified as being more effective than others and more research was needed to determine which subgroups of patients would benefit from particular exercises (van Middelkoop et al., 2010).

With the increase in research regarding neuroplasticity, it has become increasingly clear that the experience of pain is a highly individualized phenomenon. Therefore, treatment of pain must also be understood at the individual level. The role of movement in the treatment of pain seems counterintuitive. For a person with acute pain, it makes sense that resting the injured area is an appropriate treatment. However, in the patient with chronic pain, movement must be reincorporated into the treatment plan for the patient to regain function and for neural healing to occur. Since each individual experiences pain differently, incorporating movement into their daily lives can be a challenge for many patients. Patients regard a noxious stimulus in different

ways, and they attach different meanings to the pain they experience. De Jong et al. (2005) implemented a treatment of graded exposure to activity (GEXP) in patients with a highly debilitating neurological condition called complex regional pain syndrome (CRPS) type I. They found that GEXP decreased levels of self-reported pain-related fear, intensity, functional disability, and other physiological signs and symptoms (de Jong et al. 2005).

Fibromyalgia is a frustrating chronic rheumatological condition where the patient experiences widespread pain and reduced pain threshold. Patients with fibromyalgia often experience fatigue, depression, anxiety, sleep problems, and headaches among many other symptoms. A large study examined the most effective treatments for fibromyalgia, and it was determined that a heated pool with or without exercise was deemed helpful in the treatment of patients with fibromyalgia. Other effective treatments included pharmacological interventions combined with Cognitive Behavioral Therapy (Carville et al., 2008). Hauser et al. (2010) found that aerobic exercises (both on land and in the water) were effective in patients with fibromyalgia in reducing pain if performed two to three times a week at low to moderate intensity. In this study, researchers found positive effects on mood, fatigue, and limitations of quality of life by utilizing these interventions (Häuser et al., 2010). Aquatic exercise has long been utilized in managing chronic pain in a wide variety of patients. Barker et al. (2014) found that in patients with chronic musculoskeletal conditions, aquatic exercise decreased their chronic pain and demonstrated improvements in function and quality of life. These results were comparable to land exercise benefits as well (Barker et al., 2014).

Chronic Nonspecific Neck Pain (CNSNP) is another debilitating condition that results in long-term, significant pain for patients. Neck pain is extremely common and is second only to lower back pain in the general and workforce populations. A large systematic review of studies

related to treatment of CNSNP determined that therapeutic exercise was effective for managing CNSNP, both in the short and intermediate terms. However, no significant effect was noted for long term pain relief (Bertozzi et al., 2013). Carlesso et al. (2014) found that 98% of physical therapists and chiropractors utilize therapeutic exercise in their practice to address neck pain. Therapeutic exercise, especially when combined with manual therapy techniques, has been proven to be effective in managing cervical pain, according to clinical practice guidelines. Particularly, exercises that include cervical and scapulothoracic stretching and strengthening appear to be effective in patients with chronic neck pain (Carlesso et al., 2014).

Osteoarthritis is another condition that can cause chronic pain, most commonly in the hips and knees. Bennell et al. (2011) found that exercises (aerobic, strengthening, aquatic, and tai chi) were beneficial for decreasing pain and increasing function in patients with osteoarthritis (Bennell & Hinman, 2011). Researchers noted that patient adherence to exercise is a key component to the success of the interventions. Another study (Geenen et al., 2017) looked at patients with many different pain conditions, including rheumatoid arthritis, osteoarthritis, fibromyalgia, low back pain, intermittent claudication, dysmenorrhea, neck disorders, spinal cord injury, post-polio, and patellofemoral conditions. In this study, researchers concluded that exercise produced favorable results in reduction of pain and increasing function in patients experiencing chronic pain. These exercise interventions included aerobic conditioning, strengthening exercises, flexibility, range of motion exercises, core and balance training programs, yoga, pilates, and tai chi (Geneen et al., 2017).

Walking programs have been suggested to be effective in treating patients with chronic musculoskeletal pain. O'Connor et al. (2015) found that walking is associated with significant

improvements in pain reduction for those suffering from chronic musculoskeletal pain. However, long-term effectiveness for this intervention has not been studied (O'Connor et al., 2015) .

Manual Therapy

Manual therapy techniques often target a specific tissue or anatomical target (typically joints, muscle/connective tissue, or neurovascular tissue). Bishop et al. (2015) found that evidence exists of manual therapy techniques being performed as far back in time as ancient Egypt, China, and India. Manual therapy was written about in the early texts by Hippocrates as well, and today there is a large variety in schools of thought related to manual based techniques. Treatments often include the use of the practitioners' hands with the patient being passive, but treatments may also involve more patient interaction and adjunct therapies to supplement the hands-on portions of treatment (Bishop et al., 2015). There is evidence to suggest that manual therapy techniques can be effective in certain chronic pain conditions such as low back and knee pain (Bokarius & Bokarius, 2010). Carlesso et al. (2014) found that 98% of physical therapists and chiropractors utilize some form of manual therapy in their practice when treating chronic neck pain (Carlesso et al., 2014) . Coulter et al. (2018) also found moderate evidence to support the use of mobilization and/or manipulation to reduce pain and increase function in patients with chronic nonspecific low back pain (Coulter et al., 2018).

Physical Agents, Modalities and Other Management Strategies

Physical agents and modalities are widely utilized in health care centers to address painful conditions (Carlesso et al., 2014). There has been extensive debate on whether these treatments are effective in managing pain or producing a physiological effect. Carlesso et al. (2014) found some moderate evidence to support the use of modalities such as laser and acupuncture in patients with chronic neck pain. They found no evidence for the use of neck

orthoses (collars), or ergonomic and environmental changes in the work environment (Carlesso et al., 2014). Transcutaneous Electrical Neuromuscular Stimulation (TENS), mechanical traction, and acupuncture have moderate evidence in the literature to support their use in treating certain painful conditions, although there is not sufficient evidence to support long-lasting effects of these treatments. There is little evidence to support the use of hot and cold modalities in the treatment of pain, however these interventions continue to be widely utilized by physical therapists and chiropractors (57% and 48% respectively) (Carlesso et al., 2014) .

Complementary medicine offers an alternative for treating chronic pain that is often unexplored in traditional medicine. A study conducted by Aveni et al. (2016) at a Swiss academic hospital revealed that many health care practitioners (physicians, nurses, physical therapists, and midwives) felt that complementary medicine could be a viable option for treating patients with chronic pain. However, over half of the respondents had never referred a patient for complementary medicine and 84.3% of the practitioners felt that they lacked the knowledge to speak to their patients about these techniques. The main techniques that practitioners were familiar with included hypnosis, osteopathy, and acupuncture. The less familiar techniques included neural therapy, mindfulness-based stress reduction (MBSR), and biofeedback (Aveni et al., 2016).

Multidisciplinary Approach

Due to the complex nature of chronic pain, many believe that a multidisciplinary approach is needed to address the different components of disease that a patient may require. A multidisciplinary approach requires a patient to be treated by clinicians with different backgrounds or from entirely different professions to gather different perspectives. Kamper et al. (2015) compared a multidisciplinary approach to treating chronic pain with usual care (which

involves treatment that a general practitioner would typically prescribe). In this study, the biopsychosocial perspective was utilized, either a psychological component, a social/work targeted component, or both components were required to meet the definition of multidisciplinary. Also, treatments were delivered by clinicians with different professional backgrounds. This study found moderate evidence to support a multidisciplinary rehabilitation approach as compared to usual care (Kamper et al., 2015).

Summary

The evidence is clear that chronic pain is complex and multifaceted, and therefore often requires individualized treatment. Research has not yet identified a single, most effective approach to treating patients with chronic pain. Physical therapists have many options when choosing treatments for their patients' chronic pain issues. Therefore, the knowledge and attitudes of physical therapists related to chronic pain are highly important when choosing the most appropriate treatment methods for their patients. In order to build a strong foundation for the results of this research, the review of literature was organized to examine the history of the physical therapy profession, within the framework of the adult learning community. The concepts related to chronic pain and the societal impact that it has in the United States was explored, along with the physical therapist's role in addressing the opioid epidemic. Recent research related to a better understanding of the mechanisms of chronic pain in the body was explored, and the interventions typically utilized to address pain were outlined. The current available research related to physical therapists' knowledge and attitudes related to the treatment of chronic pain was explored in order to lay a foundation for the results of this study.

CHAPTER 3

METHODS

Chapter 3 describes the research design and process used to gather data related to the knowledge and attitudes of physical therapists regarding the treatment of chronic pain in the United States. The statement of the problem, the purpose of the study, and the research questions studied are included in this section. The researcher (on July 10, 2018), along with the supervising faculty, completed the Collaborative Institutional Training Initiative (CITI) program (See Appendix A), and permission was granted on 03/09/2020 (with committee modifications approved on 02/22/2021) by the Auburn University Institutional Review Board to conduct this study on human subjects (See Appendix B). The instrument was emailed to the American Physical Therapy Association (APTA) Academy of Orthopedic Physical Therapy (AOPT), who then distributed the link to the survey to the possible participants via email. The researcher directly received all survey responses and performed all data analysis; therefore, participant anonymity was protected at all times throughout the research process. All Auburn University protocols and procedures were followed throughout the data collection and analysis process.

Statement of the Problem

Currently, there is very little information available in the literature regarding physical therapists' knowledge of and attitudes toward the treatment of patients with chronic pain.

Purpose of the Study

The purpose of this study was to determine physical therapists' knowledge and attitudes regarding causes and treatments of chronic pain. Factors that may affect physical therapists' knowledge and attitudes towards treating patients with chronic pain were also examined.

Research Questions

The following research questions were explored in this study:

1. What do physical therapists in the U.S. know regarding causes of and treatments for chronic pain?

2. What are physical therapists' attitudes towards treating chronic pain in the U.S.?

3. Does degree/educational level increase the knowledge or attitude scores of physical therapists who treat patients with chronic pain?

4. Does years of experience treating patients increase the knowledge or attitude scores of physical therapists treating patients with chronic pain?

5. Does type of practice setting increase the knowledge or attitude scores of physical therapists treating patients with chronic pain?

6. Do physical therapists believe they were well equipped in their entry level training to treat patients with chronic pain?

7. Are physical therapists confident/satisfied in their current level of knowledge of chronic pain?

7a. Do those physical therapists with higher knowledge scores feel more confident/satisfied with their current level of knowledge of chronic pain?

7b. Do those physical therapists with higher attitude scores feel more confident/satisfied with their current level of knowledge of chronic pain?

8. What types of post-graduate education do physical therapists deem to be most helpful in increasing knowledge and attitudes towards treating patients with chronic pain?

Methods

In this study, data were collected from a sample (n=266) of physical therapists who were current members of the Academy of Orthopaedic Physical Therapy, which is the largest Academy/specialty area of the American Physical Therapy Association (APTA) (Academy of

Orthopaedic Physical Therapy (AOPT), n.d.). All participants were emailed and asked to complete the informed consent, demographic and initial survey information located in questions 1-14. Then respondents completed the Chronic Pain Knowledge and Attitudes Test (Questions 15-41). Participants remained anonymous throughout the study, as there were no personal identifiers gathered through the email and survey data collection process.

Sample

Participants

This sample (n=266) was chosen due to the participants' current status as licensed physical therapists practicing in the United States and their interest in orthopedics, as evidenced by their membership in the Academy of Orthopaedic Physical Therapy (AOPT), a section of the American Physical Therapy Association in the United States (n = 16,266). The total population of physical therapists in the United States as of 2019 was approximately 312,716 (American Physical Therapy Association, 2020). Therefore, the sample in this study represents 1.63% of the total members of the AOPT and 0.085% of the total population of physical therapists in the United States. Subsequently, the results of this study represent a small percentage of the AOPT and physical therapists in the United States.

This same population was utilized in the original study conducted by Wolff, et al. (1991), and therefore comparisons could be made between the participants of the original study and the current study. In 1991, there were approximately 10,000 members in the AOPT, and 119 responded to the original survey, representing 1.19% of the total members of the association. Physical therapists included in the current study were employed in the following settings: hospitals, private practice, inpatient and outpatient rehabilitation centers, academic settings, industrial/corporate wellness programs, and other settings. While the majority of the participants

held the degree of Doctor of Physical Therapy, other degree levels were represented in the sample as well.

Data Collection

Of those who received a link to the survey, 5,036 (31%) opened the survey and 266 (1.64%) submitted usable responses. Data were collected through the use of Qualtrics software, Version XM of Qualtrics, © 2018 Qualtrics. Qualtrics and all other Qualtrics products or services names are registered trademarks or trademarks of Qualtrics, Provo, UT, USA (Citing Qualtrics in Academic Research - Qualtrics, 2022). Participants voluntarily responded to the email survey/questionnaire after consenting to participate in the study. Survey respondents remained anonymous, with the only identifying information provided being the respondents status as a currently licensed physical therapist, sex/gender, and race/ethnicity. These identifiers were not sufficient to nullify anonymity. Once a survey was completed, the results of the survey were visible only to the principal investigator within the Qualtrics software.

Statistical Methods

This research utilized a non-experimental design analysis, with no variable manipulation occurring. The initial portion of the instrument (Questions 1-14) was designed to capture demographic and background information about the participants. The second portion of the survey (The Chronic Pain Knowledge and Attitude Test) was utilized to assess each participant in their knowledge and attitude towards treating patients with chronic pain. Each respondent received a knowledge score, an attitude score, and an overall score on this portion of the survey. Once all surveys were completed, the data were downloaded from the Qualtrics software and uploaded into Microsoft 365 Excel, Version 2207. Frequencies, means, and Pearson Product-Moment Correlation Coefficients, and linear regressions were calculated using the data collected.

Instrumentation

The Chronic Pain Knowledge/Attitude Test covers material that is considered minimum requirements for providing beneficial treatment for patients with benign chronic pain due to orthopedic disorders. The test, which was designed by Wolff et al. (1991), was utilized to ascertain information regarding knowledge and attitudes of physical therapists treating patients with chronic pain (Wolff et al., 1991). This instrument was supplemented by researcher-designed questions in the demographics section to clarify the participants' current status of treating patients and current practice settings. Permission from Melissa S. Wolff (original author) was granted to use the instrument and make modifications as necessary, according to new knowledge regarding pain science. However, no significant modifications were made to the original Chronic Pain Knowledge/Attitude Test.

The Instrument

The survey began with a question regarding informed consent and was followed by thirteen questions that addressed demographic and background information of the respondents. The Chronic Pain Knowledge/Attitudes Test included 28 questions (18 questions addressing knowledge and 10 addressing attitudes regarding chronic pain); Scoring of the instrument was guided by the original authors of the instrument and included scoring separate knowledge and attitude components. Knowledge questions received either two points or zero points; Attitude questions were weighted more heavily, receiving zero, two or four points based on how close the response was to the correct answer. The criterion score necessary to indicate adequate knowledge and appropriate attitudes towards chronic pain was set by the original instrument authors at 80% (Wolff et al., 1991). This minimum score was determined by examining current literature and through personal communication with clinical and pain experts.

Validity

Content validity of the questions included in the Chronic Pain Knowledge/Attitudes Test was established by the original author submitting fifty questions to "three clinical experts in pain management (a psychiatrist, a neurologist and a physical therapist), three clinical experts in physical therapy, and three specialists in exam construction and development" (p.209). Questions were rejected if two of the six experts did not agree on the content of the question, clarity, or relevance to clinical practice. If a question was rejected completely by an expert, the question was not included. The test was then reviewed by test construction specialists to ensure that objectives were met and questions were stated clearly. Correct answers for each question were agreed upon by a consensus of clinical experts as well as current physiologic and anatomical principles (Wolff et al., 1991).

Reliability

The revised test was originally piloted on twelve volunteer physical therapists. Inter and Intra rater reliability was assessed through consistency of questions answered by the group as well as by individuals (Wolff et al., 1991).

The reliability of the current study was further tested through the use of Chronbach's alpha for parts of the Chronic Pain Knowledge/Attitudes Test (The jamovi project, 2022). Questions 15-21, which had a total of thirty-nine subcomponents related to knowledge, were tested for reliability, and a Chronbach's alpha score of 0.729 was noted, which provides evidence of acceptable reliability. A second Chronbach's alpha test was conducted for the questions related to participants' attitudes. Questions 22, 30, 34, 35, 36, 37, and 41 were identified by the original authors as measuring attitudes of participants. A Chronbach's alpha score of 0.32 was

found for the questions related to attitudes, which is less than ideal for testing reliability of the construct of attitude.

Modifications to the Original Study

Originally, the study by Wolff et al. (1991) included eight demographic/background information questions. This study was modified to include thirteen demographic/background information questions. The additional five questions included a separate question indicating informed consent, one question confirming the respondent's status as a currently practicing physical therapist in the United States, one question indicating sex/gender, one question indicating race, and one question to confirm whether the respondents were currently treating patients with orthopedic diagnoses. One original demographic question was modified to reflect the current educational categories for physical therapists that have changed significantly from the original study that was conducted in 1991.

Minimal changes were made to the original survey instrument, The Chronic Pain Knowledge/Attitude Test, in order to maintain the ability to compare current scores with those obtained in the original study (Wolff et al., 1991). The minimal modifications included formatting the questions to comply with the requirements of the Qualtrics software. The nature and intent of each question was maintained despite the change in data collection method.

Data Collection

The complete survey, which included the demographic questions, initial survey and Chronic Pain Knowledge and Attitudes Test, was distributed to all physical therapists who were members of the Academy of Orthopaedic Physical Therapy (AOPT), a section of the American Physical Therapy Association in the United States (n = 16,266). Permission was granted by the AOPT to provide their assistance in disseminating the survey following approval from the AOPT

Research Chair, AOPT President and Vice President. To gain approval, the principal investigator showed proof of IRB approval from Auburn University along with providing copies of the survey instrument. Once approved, the AOPT included a link to the research survey in OsteoBLAST, the weekly newsletter produced by the AOPT. The AOPT also sent out a separate e-blast invitation to the Academy membership and posted a reminder on the AOPT Facebook page, Instagram site, and Twitter site. Data was collected between April and June of 2021.

Data Analysis

Frequencies, means, Pearson Product-Moment Correlation Coefficients, and linear regressions were calculated utilizing Jamovi, Version 2.3 (The jamovi project, 2022) and Microsoft 365 Excel, Version 2207. Total scores, means, and frequencies were calculated for each pain knowledge and attitude objective. Frequencies were calculated for demographic and pain education information questions. Correlations and linear regression between responses for select demographic and test questions were also tabulated. The confidence level was set at .05 for two-tailed research questions.

Summary

Chapter 3 has provided a detailed description of the procedures utilized in this study to gather data related to the knowledge and attitudes of physical therapists who treat patients with chronic pain. Information was provided regarding the sample of participants, the methods used to collect the data, the instrument used in the survey, the statistical information gathered during the process, the methods of data collection and the tools used for data analysis. The methods utilized in this study were provided in such a manner that the study could be reproduced as needed. The research design yielded results that were valuable to assess current physical therapists' knowledge and attitudes towards treating patients with chronic pain. The information

gathered is invaluable to assess current levels of knowledge and attitudes in the field of physical therapy and how physical therapists impact the opioid epidemic in the United States.

CHAPTER 4

FINDINGS

In Chapter 4, the descriptive and statistical results of the study are presented to determine the current knowledge and attitudes of physical therapists towards treating patients with chronic pain. The eight major research questions are addressed with the results of the data collected in this study. Chapter 4 is organized to include the statement of the problem, purpose of the study, and a list of the research questions addressed by this study first. Then the chapter continues on to provide a descriptive analysis of the demographic data gathered during the research process. Descriptive information includes sex/gender, race/ethnicity, current status of treating patients with orthopedic diagnoses, highest degree level obtained, number of years in practice of physical therapy, and the current practice setting of the physical therapist. Next, the chapter outlines the participants responses to opinion questions related to the following topics: adequacy of their entry level pain theory and management education, satisfaction with current level of knowledge regarding pain management, most helpful method of increasing knowledge related to pain management since entering the profession, and likelihood of attending a continuing education course related to pain theory and management. Next, the results from the Chronic Pain Knowledge/Attitudes Test are presented, including both knowledge and attitude questions. Statistical analyses of the various questions as indicated are provided throughout the chapter. Finally, a summary of findings is provided.

Statement of the Problem

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7b. Do those physical therapists with higher attitude scores feel more confident/satisfied with their current level of knowledge of chronic pain?

8. What types of post-graduate education do physical therapists deem to be most helpful in increasing knowledge and attitudes towards treating patients with chronic pain?

Population Characteristics and Descriptive Analysis

A total of two hundred and sixty-six subjects participated in this study and completed the entire instrument. All respondents that agreed to participate in the study (Question One: Informed Consent), answered Yes to question two (Are you currently a licensed physical therapist practicing in the United States?), and submitted a completed survey were included in the data analysis.

Demographic information was obtained in survey questions three and four, with survey question 3 asking for the participants to identify their sex/gender and survey question four identifying race/ethnicity. Table 1 provides information regarding the numbers of respondents who identified as female, male, or other sex and Figure 4.1 provides a visual representation with percentages for clarity.

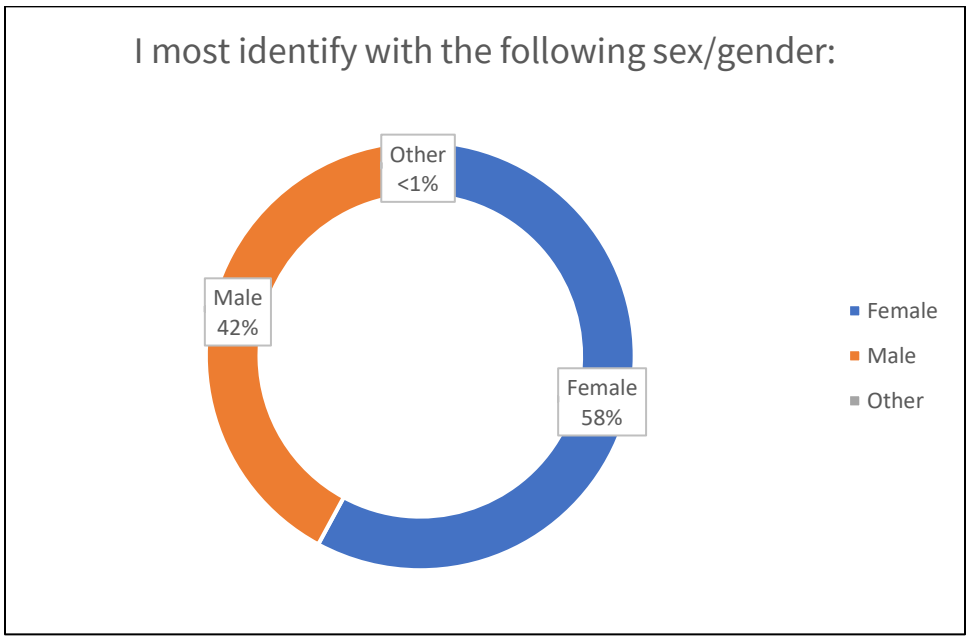
Table 1

Sex of Participants

Sex	Number
Female	154
Male	111
Other	1
Total	**266**

Figure 4.1

Representation of Males, Females, and Other Sexes



Of the 266 subjects who participated in the study, 154 (58%) identified as female and 111 (42%) identified as male. One subject (<1%) identified as other sex.

Table 2 provides numerical information regarding the participants' self-identified race, with Figure 4.2 providing visual pie chart representation of the data.

Table 2

Race/Ethnicity of Participants

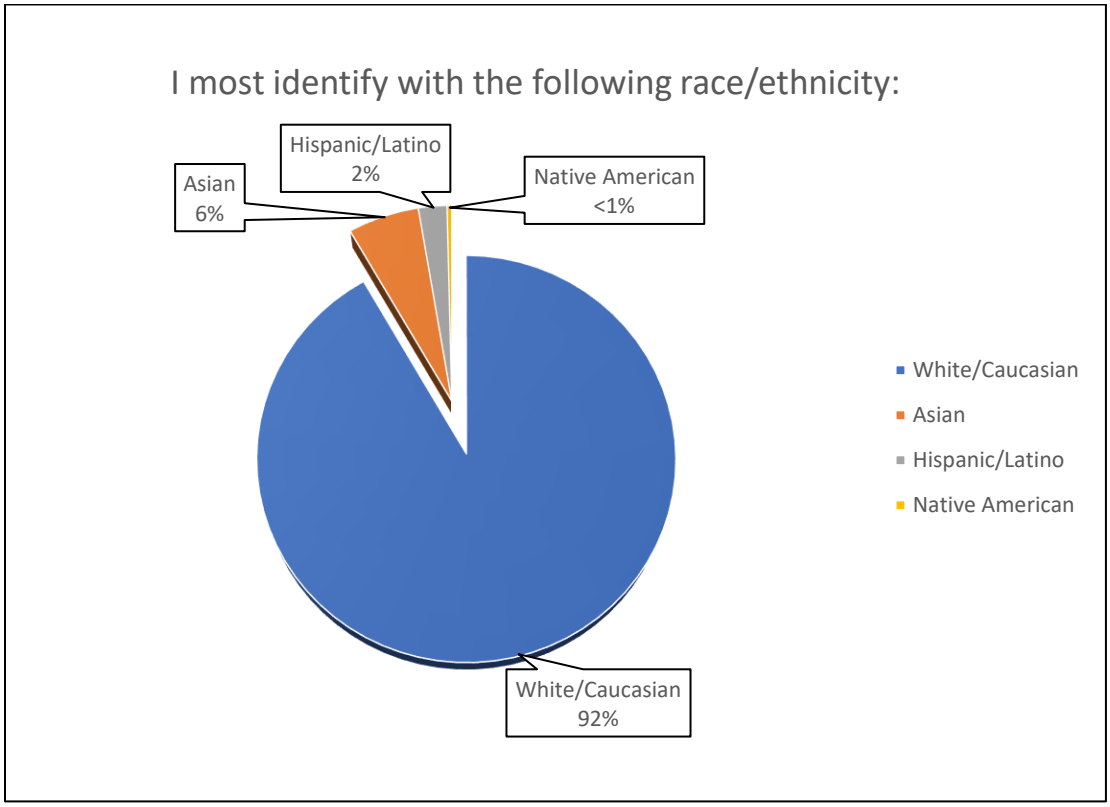
Race	Number
White/Caucasian	242
Asian	15
Hispanic/Latino	6
Native American	1
Black/African American	0

Total	**264***

*2 respondents chose not to answer this question

Figure 4.2

Race/Ethnicities Represented



Of the 266 subjects who participated in the survey, 242 (92%) identified as White/Caucasian, 15 (6%) identified as Asian, six (2%) identified as Hispanic/Latino, and one (<1%) identified as Native American. None of the subjects in this study identified as Black/African American.

The number of respondents who were currently treating patients with orthopedic diagnoses was obtained in survey question five. Table 3 provides the numbers of those who

responded Yes or No to the question of whether they were currently treating patients with orthopedic conditions, and Figure 4.3 provides a bar graph representation for visual clarification.

Table 3

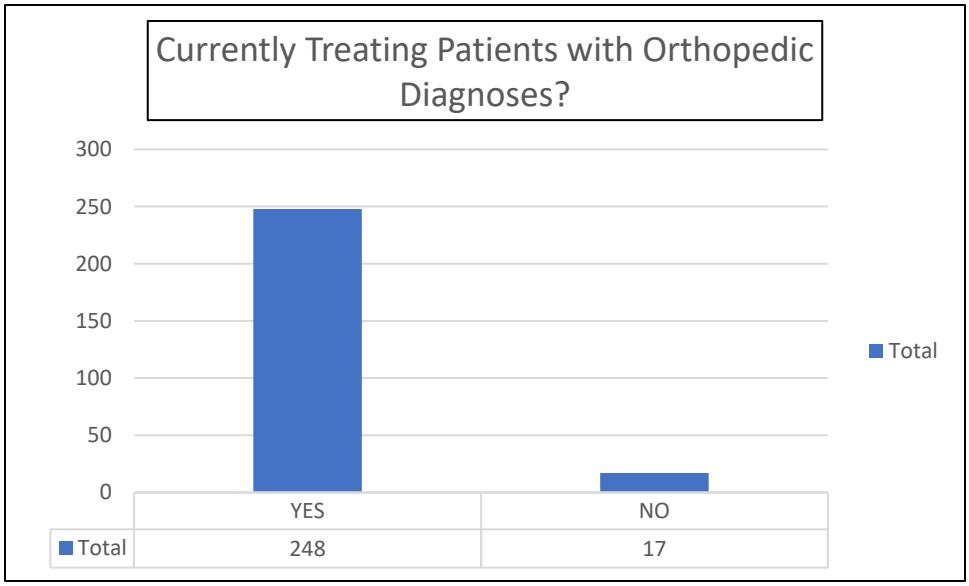
Participants Currently Treating Patient with Orthopedic Diagnoses

Currently Treating	Number
YES	248
NO	17
Total	**265**

***1 respondent chose not to answer this question**

Figure 4.3

Participants Currently Treating Patients with Orthopedic Diagnoses



Of the 266 subjects who participated in the study, 248 (93.6%) marked that they were currently treating patients with orthopedic diagnoses, while 17 participants (6.4%) were not

actively treating patients with orthopedic conditions. One participant chose not to answer this question.

By answering survey question six, respondents also provided their highest degree held in physical therapy, with results displayed in numerical values in Table 4 and a visual representation of this data provided in Figure 4.4.

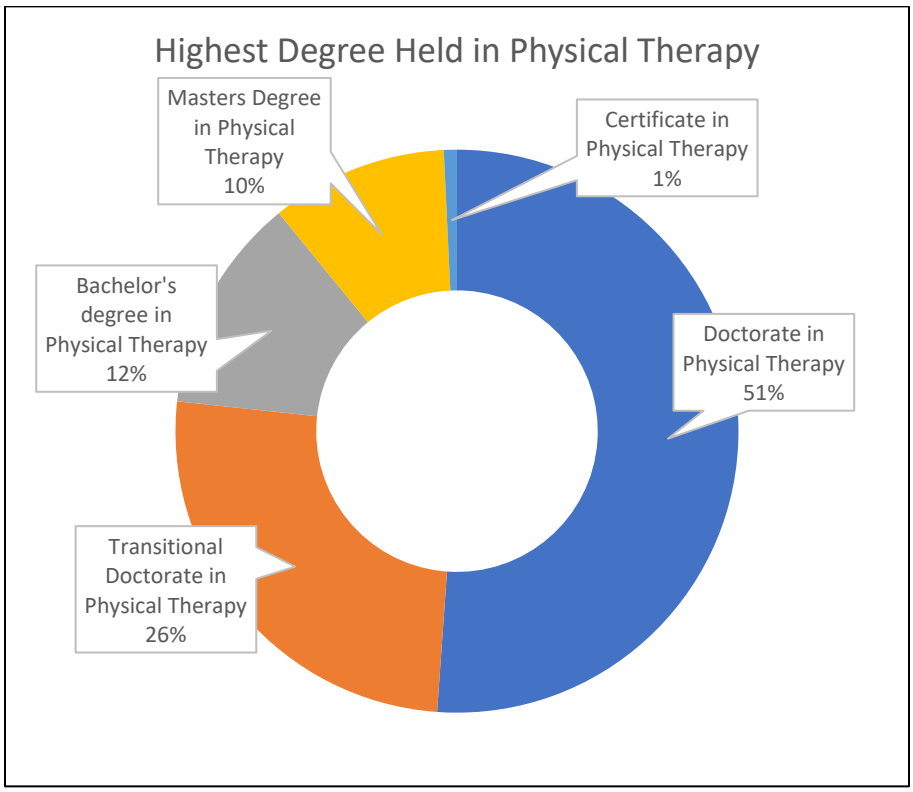
Table 4

Participants Highest Degree Held in Physical Therapy

Highest Degree Held in PT	Number
Doctorate in Physical Therapy	136
Transitional Doctorate in Physical Therapy	68
Bachelor's Degree in Physical Therapy	33
Master's Degree in Physical Therapy	27
Certificate in Physical Therapy	2
Total	**266**

Figure 4.4

Representation of Participants Highest Degree Held in Physical Therapy



Of the 266 participants in the study, 136 (51%) held a Doctor of Physical Therapy (DPT) degree, while 68 (26%) held a Transitional Doctor of Physical Therapy degree (tDPT). Thirty-three participants (12%) held a bachelor's degree in physical therapy, 27 (10%) held a master's degree in physical therapy, and two (1%) held a Certificate in Physical Therapy.

Survey question seven identified the number of years of experience that each respondent had practiced as a physical therapist. Table 5 outlines the various categories of years of experience and the responses, and Figure 4.5 provides a bar graph as a visual representation to highlight the various categories. This figure demonstrates that the respondents were highly experienced, with the majority having over ten years of experience as a physical therapist.

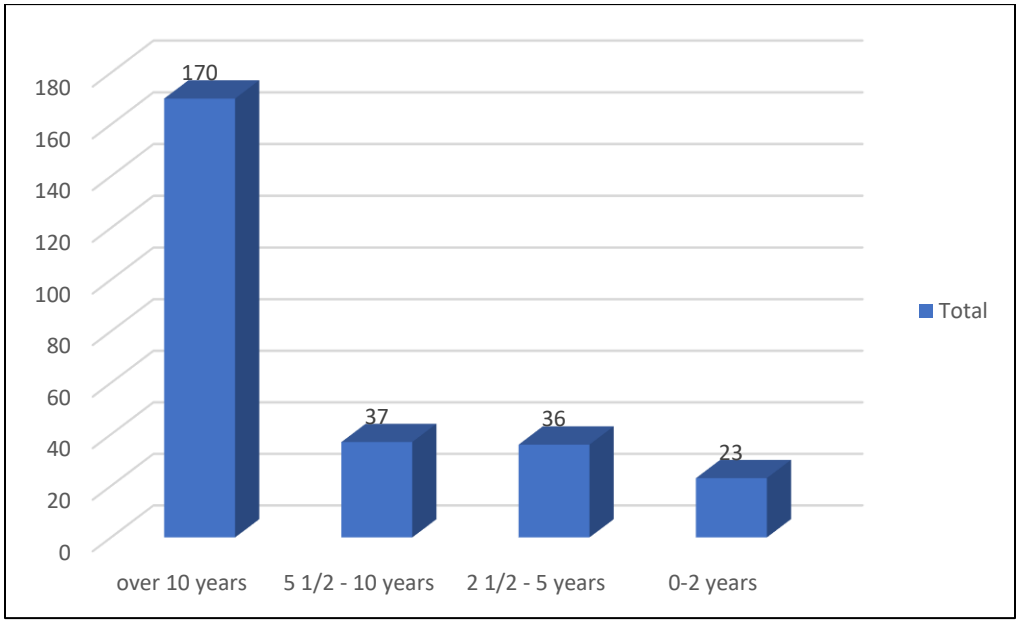
Table 5

Participants' Years of Experience as a Physical Therapist

Years of Experience as a PT	n	%
over 10 years	170	63.9%
5½ - 10 years	37	13.9%
2 1/2 - 5 years	36	13.5%
0-2 years	23	8.6%
	Total n = 266	

Figure 4.5

Participants' Years of Experience as a Physical Therapist



Of the 266 participants in the study, 170 (63.9%) had been practicing physical therapy for over ten years. Thirty-seven participants (13.9%) had been practicing PT for 5 ½ to 10 years, while 36 (13.5%) had been practicing 2 ½ - 5 years. Twenty-three participants (8.6%) had been practicing 0-2 years in the field.

The current setting in which each respondent currently practiced was identified in question eight, with the results outlined in Table 6.

Table 6

Participants' Current PT Employment Setting

Current PT Employment Setting	Number
Outpatient Rehab/Private Practice	228
Academia	10
Acute Care	6
Other	6
Home Health/Mobile PT	5
Inpatient Rehab/Skilled Nursing Facility	5
Wellness/Industrial	4
Unemployed	2
Total	**266**

If the participant chose Other as their PT setting, they were asked to provide their unique practice setting information. The other settings provided included Inpatient/Outpatient combination, Management, Telehealth, and Indian Health Services, as well as one unspecified response.

The overwhelming majority of participants (228/266= 86%) were currently employed in the outpatient/private practice physical therapy setting. Ten (4%) participants were employed in academia and six (2%) were employed in acute care PT settings. Six respondents claimed Other as their current PT setting. Five participants were engaged in the Home Health/Mobile PT

setting, while another five subjects practiced in the Inpatient Rehabilitation/Skilled Nursing setting (2% each). Four respondents (2%) practiced in the Wellness/Industrial setting and two participants were currently unemployed (<1%). Respondents who listed Other as their PT employment setting were asked to provide a description of their current setting. The six respondents listed Telehealth, Management, Inpatient/Outpatient combination setting, Care Coordinator, and Indian Health Services as their current employment settings.

Respondents were asked to report their opinion of the adequacy of their pain management and pain theory training during their entry level physical therapy educational experience in question nine. This survey question addressed research question six: Do physical therapists believe they were well equipped in their entry level training to treat patients with chronic pain? The results to this question are outlined below in Table 7 and further clarified with a pie chart in Figure 4.6.

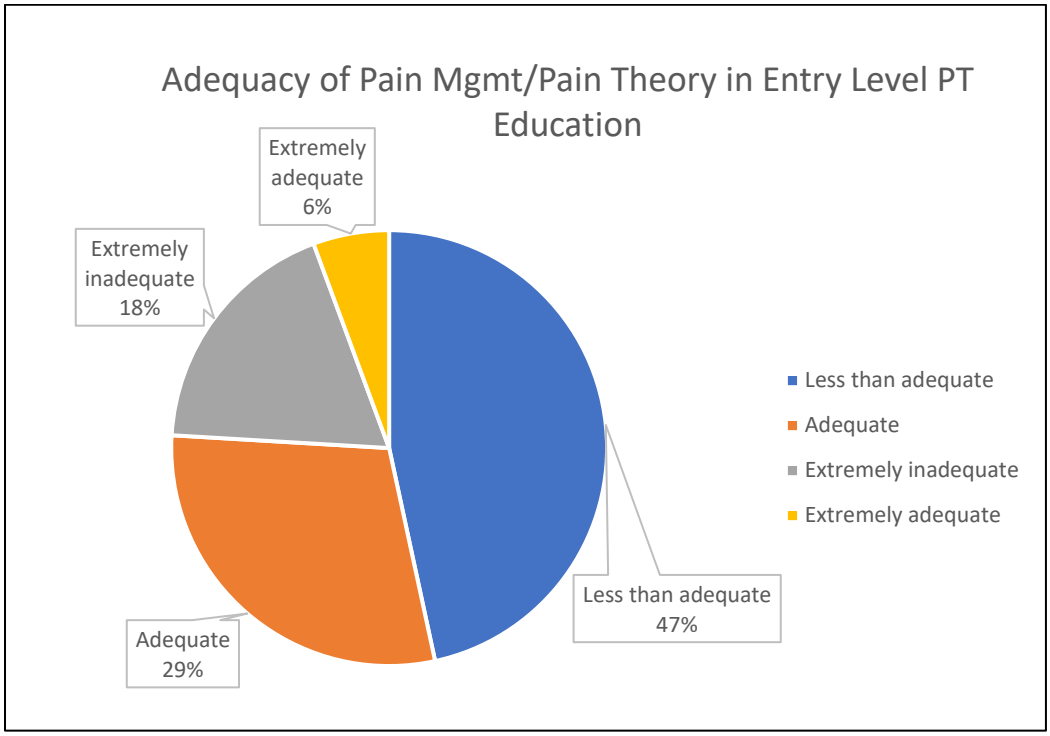
Table 7

Adequacy of Pain Management/Theory Training in Entry Level PT Education

Adequacy Options	Number (%)
Less than adequate	124 (47%)
Adequate	78 (29%)
Extremely inadequate	49 (18%)
Extremely adequate	15 (6%)
Total	**n=266 (100.00%)**

Figure 4.6

Adequacy of Pain Management/Theory Training in Entry Level PT Education



Of the 266 participants, 124 (47%) found their entry level physical therapy education related to pain management and theory as less than adequate. Another 78 (29%) described their training as adequate. Forty-nine subjects (18%) found their training to be extremely inadequate, while 15 respondents (6%) called their training extremely adequate.

The current level of satisfaction regarding each subject's own pain knowledge was rated in survey question ten, with the results outlined in Table 8 and visually presented as a pie chart in Figure 4.7.

Table 8

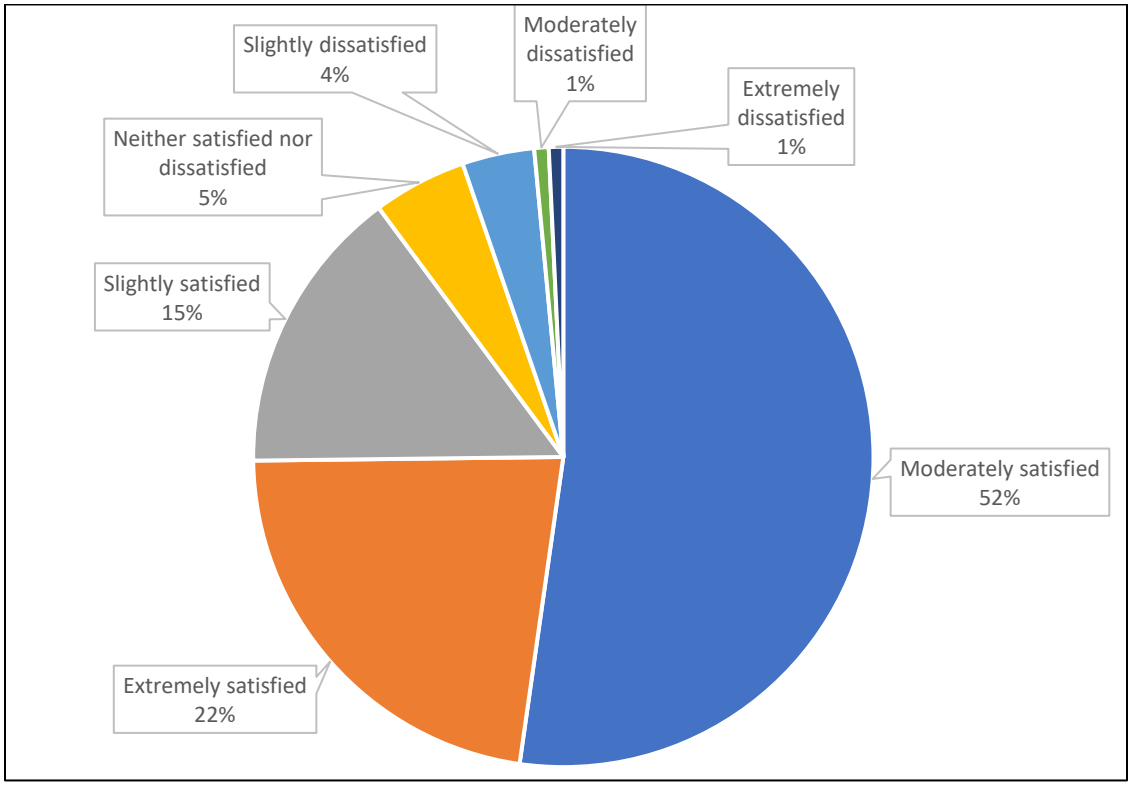
Participants' Current Satisfaction with Pain Knowledge

Level of satisfaction	Number
Moderately satisfied	139

Extremely satisfied	60
Slightly satisfied	40
Neither satisfied nor dissatisfied	13
Slightly dissatisfied	10
Moderately dissatisfied	2
Extremely dissatisfied	2
Total	**266**

Figure 4.7

Participants' Current Level of Satisfaction with Pain Knowledge



Of the 266 subjects, 139 (52%) were moderately satisfied with their current level of pain knowledge, while 60 (22%) were extremely satisfied. Forty respondents (15%) were slightly

satisfied with their current pain knowledge, while 13 subjects (5%) were neither satisfied nor dissatisfied. Ten subjects (4%) were slightly dissatisfied with their current level of pain knowledge, two (1%) were moderately dissatisfied, and two others (1%) were extremely dissatisfied with their current pain knowledge levels.

Of those sixty respondents that ranked themselves as Extremely Satisfied with their level of pain knowledge, the mean Knowledge Score was 35.93 (81%) and the mean Attitude Score was 19.83 (73.44%). Of the fourteen respondents who ranked themselves negatively regarding their current level of pain knowledge (Slightly Dissatisfied, Moderately Dissatisfied, or Extremely Dissatisfied), the mean Knowledge Score was 36.21 (82.30%) and the mean Attitude Score was 14.64 (54.22%). Table 9 outlines these findings.

Table 9

Comparison of Current Level of Satisfaction with Pain Knowledge to Knowledge and Attitude Scores

Satisfaction with Current Knowledge Level	Knowledge Score	Attitude Score
Extremely Satisfied	35.93 (81%)	19.83 (73.44%)
Slightly, Moderately, or Extremely Dissatisfied	36.21 (82.30%)	14.64 (54.22%)

Survey questions eleven and twelve address the type of resources that respondents have utilized to increase their level of knowledge regarding pain theory and pain management since they entered physical therapy practice. These survey questions helped address research question eight: What types of post-graduate education do physical therapists deem to be most helpful in increasing knowledge and attitudes towards treating patients with chronic pain?

Of all options provided, respondents identified the resource that has been the most helpful in increasing their knowledge of pain in survey question twelve, with the results outlined in Table 10. Figure 4.8 displays these findings visually in a bar graph format to highlight the importance of continuing education as a response.

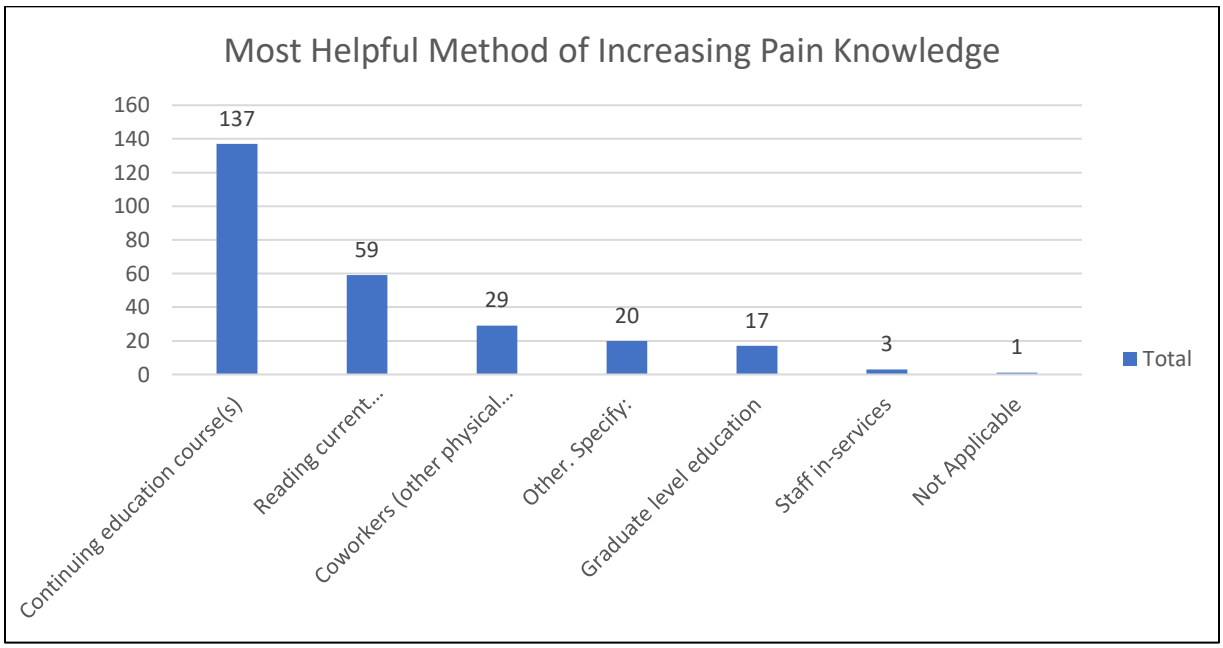
Table 10

Most Helpful Method of Increasing Pain Knowledge

Method	**Number**
Continuing education course(s)	137
Reading current literature/research	59
Coworkers (physical therapists, nurses, doctors, others)	29
Other method	20
Graduate level education	17
Staff in-services	3
Not Applicable	1
Total	**266**

Figure 4.8

Most Helpful Method of Increasing Pain Knowledge



Of the 266 subjects in this study, 137 believed that continuing education courses were the most helpful in increasing their pain knowledge, while 59 believed that reading current literature and research were the most helpful methods. Twenty-nine subjects learned the most from co-workers, while twenty listed another method that was most helpful in increasing their pain knowledge. Seventeen identified graduate level education beyond their professional entry level training as the most helpful method of increasing knowledge, while three identified staff in-services as the most helpful method.

As stated, twenty respondents indicated that another unlisted method was most helpful in increasing their pain knowledge since they entered physical therapy practice. Those other methods included watching Ted Talks, Orthopedic Residency or Fellowship programs, Pain Specialist Certification (i.e., TPS), and listening to podcasts.

Survey question thirteen addressed the likelihood of the respondents attending a continuing education course that addresses pain management. The results are outlined in Table 11 and visually represented in Figure 4.9.

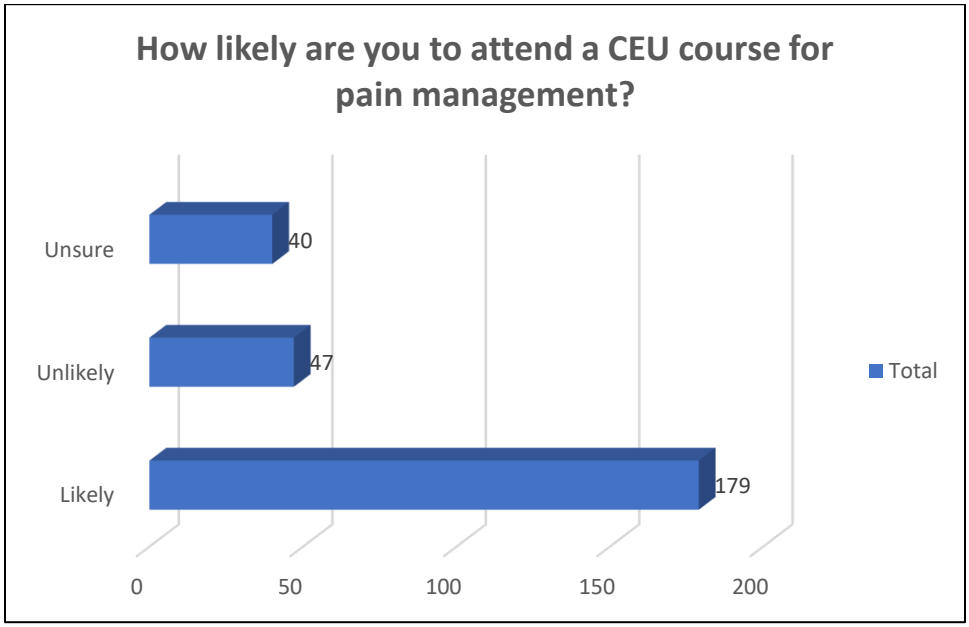
Table 11

Participants' Likelihood of Attending a CEU Course for Pain Management

Likelihood	**Number**
Likely	179
Unlikely	47
Unsure	40
Total	**266**

Figure 4.9

Participants' Likelihood of Attending a CEU Course for Pain Management



Of the 266 respondents, 179 subjects (67.2%) were likely to attend a continuing education course related to pain management, while 47 participants (17.7%) were unlikely to attend this type of course. Forty respondents (15.4%) were unsure if they would attend a continuing education course for pain management.

Survey question fourteen asked respondents to identify whether they have ever been employed as a PT at a chronic pain facility. Thirty-one respondents (11.65%) reported that they had previously worked at a chronic pain facility, while 235 (88.35%) had never worked at a chronic pain facility.

The Chronic Pain Knowledge/Attitudes Test

Survey Questions 15-41 included the Chronic Pain Knowledge/Attitudes Test (Wolff et al., 1991). This portion of the survey addressed the following research questions:

Research Question 1

What do physical therapists in the U.S. know regarding causes of and treatments for chronic pain?

Research Question 2

What are physical therapists' attitudes towards treating chronic pain in the U.S.?

The respondents' scores on this portion of the questionnaire were broken down into a raw knowledge score and a raw attitude score. The mean raw knowledge score was 35.20/44 (80%). The mean raw attitude score was 17.55/27 (65%). The overall raw score mean was calculated at 52.75/71 (74%). The results are presented in Table 12.

Table 12

Chronic Pain Knowledge/Attitudes Test Scores

	Mean Raw Score	**Points Possible**	**Mean %**	**Criterion Score**	**n meeting criterion score**	**Range**	**SD**
Knowledge Score	35.20	44	80	35.2	142 (53.4%)	22-43	4.28
Attitude Score	17.55	27	65	21.6	49 (18.4%)	4-27	4.43

Survey questions thirty-eight and thirty-nine were part of the Chronic Pain Knowledge/Attitudes Test but were not included in the knowledge, attitude, or overall scoring; however, they provided important information regarding physical therapists' reasons for frustration with treating patients with chronic pain and their perception of patients' overall improvement with various diagnoses. Frequency and ranking information were obtained in these questions, as follows:

Survey Question thirty-eight examined the different reasons that physical therapists become frustrated when treating patients with chronic pain. Respondents were asked to mark any options that they believed were reasons that treating patients with chronic pain can be frustrating. The following reasons with their frequencies are indicated below in Table 13.

Table 13

Participants' Reasons for Frustration with Treating Patients with Chronic Pain

Reason for frustration	Frequency
Successful rehabilitation requires more resources than PT alone	210
There is often not enough time for treatment	123
The patient often has a psychological disorder that I am unable to address	98
There is a feeling of helplessness on the part of the therapist	91
The diagnosis is unclear	58
It is not frustrating treating patients with chronic pain	51
I do not have the professional preparation	41
There is not enough positive reinforcement for the therapist.	27

Survey question thirty-nine addressed physical therapists' ratings of typical patient improvements that are noted with different types of diagnoses. Respondents were given six different types of diagnoses to rank in order from one to six, with one being the diagnoses in which they typically note the most patient improvements and six being the diagnosis that they observe the LEAST patient improvement. Table 14 outlines the diagnoses and which were most often ranked from one to six, based on the amount of typical patient improvement noted. Chronic conditions were ranked as showing less improvement overall.

Table 14

Ranking of Diagnoses from Most Satisfied (1) to Least Satisfied (6) with Patient Outcomes

Ranking	Diagnosis	Acute or Chronic Condition	Number of rankings at this level
Most often ranked #1	Inversion Ankle Sprain, Acute	ACUTE	161/263 (61.21%)

Most often ranked #2	Arthroscopic Meniscectomy, s/p 1 week	ACUTE	132/263 (50.19%)
Most often ranked #3	Lateral Epicondylitis, onset 3 weeks ago	ACUTE	137/263 (52.09%)
Most often ranked #4	Cervical Spine Strain, onset 8 weeks ago	CHRONIC	142/263 (53.99%)
Most often ranked #5	Laminectomy with Sciatica, s/p 8 months	CHRONIC	142/263 (53.99%)
Most often ranked #6	Colle's fracture with CRPS, s/p 12 weeks	CHRONIC	190/263 (72.24%)

Statistical Analyses

Many aspects of the data were analyzed through statistical methods. Research questions three, four, five and seven were addressed via Pearson Product Correlation Coefficients.

Research Question 3

Does degree/educational level increase the knowledge or attitude scores of physical therapists who treat patients with chronic pain?

Table 15 provides the results of the Pearson Product Correlation information related to highest physical therapy degree level obtained, knowledge scores, and attitude scores.

Table 15

Correlation between Degree Level, Knowledge, and Attitude Scores

		Highest Level of PT Degree
Knowledge Scores	Pearson's r	0.029
	p-value	0.634
	95% CI Upper	0.149

		Highest Level of PT Degree
	95% CI Lower	-0.091
	N	266
Attitude Scores	Pearson's r	0.040
	p-value	0.520
	95% CI Upper	0.159
	95% CI Lower	-0.081
	N	266

Note. * p < .05, ** p < .01,
*** p < .001

There was no significant correlation between degree level and knowledge score or degree level and attitude score at a significance level of p=.05.

Research Question 4

Do years of experience treating patients increase the knowledge or attitude scores of physical therapists treating patients with chronic pain?

Table 16 provides the results of the Pearson Product Correlation information related to years of experience treating patients, knowledge scores and attitude scores.

Table 16

Correlation between Years of Experience Treating Patients and Knowledge/Attitude Scores

		Years of Experience
Knowledge Scores	Pearson's r	-0.042
	p-value	0.496
	95% CI Upper	0.079
	95% CI Lower	-0.161
	N	266

		Years of Experience
Attitude Scores	Pearson's r	-0.070
	p-value	0.255
	95% CI Upper	0.051
	95% CI Lower	-0.189
	N	266

Note. * p < .05, ** p < .01, *** p < .001

There was no significant correlation between years of experience and knowledge score or years of experience and attitude score.

Research Question 5

Does type of practice setting impact the knowledge or attitude scores of physical therapists treating patients with chronic pain?

Table 17 outlines the results of the linear regression that was performed to determine the relationship between current practice setting, knowledge scores, and attitude scores.

Table 17

Linear Regression: Current Practice Setting and Knowledge/Attitude Scores

Model Fit Measures

Model	R	R^2
1	0.0962	0.00926

Model Coefficients - **Knowledge scores**

Predictor	Estimate	SE	t	p

Intercept [a]	35.215	0.286	122.9960	< .001
Practice Setting:				
2 – 1	-0.115	1.397	-0.0823	0.934
3 – 1	0.452	1.788	0.2527	0.801
4 – 1	0.785	1.954	0.4017	0.688
5 – 1	-2.615	1.954	-1.3379	0.182
6 – 1	-0.465	2.180	-0.2132	0.831
7 – 1	0.952	1.788	0.5323	0.595
8 – 1	0.285	3.070	0.0929	0.926

[a] Represents reference level

Model Fit Measures

Model	R	R^2
1	0.222	0.0492

Model Coefficients - **Attitude Scores**

Predictor	Estimate	SE	t	p
Intercept [a]	17.461	0.290	60.286	< .001
Practice Setting:				
2 – 1	1.439	1.413	1.019	0.309
3 – 1	-3.627	1.809	-2.005	0.046
4 – 1	1.739	1.977	0.880	0.380
5 – 1	-1.861	1.977	-0.941	0.348
6 – 1	0.539	2.206	0.245	0.807
7 – 1	2.539	1.809	1.404	0.162
8 – 1	6.539	3.106	2.105	0.036

[a] Represents reference level

A linear regression was used to predict the relationship between the participants' current practice setting and their knowledge or attitude scores. There was no significant relationship between practice setting and knowledge scores for this study. However, there was a significant relationship ($p<.05$) between practice setting and attitude scores for two particular settings when compared to the orthopedic setting. There was a significant relationship between the acute care setting and attitude scores (R^2=-3.627±1.809, p=.046). There was also a significant relationship between those who marked currently unemployed and attitude scores, when compared to those practicing in the orthopedic setting (R^2=6.539±3.106, p=.036).

Research Questions 7, 7a, and 7b

Are physical therapists confident/satisfied in their current level of knowledge of chronic pain?

7a. Do those physical therapists with higher knowledge scores feel more confident/satisfied with their current level of knowledge of chronic pain?

7b. Do those physical therapists with higher attitude scores feel more confident/satisfied with their current level of knowledge of chronic pain?

Table 18 outlines the results of the Pearson Product Correlation that examined the relationship between satisfaction of current pain knowledge, knowledge scores, and attitude scores.

Table 18

Correlation Between Satisfaction of Current Pain Knowledge and Knowledge/Attitude Score

		Satisfaction with Current Pain Knowledge
Knowledge Scores	Pearson's r	0.041
	p-value	0.503

		Satisfaction with Current Pain Knowledge
	95% CI Upper	0.161
	95% CI Lower	-0.079
	N	266
Attitude Scores	Pearson's r	0.321 ***
	p-value	< .001
	95% CI Upper	0.425
	95% CI Lower	0.209
	N	266

Note. * p < .05, ** p < .01, *** p < .001

There was no significant correlation between physical therapists' satisfaction with their current knowledge regarding pain and their knowledge scores (r=.041, p=.503). However, there was a significant correlation (r=0.321, p<.001) between PTs satisfaction with current knowledge of pain and attitude scores.

Summary

This chapter provided the answers to research questions 1-8, as outlined above. Research questions one and two were answered by providing the overall knowledge and attitude results from the Chronic Pain Knowledge/Attitudes Test. Questions three and four were answered by outlining correlational data comparing the variables of degree level and years of experience to the knowledge and attitude scores from the Chronic Pain Knowledge/Attitudes Test. There were no correlations found between either of the variables and the knowledge or attitudes of the participants. Research question five was answered through a logistic regression to determine if there was a relationship between practice setting and knowledge or attitude scores. No significant relationship was found between practice setting and knowledge. However, a significant relationship was found when comparing the attitude scores of those in the acute care setting and

those who were currently unemployed to those of the orthopedic setting. Research question six was addressed by the overwhelming opinion of the respondents who believed that their entry level education did not adequately prepare them for managing patients with chronic pain. Question seven was answered by the majority of physical therapists that claimed to be satisfied with their current level of knowledge related to pain management. However, as addressed through the research question subcomponents 7a. and 7b., there was no correlation found between the subject's level of satisfaction with their current knowledge of pain management and their knowledge scores. However, those that were satisfied with their current level of pain knowledge did exhibit significantly higher attitude scores. Research question eight was addressed by examining the different types of methods the participants used to increase their current knowledge of pain management, with continuing education being the most utilized method. A more involved analysis of the findings and a detailed summary will be further developed in Chapter 5 along with implications of the results and recommendations for future research.

CHAPTER 5

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS FOR FUTURE RESEARCH

Statement of the Problem

Currently, there is very little information available in the literature regarding physical therapists' knowledge of and attitudes toward the treatment of patients with chronic pain.

Purpose of the Study

The purpose of this study was to determine physical therapists' knowledge and attitudes regarding causes and treatments of chronic pain. Factors that may affect physical therapists' knowledge and attitudes towards treating patients with chronic pain were also examined.

Research Questions

The following research questions were explored in this study:

1. What do physical therapists in the U.S. know regarding causes of and treatments for chronic pain?

2. What are physical therapists' attitudes towards treating chronic pain in the U.S.?

3. Does degree/educational level increase the knowledge or attitude scores of physical therapists who treat patients with chronic pain?

4. Does years of experience treating patients increase the knowledge or attitude scores of physical therapists treating patients with chronic pain?

5. Does type of practice setting increase the knowledge or attitude scores of physical therapists treating patients with chronic pain?

6. Do physical therapists believe they were well equipped in their entry level training to treat patients with chronic pain?

7. Are physical therapists confident/satisfied in their current level of knowledge of chronic pain?

7a. Do those physical therapists with higher knowledge scores feel more confident/satisfied with their current level of knowledge of chronic pain?

7b. Do those physical therapists with higher attitude scores feel more confident/satisfied with their current level of knowledge of chronic pain?

8. What types of post-graduate education do physical therapists deem to be most helpful in increasing knowledge and attitudes towards treating patients with chronic pain?

If physical therapy is to be the answer to the opioid crisis, then physical therapists' knowledge of and attitudes towards treating chronic pain is an important concept to examine. Because there is very little evidence in the literature regarding physical therapists' knowledge and attitudes towards treating chronic pain, this study compared physical therapists' current knowledge and attitude scores with those reported by Wolff et al. in their previous study (Wolff et al., 1991) .

Research Question 1: What do Physical Therapists in the U.S. Know Regarding Causes of and Treatments for Chronic Pain?

The Chronic Pain Knowledge and Attitude Test was utilized to obtain a knowledge score for all participants in the original study designed by Wollf, et al. in 1991 and this same technique was used to obtain a knowledge score in the current study. Because the instruments utilized were nearly identical (with minimal updates made to reflect current professional terminology), the results gathered in both studies can be compared. When comparing the knowledge score results of the current study to the results of the original study, it was determined that improvements in

knowledge scores were noted in the current study. In the 1991 study, physical therapists' knowledge scores were below the adequate score (mean = 77.8%). However, the current study showed an increase in knowledge scores (mean = 80%), demonstrating a 2.2% overall increase. The mean knowledge score for the current study reached the threshold mark of a passing score (80%), as set by the original authors of the Chronic Pain Knowledge and Attitudes Test. Approximately 142 participants (53.4%) met this criterion score for knowledge, and these findings are outlined in Table 19.

Table 19

Comparison of Knowledge Scores (Current Study vs. Original Study)

	Mean Knowledge score	**% meeting criterion score**
Current study (2023)	80%	53.4%
Original study (1991)	77.8%	49.6%

These findings indicate that physical therapists' knowledge regarding chronic pain has increased during the time between the two studies and is presently at an acceptable level. This finding is significant because physical therapists treat patients with chronic pain on a regular basis.

As outlined in Chapter 1, chronic pain is a prevalent and costly problem today in the United States, costing somewhere between $560 and $635 billion per year (Smith & Hillner, 2019). The issue of chronic pain is multifactorial in its causes and is often a difficult problem to solve due to the underlying psychological factors and the progression of symptoms (Linton et al., 2018). Therefore, physical therapists must be knowledgeable about the underlying causes of chronic pain and the treatments available in order to successfully treat patients dealing with this

frustrating condition. The results of this study indicate that on average, physical therapists' knowledge regarding these issues is now at an appropriate level, while in 1991 that was not the case. As outlined in Chapter 2, the profession of physical therapy has changed significantly since the original study was conducted in 1991. The educational requirements to become a physical therapist have been increased such that all candidates must obtain a Doctor of Physical Therapy (DPT) degree, which was not the case when the original study was conducted. Therefore, one could speculate that the increase in knowledge scores regarding chronic pain could, in part, be attributed to the doctoring of the profession and subsequent increased educational requirements.

With the onset of the opioid epidemic in the United States, it is more important than ever that physical therapists have a strong understanding of the concepts related to treating patients with chronic pain. Raffaeli & Arnaudo (2017) state that at least 10% of the world's population is affected by chronic pain, with those numbers increasing each year (Raffaeli & Arnaudo, 2017). If physical therapy is to be an answer to the problems associated with the opioid epidemic, physical therapists must continue to improve their knowledge of the concepts related to chronic pain management. The results of this study indicate that overall knowledge in this area is improving over time and may be in an acceptable range for physical therapists to offer viable solutions to patients suffering with chronic pain. Further research is needed to further examine physical therapists' knowledge in particular areas of chronic pain, especially since this topic is complicated and the causes are multifactorial.

Research Question 2: What are Physical Therapists' Attitudes Towards Treating Chronic Pain in the U.S.?

The Chronic Pain Knowledge and Attitude Test was also utilized to obtain an attitude score for all participants in both the original study (Wolff et al., 1991) and the current study. Like research question one, the results of this study can be compared to those of the original study when examining the attitudes of physical therapists who treat patients suffering from chronic pain. When comparing the attitude scores of the participants in the original study with those of the participants in the current study, it was found that attitude scores improved but were still significantly lower than the passing threshold, on average, as set by the original authors. The original attitude scores were very low (mean = 56.9%) but in the current study those scores improved by 8.1% (mean = 65%). While the more updated score demonstrated a large increase, mean attitude scores were still 15% below the passing threshold of 80% as determined by Wolf et al. in 1991. Only 49 participants (18.4%) met the criterion score of 80% on the attitudes portion of the questionnaire. Table 20 outlines the comparison between attitude scores in the original study compared with the current study.

Table 20

Comparison of Attitude Scores (Current Study vs. Original Study)

	Mean Attitude score	**% meeting criterion score**
Current study (2023)	65%	18.4%
Original study (1991)	56.9%	7.8%

The results of this study indicate that while attitudes related to treating patients with chronic pain conditions are improving, there is still much progress to make in this area.

As stated in Chapter 1, much research has been done related to chronic pain causes and management techniques since the original study was conducted in 1991. Therefore, one might assume that physical therapists' attitudes towards treating patients with these complex conditions might have improved significantly as well. While the attitude scores did demonstrate an increase, overall attitudes are still less than ideal. Many factors play into the attitudes of physical therapists when treating patients with chronic pain. As reported in Chapter 2, Synnott et al. (2015) recognized that physical therapists preferred to treat more mechanical aspects of lower back pain but were less comfortable managing the cognitive, psychological, or social factors associated with patients dealing with chronic pain issues (Synnott et al., 2015). Similarly, de Ruddere et al. (2014) found that patients' pain was taken less seriously by general practitioners and physical therapists when clear medical evidence for why the patient was experiencing pain was lacking (de Ruddere et al., 2014). The attitudes of physical therapists related to treating patients with chronic pain reflect the complexity of the condition being treated. Future research is needed to determine the root causes of poor attitudes of physical therapists who treat patients with chronic pain.

Research Question 3: Does Degree/Educational Level Increase the Knowledge or Attitude Scores of Physical Therapists who Treat Patients with Chronic Pain?

The level of education of the participants in the current study was quite different from that of the original study in 1991 because the entry-level doctorate/transitional doctorate were not yet available at that time. The first transitional Doctor of Physical Therapy (DPT) degree was offered in 1992, and the first entry-level DPT began in 1993. By 2015, all entry-level physical therapy programs were required to offer the DPT degree, and the bachelor's or master's degree was no longer an option (Johnson & Abrams, 2005). Therefore, the level of education for

physical therapists has drastically changed since the original study was conducted in 1991. The variable of degree level (education level) was examined to determine if there was a significant correlation between degree level and knowledge/attitude scores on the Chronic Pain Knowledge and Attitudes Test. Over half of the respondents in the current study possessed a doctorate in physical therapy, while another twenty-six percent of respondents had obtained a transitional doctorate in physical therapy. There was no significant correlation noted between educational level and knowledge scores on the Chronic Pain Knowledge and Attitudes Test at a confidence level of p=.05 (r=0.02). Similarly, there was no significant correlation between educational level and attitudes of the participants at a confidence level of p=.05 (r=0.03). These findings are similar to the findings of the original study conducted in 1991 where no significant correlation was found between degree level and knowledge or attitude scores at a confidence level of p=.05. In that study, pain knowledge and degree level showed no significant correlation (r= .15). Degree level and attitude scores also showed no significant correlation (r=.13). Therefore, the results of this current study aligned with the results of the previous study and suggest that educational level has no bearing on physical therapists' knowledge of or attitudes towards treating chronic pain.

Research Question 4: Does Years of Experience Treating Patients Increase the Knowledge or Attitude Scores of Physical Therapists Treating Patients With Chronic Pain?

The years of experience as a physical therapist were also examined in this study to determine if there was a correlation with chronic pain knowledge and attitudes. The majority of respondents in this study (63.9%) had over ten years of experience practicing as a physical therapist, and a very small number of respondents (8.6%) had two years or less of experience. A Pearson Product Correlation Coefficient was utilized to determine if there was a significant

relationship between chronic pain knowledge/attitudes and years of experience practicing physical therapy. At a confidence level of p=.05, there was no significant correlation noted between years of experience as a physical therapist and chronic pain knowledge (r=-0.04). Similarly, there was no significant correlation between years of experience and attitude scores at the same confidence level of p-.05 (r=-0.07). Therefore, based on the data collected, there is no relationship noted between years of experience practicing as a physical therapist and chronic pain knowledge or attitudes. These findings are similar to those found in the original study conducted in 1991 where a Pearson Product Correlation Coefficient found no relationship between years of experience as a physical therapist and knowledge scores (r=.02, p=.05) as well as attitude scores (r=.21, p=.05).

Additional research is available that supports the findings of this study. When identifying the characteristics that classified physical therapists as experts versus those who were ranked as average, Resnick and Jensen (2003) reported that experts were not classified by years of experience, continuing education, or specialty training (Resnick & Jensen, 2003). Those practitioners that were considered experts displayed other characteristics that were often more intangible. However, some research suggests that years of experience may positively influence practitioners' knowledge in specific treatment principles, such as management of low back pain. Learman et al. (2014) noted that those physical therapists with more years of experience tended to recommend that patients remain active during acute episodes of low back pain, which has shown to be effective in managing pain. Less experienced physical therapists were more likely to recommend that patients rest or remain inactive, which is contraindicated. Therefore, in this study, years of experience was a contributing factor to positive patient outcomes (Learman et al., 2014). Further research is needed to determine how years of experience in treating patients with

chronic pain impacts physical therapists' knowledge and attitudes as well as the impact on patient outcomes.

Research Question 5: Does Type of Practice Setting Increase the Knowledge or Attitude Scores of Physical Therapists Treating Patients With Chronic Pain?

The type of practice setting was examined in this study to determine if this variable influenced the knowledge or attitude scores obtained on the Chronic Pain Knowledge and Attitudes Test. Physical therapists work in a variety of settings and are therefore exposed to different types of patients with a variety of health conditions in these settings. In this study, most respondents practiced in an outpatient or private practice orthopedic physical therapy facility (86%). Those respondents that differed indicated that they practiced in other settings such as inpatient rehab/skilled nursing, acute care, home health or mobile health services, wellness/industrial settings, and academia. A small number of respondents were currently unemployed. A linear regression was utilized to determine if there was a significant relationship between the type of setting that the participants were employed and their knowledge or attitude scores. There was no significant relationship noted between any type of practice setting and the knowledge scores when compared to the orthopedic setting. However, there was a significant relationship ($p<.05$) between practice setting and attitude scores for two settings when compared to the orthopedic setting. There was a significant relationship between the acute care setting and attitude scores ($R^2= -3.627\pm1.809$, $p=.046$) when compared to those practicing in the orthopedic setting. There was also a significant relationship between those who marked currently unemployed and attitude scores, when compared to those practicing in the orthopedic setting ($R^2=6.539\pm3.106$, $p=.036$).

Therefore, based on the findings of this study, we can assume that the type of physical therapy practice setting does not significantly impact the knowledge scores of physical therapists. The significant findings related to attitude scores are interesting to consider. When compared to the orthopedic setting, those who practiced in the acute care setting displayed lower attitude scores and therefore exhibited an inverse correlational relationship. One might argue that physical therapists who work in the acute care (hospital) setting often treat patients when they are in an acute flare up of a chronic pain syndrome, and therefore these physical therapists may have less hope for their patients to improve. These physical therapists likely see their patients when they are experiencing their highest and most debilitating levels of pain, which may have an impact on the physical therapists' attitudes towards treating patients with chronic pain. The other statistically significant relationship was noted when comparing the attitude scores of those participants who were currently unemployed to those in the orthopedic setting. It should be noted that there were only two respondents in the survey that responded as currently unemployed. Both respondents had over ten years of experience treating patients and had obtained a Transitional Doctor of Physical Therapy degree. While there is no information about the current circumstances related to their employment, both respondents had knowledge scores that were significantly higher than the mean (93% and 85% respectively). Their attitude scores were 94% and 73% respectively. Therefore, the small number of respondents in this category may have contributed to the significant results of the linear regression. The original study in 1991 did not address the type of practice setting, and therefore there is no historical data with which to compare these findings. Furthermore, there is no current literature that addresses the role of physical therapist practice setting on level of knowledge or attitudes related to the treatment of patients with chronic pain. Further research is needed to determine if practice

setting truly has an influence on the knowledge level or attitudes related to chronic pain. The attitudes of those in the acute care setting compared to the orthopedic setting and other settings should be further explored.

Research Question 6: Do Physical Therapists Believe They Were Well Equipped in Their Entry Level Training to Treat Patients With Chronic Pain?

Participants in this study were asked whether they believed they were well equipped in their entry level training to manage patients with chronic pain. The majority of responses (65%) were negative in nature, with 47% of participants indicating that their entry level training was less than adequate and 18% indicating that their training was extremely inadequate. Approximately 29% of participants indicated that their training was adequate, and six percent perceived that their training was extremely adequate. While this response is strictly an opinion of the participants, their perception of the adequacy of their training is noteworthy. The original study in 1991 posed a similar question, and the researchers collected results that are similar in nature to the current study. In the original study, 18.6% of respondents felt their entry level training was very inadequate and 53.4% felt their training was less than adequate. Approximately 28% of respondents believed their entry level training regarding chronic pain management was adequate. While the current study reflects a continued general sense that physical therapists are overall less than satisfied with their level of training regarding management of patients with chronic pain, there are some positive trends to note. For example, the highest percentage of respondents in the original study noted that they felt their preparation was extremely inadequate, but the highest percentage shifted in the current study to less than adequate. The perception of those who felt their entry level training was "adequate" stayed about the same, but 6% of respondents perceived that their training was extremely adequate in the current study, while no

respondents felt this way in the original study. These findings indicate a steady progress towards a more positive perception regarding entry level preparation of physical therapists in managing chronic pain. The findings related to the comparison of the current and original study regarding adequacy of pain management/theory training are outlined in Table 21.

Table 21

Adequacy of Pain Management/Theory Training in Entry Level PT Education (Current Study vs. Original Study)

Adequacy of Entry Level PT education	Current Study (2023)	Original Study (1991)
Extremely inadequate	18%	53.4%
Less than adequate	47%	18.6%
Adequate	29%	28%
Extremely adequate	6%	0%

Research Question 7: Are Physical Therapists Confident/Satisfied in Their Current Level of Knowledge of Chronic Pain?

To address this research question, participants were asked to rate their current level of satisfaction with their chronic pain knowledge. Approximately 89.8% of respondents ranked their current level of satisfaction with chronic pain knowledge in a positive manner (slightly satisfied, moderately satisfied, or extremely satisfied). Approximately 5% of participants were neutral in this category, and 4.5% rated themselves in a negative category (slightly dissatisfied, moderately dissatisfied, or extremely dissatisfied). Therefore, even though the majority of participants (65%) felt that their entry level training regarding pain management was inadequate, the vast majority believed they had improved their level of knowledge since they entered practice

and felt some level of satisfaction with their pain knowledge. These results can be compared to the original study where a similar question was posed. In the 1991 study, approximately 77.3% of respondents viewed their current level of satisfaction with pain knowledge in a positive manner (very or somewhat satisfied). Approximately 22.7% of participants were still dissatisfied with their knowledge of pain management (very or somewhat dissatisfied). Overall, the results indicate that most physical therapists, despite feeling underprepared by their entry level training to manage patients with chronic pain, find ways to improve their pain knowledge and feel some degree of satisfaction with their current levels of understanding regarding this topic. The number of physical therapists that are dissatisfied with their pain knowledge after gaining experience in the field has decreased from 22.7% in the original study to 6% in the current study. These findings are presented in Table 22 comparing satisfaction with pain knowledge in the current study and the original study.

Table 22

Current Level of Satisfaction with Pain Knowledge (Current Study vs. Original Study)

Current satisfaction with pain knowledge	**Current study (2023)**		**Original study (1991)**
	All satisfaction categories	**Satisfied vs Dissatisfied**	**Satisfied vs Dissatisfied**
Moderately satisfied	139 (52.3%)	239 (89.9%)	92 (77.3%)
Extremely satisfied	60 (22.6%)		
Slightly satisfied	40 (15%)		
Neither satisfied nor dissatisfied	13 (5%)		
Slightly dissatisfied	10 (4%)	14 (6%)	27 (22.7%)
Moderately dissatisfied	2 (1%)		
Extremely dissatisfied	2 (1%)		
Grand Total	**n=266**		**n=119**

Research Question 7a: Do Those Physical Therapists With Higher Knowledge Scores Feel More Confident/Satisfied With Their Current Level of Knowledge of Chronic Pain?

This subcomponent of research question 7 attempted to look deeper into those results that were gathered regarding current level of satisfaction with pain knowledge and relate those findings with actual knowledge scores. Those who felt more confident/satisfied with their current level of chronic pain knowledge (i.e. rated themselves extremely satisfied) scored an average of 81% on the knowledge portion of the Chronic Pain Knowledge and Attitudes Test. Those participants that were dissatisfied with their current level of pain knowledge scored, on average, 82.3% on the knowledge portion of the test. Therefore, those who were less satisfied with their current levels of pain knowledge actually scored higher on the knowledge portion of the exam than those who rated themselves as more satisfied with their current levels of pain knowledge.

Research Question 7b: Do Those Physical Therapists With Higher Attitude Scores Feel More Confident/Satisfied With Their Current Level of Knowledge of Chronic Pain?

For this subcomponent of research question 7, the results were examined to compare participants' satisfaction with current pain knowledge to their attitude scores on the Chronic Pain Knowledge and Attitudes Test. Those who felt more confident/satisfied with their current level of chronic pain knowledge (rated themselves extremely satisfied) scored an average of 73.44% on the attitude portion of the test. Those who rated themselves as less satisfied with their current levels of pain knowledge scored an average of 54.22% on the attitudes portion of the test. The results of this study indicate that a higher score on the knowledge portion of the exam does not align with an increased level of satisfaction of current level of pain knowledge. However, a

higher attitude score is indicative of a higher level of satisfaction with current levels of pain knowledge.

Research Question 8: What Types of Post-Graduate Education do Physical Therapists Deem to be Most Helpful in Increasing Knowledge and Attitudes Towards Treating Patients with Chronic Pain?

Because the majority of physical therapists were satisfied with their current level of knowledge regarding pain management and theory, the types of methods physical therapists have used to increase their pain knowledge and management skills was examined further. Most physical therapists (51.5%) reported utilizing continuing education courses to further their knowledge and skills regarding treating patients with chronic pain. Other popular methods of increasing their knowledge included reading current literature (22.2%) and learning from colleagues, such as other physical therapists, nurses, doctors, etc. (10.9%). In the original 1991 study, these same three categories (continuing education, colleagues, and current literature) were the most utilized methods of increasing knowledge related to pain management. Continuing education was the most utilized method in the 1991 study (50.5%) as well as in the current study (51.5%). However, current literature was reported as the most utilized source for 22.2% of physical therapists in the current study, compared to 13.3% of physical therapists in the original study. This finding indicates that current physical therapists rely on evidence-based practice when seeking information regarding management of pain more frequently than those in the previous study.

As stated in Chapter 2, Cleland et al. (2009) report a lack of evidence to demonstrate that continuing education for physical therapists translates into improved patient outcomes. (Cleland et al., 2009) . Particularly in relation to pain management, relatively little has been published

regarding the role that continuing professional development plays in the progression of physical therapists' knowledge. There is no evidence to suggest which types of continuing education options are the best for improving skills related to pain knowledge and management (Devonshire & Nicholas, 2018). Furthermore, Peterson et al. (2022) found that many continuing education courses related to orthopedic physical therapy interventions may not be based on current evidence. Their research demonstrated that fewer than half of the continuing education courses that were studied were supported by current research or clinical practice guidelines (Peterson et al., 2022). With little evidence as to which types of continuing education are most beneficial and the fact that many continuing education courses are not evidence based, there are real questions as to whether continuing education is providing the best opportunity for physical therapists to learn more about the management of patients with chronic pain. Adult learners should have opportunities to learn in a way that is meaningful to them and that will provide sound, research-based knowledge. These issues require further exploration to determine whether the continuing education opportunities provided to physical therapists are grounded in sound adult learning theory and evidence-based practice.

Almost a quarter of respondents reported that they utilized current literature to learn about pain and improve their knowledge levels. Jette et al. (2003) reported that utilization of scholarly articles was more prevalent with younger therapists with fewer years since they were licensed. The authors state that training, being familiar with search strategies and use of databases, and critical appraisal techniques were more evident in physical therapists with fewer years of experience (Jette et al., 2003). Overall, there is a need for future research to focus in this area to determine which types of continuing education opportunities and evidence-based practice

usage habits provide the greatest increase in physical therapists' knowledge and attitudes towards treating chronic pain as well as those that provide the greatest patient outcomes.

Physical Therapists' Reasons for Frustration

Physical therapists' reasons for frustration with treating patients with chronic pain were also examined in this study. The most frequent reason for frustration that was cited was that the physical therapists recognized that successful rehabilitation required more resources than physical therapy alone. This response highlights the idea that treating chronic pain requires a multi-modal treatment approach, and often patients do not receive this type of holistic care when managing chronic pain. As stated in Chapter 2, this frustration with current concepts and treatments regarding chronic pain led to the development of modern-day pain neuroscience education which has significantly improved patient outcomes for physical therapists managing patients with chronic pain by integrating a multimodal treatment approach (Louw et al., 2016). The fact that this was cited by 210 of the 266 respondents as their major frustration highlights the fact that the Biopsychosocial Model is being utilized by physical therapists who are treating patients with chronic pain. Physical therapists are recognizing the multi-faceted causes of chronic pain and are realizing that other disciplines are needed to fully address these concerns. Gatchel et al. (2007) report that the biopsychosocial model has become widely accepted as the most holistic approach to the management of chronic pain. The findings of this study indicate that physical therapists, along with other healthcare providers that are referenced in other research, are considering and applying the Biopsychosocial Model when evaluating and making treatment decisions for patients suffering from chronic pain (Gatchel et al., 2007) .

Another frequently cited reason for frustration in this study included the physical therapist's recognition that they do not have enough time to adequately treat their patients that

suffer from chronic pain. Bernhardsson et al. (2014) found similar results when studying barriers to the implementation of physical therapy clinical practice guidelines and evidence-based practice. The researchers found that the biggest barrier for physical therapists in increasing their knowledge and use of evidence-based practice was a perceived lack of time (Bernhardsson et al., 2014).

Many physical therapists believed that their patients often have a psychological disorder that the physical therapist is unable to address, which was another cause for frustration. The results of this study indicate that physical therapists often perceive psychological barriers in patients dealing with chronic pain, and the physical therapist may not feel equipped to handle these conditions. While physical therapists do not claim to be experts in the field of mental health, research indicates that psychological factors in patients can be identified and modified through physical therapy treatments when provided by a well-trained and knowledgeable physical therapist (Nicholas & George, 2011). Some psychological techniques that have been cited as effective in managing patients with chronic pain include Cognitive Behavioral Therapy (Beissner et al., 2009; Carville et al., 2008) and Acceptance and Commitment Therapy (ACT) (Mccracken & Jones, 2012). However, some studies have shown that physical therapists may believe that these types of interventions are out of the scope of the physical therapist and should therefore be avoided (Carlesso et al., 2015) . More research is needed in this area to determine which types of mental health interventions are most effective when managing patients with chronic pain and disability as well as identifying which interventions fall into the scope of practice of the physical therapist. Again, the findings of this study indicate that physical therapists are utilizing the Biopsychosocial Model (Gatchel et al., 2007) when determining the needs of their patients, and they are recognizing that other disciplines (including psychological

interventions) may be needed beyond physical therapy to fully address the patient's chronic pain issues.

In this study, physical therapists frequently cited a feeling of helplessness in being able to address the patient's problems as a source of their frustration. Physical therapists must feel as though they have self-efficacy and competence to treat chronic pain conditions, and often when patients have a psychological, social, or other concern that is outside of their area of expertise, they perceive a lack of ability to manage that condition. The Self-Determination Theory outlines that adult learners need to have competence, autonomy, and experience relatedness in order to continue to be motivated to learn and grow (Ryan & Deci, 2017). This continued feeling of helplessness on the part of the physical therapist indicates a lack of perceived competence and control over the situation when treating patients with chronic pain.

Some respondents (n=58) felt frustrated when they treat patients with chronic pain because the diagnosis is unclear. This type of response indicates a tendency for some physical therapists to continue to utilize the Medical Model in practice. The Medical Model indicates that a defect or failure in a body system or a physiological structure must be present to justify the cause of pain or disability (Roush & Sharby, 2011). When there is a lack of clear evidence or reason for the patient to experience pain, the physical therapist can feel frustrated. Often, a patient may experience pain even though there is not a clear diagnosis that has been provided or there are no physical findings available. The Biopsychosocial Model of pain management provides a framework for the physical therapist to successfully treat a patient with chronic pain, despite a lack of definitive diagnosis or structural cause of their pain (Gatchel et al., 2007; Roush & Sharby, 2011).

Some physical therapists felt that they did not have the professional preparation to manage patients with chronic pain (n=41). The results of this study indicate that a large majority of physical therapists do not believe that their entry level education fully prepared them to treat patients with chronic pain, but that most PTs were satisfied with their current level of knowledge related to chronic pain. The fact that some PTs were frustrated with their level of preparation indicates that there is a level of competence and self-efficacy that is lacking and should be addressed from an adult education standpoint (Ryan & Deci, 2017). A small number of respondents (n=27) did not feel that there was enough positive reinforcement to the therapist when treating patients with chronic pain. As discussed earlier, the Behavioral Learning Theory explores the role of positive reinforcement in learning (Plack & Driscoll, 2017). If the physical therapist does not receive frequent positive reinforcement when treating patients with chronic pain, they can become frustrated and feel as though they are not helping the patient progress.

Of those who responded in this study, 51 (19%) reported that they do not feel frustrated when treating patients with chronic pain conditions. These physical therapists did not indicate a feeling of helplessness or cite any other reasons for concern when treating patients with chronic pain.

Types of Diagnoses and PT Satisfaction with Outcomes

The types of diagnoses that physical therapists often feel satisfied with treating were also examined in this study. The respondents overwhelmingly identified acute, musculoskeletal diagnoses as those that were more satisfying to treat, including inversion ankle sprain, arthroscopic meniscectomy of the knee, and lateral epicondylitis with an onset of three weeks ago. Those diagnoses with longer time frames and more chronic presentations were consistently ranked lower in physical therapist satisfaction. The diagnoses included Cervical Spine Strain

(onset 8 weeks ago), Laminectomy with Sciatica (s/p 8 weeks), and Colle's fracture with Complex Regional Pain Syndrome (s/p 12 weeks). The diagnoses that typically respond quickly and successfully to treatment were consistently ranked higher in physical therapist satisfaction than those that were more chronic in nature. These findings are significant because they indicate that physical therapists are more satisfied when they can see positive patient outcomes in a timely manner, which is often not the case when treating patients with chronic pain.

Summary

In summary, the results of research questions one and two in this study indicate that, on average, physical therapists' knowledge of concepts related to the management of chronic pain has reached the threshold level of a passing score and has improved since the original data was collected in 1991, based on the findings of the Chronic Pain Knowledge and Attitudes Test. However, current attitude scores (mean = 65%) did not meet the threshold for a passing score but have demonstrated overall improvement compared to the original study conducted in 1991 (Wolff et al., 1991). When comparing the two studies, both knowledge and attitude scores have improved during the thirty-year gap between the two studies. However, despite having adequate knowledge of pain related concepts, physical therapists' attitudes towards treating chronic pain continue to be less than ideal.

Research questions three, four and five addressed various factors that could impact physical therapists' knowledge and attitudes towards treating chronic pain. The variables of degree level (education level) and years of experience practicing physical therapy were examined to determine if there was a connection between those factors and knowledge/attitude scores. There was no correlation noted between any of these factors and the knowledge/attitude scores of the physical therapists. These results were similar to the original study conducted in 1991. When

comparing the relationship of the practice setting to the knowledge and attitude scores, an inverse significant relationship was found between the attitude scores of those in the acute care setting when compared to those in the orthopedic setting. A positive significant relationship was found when examining the attitude scores of the two responses of the participants who were currently unemployed when compared to those in the orthopedic setting.

This study also examined physical therapists' perception of how well equipped they were in their entry level educational training to treat patients with chronic pain as well as their current satisfaction with their knowledge of pain with research questions six and seven respectively. Overwhelmingly, physical therapists reported inadequate preparation regarding pain management and theory. However, despite physical therapists' perceptions of inadequate entry level training related to pain management, the majority of physical therapists reported that they were satisfied with their current level of pain knowledge and theory. Interestingly, those who rated themselves negatively in terms of their current level of pain knowledge scored higher on the pain knowledge portion of the exam than those who rated themselves positively regarding their knowledge of pain. However, those same physical therapists who scored highest in pain knowledge scored much lower with attitude scores than those who were satisfied with their level of knowledge.

Based on the results of research question eight, the majority of physical therapists reported utilizing continuing education courses to further their knowledge and skills regarding treating patients with chronic pain. Other popular methods of increasing their knowledge included reading current literature and learning from colleagues, such as other physical therapists, nurses, doctors, etc. In the original 1991 study, these same three categories

(continuing education, colleagues, and current literature) were the most utilized methods of increasing knowledge related to pain management.

Conclusions

When comparing the original study from 1991 and the current study, current physical therapists demonstrated an increase in both knowledge and attitude scores on the Chronic Pain Knowledge/Attitude Test. While mean knowledge scores were at the criterion range for current physical therapists, only 53.4% achieved the criterion score. Many physical therapists still have room for improvement in their knowledge base as it relates to current pain management. Additionally, although current physical therapists demonstrated improved attitude scores, the mean attitude score was still significantly below the criterion score and only 18.4% of respondents met the criterion score. Therefore, despite an overall increase in knowledge regarding pain management, physical therapists still have very poor attitudes overall regarding treating patients with chronic pain.

The reasons for physical therapists' poor attitude scores were not shown to be attributable to any one variable in this study or in the original study. Factors such as level of education and years of experience had no effect on the knowledge or attitude scores of the respondents in this study. When examining the practice setting, attitude scores were significantly lower for those in acute care settings when compared with the orthopedic setting. Respondents overwhelmingly perceived a lack of preparation regarding their entry level education related to pain management, however the majority of respondents were satisfied with their current level of knowledge. This indicates that physical therapists are finding ways to overcome their perceived knowledge deficits once they are actively engaged in the profession and treating patients. Continuing

education, learning from colleagues, and accessing current literature continues to be the most utilized methods of improving their knowledge base related to pain management.

Implications

The opioid epidemic is a massive health concern in the United States, and physical therapists can play a major role in decreasing the rate of opioid addiction. Physical therapists have opportunities to create strong relationships with patients and make an impact on their daily lives in many ways. The physical therapist's knowledge related to the management of chronic pain is paramount in the process of treating patients with these debilitating conditions. The attitude of the physical therapist is also of key importance and can be a determining factor in patient outcomes. Physical therapists are lifelong learners who must continue to hone their knowledge and skills in many areas to be effective in their ability to help patients manage their pain. While the medical model still seems to prevail in many areas of medicine, physical therapists seem to be shifting towards the biopsychosocial model instead. This holistic method of evaluating a patient from many different aspects of life helps to explain why chronic pain is more debilitating in some patients as compared to others. Pain is an individual experience and can be perceived in many ways. The physical therapist must have the knowledge and attitude to view each patient as an individual and understand the complex underlying mechanisms of chronic pain. The literature continues to expand daily regarding pain science, and our understanding of the pain experience is growing. Physical therapists must continue to learn and grow to keep up with this knowledge expansion. This study indicates that physical therapists have improved their knowledge base related to pain science and management, but there is still work to be done in many areas. Physical therapists often still feel frustration when managing patients with chronic pain. Continued research is needed to explore the solution to this

frustration in order to help patients receive better outcomes with conditions that involve chronic pain.

Recommendations for Future Research

Individual perceptions of pain

This research study presents many more questions for consideration. Inherently, the topic of pain science is one that is highly studied and will continue to inspire further research until the mechanisms of pain are fully understood. The leaders in the world of pain research continue to produce quality research, and therefore our understanding of the causes of chronic pain is growing every day. The individual differences related to the pain experience cannot be understated. Therefore, more emphasis should be placed on investigating these unique experiences and the ideal treatment methods to address them. For example, more research is needed to explain the differences in the way people of various racial/ethnic backgrounds perceive pain. In this study, diversity was a limiting factor because no African American physical therapists responded to the study and very few other races besides those identifying as Caucasian were represented. Finding ways to involve those from various racial and ethnic backgrounds will strengthen future studies and promote a better understanding of the way different individuals experience pain.

Physical Therapy Entry Level Education

The education of physical therapists needs further exploration through research as well. As noted, the educational accreditation standards for physical therapists only mention the word pain once, and there is very little known about how physical therapy programs are integrating pain science into their curriculums. Further information is needed to determine how these topics are being addressed in an entry level physical therapy program in order to address the concerns

that physical therapists expressed regarding their preparation related to pain management. In particular, further research should focus on the implementation of curricular standards such as those recommended by the IASP to integrate the most updated pain science information into the entry level physical therapy curriculums.

The results of this study indicate that there is a lack of self-efficacy and competence on the part of many physical therapists, and many of them believe that their entry level education did not prepare them for managing these challenging cases. Further exploration related to how to better prepare future physical therapists for these situations is warranted, including how to improve self-perceived competence and self-efficacy in these areas. Many physical therapists indicated that they often experienced a feeling of helplessness and that they did not have the professional preparation to manage patients with chronic pain. Entry level physical therapy education should address these issues and employ the appropriate adult learning education theories and content to prepare students to enter the field and manage challenging cases.

Physical Therapy Continuing Education

Another area for future research lies with the effectiveness of continuing education modules to impact the knowledge and attitudes of physical therapists. The majority of respondents noted that continuing education was their major source of knowledge related to pain management topics. There is a need for further information regarding what types of continuing education programs or modules are most effective for teaching these principles. Further research should investigate which modules help the physical therapist learn the most about chronic pain and patient outcomes should be monitored to determine how well these principles are being applied to physical therapy practice. Similarly, more research is needed to determine which modules are most effective in teaching the actual patients about how to manage their pain.

Patient outcomes should be monitored to determine if the pain science modules are effective in helping patients understand and manage their pain in a way that provides positive functional outcomes.

Another area of continuing education that should be further explored is the role of the Biopsychosocial Model of pain management and interprofessional collaboration of physical therapists. The findings of this study indicate that many physical therapists believe that successful rehabilitation of patients with chronic pain requires more resources than simply physical therapy alone. Many participants recognized the psychological and sociological aspects of chronic pain management, and further emphasis is needed to determine to what extent physical therapists are considering and implementing this model in practice. Continuing education should focus on strategies to help physical therapists integrate other disciplines into the treatment plan when a patient with chronic pain is not progressing well.

The Relationship Between Knowledge, Attitudes, Motivation to Learn, and Behaviors

This study highlights the importance of entry-level education and continuing education in developing the needed knowledge to treat patients who are suffering with chronic pain. The physical therapist must engage as a lifelong learner to effectively manage these conditions, and the impact of attitudes, motivation, and behaviors in this process is noteworthy. In entry-level physical therapy education and in continuing education opportunities, future studies related to the motivation and attitudes of physical therapy instructors and students should be examined further. The ideas of measuring instructor and student engagement versus resistance to learning (in the negative sense) may shed light upon why learners do not feel prepared during their entry level education experience and why continuing education is not significantly improving knowledge or attitude scores. If the appropriate learning content is present in both entry level

education and continuing education opportunities, then the level of student engagement should be studied. Specifically, the comparison of knowledge and attitude scores when comparing students who are passively engaged, actively engaged, passively disengaged, and actively rejecting the learning process may be of interest (Taylor, 2021) . The teaching practices should also be studied to determine if entry level education and continuing education opportunities provide motivational immediacy for the learner. While generally physical therapists and PT students are globally motivated to learn, many factors can impact immediate motivation to learn (Taylor, 2021). Understanding the reasons why learners are disengaged or resistant to learning may assist in promoting better teaching practices to address each learner's individual needs.

The successful integration of adult education theory with models of healthcare practice may be the key to helping physical therapists achieve the requisite knowledge and aspirational attitudes required to manage patients who suffer with chronic pain.

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Appendix A

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- Name: Jennifer Ballard (ID: 7279369)
- Institution Affiliation: Auburn University (ID: 964)
- Institution Email: jsb0079@tigermail.auburn.edu
- Institution Unit: Adult Education
- Phone: 3342333725

- Curriculum Group: IRB #1 Health Science Emphasis - AU Personnel - Basic/Refresher
- Course Learner Group: IRB #1 Health Science Emphasis - AU Personnel
- Stage: Stage 1 - Basic Course
- Description: Choose this group to satisfy CITI training requirements for Key Personnel (including AU Faculty, Staff and Students) and Faculty Advisors involved primarily in biomedical research with human subjects.

- Record ID: 27783949
- Completion Date: 09-Jul-2018
- Expiration Date: 08-Jul-2021
- Minimum Passing: 80
- Reported Score*: 94

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Belmont Report and Its Principles (ID: 1127)	09-Jul-2018	3/3 (100%)
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	09-Jul-2018	5/5 (100%)
Informed Consent (ID: 3)	09-Jul-2018	5/5 (100%)
Privacy and Confidentiality - SBE (ID: 505)	09-Jul-2018	5/5 (100%)
Social and Behavioral Research (SBR) for Biomedical Researchers (ID: 4)	09-Jul-2018	4/4 (100%)
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	09-Jul-2018	5/5 (100%)
Students in Research (ID: 1321)	09-Jul-2018	3/5 (60%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

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Collaborative Institutional Training Initiative (CITI Program)
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Phone: 888-529-5929
Web: https://www.citiprogram.org

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- Name: Jennifer Ballard (ID: 7279369)
- Institution Affiliation: Auburn University (ID: 964)
- Institution Email: jsb0079@tigermail.auburn.edu
- Institution Unit: Adult Education
- Phone: 3342333725

- Curriculum Group: Responsible Conduct of Research for Social and Behavioral
- Course Learner Group: Social, Behavioral and Education Sciences RCR
- Stage: Stage 1 - RCR
- Description: This course is for investigators, staff and students with an interest or focus in Social and Behavioral research. This course contains text, embedded case studies AND quizzes.

- Record ID: 27783948
- Completion Date: 10-Jul-2018
- Expiration Date: 09-Jul-2023
- Minimum Passing: 80
- Reported Score*: 100

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Authorship (RCR-Basic) (ID: 16597)	10-Jul-2018	5/5 (100%)
Collaborative Research (RCR-Basic) (ID: 16598)	10-Jul-2018	5/5 (100%)
Conflicts of Interest (RCR-Basic) (ID: 16599)	10-Jul-2018	5/5 (100%)
Data Management (RCR-Basic) (ID: 16600)	10-Jul-2018	5/5 (100%)
Mentoring (RCR-Basic) (ID: 16602)	10-Jul-2018	5/5 (100%)
Peer Review (RCR-Basic) (ID: 16603)	10-Jul-2018	5/5 (100%)
Research Misconduct (RCR-Basic) (ID: 16604)	10-Jul-2018	5/5 (100%)
Plagiarism (RCR-Basic) (ID: 15156)	10-Jul-2018	5/5 (100%)
Research Involving Human Subjects (RCR-Basic) (ID: 13566)	10-Jul-2018	5/5 (100%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

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COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- Name: Jennifer Ballard (ID: 7279369)
- Institution Affiliation: Auburn University (ID: 964)
- Institution Email: jsb0079@tigermail.auburn.edu
- Institution Unit: Adult Education
- Phone: 3342333725

- Curriculum Group: IRB Additional Modules
- Course Learner Group: Workers as Research Subjects - A Vulnerable Population
- Stage: Stage 1 - Basic Course

- Record ID: 27783947
- Completion Date: 10-Jul-2018
- Expiration Date: 09-Jul-2021
- Minimum Passing: 80
- Reported Score*: 100

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	10-Jul-2018	4/4 (100%)

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COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- Name: Jennifer Ballard (ID: 7279369)
- Institution Affiliation: Auburn University (ID: 964)
- Institution Email: jsb0079@tigermail.auburn.edu
- Institution Unit: Adult Education
- Phone: 3342333725

- Curriculum Group: IRB Additional Modules
- Course Learner Group: Internet Research - SBE
- Stage: Stage 1 - Basic Course

- Record ID: 27783946
- Completion Date: 09-Jul-2018
- Expiration Date: 08-Jul-2021
- Minimum Passing: 80
- Reported Score*: 80

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Internet-Based Research - SBE (ID: 510)	09-Jul-2018	4/5 (80%)

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Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org

CITI PROGRAM

Completion Date 29-Jul-2020
Expiration Date 29-Jul-2023
Record ID 37155645

This is to certify that:

Jonathan Taylor

Not valid for renewal of certification through CME.

Has completed the following CITI Program course:

IRB Additional Modules
(Curriculum Group)
Internet Research - SBE
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

Auburn University

CITI
Collaborative Institutional Training Initiative

101 NE 3rd Avenue, Suite 320
Fort Lauderdale, FL 33301 US
www.citiprogram.org

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CITI PROGRAM

Completion Date 29-Jul-2020
Expiration Date 29-Jul-2023
Record ID 37155627

This is to certify that:

Jonathan Taylor

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

IRB Additional Modules
(Curriculum Group)
Defining Research with Human Subjects - SBE
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

Auburn University

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?wdf12d150-db29-48f2-809b-b34a4493529f-37155627

Appendix B

AUBURN UNIVERSITY INSTITUTIONAL REVIEW BOARD for RESEARCH INVOLVING HUMAN SUBJECTS

RESEARCH PROTOCOL REVIEW FORM

FULL BOARD or EXPEDITED

For information or help contact **THE OFFICE OF RESEARCH COMPLIANCE (ORC)**, 115 Ramsay Hall, Auburn University
Phone: 334-844-5966 **e-mail:** IRBAdmin@auburn.edu **Web Address:** http://www.auburn.edu/research/vp/ohs/index.htm

Revised 2.1.2014 **Submit completed form to IRBsubmit@auburn.edu or 115 Ramsay Hall, Auburn University 36849.**

Form must be populated using Acrobat / Pro 9 or greater standalone program (do not fill out in browser). Hand written forms will not be accepted.

1. **PROPOSED START DATE of STUDY:** 12/01/19

PROPOSED REVIEW CATEGORY (Check one): ☐ FULL BOARD ☑ EXPEDITED

SUBMISSION STATUS (Check one): ☑ NEW ☐ REVISIONS (to address IRB Review Comments)

2. **PROJECT TITLE:** Physical Therapists' Knowledge and Attitudes Toward Treating Chronic Pain

3. Jennifer Ballard	Ph.D. Candidate	CFLT/Adult Education Pr	jsb0079@auburn.edu
PRINCIPAL INVESTIGATOR	TITLE	DEPT	AU E-MAIL
9061 Black Cherry Trail Pike Road, AL 36064	334 233-3725	jballard@hawks.huntingdon.edu	
MAILING ADDRESS	PHONE	ALTERNATE E-MAIL	

4. **FUNDING SUPPORT:** ☑ N/A ☐ Internal ☐ External Agency: _____ ☐ Pending ☐ Received

For federal funding, list agency and grant number (if available): _____

5a. List any contractors, sub-contractors, other entities associated with this project:

n/a

b. List any other IRBs associated with this project (including Reviewed, Deferred, Determination, etc.):

n/a

PROTOCOL PACKET CHECKLIST

All protocols must include the following items:

- ☑ **Research Protocol Review Form** (All signatures included and all sections completed)
  (Examples of appended documents are found on the OHSR website: http://www.auburn.edu/research/vpr/ohs/sample.htm)
- ☑ **CITI Training Certificates** for all Key Personnel.
- ☑ **Consent Form or Information Letter** and any Releases (audio, video or photo) that the participant will sign
- ☑ **Appendix A**, "Reference List"
- ☐ **Appendix B** if e-mails, flyers, advertisements, generalized announcements or scripts, etc., are used to recruit participants.
- ☑ **Appendix C** if data collection sheets, surveys, tests, other recording instruments, interview scripts, etc. will be used for data collection. Be sure to attach them in the order in which they are listed in # 13c.
- ☐ **Appendix D** if you will be using a debriefing form or include emergency plans/procedures and medical referral lists (A referral list may be attached to the consent document).
- ☑ **Appendix E** if research is being conducted at sites other than Auburn University or in cooperation with other entities. A permission letter from the site / program director must be included indicating their cooperation or involvement in the project. NOTE: If the proposed research is a multi-site project, involving investigators or participants at other academic institutions, hospitals or private research organizations, a letter of IRB approval from each entity is required prior to initiating the project.
- ☐ **Appendix F** - Written evidence of acceptance by the host country if research is conducted outside the United States.

FOR ORC OFFICE USE ONLY

DATE RECEIVED IN ORC: _____ by _____		PROTOCOL #: _____	
DATE OF IRB REVIEW: _____ by _____		APPROVAL CATEGORY: _____	
DATE OF IRB APPROVAL: _____ by _____		INTERVAL FOR CONTINUING REVIEW: _____	
COMMENTS:			

From: IRB Administration
Sent: Monday, March 9, 2020 3:00 PM
To: Jennifer Ballard <jsb0079@auburn.edu>
Cc: James Witte <witteje@auburn.edu>
Subject: Ballard Approval, Exempt Protocol #20-063 EX 2003 "Physical Therapists Knowledge and Attitudes Toward Treating Chronic Pain"

*Use IRB**submit**@auburn.edu for protocol-related submissions and IRBadmin@auburn.edu for questions and information.*
The IRB only accepts forms posted at https://cws.auburn.edu/vpr/compliance/humansubjects/?Forms and submitted electronically.

Dear Ms. Ballard,

Your protocol entitled "Physical Therapists Knowledge and Attitudes Toward Treating Chronic Pain" has been approved by the IRB as "Exempt" under federal regulation 45 CFR 46.101(b)(2)(i).

Official notice:
This e-mail serves as official notice that your protocol has been approved. By accepting this approval, you also accept your responsibilities associated with this approval. Details of your responsibilities are attached. Please print and retain.

Electronic Information Letter:
A copy of your approved protocol is attached. However you still need *to add the following IRB approval information to your information letter(s):* "**The Auburn University Institutional Review Board has approved this document for use from March 9, 2020 to ------- Protocol #20-063 EX 2003**"

You must use the updated document(s) to consent participants. *Please forward the actual electronic letter(s) with a live link so that we may print a final copy for our files*.

Expiration:
Continuing review of this Exempt protocol is not required; however, all modification/revisions to the approved protocol must be reviewed and approved by the IRB.

When you have completed all research activities, have no plans to collect additional data and have destroyed all identifiable information as approved by the IRB, please notify this office via e-mail. A final report is no longer required for Exempt protocols.

Best wishes for success with your research!

IRB Admin
Auburn University
115 Ramsay Hall

IRB Administration
Mon 2/22/2021 10:24 AM
To: Jennifer Ballard
Cc: Jonathan Taylor
Investigators Responsibilities rev 1-2011.docx
16 KB

Ballard 20-063 EX 2003 Personnel Modification 2021-1.pdf
713 KB
□□

2 attachments (729 KB)Download allSave all to OneDrive - Auburn University
Use IRBsubmit@auburn.edu for protocol-related submissions and IRBadmin@auburn.edu for questions and information.
The IRB only accepts forms
posted at https://cws.auburn.edu/vpr/compliance/humansubjects/?Forms and submitted electronically.

Dear Ms. Ballard,

Your request for the modification of your protocol has been approved. The review category continues as "EX" under federal regulation 45 CFR 46.101(b). Attached is a copy of your approved documents.

Official notice:
This e-mail serves as official notice of approval to requested modifications. By accepting this approval, you also acknowledge your responsibilities associated with this approval. Retain a copy of the attached details of your responsibilities.

Expiration:
Continuing review of this Exempt protocol is not required; however, all modification/revisions to the approved protocol must be reviewed and approved by the IRB.

When you have completed all research activities, have no plans to collect additional data and have destroyed all identifiable information as approved by the IRB, please notify this office via e-mail. A final report is no longer required for Exempt protocols.

Best wishes for success with your research!

IRB Admin
Office of Research Compliance
Auburn University
540 Devall Drive
Auburn, AL 36832

AUBURN

AUBURN UNIVERSITY INSTITUTIONAL REVIEW BOARD
PERSONNEL MODIFICATION FORM

(USE THIS FORM **ONLY** TO REQUEST A MODIFICATION TO KEY PERSONNEL)

Submit the modification form via irbsubmit@auburn.edu Guidance available www.auburn.edu/irb
For information or assistance completing the form contact us at 334-844-5966 or IRBAdmin@auburn.edu

Today's Date 2/9/21

Principal Investigator Jennifer Ballard

Protocol Number #20-063 EX 2003

Title of Protocol "Physical Therapists Knowledge and Attitudes Toward Treating Chronic Pain"

Add the following personnel (Attach CITI documentation for new personnel)

Name	Role in Protocol	Experience/Training/Degrees
Dr. Jonathan Taylor	Co-chair: In this role, Dr. Taylor will be responsible for guidance of the primary investigator as well as assisting with identifying key personnel needed (i.e. statistical support, Qualtrics help). Dr. Taylor will be reading and recommending edits to the final dissertation document. He will be meeting with the PI as needed to ensure that progress is being made in a timely manner.	Associate Profess/Chair of the Adult Education Program at Auburn University Ph.D. (Adult Education) MS (Psychology) BS (Economics) Former President of the AAACE (American Association of Adult and Continuing Education)

Remove the following personnel

Name	Role in Protocol

Signatures

Principal Investigator J Ballard Jennifer Ballard **Date** 2/9/21

Faculty PI, if applicable _____ **Date** 2/12/2021

- Federal regulations require IRB approval before implementing proposed changes.
- Use Adobe Acrobat/Pro 9 or greater standalone program. No hand-written forms.

The Auburn University Institutional Review Board has approved this Document for use from 02/19/2021 to ----------
Protocol # 20-063 EX 2003

Appendix C

Physical Therapists Knowledge and Attitudes Towards Treating Chronic Pain

---

Start of Block: SURVEY INSTRUCTION

Start of Block: Informed Consent

Q1
Informed Consent
We are interested in understanding physical therapists knowledge and attitudes towards treating various types of pain. You will be presented with information relevant to pain theory, knowledge, and attitudes and asked to answer some questions. Please be assured that your responses will be kept completely anonymous.

The study should take you around 15 minutes or less to complete. Your participation in this research is voluntary. You have the right to withdraw at any point during the study, for any reason, and without any prejudice. If you would like to contact the Principal Investigator in the study to discuss this research, please e-mail Jennifer Ballard at jsb0079@auburn.edu.

By clicking the button below, you acknowledge that your participation in the study is voluntary, you are 18 years of age, and that you are aware that you may choose to terminate your participation in the study at any time and for any reason.

Please note that this survey will be best displayed on a laptop or desktop computer. Some features may be less compatible for use on a mobile device. You may experience minor eye strain from viewing the questionnaire on a computer or mobile device.

- ○ I consent, begin the study (1)
- ○ I do not consent, I do not wish to participate (2)

Q2 Are you currently a licensed physical therapist practicing in the United States?

- YES (1)
- NO (2)

Skip To: End of Survey If Are you currently a licensed physical therapist practicing in the United States? = NO

Q3 I most identify with the following sex/gender.

- Male (1)
- Female (2)
- Other (3)

Q4 I most identify with the following race/ethnicity.

- Black/African American (1)
- White/Caucasian (2)
- Hispanic/Latino (3)
- Asian (4)
- Hawaiian/Pacific Islander (5)
- Native American (6)

Q5 Are you currently treating patients with orthopedic diagnoses in a physical therapy setting?

- ○ YES (1)
- ○ NO (2)

Q6 What is the highest level/degree that you hold in Physical Therapy?

- ○ Certificate in Physical Therapy (1)
- ○ Bachelor's degree in Physical Therapy (2)
- ○ Master's degree in Physical Therapy (3)
- ○ Doctorate in Physical Therapy (4)
- ○ Transitional Doctorate in Physical Therapy (5)

Q7 How many years of physical therapy experience do you have?

- ○ 0-2 years (1)
- ○ 2 1/2 – 5 years (2)
- ○ 5 ½ - 10 years (3)
- ○ over 10 years (4)

Q8 In what setting are you primarily employed/practicing?

- ○ acute care hospital (1)
- ○ inpatient rehabilitation facility (2)
- ○ skilled nursing facility (3)
- ○ outpatient rehabilitation facility (4)
- ○ other; specify: (5) _____

Q9 How adequate was the pain management and theory information you received during your ENTRY LEVEL physical therapy training in equipping you for the orthopedic population you treat?

- ○ Extremely adequate (1)
- ○ Adequate (2)
- ○ Less than adequate (3)
- ○ Extremely inadequate (4)

Q10 How satisfied are you with your CURRENT level of knowledge in regard to pain management and theory?

- ○ Extremely satisfied (1)
- ○ Moderately satisfied (2)
- ○ Slightly satisfied (3)
- ○ Neither satisfied nor dissatisfied (4)
- ○ Slightly dissatisfied (5)
- ○ Moderately dissatisfied (6)
- ○ Extremely dissatisfied (7)

Q11 Since you entered practice, from which of the sources below have you received useful information in regard to pain management and theory? (Mark any that apply)

- ☐ Continuing education course(s) (1)
- ☐ Graduate level education (2)
- ☐ Staff in-services (3)
- ☐ Reading current literature/research (4)
- ☐ Coworkers (other physical therapists, nurses, doctors, occupational therapists, clergy, others) (5)
- ☐ Materials and demonstrations provided by medical supply/equipment sales representatives (6)
- ☐ Other. Specify: (7) _____
- ☐ None of the above (8)

Q12 Of the sources noted in the previous question, which ONE did you find to be most helpful to increase your knowledge in pain management and theory?

- ○ Continuing education course(s) (1)
- ○ Graduate level education (2)
- ○ Staff in-services (3)
- ○ Reading current literature/research (4)
- ○ Coworkers (other physical therapists, nurses, doctors, occupational therapists, clergy, others) (5)
- ○ Materials and demonstrations provided by medical supply/equipment sales representatives (6)
- ○ Other. Specify: (7) _____
- ○ Not Applicable (8)

Q13 Given the numerous continuing education courses that are available, how likely would you be to attend a course in pain management compared to other professional courses you might attend?

- ○ Likely (1)
- ○ Unlikely (2)
- ○ Unsure (3)

Q14 Have you ever been employed as a physical therapist at a chronic pain facility?

- ○ YES (1)
- ○ NO (2)

Q15 The statements below are examples of physiological changes associated with pain. Mark "Acute" for those that are most characteristic of acute pain, and mark "Chronic" those that are most characteristic of chronic pain.

	Characteristic of which type of pain?	
	Acute Pain (1)	Chronic Pain (2)
Serves as a warning of tissue damage (1)	○	○
Can result in anxiety (2)	○	○
Has a biological function (3)	○	○
Long term (4)	○	○
Can result in depression (5)	○	○

Q16 The diagnoses below are examples of conditions that are either somatopathic or neuropathic. Indicate whether the pain associated with each of the conditions is primarily somatic or neuropathic in origin.

	Source of pain	
	Somatopathic (1)	Neuropathic (2)
Supraspinatus impingement syndrome (1)	○	○
Complex Regional Pain Syndrome/Reflex Sympathetic Dystrophy (2)	○	○
Femur fracture (3)	○	○
Trigeminal neuralgia (4)	○	○
Brachial plexus avulsion (5)	○	○
Lateral epicondylitis (6)	○	○

Q17 The statements below represent factors that would cause a change in a patient’s pain experience. Mark "Lowers patient's tolerance to pain" for those that would lower the patients tolerance to pain, and mark "Raises patient's tolerance to pain" for those that would raise the patient's tolerance to pain.

	Effect on pain tolerance	
	Lowers patient's tolerance to pain (1)	Raises patient's tolerance to pain (2)
Positive family support (1)	○	○
Depression (2)	○	○
Poor family communication (3)	○	○
Sleep deprivation (4)	○	○
Sadness (5)	○	○
Anxiety (6)	○	○
Social isolation (7)	○	○
Increased ability to concentrate (8)	○	○

Q18 Mark the box next to any of the following statements that are CORRECT.

- [ ] Narcotics act on the central nervous system to decrease the perception of pain, whereas non-narcotic analgesics, like aspirin, act on the peripheral nervous system to decrease transmission of nerve impulses. (1)
- [ ] Distraction and diversion activities can decrease the perception of pain (2)
- [ ] Signs and symptoms of acute pain and chronic pain are different, but treatment of acute and chronic pain are the same. (3)
- [ ] The body gradually adapts to continuous pain so that physiological "fight or flight" responses are no longer exhibited. (4)

Q19 When treating a patient with a chronic pain syndrome, which of the following do you expect may be a problem? (Mark all that apply)

- [ ] Anger (1)
- [ ] Interpersonal communication (2)
- [ ] Depression (3)
- [ ] Fear (4)

Q20 Which of the following treatments are likely to help decrease symptoms of depression in a patient with chronic pain over the long term? These may or may not be techniques you use in your practice. (Mark all that apply)

- [ ] Ice massage (1)
- [ ] Imagery exercises (2)
- [ ] Increasing functional skills (3)
- [ ] Resuming hobbies (4)
- [ ] Ultrasound treatments (5)
- [ ] Relaxation exercises (6)

Q21 Which of the following often have an influence on a patient's perception of pain when the pain is chronic? (Mark all that apply)

- [ ] Financial difficulties (1)
- [ ] Patients own history of injury (2)
- [ ] Health history of significant others (3)
- [ ] Litigation (4)
- [ ] Religion (5)
- [ ] Significance of the pain to the patient (6)

Q22 The severity of an injury correlates directly to the severity of the pain.

- Agree completely (1)
- Agree somewhat (2)
- Disagree somewhat (3)
- Disagree completely (4)

Q23 A PT has been treating a patient with a diagnosis of a cervical strain as a result of a motor vehicle accident. The patient has recently decreased his established exercise routine, complains of restless sleep, diminished appetite, less interest in sex and a sense of increasing frustration with his situation. Choose the statement which comes closest to describing the appropriate assessment of the situation. The PT should....

- be concerned that the patient is developing depression (1)
- further decrease the patient's exercise program (2)
- not be overly concerned with any of these changes (3)
- begin to consider that the patient is malingering (4)

Q24 A PT instructs their patient to lightly rub the injured area after a series of exercises. The basis for this technique is explained by principles based on the theory of…

- behavior modification for pain control (1)
- endogenous opiate stimulation for pain relief (2)
- gate control for nerve stimulation (3)
- patterning for nerve conduction (4)

Q25 The clinical findings of pallor, tachycardia and hypertension are characteristics of a pain response. A patient with pain of one year duration does not have any of these signs. The most reasonable conclusion would be that the patient…

- ○ is not in pain (1)
- ○ is a malingerer (2)
- ○ has an underactive limbic system (3)
- ○ has adapted autonomic responses (4)

Q26 The pain of Causalgia, Trigeminal Neuralgia, Complex Regional Pain Syndrome/Reflex Sympathetic Dystrophy is…

- ○ associated with an inflammatory reaction (1)
- ○ due to nerve pathology (2)
- ○ relieved by analgesic drugs (3)
- ○ none of the above (4)

Q27 A PT observes that a patient with Complex Regional Pain Syndrome is hypersensitive to touch and complains of increased pain when she is anxious because... (Mark all that apply)

- ☐ she has not been able to be active and therefore any activity is painful. (1)
- ☐ of an increase of sympathetic nerve activity at the injury site. (2)
- ☐ of an inhibition of sympathetic nerve activity (3)

Q28 A malingerer is defined as one who...

- has pain that lasts longer than six months. (1)
- has litigation pending. (2)
- consciously fabricates symptoms. (3)
- has a variety of pain complaints without a known physiologic cause. (4)

Q29 A PT observes a patient rubbing her knee after a series of exercises. The patient may be...

- increasing A beta nerve fiber input. (1)
- increasing the release of histamines. (2)
- decreasing C nerve fiber input. (3)
- increasing C nerve fiber input. (4)

Q30 Chronic pain usually results in chronic disability.

- Agree completely (1)
- Agree somewhat (2)
- Disagree somewhat (3)
- Disagree completely (4)

Q31 Which of the following is the most common emotional reaction in patients with chronic pain?

- Hostility (1)
- Malingering (2)
- Anxiety (3)
- Depression (4)

Q32 A patient with chronic pain has been doing less of the exercise program established 2 weeks ago because she states she has pain when she exercises. After a re-evaluation it is determined that there is no deterioration in her physical condition and no obvious change in her psychosocial status. Which of the following might the PT do?

- Agree that she should decrease the exercises because of the complaints of pain. (1)
- Ask that she continue the exercise program, explaining why the PT feels it is necessary to do so. (2)
- Suggest to the patient a few days of rest. (3)
- Use hot packs and ultrasound prior to exercise. (4)

Q33 The most likely reason for a patient with a chronic pain syndrome to demonstrate pain behavior to the therapist (limping, moaning, wincing) is...

- the patient is afraid of appearing well (1)
- the patient wants to get sympathy (2)
- the patient does not want to comply with the treatment program (3)
- the patient received positive reinforcement for such behavior in the past (4)

Q34 Chronic pain is a multi-faceted problem. As a physical therapist, which of the following are you willing to address? (Mark all that apply)

- [ ] The sensory component (1)
- [ ] The emotional component (2)
- [ ] The functional component (3)

Q35 One way to help a patient manage chronic pain is to teach the patient coping skills. As a physical therapist this is something I do or am willing to do...

- ○ Usually (1)
- ○ Occasionally (2)
- ○ Rarely (3)

Q36 How
I prefer to treat patients with chronic pain over patients with acute/subacute pain. (1)

- ○ I prefer to treat patients with acute/subacute pain over patients with chronic pain. (2)
- ○ I do not have preference for treating patients in regard to their pain. (3)

Q37 Evaluating the need to involve the "significant other" of a patient with chronic pain in the rehabilitation process is a necessary component of the physical therapy program.

- ○ Agree completely (1)
- ○ Agree somewhat (2)
- ○ Disagree somewhat (3)
- ○ Disagree completely (4)

Q38 It is frustrating treating patients with chronic pain because... (Mark any statement(s) that apply.)

- ☐ I do not have the professional preparation. (1)
- ☐ The diagnosis is unclear. (2)
- ☐ There is often not enough time for treatment. (3)
- ☐ Successful rehabilitation requires more resources than physical therapy alone. (4)
- ☐ The patient often has a psychological disorder that as a physical therapist I am unable to address. (5)
- ☐ There is not enough positive reinforcement to the therapist. (6)
- ☐ There is a feeling of helplessness on the part of the therapist. (7)
- ☐ It is not frustrating treating patients with chronic pain. (8)

Q39 Below is a list of six common orthopedic diagnoses. Rank them from 1-6 based on how satisfied you usually are with the amount of improvement each type of patient makes by the time

of discharge from your facility. The first choice represents MOST satisfied and the bottom choice represents LEAST satisfied. (Drag and drop choices into the correct order)
_____ Laminectomy with complaints of "sciatica", 8 months post surgery. (1)
_____ Cervical spine strain, 8 weeks post injury. (2)
_____ Inversion ankle sprain, immediate post trauma. (3)
_____ Arthroscopic meniscectomy, 1 week post surgery. (4)
_____ Colles' fracture with Complex Regional Pain Syndrome/Reflex Sympathetic Dystrophy, 12 weeks post trauma. (5)
_____ Lateral epicondylitis, 3 weeks post Initial onset. (6)

Q40 You receive a referral for therapy 3 times/week for one month for a patient with chronic low back pain of 5 years duration, etiology unknown. The patient has had one laminectomy and is receiving disability payments. After your initial evaluation you also have the following information from the patient: •The patient has had numerous trials of physical therapy in the past five years and has not followed through with the previous programs. •The patient feels that the exercises are often too difficult and always too painful to do. •The patient and the medical doctor are considering a second surgery if there is no change from physical therapy in one month. Mark the <u>THREE (3)</u> treatments you would consider most important to initiate within the established time frame.

- ☐ Establish a home exercise program. (1)
- ☐ Discuss and practice with the patient relaxation techniques. (2)
- ☐ Concentrate on posture awareness. (3)
- ☐ Concentrate on body mechanics and exercise. (4)
- ☐ Use traditional therapeutic modalities. (5)
- ☐ Develop a work hardening routine. (6)

Q41 Choose the one statement which comes closest to describing your feelings about the possible benefits of physical therapy for the patient in the previous question.

- ○ Therapy may prevent another surgery. (1)
- ○ Therapy may help the patient to manage his pain more effectively (2)
- ○ Therapy will probably not be beneficial for pain management (3)
- ○ Therapy will probably make no change in the patient's course. (4)