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Amelia Grace Gradwell
Philadelphia College of Osteopathic Medicine, ameliafi@pcom.edu

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Philadelphia College of Osteopathic Medicine

Department of Psychology

OSTEOPATHIC MEDICAL STUDENT KNOWLEDGE OF AND ATTITUDES TOWARD CHRONIC PAIN

By Amelia Grace Gradwell

Submitted in Partial Fulfillment of the Requirements of the Degree of

Doctor of Psychology

July 2013

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PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE
DEPARTMENT OF PSYCHOLOGY

Dissertation Approval

This is to certify that the thesis presented to us by Amelia Gradwell on the 18th day of July, 2013, in partial fulfillment of the requirements for the degree of Doctor of Psychology, has been examined and is acceptable in both scholarship and literary quality.

Committee Members' Signatures:

Barbara A Golden, PsyD, ABPP, Chairperson

Robert A DiTomasso, PhD, ABPP

Harry J Morris, DO, MPH

Robert A DiTomasso, PhD, ABPP**,** Chair, Department of Psychology

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Acknowledgments

I wish to thank Jane E. O'Rorke, M.D., Ian Chen, M.D., Inginia Genao, M.D., Mukta Panda, M.D., and Sam Cykert, M.D., for permission to use the attitudes and beliefs scale (2007). I would also like to thank Betty R. Ferrell, R.N., Ph.D., F.A.A.N. and Margo McCaffery, R.N., M.S., F.A.A.N., for use of the knowledge and attitudes survey regarding pain (2008). I appreciate being allowed the privilege of utilizing these surveys for my work in hopes of furthering research in this area of medicine.

I wish to acknowledge the exceptional dissertation committee to whom I am grateful and extremely fortunate to have worked with on this project. Barbara A. Golden, Psy.D., A.B.P.P., my dissertation chair and mentor throughout my doctoral program, has provided me with the utmost support and guidance during my time at Philadelphia College of Osteopathic Medicine, and for this I am forever thankful. Thank you for passing on your love of behavioral medicine; I am so glad to have met you at an integral time in my career development. I give my heartfelt thanks to Robert A. DiTomasso, Ph.D., A.B.P.P., for not only serving as a committee member with statistical prowess, but also a cheerleader in my academic and professional endeavors. Thank you to Harry J. Morris, D.O., M.P.H., for his sound clinical judgment, feedback, and wisdom regarding my study, based on his many years of working with medical students and within the clinical setting. This study would not have been possible without this committee, whose unique talents, skills, and expertise exemplify a passion for teaching students and treating patients in primary care settings with the best possible care.

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A special thank you to Michael Becker, D.O., for his assistance with the data collection process and for attendance at my oral dissertation defense. Your strong rapport with the D.O. students helped tremendously in my outreach efforts. Thanks so much.

I could not be more thankful to my husband, Tom, for his devotion not only to me as his spouse but to my personal and professional goals, as well. He has been my constant throughout my years in graduate school, and without him I would not be where I am today. He has instilled in me the importance of hard work, dedication, and perseverance. "Thank you for asking."

Thank you to my family, friends, and colleagues for standing by me during this process. I truly appreciate the support and wonderful times that we have shared during my studies. Last but certainly not least, thank you to the fantastic medical students who elected to participate in this study, for this work would not have been possible without you!

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Abstract

Chronic pain is a prevalent presenting problem for patients in medical settings, yet how physician knowledge and attitudes about those with chronic pain may influence the treatment of this condition is not fully understood. The purpose of this study was to evaluate the knowledge and attitudes of osteopathic medical students about pain management, with particular emphasis on chronic pain, in an effort to address the lack of chronic pain research currently available. A review of current literature, including an overview of chronic pain, is included. This study used original data, collected from first and fourth year D.O. students at a northeastern private graduate medical school. Participants completed an online survey compiled from: the attitudes and beliefs scale, and the knowledge and attitudes survey regarding pain. The findings can be used to meet the needs of trainees in medical schools, more specifically in schools of osteopathic medicine. Potential explanations, limitations of the study, and implications of the research are also explored.

Keywords: chronic pain, interdisciplinary care, medical students, knowledge and attitudes

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Chapter 1: Introduction

Statement of the Problem.

Symptoms of chronic pain include functional impairment, emotional distress, overreliance on medications, and discord in relationships with significant others (Lewandowski, 2004). The American Chronic Pain Association (2012) stated that "chronic pain is pain that continues a month or more beyond the usual recovery period for an injury or illness or that goes on for months or years due to a chronic condition."

Recent research has highlighted the importance of strong clinical proficiency when working with patients suffering from pain. In a cross-sectional study of patients and physicians from 12 primary care centers, Staton et al. (2007) found a significant difference between patients' ranking of pain symptoms and their physicians' estimations. Most notably, the finding was particularly true when the patient was Black. Physician participants were more than two times more likely to underestimate pain in Blacks than all other ethnicities combined. Staton et al. emphasized the importance of exploring this association further. It is unclear if there are other contributing factors, such as patient perception of pain control or use of prayer. The researchers further noted that additional training for residents and young physicians might be useful because they are more likely than other groups of physicians to underestimate patient pain levels (Staton et al., 2007).

Previous research in the area of pain management knowledge among medical students has been limited to allopathic medical students and undergraduate students (pre-med majors); and has been primarily conducted overseas. However, these studies have all found that medical students are lacking in knowledge and attitudes necessary for accurate assessment and quality treatment of patients with chronic pain. According to

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Ury, Berkman, Leipzig, and Ahronheim (1998), 40% of new U.S. graduates reported they had received no instruction on pain management in medical school. Only 20% of students reported that they had received instruction during both preclinical and clinical years.

According to data collected from questionnaires completed by interns at St. Vincent's Hospital and Medical Center in New York, 75% of students polled said they had managed three or fewer patients with chronic pain in medical school, and 45% felt uncomfortable dealing with pain management. The researchers asserted that there is a need for greater research in pain management education and for changes in the curriculum of medical schools (Frankel, 1998; Ury et al., 1998).

With limited training about pain management during undergraduate and graduate medical education, the professional medical discipline has discovered numerous issues with patient care of those suffering from acute and chronic pain. There are specific shortcomings in the medical field that prevent the patient from receiving functional pain control, including physician barriers, patient and caregiver barriers, psychological barriers, and health system barriers (Mokdad, Marks, Stroup, & Gerberding, 2004; Phillips, 2000; Ward, Carlson-Dakes, Hughes, Kwekkeboom, & Donovan, 1998).

Physician barriers include lack of interest, involving limited professional and financial incentives; lack of open-mindedness, including potential biases toward chronic pain patients; low priority, as there is a limited amount of time and attention paid during residency for treating chronic pain patients; knowledge, as there is no requirement to pass a board examination on pain management; and skills, which are lacking in most cases because training is limited or nonexistent (Mokdad et al., 2004; Phillips, 2000).

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Patient and caregiver barriers to pain management involve an inability to tell the physician about the existence of or amount of pain the patient is in, due to a fear that it will affect the ability to effectively treat the presenting concern (Ward et al., 1998). Psychological barriers to pain management include patient fears they won't be treated as suffering from "real" pain if they are being treated psychologically. Health system barriers that may further influence the physician include inadequate reimbursement, increasing costs of medication, restrictive regulations, multiple venues of care, and the overall focus of healthcare on a cure rather than the quality of life of a patient (Mokdad et al., 2004).

Purpose of the study.

The purpose of this study was to evaluate the knowledge and attitudes of osteopathic medical students in regard to pain management, with particular emphasis on chronic pain. This study aimed to address the lack of chronic pain research. Repercussions of a lack of knowledge about diagnosis and how to treat chronic pain, as well as implications of attitudes towards patients with chronic pain, will be explored. Chronic pain is being diagnosed more frequently, and multimodal methods of treatment have been empirically supported. Considering that existing studies on chronic pain training and knowledge are somewhat dated and were conducted with medical interns, it would be highly beneficial to use a similar questionnaire to assess graduate allopathic or osteopathic medical school students for further implications and to establish whether change has occurred in the interim.

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Chapter 2: Literature Review

Introduction to chronic pain.

Definitions for the diagnosis of chronic pain vary; some are more specific and time-limited than others. Gatchel, Peng, Peters, Fuchs, and Turk defined chronic pain as "…the experience of pain for at least three to six months duration" (2007, p. 581), which will serve as the operational definition for chronic pain in this study. In addition, an attitude will be defined as "…a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related" (Allport, 1935). In turn, knowledge will be defined as "the fact or condition of knowing something with familiarity gained through experience or association" (Merriam-Webster Online Dictionary, 2010).

According to The Joint Commission, there are approximately 50 million Americans with some form of chronic pain. Of these, 4 in 10 have moderate-to-severe pain and cannot find adequate relief (ABC News, USA Today, & Stanford Medical Center, 2005; Phillips, 2000). Those with chronic pain seek treatment to meet multidimensional concerns including obvious physical health, as well as often less obvious or less correlated mental health concerns.

Interaction of mental health and physical health concerns.

There is often an interaction between physical health and mental health concerns associated with chronic pain conditions that provides support for the use of interdisciplinary treatment teams (Farrugia & Fetter, 2009). Mental health professionals typically interact with patients suffering from chronic pain when it has become either their primary or secondary problem that is presenting with other developmental issues

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(Farrugia & Fetter, 2009). Some people who experience chronic pain have a history of sleep disorders; appetite, thought, energy, or mood dysfunctions, drug issues, or trauma (ABC News, USA Today, & Stanford Medical Center, 2005; Cochran, 2007). Those with chronic depression or other long-standing mental health disorders may be at increased risk for chronic pain as their primary or secondary complaint when compared to the general population (Arnow et al., 2009; Cochran, 2007). The rationale behind this lies in the proximity of brain processing centers for pain, emotion, and other autonomic behaviors that may create the threat of crossover of neurological activity (Cochran, 2007).

The interaction between mental health and physical health concerns may be most concisely captured by the seven-factor model (Davidson, Tripp, Fabrigar, & Davidson, 2008). This model is based on data from the the Beck Anxiety Inventory, Beck Depression Inventory, Beck Hopelessness Scale, Chronic Pain Coping Index, Multidimensional Pain Inventory, Pain Catastrophizing Scale, McGill Pain Questionnaire—Short Form, Pain Disability Index, and the Tampa Scale of Kinesiophobia completed by patients with chronic pain. Findings indicate that there are seven dimensions of the pain experience: pain and disability, pain description, affective distress, support, positive coping strategies, negative coping strategies, and activity (Davidson et al., 2008).

Patients who receive treatment for major depression and chronic pain have higher medical costs than other categories of chronic pain patients, both with and without depression (ABC News et al., 2005; Arnow et al., 2009). These high medical costs can create a large burden for taxpayers (Lynch, 2008). Wagner et al. (2001) noted that a

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minority of people with chronic conditions actually receives appropriate treatment, which, in turn, can lead to increased medical costs and taxpayer burden. The Institute of Medicine reported that pain conditions resulted in productivity costs of approximately $300 billion in 2010 (2011). This approximation was based on three estimates: the days of work missed (approximately $12 billion); hours of work lost (approximately $96 billion); and lower wages (from $190.6 billion to $226.3 billion).

Most of the reported loss was found to be due to decreased productivity while at work (Institute of Medicine, 2011). Approximately 13% of the U.S. workforce is estimated to have lost work during the past week due to pain conditions, including headache (5.5%), back pain (3.4%), arthritis (2%), and other musculoskeletal pain (2%) (Stewart, Ricci, Chee, Morganstein, & Lipton, 2003). An ever-increasing burden on public assistance for medical coverage magnifies the importance of finding and using empirically supported treatments, such as cognitive-behavioral therapy (CBT), in an interdisciplinary setting for chronic pain conditions (Robinson, Leo, Wallach, McGough, & Schatman, 2010). Medical students, interns, residents, and practicing physicians alike must be informed and willing to use these empirically supported treatments in order to provide patient-centered current and relevant care practices.

Training for medical students about chronic pain

Chibnall, Tait, and Ross (1997) conducted a 4x2 factorial design study of 95 medical students' clinical judgment of chronic pain using vignettes. The findings showed that subjects perceived patients with medical evidence as having higher pain intensity and greater pain-related disabilities than patients without medical evidence for their pain. Patients with high and moderate amounts of pain were more emotionally distressed.

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However, patients with higher pain levels had their pain reports discounted by the medical students (Chibnall et al., 1997). These findings underscore the importance of being able to conduct holistic and patient-centered assessments.

In a study conducted in Finland, undergraduate medical students were assessed via electronic questionnaire on knowledge, interviewing skills, and pain evaluations using an objective structured clinical examination and the International Assessment for the Study of Pain (IASP) (Leila, Pirkko, Eeva, Eija, & Reino, 2006). The researchers found that students were unaware of the association between chronic pain and depression and did not ask about the patient's present life situation, even though the patients were instructed to present as tired and depressed (Leila et al., 2006). The researchers stressed the importance of having both knowledge and communication skills when working with chronic pain patients, as well as a preparedness to work as a member of a team. An understanding of the patient's background and feelings about the chronic pain diagnosis is also essential (Leila et al., 2006).

In a study conducted in Northern Ireland, undergraduate third and fifth year medical students completed a questionnaire about chronic pain management (Campbell, 1992). Area medical centers were also polled in order to gain an understanding of local resources of which students should be aware. The researcher concluded that although by the end of the medical program, students achieved increases in knowledge on topics of chronic pain and pain management, more formal education about pain is required at both the undergraduate and graduate levels (Campbell, 1992).

Stevens et al. (2009) studied two medical school cohorts to compare pain assessment and management skills. The first cohort did not receive a specialized pain

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assessment and management curriculum, while the second cohort did. Both cohorts were evaluated using a required clinical skills examination 1 year later as part of their traditional course sequence. The authors found that the students who received the pain assessment curriculum demonstrated sustainable increases in relevant skills for patients with pain (Stevens et al., 2009).

Goldberg, Gliatto, and Karani (2011) studied two cohorts of students enrolled at the Mount Sinai School of Medicine, using a clinical rotation in palliative medicine, to further understand the influence on student knowledge and self-assessed preparedness in caring for patients with serious illnesses. Students from the first cohort did not have this clinical rotation and were compared to the second cohort who did. Findings demonstrated that students who received the clinical rotation had stronger self-assessed skills in pain management. The researchers asserted that based on these findings, clinical experience should be integrated into the curriculum at all medical schools (Goldberg et al., 2011).

A study conducted by Mezei and Murinson (2011) involved the collection of data from 117 U.S. and Canadian allopathic medical schools to discern pain education curricular content. Findings indicated that pain training typically occurred within the context of required general medical coursework, with 80% of U.S. schools requiring at least one pain session. A pain session was identified as focused training 1 hour in duration. They found that during these pain sessions, little to no attention was given to topics included in the International Association for the Study of Pain core curriculum. The total number of pain sessions ranged from 1 to 28, reflecting a mean of 9 and a median of 7. Based on the findings, Mezei and Murinson (2011) argue that the inclusion

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of pain topics in an adjunct-style manner during another course results in fragmented and compromised learning. The researchers assert that current curricula are extremely limited and that in the future pain education should be integrated, with pain-focused courses.

Chronic pain knowledge was assessed with final year medical and final year physiotherapy students (Ali & Thomson, 2009). The students completed a chronic pain questionnaire with knowledge and management components. Final year physiotherapy students were found to have statistically significant greater knowledge of chronic pain than their final year medical student counterparts. Final year medical students were found to have a statistically significant greater understanding of chronic pain patient management issues. The authors believed that the findings emphasize the potential for future interdisciplinary training experiences so that students may implement a biopsychosocial framework of care (Ali & Thomson, 2009).

The assessment of attitudes toward pain by Wilson, Brockopp, Kryst, Steger, and Witt (1992) is a questionnaire that was administered to first year medical students at the University of Kentucky College of Medicine in order to provide pretest and posttest measures for a 6-hour Health and Society course taught by faculty from the Department of Behavioral Science. The measure was administered at the beginning of a mandatory pain seminar and again 5 months after completion of the seminar. Overall, students overestimated both acute and chronic pain problems, though this occurred more frequently in the first survey. Attitudes toward pain measures indicated overall negative themes during the pretest and posttest; however, after 5 months the students were less likely to indicate imaginary origins to pain. Findings indicate that first year medical students have a limited scope of knowledge or experience about pain, that factual

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knowledge gained during the course faded with time, and that after the course, students had an increased awareness about the rewarding and complex nature of working with pain patients. The authors indicated the importance of integrating attitudinal aspects with the factual learning that medical students gain while in school. This may be achieved by the incorporation of clinical skill sets and scientifically based curricula (Wilson et al., 1992).

Standardized training protocols for pain management.

In an attempt to address the lack of pain management training for many years in the medical field, Pilowsky created an outline curriculum on pain for medical schools in 1988. This outline delineates the biopsychosocial model for teaching chronic pain to undergraduate students and incorporates interdisciplinary treatment into the curriculum. Pilowsky did not imply a particular time frame for the topics in the curriculum because those specifics should be left to the discretion of each medical school (Pilowsky, 1988). As noted by Leila et al. (2006), this editorial has been available and yet underused for decades. Though not considered a curriculum for graduate medical schools, Pilowsky's model could possibly be assessed and reformatted for this use.

Considering the lack of curriculum on pain in recent years, Silverman (2003) discussed the creation of a virtual textbook by the American Academy of Pain Management for self-study purposes. Students could use their own time to learn about pain diagnosis and treatment, as it has been argued by medical school professionals that there is not enough time in the curriculum to discuss pain in the classroom. The book consists of nine sections, plus an additional cumulative self-test section. Advocates for

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the implementation of a medical school curriculum on pain argue that students do not have available free time to complete this self-study coursework, either (Silverman, 2003).

The Joint Commission published new standards for pain to address the shortcomings in treatment. *Pain assessment and management: An organizational approach (CITE)* contains the following topics: rights and ethics, pain assessment, pain care for patients, education, continuum of care, and improvement of organization performance. The Joint Commission uses these standards when reviewing facilities for accreditation review (Phillips, 2000). Because this publication has been available for approximately a decade, it would be interesting to see if the standards are taught in medical training settings.

Patient experience of pain.

Patients suffering from pain report varying degrees of satisfaction with prescribed treatment and intervention modalities. According to a poll conducted by ABC News, USA Today, and Stanford Medical Center (2005), over 60% of Americans have spoken with a doctor or other medical professional about pain symptoms. Notably, 90% reported that their doctor understood the problem, while only 59% reported that they received a great deal or good amount of pain relief (ABC News et al., 2005).

In a 2001 study, Alberque and Eytan reflected on a case study of a cross-cultural treatment experience. During the treatment of a cross-cultural patient, the researchers noted that culture might influence presentations of pain. Misdiagnosis or nondiagnosis may occur due to a lack of understanding about the patient's cultural expectations and the physician's own ethnic background. Alberque and Eytan believe there is a significant relationship between patient's locus of control style and ethnicity, and stressed the

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importance of having competent professionals working as a team to advance the accurate diagnosis and treatment of cross-cultural patients (2001). Considering that pain may manifest differently from person to person, pain models were created in an effort to increase understanding of and relevant treatment for pain conditions.

Models for pain.

In an article by Sewitch, Abrahamowicz, Dobkin, and Tamblyn (2003), the Patient-Physician Discordance Scale was discussed. The questionnaire may be used for several chronic diseases, including chronic pain conditions, and can be used in practice and research settings. The study by Sewitch et al. (2003) revealed that the scores have good construct validity, satisfactory convergent validity, and acceptable internal consistency. Key findings from use of the questionnaire include a lower discordance associated with more positive health outcomes and patient adherence. In addition, physicians were less perceptive about psychological distress than pain and disease severity (Sewitch et al., 2003). These findings emphasize the need for interdisciplinary treatment teams for chronic pain and enhanced pain management training for physicians.

The traditional biomedical model views pain as a symptom of underlying disease or tissue damage and remains prevalent among healthcare professionals and patients alike (Keefe, Abernethy, & Campbell, 2005). There are several limitations of the biomedical model: (a) the amount of pain is not always directly proportionate or equivalent to the illness or disease, (b) interventions, including surgery, do not always eliminate pain, and sometimes may exacerbate pain, and (c) psychological factors are important in explaining pain and the ability to adjust to pain levels (Keefe et al., 2005). Due to the limitations of

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this model, subsequent models were created in order to analyze pain from a more holistic perspective.

The first of these models, classified under *pain theories*, is the gate control theory (Melzack & Wall, 1965). Gate control theory sought to incorporate the biomedical model with psychological perspectives on pain, positing that pain is a complex experience with many layers and elements. Gate control theory explains that the spinal cord contains a neurological "gate" that will either allow pain signals to travel toward the brain or will block such signals. Gate control theory is often used to explain phantom or chronic pain. This theory was the first to endorse the use of psychology for many medical diagnoses (Melzack & Wall, 1965. Fordyce (1976) applied the operant conditioning theory to chronic pain, noting that pain behaviors are learned after experiencing painful physical symptoms.

The second model, the *cognitive-behavioral therapy model* (CBT), was applied to chronic pain first by Turk (1983) and then by Turner and Clancy (1988) to incorporate thoughts and beliefs in the assessment of how people recognize and cope with pain. CBT is easily applicable and comprehensive for use with chronic pain patients and includes biopsychosocial factors as part of the assessment process. Due to its ease of use, standardized treatments have been created from this model for patients with chronic pain (Gatchel et al., 2007; Keefe et al., 2005; Robinson et al., 2010).

The third pain theory model, known as the *neuromatrix theory*, was created when Melzack updated the gate control theory in order to adapt concepts delineated by CBT (Melzack, 1999). The neuromatrix theory offers information on how the brain may compile information from different sources in order to produce the sensation of pain.

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Although these more recent pain theories exist, healthcare professionals and patients continue to utilize the biomedical model, despite its aforementioned limitations (Melzack, 1999).

Professional treatment of pain.

Peng et al. (2008) implemented a study of Canadian multidisciplinary pain treatment centers to assess actual levels of cohesive patient care. The study found that the concept of multidisciplinary is often used loosely and that the more definitive interdisciplinary term should be used as the ideal organization of professionals in healthcare settings (Peng et al., 2008). *Interdisciplinary* treatment approaches are characterized by coordinated interventions employed by a variety of disciplines working together in the same facility, with joint treatment goals based on ongoing communication. Pain management program treatment teams may include healthcare professionals such as physicians, nurses, physical therapists, psychologists or social workers, biofeedback therapists, occupational therapists, recreational therapists, and vocational counselors (Belar & Deardorff, 2009; Robinson et al., 2010). Only one third of the facilities surveyed were staffed with either a psychiatrist or psychologist, due to lack of funding because mental healthcare is not routinely covered by insurance in Canada. The researchers advocated for the staffing with a mental health professional because many patients with chronic pain also suffer from anxiety and depression (Peng et al., 2008).

It has been noted that comprehensive pain assessments require expertise from multiple domains and are thus optimally conducted by a team of professionals from various fields (Turk & Robinson, 2011). Professional staff may vary from setting to setting, but ideally includes at least a physician, a psychologist, and a rehabilitation

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counselor. In an optimal setting, team members work with the patient individually and then meet as a team to collaborate in the development of a holistic conceptualization of the patient and treatment (Turk & Robinson, 2011). According to research from Scascighini, Toma, Dober-Spielmann, and Sprott (2008), a minimum standard of interdisciplinary care may be used: individualized exercise plans, consistent use of relaxation techniques, group therapy led by a clinical psychologist for approximately 1.5 hours per week, psychoeducation sessions one time per week, two physiotherapy treatments per week for pacing techniques, medical training therapy (PT), and neuroeducation from an experienced physician.

Golden, Gatchel, and Glassman (2010) recommend that physicians utilize behavioral health consultants or a team of interdisciplinary professionals to administer clinical interviews to the patient. Golden et al. (2010) incorporate the practice of CBT into treatment plans for chronic pain patients. These authors also provide advice for practitioners treating patients with chronic pain: employ psychoeducation; highlight the importance to patients of participating in pain treatment; encourage all treatment team members, including the patient, to communicate regularly about treatment status; inform the patient about resources available to meet physical and psychosocial needs; and create a realistic treatment plan with the patient in order to improve daily functioning. Belar and Deardorff (2009) posit that clinical health psychologists have the skill set and bedside manner to appropriately address these patient needs.

CBT uses the biopsychosocial model of pain to treat the condition as not only a physical but also an emotional experience that is shaped by cognitions about the causes and consequences of pain and by reactions to the social world (Farrugia & Fetter, 2009;

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Gatchel et al., 2007). Emotional arousal leads to increased muscle tension, and fear of re-injury or further pain can lead to placing limits on activities. Decreased muscle strength and loss of function can give way to further pain. Because pain causes emotional discomfort, therapy aims to get the patient to take an active role in treatment, and to self-manage the chronic pain condition. Combining conventional medical treatment with psychological interventions such as diversion techniques, biofeedback, relaxation, activity pacing, and operant conditioning may assist with the recovery of chronic pain (Farrugia & Fetter, 2009; Gatchel et al., 2007). In addition, CBT for chronic pain might be improved by modifying techniques thereof to suit individual patient needs.

Motivational interviewing may also be used with CBT to facilitate behavior change (Heapy, Stroud, Higgins, & Sellinger, 2006; Resnicow et al., 2002). The utilization of these models in practice requires the physician to be aware of the potential benefit of working with professionals from complementary fields. And in reverse, physicians who correspond with professionals from complementary fields for the purpose of chronic pain treatment may become more aware of these models.

A self-management perspective has been highlighted as highly beneficial for patients working with interdisciplinary chronic pain management programs (Glenn & Burns, 2003). Patients who are empowered to use their own resources and implement treatment plans outside of the medical setting are most likely to improve in symptomatology and overall pain management. Conceptualizing patient stage of change using Prochaska's transtheoretical model (Prochaska & DiClemente, 1983) may assist in developing individualized treatment protocols and provide an understanding of varying treatment outcomes. Prochaska's transtheoretical model emphasizes the importance of

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ongoing patient assessment to determine preparedness, motivation, and willingness to change behaviors. The model uses a scale for this assessment: pre-contemplation, contemplation, preparation, action, maintenance, and potential relapse stages are identified and include descriptions to assist the practitioner with both assessing and treating individuals at each stage.

Glenn and Burns found that patient thoughts about self-management at the start of treatment might influence how much he or she improve during and after pain management programs (2008). In addition, Jensen, Turner, and Romano (2001) found that patient self-reported levels of pain intensity, depression, and disability decrease as a result of increased perception of control over pain and decreased catastrophic cognitions. This finding further emphasizes the efficacy of interdisciplinary treatment team models for chronic pain patients (Jensen et al., 2001).

Conclusion

Clearly, chronic pain is at the forefront of modern medicine. It is crucial for patients to receive empirically based treatment for chronic pain conditions. As delineated above, interdisciplinary treatment teams have shown great success in comparison with stand-alone specialty care and should be employed as the preferred method of treatment for chronic pain patients. Medical students should receive updated training on the latest interventions for chronic pain. This is especially salient for primary care settings, where chronic pain is most often reported.

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Chapter 3: Hypotheses

It is hypothesized that (a) knowledge-based proficiency to understand and treat chronic pain will be greater in the fourth year medical students than in the first year medical students, (b) attitudes about chronic pain will be more positive in the first year medical students, and (c) attitudes about interdisciplinary treatment for chronic pain will be more positive in the fourth year medical students.

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Chapter 4: Method

Design and design justification.

This study used a quasiexperimental, quantitative, cross-sectional, between-subjects survey design. This design was chosen because the survey was administered to first and fourth year student cohorts and then compared to provide information about similarities and differences. A quantitative quasiexperimental design allowed inferences to be drawn in an observational manner without cause-effect conclusions.

The cross-sectional design was selected to provide the capability to measure each participant at one point in time for ease of instrument use and enhanced chance of participation. A between-subjects design allowed the avoidance of carryover effects, as participants are unique to each group. In summation, this design allowed for wider sampling and provided attitudinal data of interest.

Participants.

For the purposes of this study, osteopathic medical students from a small northeastern private graduate school were selected in a convenience sample. All of the students from the first and fourth year cohorts were asked to voluntarily participate in the study. It was anticipated that approximately 500 students would participate in the study, given that each cohort consisted of approximately 250 students. Demographic information was specified on each completed survey; considering that two entire cohorts were expected to participate, it was estimated that these students would be representative of the medical student body at the graduate school in terms of gender, race, and SES. Specialty medicine areas were included as part of the demographic information collected for purposes of comparison.

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Students were asked to self-attest to their standing in the program in order to protect their anonymity. Data on ethnicity, age, and gender were collected in order to analyze differences between the groups.

Inclusion criteria. Inclusion criteria for participation was enrollment in the D.O. Program as a first or fourth year medical school student in good standing. All students recruited were enrolled at the same campus of the school.

Exclusion criteria. Exclusion criteria included being on probation or any other disciplinary status in the program according to self-report.

Recruitment. First year students were recruited via classroom announcement during fall of the 2012-2013 academic year. Fourth year students were recruited during orientation sessions in healthcare center rotations during the fall and winter of the 2012-13 academic year. The purposes of the study were explained and the survey web link was provided for all interested in participating.

Measures.

Similar studies have been conducted to gauge undergraduate medical student and practicing physician knowledge about chronic pain. The authors of these studies were contacted and provided written permission to utilize their surveys for the purposes of this study.

The attitudes and beliefs scale by the 4P Study Group (2007) is an 84-item self-administered survey that includes 49 questions on physician attitudes toward patients with chronic nonmalignant pain and beliefs regarding their care. Twenty-seven questions focus on the physician's previous education in chronic pain management. Eight questions address demographics, including physician's age, race, gender, and years in

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practice. Attitude and belief questions are scored on a 5-point Likert scale ranging from *strongly disagree* to *strongly agree*. Attitude questions included items on physicians' opinions regarding who should manage chronic pain patients and their comfort, frustration, and satisfaction in managing chronic pain patients. Physicians were asked about the scope and method of their education on chronic pain while in medical school, residency, or after completing residency (formal continuing medical education or self-directed learning). Validity and reliability data are not available for this measure. The measure has been adapted for the purposes of this study to more accurately reflect the participant population.

The knowledge and attitudes survey regarding pain by Ferrell and McCaffery (2008) is a tool that may be used by medical professionals as a pretest and posttest measure in educational settings. The 38-question measure was created and normed on nursing students using standardized questions based on pain management protocols set in place by the American Pain Society, the World Health Organization, and the Agency for Health Care Policy and Research. Test-retest reliability was established (r>.80) in a continuing education class of staff nurses (N=60). Internal consistency reliability was established (alpha r>.70) with items reflecting both knowledge and attitude domains (Ferrell & McCaffery, 2008).

The first section of the study questionnaire consisted of knowledge-based questions about chronic pain. These questions were offered in a multiple-choice format. Topics such as chronic pain statistics, key symptoms, links to psychological and social factors, and treatment options were included in this section.

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The second section consisted of attitude-based questions. These questions provided participants with a Likert scale with which to rank their personal attitudes about issues related to chronic pain. Topics such as attitudes about symptoms attributed to chronic pain and utilizing interdisciplinary treatment options were included in this section.

The third and final section consisted of demographic data. Questions about the participants' age, gender, race, and year in school were included in this section. The participants were asked if he or she ever experienced chronic pain. If so, they were provided with an optional opportunity to explain this experience and possible repercussions thereof.

Procedure

The survey questions were finalized and placed into an online format for easy access by the students and for statistical collection purposes. The measurement consisted of an Internet-based questionnaire (created through SurveyMonkey.com) that was accessed using a link given to D.O. students when they were recruited. Participants could voluntarily complete the questionnaire at their leisure, but were given a deadline for submission of responses. All participants received the same questionnaire.

Sequence of events. First, researchers recruited participants from the first year cohort via classroom during the fall of the 2012-2013 academic year. Researchers recruited participants from the fourth year cohort during orientation sessions in healthcare center rotations in the fall and winter of the 2012-2013 academic year. Fliers were given to all students during these recruitment sessions that included the online link to the survey. Then, an email was sent to eligible students to encourage participation. The

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participant read a cover letter statement of disclosure as part of this email, which included the procedures for completion of the internet-based questionnaire.

Voluntary willingness to participate in the study was completed by the process of clicking on the survey link after reading the statement of disclosure. In order to click on the link, the participant must also self-attest they were a first or fourth year student in good standing in the D.O. Program.

At the end of the survey, instructions to email the investigator were provided so all participants could elect to enter a drawing for one of six $25 Amazon e-cards. Follow-up emails were sent to students as reminders to complete the survey. Measures were scored and interpreted.

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Chapter 5: Results

Statistical Analyses.

A one-way multivariate analysis of variance (MANOVA) and an independent samples *t-test* were used to analyze the data. The MANOVA was selected to test the first two proposed hypotheses and describe the relationship between the independent and dependent variables identified in each. The third proposed hypothesis was tested with an independent samples *t-test*.

The independent variable, which is one variable with two levels, for the MANOVA and independent samples *t-test* is group status (first year and fourth year D.O. students). The dependent variables for this study were knowledge-based proficiency to understand and treat chronic pain, attitudes about chronic pain, and attitudes about interdisciplinary treatment for chronic pain. Reliability for all variables in the survey revealed an alpha of .80. Also, psychometric analysis of scales including factor analysis and reliability analysis were used to measure construct validity.

Demographics

Participant demographics are described in Tables 1 through 8. Means, medians, modes, and frequencies were used to describe key characteristics of the sample. Generally, the average participant was a 25-year-old, white, Catholic, first year male medical student with an interest in the internal medicine specialty and an undergraduate degree in biology, with some professional post-collegiate work experience. Descriptive statistics were used for organization and summarization of participant data for the overall sample (N=226).

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Assessing other demographics, the two groups varied slightly in age range, but there was not a statistically significant difference. Other demographics between the groups were similar as well, considering the medical school's devotion to diversity. This is believed to lend to greater generalizability and external validity.

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Table 1

Age

	M	*SD*
	25.82	3.88
	%	*n*
No response	20.1	46

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Table 2

Gender and Year in Medical School

	%	*n*
Gender		
Male	44.9	102
Female	35.7	81
No response	18.9	43
Year in Medical School		
First Year	41.0	93
Fourth Year	39.6	90
No response	18.9	43

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Table 3

Ethnicity

	%	*n*
White	62.6	142
Black, African American, or Negro	3.5	8
Spanish/Hispanic/Latino	2.6	6
American Indian or Alaska Native	0.9	2
Asian Indian	5.3	12
Chinese	3.1	7
Filipino	1.3	3
Japanese	1.3	3
Korean	2.6	6
Vietnamese	1.3	3
Other Asian	1.3	3
Native Hawaiian	0.4	1
Guamanian or Chomorro	0.4	1
Samoan	0.9	2
Other Pacific Islander	0.4	1
Some other race	2.2	5
No response	9.3	21

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Table 4

Primary Specialty of Interest

	%	*n*
Internal medicine	22.0	50
Family medicine	16.7	38
Other	41.9	95
Anesthesiology	2.1	5
Emergency medicine	7.3	17
Neurology	1.3	3
Neurosurgery	0.9	2
Obstetrics/Gynocology	3.5	8
Opthamology	0.4	1
Orthopedics	1.6	4
Otolaryngology	0.4	1
Pathology	0.4	1
Pediatrics	5.7	13
Physiatry	0.4	1
Physical medicine and rehabilitation	0.4	1
Psychiatry	1.3	3
Radiation oncology	0.4	1
Radiology	1.3	3
Surgery	5.2	12

(continued)

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Primary Specialty of Interest

	%	*n*
Urology	0.9	2
No response/N/A/Undecided	4.0	10
No response	18.9	43

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Table 5

Subspecialty of Interest

	%	*n*
Addiction medicine	0.4	1
Aerospace medicine	0.4	1
Anesthesiology	0.4	1
Cardiology	5.2	13
Child psychiatry	0.4	1
Critical care surgery	0.8	2
Emergency medicine	1.6	4
Endocrinology	0.4	1
Fertility	0.4	1
Forensic	0.4	1
Functional/Stereotactic	0.4	1
Gastrointestinal	2.4	6
Hospice	0.4	1
Infectious disease	0.9	2
Internal medicine	0.4	1
Maternal fetal medicine	0.4	1
Neonatology	2.2	5
Nephrology	0.4	1
Neurology	0.4	1

(continued)

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Subspecialty of Interest

	%	*n*
Neurovascular	0.4	1
Obstetrics/Gynocology	2.8	7
Oncology	2.0	5
Opthamology	0.4	1
Orthopedics	1.2	3
Otolaryngology	0.8	2
Pain	0.4	1
Pediatrics	2.4	6
Physical Medicine and Rehabilitation	0.4	1
Preventative Medicine	0.4	1
Pulmonary Critical Care	0.4	1
Radiology	1.6	4
Rheumatology	1.6	4
Sports Medicine	2.0	5
Surgery	1.6	4
Urology	0.8	2
N/A/Undecided	35.6	89
No response	18.9	43

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Table 6

Undergraduate Degree

	%	*n*
Anthropology	0.4	1
Athletic Training	0.4	1
Biochemistry	4.8	12
Biology	38.4	96
Bioscience	0.8	2
Chemistry	2.4	6
Clinical lab sciences	0.4	1
Electrical engineering	0.4	1
English	1.6	4
Environmental engineering	0.4	1
Finance	0.4	1
Health	1.6	4
Human development	0.4	1
Human physiology	0.4	1
Kinesiology	1.6	4
Life science	1.2	3
Neuroscience	5.2	13
Nursing	0.4	1
Pharmaceutical product development	0.4	1

(continued)

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Undergraduate Degree

	%	*n*
Philosophy	0.8	2
Psychology	4.0	10
Public Health	0.4	1
Science	0.8	2
Spanish	0.4	1
Theatre	0.4	1
No response	2.4	6
N/A/Undecided	18.9	43

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Table 7

Professional (post collegiate) job experience

	%	*n*
Experience	36.8	92
No experience	36.4	91
No response	18.9	43

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Table 8

Religious Preference

	%	*n*
Agnostic	2.0	5
Atheist	1.2	3
Baptist	0.8	2
Buddhist	0.4	1
Catholic	27.2	68
Chinese traditional	0.4	1
Christian, nondenominational	10	25
Episcopalian	0.4	1
Evangelical Christian	0.4	1
Greek Orthodox	0.4	1
Hindu	0.8	2
Islam	1.6	4
Jewish	3.2	8
Lutheran	0.8	2
Methodist	0.8	2
Muslim	1.2	3
Orthodox Christian	0.4	1
Presbyterian	1.6	4
N/A/None/Not religious/Unspecified	20.0	50
No response	18.9	43

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Average scores on dependent variables.

The average responses on the dependent variables are shown in Table 9. Correlations on the dependent variable scores are shown in Table 10. A bivariate positive correlation between knowledge score and average attitude was found as shown in Table 10. The Pearson correlation supported the assumption that when knowledge about chronic pain increases, attitudes about chronic pain decrease.

Hypotheses 1 and 2 MANOVA results.

A one-way MANOVA was selected to test the first two hypotheses, with group status (first and fourth year D.O. students) serving as the independent variable; knowledge-based proficiency to understand and treat chronic pain and attitudes about chronic pain served as the dependent variables (see Tables 9 and 10). The average knowledge scores for first and fourth years were compared (22.18 and 24.98, respectively). The standard deviation knowledge scores for the first and fourth years were also compared (3.18 and 3.21, respectively).

The total average score for both cohorts was calculated (M = 23.55), as was the total standard deviation (SD = 3.48). The average attitude scores for the first and fourth year students were compared (3.28 and 3.18, respectively). The standard deviation attitude scores for the first and fourth years were also compared (.15 and .19, respectively). The total average score for both cohorts was compiled (M = 3.23), as was the total standard deviation (SD = .18).

The asssumptions of MANOVA were tested. There was a significant negative correlation between knowledge of chronic pain and attitude about chronic pain (r (209) =

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-.245, $p = .000$). Results of Box's Test of the equality of covarinace matrices were not significant.

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Table 9

Means and Standard Deviations

	Chronic pain knowledge			Chronic pain attitudes		
Group	M	SD	*n*	M	SD	*n*
D.O. Student Year						
First Year	22.18	3.18	93	3.28	.15	93
Fourth Year	24.98	3.21	89	3.18	.19	89
Total	23.55	3.48	182	3.23	.18	182

Note. Scores on the chronic pain knowledge measure range from 0 to 40. Scores on the chronic pain attitudes measure range from 2 to 5.

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Table 10

Correlations among the Dependent Variables

	Total Knowledge Score	Average Attitude Score
Total knowledge score	1	-.25
Average attitude score	-.25	1

Note. Correlation is significant at the 0.01 level (1-tailed).

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Table 11

Group Statistics

	Total Interdisciplinary Care		
Group	M	SD	*n*
D.O. student year			
First Year	3.17	.29	93
Fourth Year	3.05	.37	90

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(Box's M = 3.67, $F(3, 6217112.71) = 1.208$, $p = .305$) indicating that the observed covariance matrices of the dependent variables are equal across groups. Results of the Levene's test of equaliy of error variances between the groups were not significant for knowledge scores ($F(1, 180) = .036$, $p = .85$). However, on the attitude scale, the Levene's test was violated and there was a significant difference between the groups on error variances ($F(1, 180) = 4.08$, $p = .05$). For the test of multivariate effect, Wilks's Lambda was significant (Wilks's = .086, $F(2, 179) = 21.60$, $p<.001$. These results support that there was a significant difference between the first and fourth year students.

A post-hoc test of between-subjects effects using a one-way ANOVA revealed a significant difference between first and fourth year students on knowledge of chronic pain scores, $F(1,180) = 34,79$, $p<.001$. The results demonstrated that fourth years had significantly greater knowledge of pain than first years (refer to Table 9). On the dependent variable of knowledge, partial eta squared = .162, indicating that 16.2 % of variance on the dependent variable is attributed to or explained by differences in year in medical school. On a post-hoc test of between-subjects, a comparison of first and fourth years on attitudes toward pain revealed $F(1,180) = 16.51$, $p<.001$. On the dependent variable of attitude, partial eta squared = .084, meaning that 8.4% of variance on attitudes toward pain is attributed to or explained by differences in medical school. Fourth year students had less positive attitudes toward chronic pain patients.

Hypothesis 3 independent samples *t*-test results.

The third hypothesis, regarding attitudes about interdisciplinary treatment for chronic pain, was tested with an independent samples *t*-test. Scores from 93 first Year students were measured ($M = 3.18$, $SD = .29$) and compared to the scores from 90 fourth

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year students (M = 3.05, SD = .37). The independent variable was group status (first year and fourth year D.O. students). The dependent variable was attitudes about interdisciplinary treatment for chronic pain (see Table 11). The Levenes test comparing the 2 groups was not significant (F = .58, p = .45). The observed $t(181) = 2.52$ (p<.013) was sigificant indicating that fourth year students had significantly less positive attitudes toward interdisiciplinary care than first year students.

Additional Analyses

Principal Components Analysis. Varimax rotated factor analysis using Kaiser's criterion for the knowledge measure revealed that four factors were extracted. A .40 cut-off for saliency of factor loading was used. Item 5 was eliminated from consideration during the analysis as it was double-loaded on factors 1 and 2; eight items were loaded on factor 1, three items were loaded on factor 2, three items were loaded on factor 3, and two items were loaded on Factor 4.

The test of assumptions, KMO and Bartlett's Test, were analyzed. The Kaiser-Meyer-Olkin measure of sampling adequacy = .875. According to Field (2009), KMO values vary between 0 and 1, with values closer to 1 supporting that "patterns of correlations are relatively compact and so factor analysis should yield distinct and reliable factors" (p. 647). The Bartlett's test of sphericity was significant (p = .000) and rejects the null hypothesis that the intercorrelation matrix is an identity matrix (i.e., all correlations are 0 and there is an absence of relationships between items). When Bartlett's test results are highly significant (p<.001) as in the present case, the items are correlated highly enough to legitimize a factor analysis. After rotation, factor 1 items accounted for 25.48% of the variance; factor 2, 10.59% of the variance; factor 3, 9.19%

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of the variance; and factor 4, 8.57% of the variance. The rotated component matrix is shown in Table 12 below.

Factor 1 was labeled *Patient Experience of Pain*, suggesting that this factor is measuring the medical student's ability to reflect an understanding of patient reported pain. Factor 2 was labeled *Opioid Analgesic Knowledge*, suggesting that this factor is measuring the medical student's ability to reflect an understanding of opioid analgesic medications. Factor 3 was labeled *Medication Administration*, suggesting that this factor is measuring the medical student's ability to reflect an understanding of how to administer medications. Factor 4 was labeled *Morphine Dosage Knowledge*, suggesting that this factor is measuring the medical student's ability to reflect an understanding of morphine dosages for various clinical applications.

A one-way MANOVA was conducted to compare the first and fourth year students on each of the extracted factors. In testing the assumptions of MANOVA the intercorrelations between these factors were computed and Factors 1, 2, 3, and 4 were significantly correlated (see Table 12). Box's test of the equality of covarinace matrices were not significant (Box's M= 16.801, $F(10, 156238.06) = 1.64$, $p = .089$), indicating that the observed covariance matrices of the dependent variables are equal across groups. The Levene's test of equality of error variances revealed that the error variances were equal between groups for factor 1 (($F(1,181) = .386$, $p = .546$), factor 2 (($F(1,181) = .101$, $p = .751$) and factor 3 (($F(1,181) = .1693$), $p = .195$). However, for factor 4 the Levene's test were significant (($F(1,181) = 10.096$, $p = .002$) indicating that the error variance of this dependent variable is not equal across groups, a violation of assumption.

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Table 12

Rotated Component Matrix

	Factor			
Item	1	2	3	4
1		.776		
2		.681		
3	.700			
4			.643	
6		.537		
7	.689			
8			.515	
9	.785			
10	.793			
11				
12	.703			
13			.680	
14	.418			
15	.713			
16				.837
17	.758			
18				.770

Note. Item 5 was eliminated because it was double-loaded on factors 1 and 2.

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The overall Wilks's lambda was significant ((Wilks's = .094, $F(4, 178) = 4.164$, $p = .003$).

Using one-way ANOVAs as post hoc tests, there was a statistically significant difference observed between first years and fourth years on factors 2 ($F(1, 181) = 4.490$, $p = .035$) and factor 3 only ($F(1, 181) = 7{,}137$, $p = .008$). The difference between groups on factor 1 approached signficance ($F(1, 181) = 3.663$ $p = .057$). On factor 2, fourth year students showed significantly higher scores than first years. On factor 3, fourth year students showed significantly higher scores than first years.

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Chapter 6: Discussion

Summary of findings. It was hypothesized that knowledge-based proficiency to understand and treat chronic pain would be greater in the fourth year medical students than in the first year medical students. This hypothesis was supported during statistical analysis.

It was hypothesized that attitudes about chronic pain would be more positive in the first year medical students. This hypothesis was supported during statistical analysis.

It was hypothesized that attitudes about interdisciplinary treatment for chronic pain would be more positive in the fourth year medical students. This hypothesis was not supported during statistical analysis. There was a significant difference found in the statistical analysis, but little clinical or practical significance can be derived due to the large *N*.

Significance. The findings of this study are significant because they support the clinical observation that although knowledge increases with time in medical school, attitudes about chronic pain and interdisciplinary treatment for chronic pain do not improve. Of particular interest, there is a negative correlation between knowledge and chronic pain attitudes.

The first two hypotheses were supported because a significant difference between knowledge and attitudes toward chronic pain was identified among the first and fourth year students. The third hypothesis found a significant difference in statistical analysis; however, it is of little clinical utility due to the large sample size. The third hypothesis was not supported since attitudes became somewhat more negative from the first to the fourth medical student cohort.

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Relationship to previous works. Though no studies were found to compare graduate medical levels of knowledge and attitudes about chronic pain, research has been conducted with undergraduates and residents. However, findings correlate with previous research gained from other student body's inasmuch that the participants reflected a less than optimal level of comfort and desire to work with chronic pain patients. Knowledge about chronic pain results reflects a correlation with previous works, as well. Knowledge appears to increase with education and clinical exposure to patients. Some of the participants received some education about chronic pain during a Palliative Care course, unlike the findings discovered in the literature which reflected 40% of students enter their profession as a physician without pain education (Ury et al., 1998).

Relevance to theory and practice of psychology. The study is relevant to the theory and practice of psychology as psychologists serve on interdisciplinary treatment teams for patients with a number of primary care health concerns, including chronic pain. As team members, it is the role of the psychologist to understand the framework of the team in order to manage communication both among team members as well as between the team and the patients. Knowing that physician attitudes toward the team and chronic pain decrease with education emphasizes the need for psychologists to educate and empower for the needs of the patient as well as a healthy workplace environment.

Psychologists in interdisciplinary treatment settings can serve as behavioral health consultants and in educational roles to increase collaborative efforts among the professions. Psychology students and seasoned professionals alike are encouraged to gain competence in these areas, as they are becoming in-demand positions for those working in medical settings. Supporting the physician role and demands of the medical field

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while advocating for patient care and individual needs will create a unique, beneficial job description for the psychologist in the Clinical Health subset.

Implications. Findings imply the need for additional chronic pain didactic and clinical education during medical school. Considering the high likelihood of working with chronic pain on a weekly, if not daily, basis, medical programs must meet the demand to graduate objective and skilled physicians. Knowledge competency for chronic pain must increase to meet the demands of the large patient body with this diagnosis.

Additional time in the didactic setting to discuss and inform regarding chronic pain may serve to improve chronic pain knowledge among medical students. Repercussions due to a lack of knowledge about diagnosis and how to treat involve rising health care costs, prolonged treatment times, worsening patient conditions, and malpractice risks. The medical field cannot afford to continue to educate professionals without the use of advanced empirically supported techniques.

Chronic pain didactic and clinical education during medical school must focus on the attitudes of the physician in training for working with chronic pain patients. The potential physician barriers should be targeted in both the didactic and clinical educational experiences of the student so that reflection for potential biases and assumptions may be discovered. Students should be given the opportunity to reflect on personal diversity issues and seek consultation or supervision as necessary for appropriate and objective treatment of the patient body.

Education must also be provided to cover the other shortcomings that prevent the patient from quality health care, namely patient and caregiver barriers, psychological barriers, and health system barriers (Mokdad, Marks, Stroup, & Gerberding, 2004;

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Phillips, 2000). Communication competency to work with patients as well as other professional disciplines is paramont to close the gap in care.

Behavioral health consultants may assist physicians in the conceptualization and treatment planning process, particularly for patients with specific system barriers. Physicians must be trained to be aware of and capable of working with these issues as the head of the patient treatment team.

Interdisciplinary treatment teams are becoming more and more widespread; exposure to this format does not appear to support positive attitudes among the participating body. The integrated healthcare model is at the forefront of medicine. Medical student barriers toward embracing this flux in structure need to be identified in school so attitudes may improve, along with the ability to provide objective patient care.

Explanations for Unexpected Findings. Interdisciplinary treatment attitudes did not significantly improve in the fourth year students when compared to the first years. There is a negative correlation that as knowledge increases, attitudes decrease. Clinical and didactic experiences during medical school appear to impact attitudes toward working with other professionals. This is of course less than ideal, and something that this researcher encourages educators to target during interactions with students.

Explanations for this may include limited, negative or frustrating interdisciplinary professional interactions during student training. Other explanations include time limitations to coordinate services, misconceptions about professional roles on the treatment team, and lack of education about the interdisciplinary referral/consultant process. The student may not feel encouraged to communicate and consult with those from other disciplines regarding patient care.

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It is speculated that educators may be reluctant to encourage the interdisciplinary model as such due to implications on the professional identity and integrity of the medical doctor. In any event, large and overarching explanations cannot be deemed from the small discrepancy that was found. What can be deemed from the results is the importance of interdisciplinary professionals to seek educational experiences and opportunities to combine forces for the well being of patients being served.

Diversity Implications. Presenting features of chronic pain vary by the individual. Cultural considerations have found that some groups of people with chronic pain are more likely to initially report physical symptoms while others may first indicate emotional, interpersonal, or spiritual symptoms. The context of the report does not necessarily diminish the quality thereof, as medical professionals have at times misunderstood. This underlies the importance of seeking clinical competence in working with diverse populations. Diversity and cultural competency should be emphasized during all medical training, but particularly while discussing chronic pain patients due to the prevalence of the condition and the subjectivity of the pain experience.

Advocacy Implications. Patients with chronic pain continue to have difficulty in getting needs met. Patients with this condition may be seen by care providers as malingering for secondary gain, as mentally unstable, or even as drug addicts. Though by and large this is not true, the stigma remains and patients go without adequate treatment. Psychologists, in the role of behavioral health consultants, may serve as advocates to educate and empower both the treatment team and the patient. Medical students and physicians alike may work with clinical health psychologists to understand the complexity of these issues. Medical school curricula concerning pain management

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should incorporate the implications surrounding advocacy in working with this patient body.

Limitations. The inclusion of only D.O. students, with first & fourth year students being selected with convenience sampling, is considered the primary limitation of this study. Though this utilizes a participant body of interest to the researcher, external validity must be considered with caution, as this is a small sampling from one osteopathic medical school. In addition, one of the measures being used for the study has not been normed, which means that it does not have associated reliability and external validity.

Two hundred twenty-six total participants were voluntarily involved in this study; however, only 176 completed the survey from start to finish. It is difficult to exclude partial responses based on the format of the online survey; therefore, they have been included in the statistical analyses and labeled *no response*. In future studies, additional efforts may be made in the creation of the survey format to prevent some of these issues.

Future directions. This study may assist with curricula development in physician training programs, and also carries implications for practice in primary care and psychology. Findings highlight the necessity for a standardized chronic pain curriculum to be established in medical education settings. This research may be used to advocate for the evidence-based treatment of chronic pain to serve the needs of patients who may otherwise be considered difficult or unrewarding to work with.

Medical educators may seek resources for the development of additional pain didactic and clinical components such as: Pilowsky's 1988 an outline curriculum on pain for medical schools, which utilizes the biopsychosocial model that may be easily integrated into interdisciplinary treatment settings. The virtual textbook created by the

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American Academy of Pain Management (2003) for self-study purposes may also be provided in medical school for students to learn about pain diagnosis and treatment at their leisure. Students could then reflect on their self-study experiences within the classroom as part of a larger pain curriculum. Medical educators and administrative bodies may also seek The Joint Commission's *Pain assessment and management: An organizational approach (CITE)* to assess current pain programs that may already be in place.

Medical educators should also consider the incorporation of relevant clinical literature offered by interdisciplinary professionals. In addition, medical students should be informed of the latest, empirically supported techniques for use with pain. These include: the Patient-Physician Discordance Scale, the neuromatrix theory, Gate control theory for pain, the cognitive-behavioral therapy model, which uses the biopsychosocial model, motivational interviewing, and Prochaska's transtheoretical model to assess patient treatment goals, strategies, and case conceptualizations.

This study is relevant to the theory and practice of psychology. Psychology is theoretically and practically based on providing care to benefit others. Chronic pain is a condition that can benefit from empirically supported treatments, such as behavioral medicine. Psychologists must continue to connect with physicians to provide interdisciplinary holistic healthcare for those with chronic pain.

There are many areas to pursue for future research on chronic pain. A postsurvey for the D.O. student participants receiving specific chronic pain coursework would be a great source of information for comparison purposes to the proposed study and to determine the utility of such coursework. In addition, it would be very helpful to

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research other D.O. Programs across the country using the methods of the proposed study. M.D. Programs would also be targeted areas to consider, and a useful source of data to compare and contrast with the results.

In addition, it would be interesting to survey patients with chronic pain about their perceived treatment from medical students in order to better understand how medical student knowledge and attitudes affect care from the patient's perspective. Considering that two cohorts of students were used as participants in this study, it would be additionally helpful to conduct a longitudinal study of D.O./M.D. students where the same students could be tracked throughout their time in medical school in order to understand more about the influence of additional training as the participants make their way through various didactic and clinical experience.

Summary and conclusions.

Interdisciplinary treatment teams have been more successful than stand-alone specialty care and should be employed as the preferred method of treatment for chronic pain patients. Medical students should receive updated training on the latest interventions for chronic pain. This is especially salient for physicians in primary care settings, where chronic pain is most often reported. Advanced medical students who participated in this study reported more negative attitudes toward both chronic pain and interdisciplinary treatment for this condition than their more junior colleagues.

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