Pain Management in Nursing Homes

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Abstract

Background: Pain is a leading cause of disability and a major contributor to health care costs. Over 85% of patients in nursing homes report pain on a daily basis (CDC, 2016). The rescheduling of hydrocodone to schedule II created an unprecedented challenge for physicians to write a triplicate prescription for patients in the nursing homes who required hydrocodone to manage pain. To circumvent the problem, one nursing home used Buprenorphine Transdermal System (BTDS) for pain management, which is a schedule III opioid analgesic that does not require the triplicate.

Design and Method: A pre- and post- intervention design was utilized to explore the efficacy, safety, and tolerability of the BTDS among nursing home patients who had chronic and post-operative pain. Pain scores were analyzed during the admission, 48 hours, 72 hours, week 1, week 2, and week 3. The Universal Pain Assessment Tool was used to measure the pain scores and an Independent Samples Kruskal-Wallis test followed by a post-hoc analysis was used to determine the significance of difference among the pain scores.

Results: The differences in the pain scores were statistically significant (alpha < 0.05) for the total sample, chronic pain group, and post-operative pain group. The overall pain improved by 42.5% in 48 hours and 58.1% in 72 hours. The average pain scores were down to 3/10 by week 1 and 2/10 by week 2. The use of adjunct pain medications (Tramadol or Tylenol #3) also declined progressively during the course of treatment with BTDS.

Conclusion: The chronic and post-operative pain were safely and effectively managed with BTDS; thus, BTDS could be used as an alternative analgesic armamentarium to provide adequate pain relief among nursing home patients who do not have access to Schedule II pain medications.

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Pain Management in Nursing Homes

In 1979, the International Association for the Study of Pain defined pain as an unpleasant sensory and emotional experience arising from actual or potential tissue damage. Pain is whatever the patient says it is and whenever they say they are experiencing it (McCaffery & Pasero, 1999). The American Pain Society referred to pain as the fifth vital sign two decades ago, and multiple clinical practice guidelines for pain have since emerged. The Joint Commission on Accreditation of Healthcare Organization has also established standards for pain assessment and management relevant to multiple health care disciplines and settings; however, adequate management of pain remains a substantial health care problem (Lynch, 2001). The World Health Organization (WHO) has acknowledged adequate pain relief as a basic human need and the failure to treat pain as an unethical breach of human rights (Brennan, Carr, & Cousins, 2007).

Pain management is such a huge burden on the health care system in the U. S. that it is considered a national epidemic (Zanocchi et al., 2008). Pain is a leading cause of disability and a major contributor to health care costs. It affects more than 100 million people in the U.S. (IOM, 2011), and over 85% of residents in the nursing homes experience pain regularly (Herr et al., 2011). It is associated with depression, anxiety, sleep impairments, functional decline, increased incidence of falls, prolonged rehabilitation, increased healthcare utilization, and rising healthcare costs (Corniola, 2016). Currently, over 1.4 million older adults in the United States reside in nursing homes, (CDC, 2016) and their pain remains under-assessed, under-reported, and under-treated (Parker, 2013).

Background

Pain management in nursing homes presents a unique challenge to health care providers because of inadequate information exchanged during the patients' transition between healthcare facilities (HCFs) (Nanda and Wachtel, 2007). Patients with chronic pain that are transferred from HCFs, such as hospitals, rehabilitation centers, or long-term acute care facilities to a nursing home many times do not come with a schedule prescription that is needed for medication. The pharmacy

affiliated with the nursing home cannot provide Schedule II medications without the signed specialized prescription. Thus, when hydrocodone was re-categorized to schedule II from schedule III on October 6, 2014 by Drug Enforcement Administration, it created an unprecedented challenge for the physicians because hydrocodone is the most commonly prescribed opioid analgesics in the nursing homes.

The Joint Commission requires physicians to make an initial visit within 72 hours of patients being admitted to the nursing home, then follow-up once every month for the first 90 days (Unwin, Porvaznik, & Spoelhof, 2010). In the majority of nursing facilities physicians round in nursing homes once or twice a week. Patients admitted to nursing homes with an order for Schedule II pain medications will face a delay for adequate pain management until seen by their attending physician. This creates a significant problem for facility nurses to adequately manage pain for the patients. Providers serving several nursing facilities recognized that a few of their patients needed additional short-term pain management beyond the routine pain medications and non-pharmacological treatments. There was also a concern for the use of opioids and side effects in the older population. With these concerns noted, a pain management protocol (see Appendix A) was developed for patients arriving with an order for scheduled II medications and implemented for a local practice that serves patients in nursing facilities. This project will evaluate the effectiveness of this protocol on pain management for the patients.

PICOT Question

In nursing home patients admitted with moderate to severe pain, what is the effect of a pain protocol compared to the usual standard of care on pain scores of patients who have chronic or post-operative pain during a four-month period?

Review of Literature

There are various kind of pain medications available to treat different types of pain. The over-the-counter pain medications commonly used are Acetaminophen and Non-Steroidal Anti-Inflammatory Drugs (NSAIDs). These medications are usually used for mild or medium pain and

discomfort. The long-term use of NSAIDs is linked with gastrointestinal and kidney injury.

Opioids or narcotic drugs are generally prescribed for moderate to severe and chronic pain. Narcotics are potent analgesics that exert the pharmacological effect by attaching with specific opioid receptors (mu, delta, or kappa) in the brain. The binding of narcotics with its respective opioid receptors blocks the brain and nervous system from sensing the pain signal from the injured or inflamed sites.

In 1970, the Food and Drug Administration released the classification of narcotics under the Controlled Substance Act and scheduled them into five distinct categories ranging from Schedule I to Schedule V. The classification is based on benefits of the narcotic, its potential for abuse, and its likelihood for dependency. Currently, Schedule II to Schedule V narcotics are used for management of moderate to severe pain. Schedule II medications such as Morphine, Hydrocodone, Oxycodone, Hydromorphone, Fentanyl patch, etc. are opioid formulations with strong analgesic effect, but they have high potential for abuse and dependence. Tylenol with codeine (Schedule III) and Tramadol (Schedule IV) have less potential for abuse compared to Schedule II drugs; however, their analgesic effect is relatively milder, and patients with moderate to severe pain do not achieve optimum pain relief.

In 2010, the FDA approved Buprenorphine Transdermal System (BTDS) or Butrans Patch for the management of moderate to severe chronic pain in patients requiring an opioid analgesic. BTDS is categorized as a Schedule III narcotic and it is indicated for the management of moderate to severe pain that require around-the-clock opioid treatment, and for which alternate treatments are not adequate. Buprenorphine is a semisynthetic opioid, a derivative of the naturally occurring opium alkaloid thebaine. It has a chemical structure similar to that of other opioids; however, it has a unique mechanism of action because it acts both as a partial μ-opioid receptor agonist and a partial κ-opioid receptor antagonist. The high affinity for μ-opioid receptor produces the analgesic effect, and the robust receptor saturation reduces the addiction potential by causing less euphoria on initiation and fewer withdrawal symptoms on discontinuation. It prevents hyperalgesia effect of

opioids, dysphoria, and psychotomimetic symptoms by blocking the κ-opioid receptor. It is highly lipophilic and has a long half-life of 32 hours, which provides a prolonged duration of analgesia. It is 96% alpha and beta globulin bound; thus, it does not compete with most of the medications, which are primarily albumin-bound. It is metabolized in the liver and the metabolites are mainly excreted in feces and minimally in urine. It is contraindicated in patients with severe respiratory depression and gastrointestinal obstruction. The most common side effects include nausea, headache, constipation, and application site erythema, rash, or pruritus. Currently, it is available in 5, 7.5, 10, and 20 mcg/hr formulation and one patch provides sustained analgesia for seven days (Pergolizzi et al., 2015). Numerous studies have demonstrated the efficacy, safety, and tolerability of BTDS.

Therapeutic Efficacy

BTDS has been effectively used for the different nomenclature of pain such as somatic, nociceptive, neuropathic, and cancer pain in various therapeutic settings.

Observational studies. In a prospective, non-interventional, post-marketing study Przeklasa-Muszynska and Dobrogowski (2011) reported that BTDS was effective in treating moderate to severe chronic musculoskeletal, neuropathic, and cancer pain. A three-month follow-up of 4030 patients receiving BTDS revealed that the mean pain intensity decreased by 73% from 62.3 mm to 16.5 mm on a 100 mm visual analogue scale, and the sleep score increased significantly. Over 85% of patients reported adequate pain relief, and 96% rated BTDS very easy to use. Similarly, Whale et al. (2013) conducted a post-marketing surveillance study on 2713 elderly patients who received BTDS for chronic non-malignant pain due to inadequate pain relief from other opioids. During the 8-week observation period, the mean pain intensity decreased by four points, and the quality of sleep, quality of life, social activities, and self-reliance increased significantly.

Randomized controlled studies. Leng et al. (2015) compared the effectiveness and safety of BTDS and sustained-released tramadol in a randomized, double-blinded, multicenter study with

280 patients who had chronic moderate to severe musculoskeletal pain not relieved by NSAIDs. At the end of eight weeks, both treatment groups had statistically significant reduction in pain with a difference in the visual analogue score of 0.45 (95% confidence interval, -0.02 to 0.91). The incidence of adverse events was also similar between the two treatment groups. Thus, the authors concluded that the efficacy of BTDS was comparable to that of sustained-release tramadol tablets.

BTDS is efficacious and well-tolerated by patients with moderate to severe chronic low back pain. Gordon et al. (2010) conducted a randomized, double-blinded, placebo-controlled crossover study, followed by an open-label extension phase to examine the efficacy and safety of BTDS on 78 patients who used opioids for chronic moderate to severe low back pain. In the eight-week period, patients in the BTDS group had significantly improved overall pain and sleep scores compared to the placebo group ($p = 0.027$). The improved pain scores were sustained for six months. The authors concluded that BTDS was effective in the management of chronic low back pain with moderate to severe intensity. In a multicenter, randomized, double-blinded, parallel group study, Steiner, Munera, Hale, Ripa, and Landau (2011) also found statistically significant improved pain scores for 660 opioid-experienced patients treated with BTDS for moderate-to-severe chronic low back pain. Steiner et al. (2011) conducted a multicenter, randomized, double-blinded, placebo-controlled study on 541 patients with moderate-to-severe chronic low back pain and found statistically significant reduction in pain scores and sleep disturbance scores. In a multicenter, enriched, double-blinded, randomized trial, Miller et al. (2013) compared the impact on quality of life with a 12-week treatment of BTDS among 660 opioid-experienced patients with moderate-to-severe chronic low back pain and reported that BTDS exhibited an improvement in the quality of life.

BTDS is a safe and effective alternative for treating patients with severe post-traumatic pain. Correa-Illanes, Roa, Pineros, Ferrer, and Adriasola (2014) performed a retrospective analysis of 57 severe post-traumatic patients with nociceptive and neuropathic pain who received BTDS for four years. They found that the mean pain intensity reduced by 4.4 +/- 2.2 points after 14 months of

treatment, 66.7% patients had ≥ 50% pain relief, 69% reported functional improvement, especially in gait ability and activities of daily living, and 80.7% had improved sleep quality. In addition, 72% of patients stopped using concomitant analgesics during BTDS treatment.

BTDS has also proven to be effective in treating chronic osteoarthritis pain. In a randomized, double-blinded, parallel group study, James, O'Brien, and McDonald (2010) found that BTDS was effective in treating osteoarthritis pain. The study of 246 individuals with osteoarthritis of hip and knee revealed that BTDS significantly decreased pain scores, improved quality of sleep, and enhanced quality of life. In a multicenter, randomized, double-blinded, parallel-group double-dummy study of 204 adults aged between 40-85 years, Ripa, McCarberg, Munera, Warren, and Landau (2012) found that BTDS had similar analgesic and tolerability profiles compared to Vicodin for the treatment of osteoarthritis pain. In an open-label, randomized, parallel group study of 220 individuals aged ≥ 60 years, BTDS plus paracetamol was comparable to Co-codamol in treating pain among older adults with hip and knee osteoarthritis. Both treatments reduced the pain significantly with an estimated treatment difference of -0.02 (95% confidence interval). The BTDS plus paracetamol group needed significantly less escape medication than the Co-codamol group (Conaghan, O'Brien, Wilson, & Schofield, 2011).

BTDS has a comparable efficacy profile to that of other opioids including fentanyl and morphine. In a prospective, randomized, longitudinal study Mitra, Chowdhury, Shelley, and Williams (2013) measured the pain intensity, physical activity, sleep, mood, additional rescue medication use, and side effects between BTDS and the fentanyl patch among 46 opioid-naïve adults with non-malignant persistent pain. Their findings showed that BTDS and the fentanyl patch were comparable in treating persistent pain. Wolff et al. (2011) conducted a systematic review of efficacy and safety of BTDS versus fentanyl or morphine in patients with moderate to severe chronic pain and found that BTDS was a safe alternative for fentanyl in treating chronic pain. Also, in comparison with morphine, BTDS had a significantly higher decrease in pain intensity (mean difference -16.20, 95% CI -28.92 to -3.48).

Tolerability Profile

The tolerability of an opioid is directly proportional to its adverse effects. In general, the adverse effects of an opioid are the main reason for the discontinuity of the treatment. BTDS is better tolerated compared to other opioids because it bypasses the direct contact with the gastrointestinal opioid receptors, and it does not have peak and trough kinetic profiles. Moreover, it does not affect the sphincter of Oddi. Thus, it has been associated with less nausea, vomiting, and constipation (Ripa et al., 2012).

Gastrointestinal effects. Wolff et al. (2012) conducted a systematic review of adverse events of BTDS versus the fentanyl patch in patients with chronic moderate-to-severe pain and found that fentanyl caused more constipation than BTDS. In a randomized control study, Correa et al. (2014) stated that out of 57 patients on BTDS, 13 had nausea, eight had constipation, and three had vomiting. The direct comparison of adverse events between the fentanyl patch and BTDS showed that the fentanyl patch triggered more nausea (OR 4.66, 95% CI 1.07 to 20.39) and vomiting (OR 17.32, 95% CI 4.43 to 67.71) compared to BTDS. Similarly, morphine caused more vomiting (OR 15.85, 95% CI 3.92 to 64.13) and constipation (OR 7.50, 95% CI 1.45 to 38.85) compared to BTDS (Wolff et al., 2011). In a randomized controlled trial, Conaghan et al. (2011) found that BTDS and Co-codamol caused a similar rate of nausea, vomiting, and constipation. In a post-marketing survey, 13,179 patients received BTDS after failing previous opioid therapy for moderate to severe chronic pain. The most common adverse events reported were nausea (4%), dizziness (1.9%), vomiting (1.6%), and constipation (1%). The phase III clinical trial in the U. S. for BTDS also showed low adverse events for opioid naïve patients, for example, constipation (3%), dizziness (3%), nausea (2%), and vomiting (2%). Similarly, the adverse events for the opioid-experienced patients on BTDS were also minimal, with nausea (4%), vomiting (3%), and constipation (3%) (Atkinson, Fudin, Pandula, & Mirza, 2013).

Adverse site reaction. Przeklasa-Muszynska and Dobrogowski (2011) reported local skin reaction on 34 out of 4030 (0.8%) patients on BTDS. Wen et al. (2013) performed a pooled analysis of 6566 patients on BTDS and a placebo patch. The overall incidence of adverse site reaction for BTDS versus the placebo patch was 23.4% and 22.6% respectively. Approximately 98% of the reactions were mild to moderate in intensity. The most common adverse site reactions were pruritus, erythema, and rash. There were no severe and inflammatory site reactions. The adverse site reaction profile of BTDS was comparable with those of other transdermal patches.

Withdrawal effects. BTDS has the least withdrawal symptoms compared to other opioids, and the symptoms are managed easily compared to other opioid withdrawal. Tompkins, Smith, Mintzer, Campbell, and Strain (2014) conducted a double-blind study to compare the withdrawal effects of BTDS and morphine and found that there was a minimal evidence of BTDS withdrawal on any given measure compared to morphine. The authors concluded that spontaneous withdrawal from BTDS appeared subjectively and objectively milder compared with that of morphine for at least 18 days after the drug cessation.

Safety Profile

The safety profile varies greatly between opioids and it can play a crucial role in choosing the types of opioids especially for elderly patients. Studies have shown that BTDS is safe to use in older adults because of its cardiac, respiratory, and renal safety profiles. BTDS does not prolong the QTc interval; therefore, it has less risk of sudden cardiac death compared to other opioids (Mitra et al, 2013). Respiratory depression is a major risk for opioid-treated patients who have an underlying pulmonary condition or who are receiving concomitant central nervous system depressants. All opioids do not show equal effects on respiratory depression. BTDS is the only opioid with a ceiling effect for respiratory depression when used without other opioids and central nervous system depressants. Moreover, BTDS-induced respiratory depression has a ceiling effect at a lower dosage (Pergolizzi et al, 2015), which means that the severity of respiratory depression does not increase as the dosage of BTDS increases. BTDS is also minimally excreted in the urine;

thus, renal function has no effect on the metabolism of BTDS. In the elderly and patients with renal dysfunction, the half-life of opioids and its metabolites increase due to impaired elimination. However, in the systematic review, Wolff et al. (2012) found that BTDS was suitable for older adults and patients with renal impairment or end-stage renal failure requiring hemodialysis, as BTDS metabolites are mostly eliminated in feces, and renal impairment does not affect the pharmacokinetics of BTDS.

Additionally, BTDS does not require dose adjustment when it is used among older adults. Al-Tawil, Odar-Cederlof, Bergrren, Johnson, and Persson (2013) measured the area under the plasma concentration-time curve (AUC) among 37 older adults and 37 younger individuals who received 5 mcg/hr BTDS for 7 days on the right arm and then 7 days on the left arm consecutively. They found similar mean AUC for elderly and younger individuals and recommended that no dose adjustment is required in elderly with BTDS treatment. Karlsson, Söderström, Augustini, and Berggren (2014) followed a prospective, multi-center, open-label, multiple-dose, age-group controlled study and demonstrated the safety of BTDS in chronic pain patients, regardless of age, supporting the conclusion that no age-related dose adjustment of BTDS was required.

Project Framework

The Iowa Model of Evidence-based Practice, developed by Marita G. Titler, will be used as a framework to guide the project, and evaluate the outcomes. The Iowa Model provides a holistic approach, taking into consideration the patients, providers, and organization to guide practice decisions (Titler et al., 2001). The first step in the Iowa Model is the identification of the clinical problem. Pain management in the nursing home is a problem focused trigger that requires an evidence-based practice change. The second step is to determine the priority for the organization. Adequate pain relief has always been a top priority for all the healthcare facilities. Once the priority of the problem is determined, the third step is to assemble relevant research, synthesize related literature, and critique the available evidence. From the review of literature above, there are ample empirical evidence that BTDS is an effective and safe alternative to Schedule II medications for

pain management. The practice group initiated the next step, which was to pilot the change into the practice and collect data. If the change is deemed appropriate for the practice, the final step is to institute the change into the practice and monitor the outcomes. The flow chart of the Iowa Model of Evidence-based Practice is provided in Appendix B.

Methods

Project Design

This is a quality improvement project, which will provide a retrospective evaluation of pain management prior and after the pain protocol implementation. Thus, the project will be conducted using a pre-test, intervention, post-test design facilitated through an Iowa Model of Evidence-based Practice.

Population/Setting

This project will evaluate the pain scores of patients admitted into a nursing home.

Inclusion Criteria. Patients admitted to nursing homes with moderate to severe pain who have admission orders for schedule II medications but lack triplicate prescriptions.

Exclusion Criteria. Patients with severe chronic obstructive pulmonary disease (COPD), interstitial lung disease, severe bronchial asthma, gastrointestinal obstruction, cancer pain. Patients on Quinidine, Procainamide, Amiodarone, and Sotalol.

Measurement Method

The pain management protocol will be utilized to conduct the project and evaluate the outcomes. The Universal Pain Assessment Tool (UPAT, see Appendix C) will be used to measure the pain score before and after the application of BTDS. An objective measure of pain is not a trivial task as it is a subjective phenomenon. Moreover, pain assessment in the elderly population is complex due to functional and cognitive decline. Therefore, UPAT will be used as it comprises of Numeric Rating Score (NRS), Verbal Descriptor Scale (VDS), Wong Bake FACES Pain Scale-Revised (FPS-R), and Activity Tolerance Scale. The strength of UPAT is the efficiency to screen for pain. Using UPAT, the patient can assign a numerical value for their pain ranging from zero to

ten and rate the intensity of their pain. Patients who cannot or do not want to use the numerical scale can describe their pain in terms of “no pain” to “worst pain possible”. The facial pain scale will help the person assessing the pain when patients cannot clearly express their level of pain. The Activity Tolerance Scale will help to understand how the pain is interfering with the activities of daily livings ranging from “no pain” to “requiring bedrest”.

Reliability and Validity. The NRS is the most widely used tool to assess pain among all age groups. Studies have shown that nursing home residents with mild to moderate cognitive impairment will be able to complete the VDS compared to other scales. The FPS-R can be used among patients who have language and communication barriers. The UPAT has been successfully used with different ethnic groups. All the scales included in the UPAT have demonstrated good internal consistency with Cronbach’s α coefficients of 0.85 to 0.89. Test-retest reliability for the NRS ranged from 0.57 to 0.83, VDS from 0.52 to 0.83, and FPS-R from 0.44 to 0.94. All three scales were found to be valid according to the factor analysis; although, the FPS-R was found to be the weakest (Herr, Spratt, Mobily, & Richardson, 2004).

Implementation/Data Collection

The project was approved from The University of Texas at Arlington Institutional Review Board on 5/8/2017 (see Appendix P). The data were collected between 09/12/2017 and 01/12/2018 using the pain management protocol. A power-point presentation was used to educate and train nursing staffs, supervisors, and the director of nursing on the implementation of the pain management protocol and data collection process. After the patients were admitted to the nursing home, nurses assessed the level of pain and recorded the pain score in the electronic health record (EHR). The nurse notified the admitting physician or the nurse practitioner (NP) regarding the patient status, diagnoses, discharge medications list, and the pain level. If the pain level was 5 or greater and the patient met the inclusion criteria, the physician or the NP ordered the nurse to apply BTDS 5 mcg/hr, along with the adjuvant Tramadol or Tylenol #3 as needed. Tramadol was preferably used as an adjuvant pain medication; but, Tylenol #3 was utilized if patients had an

allergic reaction or did not want Tramadol. Tramadol was prescribed at 50 mg and Tylenol #3 at 30/300 mg one tablet orally every four to six hours as needed for pain. During the nursing home rounds, the attending physician and/or the NP assessed the pain among patients with BTDS. If the pain was adequately controlled the patient continued with BTDS 5 mcg/hr. If the pain was not controlled, the dosage was gradually titrated up by 5 mcg/hr, or the medication was changed to Schedule II depending on the patients' preference. Nurses recorded the pain scores and any adjuvant medication used such as Tylenol #3 or Tramadol in the EHR. NP collected the average pain scores and the frequency of adjuvant medications used per day at 48 hours, 72 hours, week 1, week 2, and week 3.

Statistical Analysis

Information of the patients who received the BTDS was recorded on the Excel spreadsheet using the patient ID number, age, gender, ethnicity, diagnosis, and pain scores. The data were later transferred to SPSS where they were labeled and re-coded for analysis. Patients were divided into two categories – chronic pain group and post-operative pain group. Descriptive statistics such as mean, median, range, and standard deviation were used to compute age and pain scores. Non-parametric Independent Samples Kruskal-Wallis test was used to determine the significance of difference between the admission pain score and pain scores at 48 hours, 72 hours, week 1, week 2, and week 3. A post-hoc analysis was conducted to analyze the statistical difference among the various pain scores. The level of significance, alpha, was set at 0.05. A Chi-square Automatic Interaction Detector (CHAID) technique was used to determine the relationship between pain scores and variables, such as age, gender, ethnicity, dosage of BTDS, and frequency of adjuvant pain medication used. All three analyses (Kruskal-Wallis test, post-hoc analysis, and CHAID) were initially performed for the total sample group and then, separately, for the chronic pain group and the post-operative group.

Results

The total sample population was 94. Fifty-three patients (56.4%) had chronic pain (48

chronic back pain, 5 fibromyalgia) and 41 patients (43.6%) had post-operative pain (17 hip surgeries, 9 knee surgeries, 6 lumbar surgeries, 2 below knee amputations, 2 foot amputations, 3 open-reduction internal fixation (ORIF) of distal femur, and 2 ORIF of ankle) (see Appendix E for nomenclature of pain). The median age of the patient was 73 with a mean of 73.21 ranging from 58 to 89 years and a standard deviation of 8.34. There were 59 females (62.8%) and 35 males (37.2%) among 40 Caucasians (42.6%), 28 African Americans (29.8%), 19 Hispanics (20.2%), and 7 Asians (7.4%) (see Appendix E for ethnicity of population sample).

The overall mean admission pain score for the total sample was 8.3, ranging from 7 to 10 with a median score of 8 and a standard deviation of 0.63. The mean pain scores at 48 hours, 72 hours, week 1, week 2, and week 3 were 4.77, 3.47, 2.73, 1.9, and 1.72, respectively. For the chronic pain group, the mean admission pain score was 8.17, ranging from 7 to 9 with a median pain score of 8 and a standard deviation of 0.67. The mean pain scores of 4.92, 3.58, 2.98, 2, and 1.77 were obtained at 48 hours, 72 hours, week 1, week 2, and week 3, respectively. The average admission-pain score for the post-operative group was 8.46, ranging from 8 to 10 with a median pain score of 8 and a standard deviation of 0.55. The respective mean pain scores at 48 hours, 72 hours, week 1, week 2, and week 3 were 4.56, 3.32, 2.41, 1.78, and 1.66 (see Appendix H for more information on pain scores of different groups at various points on the timeline).

Fifty-eight patients used Tramadol, and 36 patients used Tylenol #3 as an adjunct pain medication. The mean of frequencies of adjunct pain medication used per day were 4.2, 2.6, 1.8, 1.6, and 1.4 at 48 hours, 72 hours, week 1, week 2, and week 3, respectively (see Appendix G).

BTDS was titrated up to 15 mcg/hr for 18 patients and 10 mcg/hr for 73 patients. Three patients only needed BTDS of 5 mcg/hr (initial dose). No patient required the maximum dose of BTDS, 20 mcg/hr. Sixty-two patients needed BTDS to be increased from 5 mcg/hr to 10 mcg/hr at 48 hours after the admission. For 10 patients, BTDS was increased from 5 mcg/hr to 10 mcg/hr at 72 hours. Four patients required the BTDS to be increased at both 48 and 72 hours. The BTDS was increased at 48 hours and week 1 for 13 patients and at 72 hours and week 2 for two patients (see

Appendix F for maximum dose and titration of BTDS). The CHAID analysis calculated the summative pain scores with a mean score of 27.11 for 18 patients on BTDS 15 mcg/hr and a mean score of 21.9 for patients on BTDS at both 5 mcg/hr (3 patients) and 10 mcg/hr (73 patients), which is provided in Appendix O.

There were three reported cases of constipation, five nauseas, one mild redness at the BTDS application site, and one pruritus at the application site. Eighty-four patients did not report any adverse reaction.

Discussion

There were 126 patients who required the Schedule II pain medications. Only four out of 126 patients had a written triplicate from the discharged facilities; thus, they did not meet the inclusion criteria. There were eight chronic pain patients and three post-surgical patients who dropped out of the study after the initiation of the BTDS. Eleven patients had severe COPD, four patients were on Amiodarone, and two patients had interstitial lung disease; thus, they were excluded from the study. Therefore, the final sample consisted of 94 patients in the study.

The Kruskal-Wallis test performed for the total sample, the chronic pain group, and the post-operative group rejected the null hypothesis and revealed that there was a statistically significant difference between the admission pain scores and pain scores at 48 hours, 72 hours, week 1, week 2, and week 3 for each group (alpha = 0.000) (see Appendix I, Appendix K, and Appendix M for more information on Kruskal-Wallis Test). The post-hoc analysis identified which pain scores were significantly different from each other by comparing the pain scores at various points on the timeline (total of 15 comparisons) for all of the three groups (see Appendix J, Appendix L, and Appendix N for more information on post-hoc analysis).

The post-hoc analysis for the total sample revealed that the difference in pain scores was statistically significant between all pain scores on the timeline except for pain scores in week 2 and week 3 (alpha = 1.00) (see Appendix J). Looking retrospectively, the mean pain score of the total sample at week 2 was already below two on the scale of zero to ten; thus, the significant decrease

in the pain score at week 3 was not anticipated (see Appendix H, Table 1). The post-hoc analysis of the chronic pain group showed statistically significant differences among majority of pain scores on the timeline except for the pain scores between week 2 and week 3 (alpha = 1.00), and pain scores between 72 hours and week 1 (alpha = 0.551) (see Appendix L). For week 2, the mean pain score was already below two on the scale of zero to ten (see Appendix H, Table 2); thus, it was unlikely to find any significant statistical difference in mean pain score during week 3. However, the statistically insignificant pain scores between 72 hours and week 1 could be attributed to the small sample size, because the alpha value is very close to 0.5 (see Appendix L). The post-hoc analysis for the post-operative group indicated that pain scores were statistically significant for most pain scores on the timeline except for pain scores between 48 hours and 72 hours (alpha = 0.212), between week 1 and week 2 (alpha = 0.255), between week 1 and week 3 (alpha = 0.071), and between week 2 and week 3 (alpha = 1.000) (see Appendix N). These levels of statistical insignificance can be recursively attributed to the small sample size.

Overall, analyzing the pain scores from the total sample, the chronic pain group, and the post-operative group, it was found that the mean pain score was less than four out of 10 at 72 hours for all three groups. Moreover, the mean pain scores were around two out of 10 for week 1 and remained less than two out of 10 throughout week 2 and week 3 for all three groups. Additionally, the frequency of adjunct medication used went down by 38% between 48 hours to 72 hours. This could be related to the fact that 66% of BTDS was changed from 5 to 10 mcg/hr at 48 hours. It is important to note that patients were using adjunct medication less than two times per day on average after 72 hours of the application of BTDS. The CHAID analysis demonstrated that patients who needed a higher dose of BTDS had significantly higher summative pain score.

The statistically significant differences in pain scores at various points on the timeline (admission pain score, 48 hours, 72 hours, week 1, week 2, and week 3) validated the findings of randomized controlled trials on effectiveness of BTDS performed by Leng et al. (2015), Steiner et al. (2011), Miller et al. (2013), Ripa et al. (2012), and Wolff et al. (2011). Furthermore, it was

tolerated well by the majority of the participants, and it showed only minor side effects for a relatively small group of people.

One of the strengths of this study was the strong support from the administration. The pain protocol served as a guide to initiate the BTDS and also allowed for the monitoring of the patients' pain scores throughout their stay in the facility. All nurses followed the pain protocol and used the numeric pain scale from zero to ten, with zero being no pain at all and ten being the worst pain imaginable. The use of numeric pain scale instead of other scales provided the homogeneity and concordance for inter-rater reliability on pain scores. The attrition rate was 10.48%, and the remaining patients were compliant with the use of BTDS.

The sustainability of this study depended on the key stakeholders who influenced the trajectory of the project and the outcomes. For this project, the key stakeholders included the physician, NP, director of nursing, nursing supervisors, nurses, administrator, and patients. The physician and NP were alert and vigilant in overseeing the project. They ensured that the project was on the right track. The director of nursing and the nursing supervisors closely monitored whether the nurses were following the instructions to address the pain. The administrator dealt with patients and families' complaints and concerns. Approximately, 90% of the patients chose to continue with BTDS. Therefore, all the key stakeholders played a pivotal role in implementation and outcome of the intervention.

Another aspect of sustainability is to assess for organizational readiness. It is one of the most important factors in successfully implementing the change into the practice. Organizational readiness refers to the extent to which the individuals within the organization are psychologically prepared and whether the organization is resourceful enough to implement and sustain the change. When the individuals are motivated and enthusiastic about the change, the organizational readiness is high, and they are more likely to exhibit cooperation and perseverance for the change. However, if the members of the organization are not ready for the change, the attempt to bring in changes usually fails (Gagnon et al., 2014).

Assessment of organizational readiness is crucial in determining the congruency across the organization. It helps to find a disconnect among the members of the organization and assists in resolving their conflicts. Embarking on change without the readiness of the organization is a waste of effort, resources, and opportunities. Moreover, it can cause an organization unintended or unprecedented harm. Therefore, it is important to determine the cohesiveness and consistency of the organization, in order to prevent impediments that might bottleneck the project. The readiness assessment can help to determine attitudes and beliefs of the individuals and how to get them involved and engaged early on. It can also help to overcome antagonistic attitudes and resistance towards the change. It will allow assessing whether the stakeholders' goals and organization objectives align with expected outcomes of the change. It will help to determine the level of receptiveness of the individuals within the organization (Vakola, 2013).

For this project, the readiness assessment of the nursing home was conducted and the psychometric tool for the organizational readiness assessment is provided in Appendix D. A score of 51 or greater is indicative of the organizational readiness for change.

The strengths of an organization can be utilized to maximize the opportunities and minimize the perceived threats. The strength of this study was the motivation of the director of nursing and the administrator, the approval of medical director, the simple intervention to substitute Schedule II pain medication with standard Schedule III drug, the nursing staffs' familiarity of using the proposed Schedule III pain medication, and the easy pain scale tool to gather the data.

Limitations

The limitations of this project was a small sample size, and it was not representative of the general population with chronic and post-operative pain. Thus, it decreased the power of the study to accurately detect the actual presence of differences in the pain scores. It also increased the margin of error and sampling variability; thus, there was a threat to external validity. Therefore, the results could not be generalized to a larger population. In addition, it increased the risk of Type II error i.e., accepting the false null hypothesis. Another limitation of the study was that it was

conducted in only one nursing home. The work-flow process varies widely among nursing home facilities; thus, the same data collection process cannot be utilized for other nursing homes. Staff turnover rates are fairly high in nursing homes, and there is always a perceived threat of unfamiliarity of pain protocol among newly hired nurses, especially with weekend and agency nurses. For this project, the new nurses had to been educated and reinforced on the pain management protocol several times during the data collection process. A new corporation took over the facility in the midst of the data collection process with ensuing changes from the new management. The new administrator, director of nursing, and other staffs were briefed frequently on the pain management protocol, and the change in the management had modest effect on the data collection process. Lastly, the study was only able to explore the effectiveness of BTDS on chronic pain and post-operative pain, and not on other nomenclature of pain such as somatic pain, visceral pain, neuropathic pain, or cancer pain.

Implications

The theoretical implication of this study is that it lends support to the gate control theory of pain and endogenous opioid system, which describes how pain can be modulated through activation of descending inhibitory pathways and by blocking various opioid receptors in the nervous system. BTDS is a partial μ agonist and a partial κ opioid receptor antagonist.

There are numerous clinical implications of this study. Since there was a progressive improvement in pain scores throughout the patients' stay in the nursing home, it is likely that their functional status, sleep, anxiety, depression, and overall quality of life also improved subsequently. Future research can explore the relationship between BTDS and these outcomes. Similarly, the correlation between the incidence of falls in nursing homes and the BTDS can also be studied. Since BTDS contains buprenorphine, which has been used for the treatment of opioid addiction, it will be interesting to see if BTDS reduces the opioid addiction among Schedule II pain medication users. Nursing home facilities can measure the patients' satisfaction score on pain management with BTDS, and other physicians and NPs can also utilize the BTDS to see if it adequately

provided pain relief among their patients.

The findings of the study provide opportunities for future interventions and development of pain protocol. One of the interesting findings in this study was the 42.5% decrease in pain scores between admission and 48 hours for the total sample group. However, patients used adjuvant pain medication more than 4 times a day between those periods. Thus, it is confounding whether the pain improved because of the BTDS or the frequency of the adjuvant pain medication. Since there are two independent variables (BTDS and adjuvant medications) for a dependent variable (pain score), there is a threat to internal validity of the study. Therefore, further research is needed to explore these independent variables in more depth. A closer interpretation of another finding showed that the dosage of BTDS was increased from 5 to 10 mcg/hr for two-thirds of the patients at 48 hours, and there was 27% improvement in the pain scores between 48 hours and 72 hours for the total sample group. Interestingly, the frequency of adjunct pain medication used also dropped down by 38% during that timeline. Thus, it can be extrapolated that the starting BTDS at 10 mcg/hr instead of 5 mcg/hr during admission will provide faster and greater pain relief for patients, and they will most likely use less adjunct pain medications. This presents an opportunity to investigate on the initial dosage of BTDS for future pain management interventional studies.

The implementation of a pain management protocol in the nursing homes requires a deeper attention to greater details due to a large population of vulnerable elderly patients and a disorderly work-flow environment. Advancements in technologies and implementation of electronic health records can facilitate in developing safe, efficient, and cost-effective pain protocols, which can positively impact healthcare policies regarding managing pain in nursing homes. Large-scale studies are needed to support the findings of this study in order to achieve clinical significance and to develop effective pain management protocols for nursing home patients.

Conclusion

This study was built on the existing knowledge and insights drawn from the scholarly literature in the fields of safety, efficacy, and tolerability of BTDS. The construct of this study is

based on the fundamental issue that plagued nursing homes on managing the moderate to severe pain for the patients who required Schedule II analgesics. The unavailability of triplicates for the Scheduled II medications during the admission process led to the development of a pain protocol involving BTDS patch. This study addressed the key question of whether the BTDS was comparable to Schedule II analgesics in managing moderate to severe pain in chronic and post-operative groups of patients. The result yielded by this study provided a strong and convincing evidence that BTDS effectively managed moderate and severe pain in both groups. The data showed that pain scores improved progressively after the application of BTDS and continued to improve throughout the patients' stay in the nursing home. Furthermore, BTDS was well tolerated, and the side effects were minimal. Protocol-based pain management with BTDS provided safe, effective, and efficient analgesia for nursing home patients. Thus, BTDS could be used as an alternative analgesic armamentarium to provide adequate pain relief among nursing home patients who do not have access to Schedule II pain medications.

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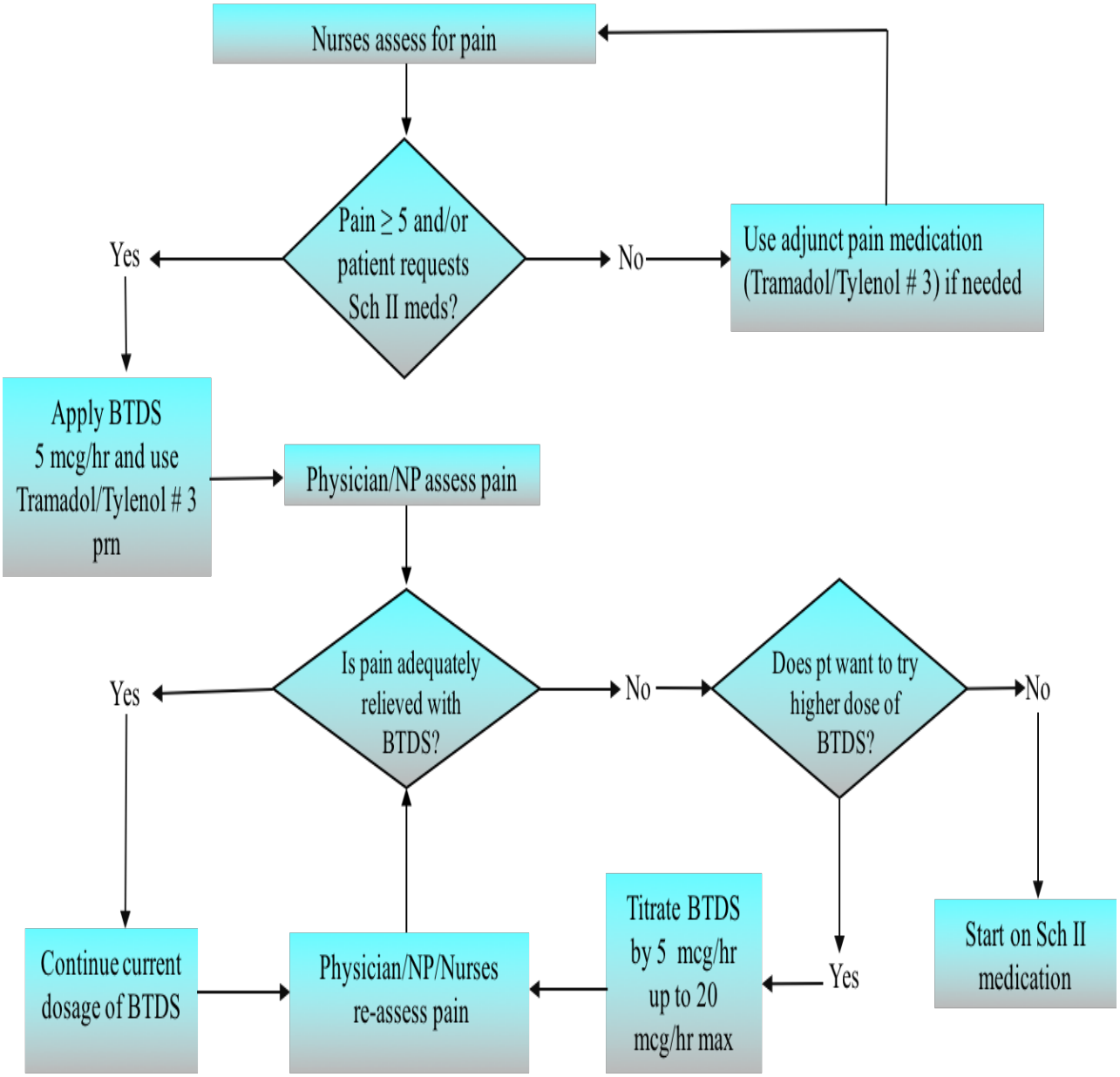
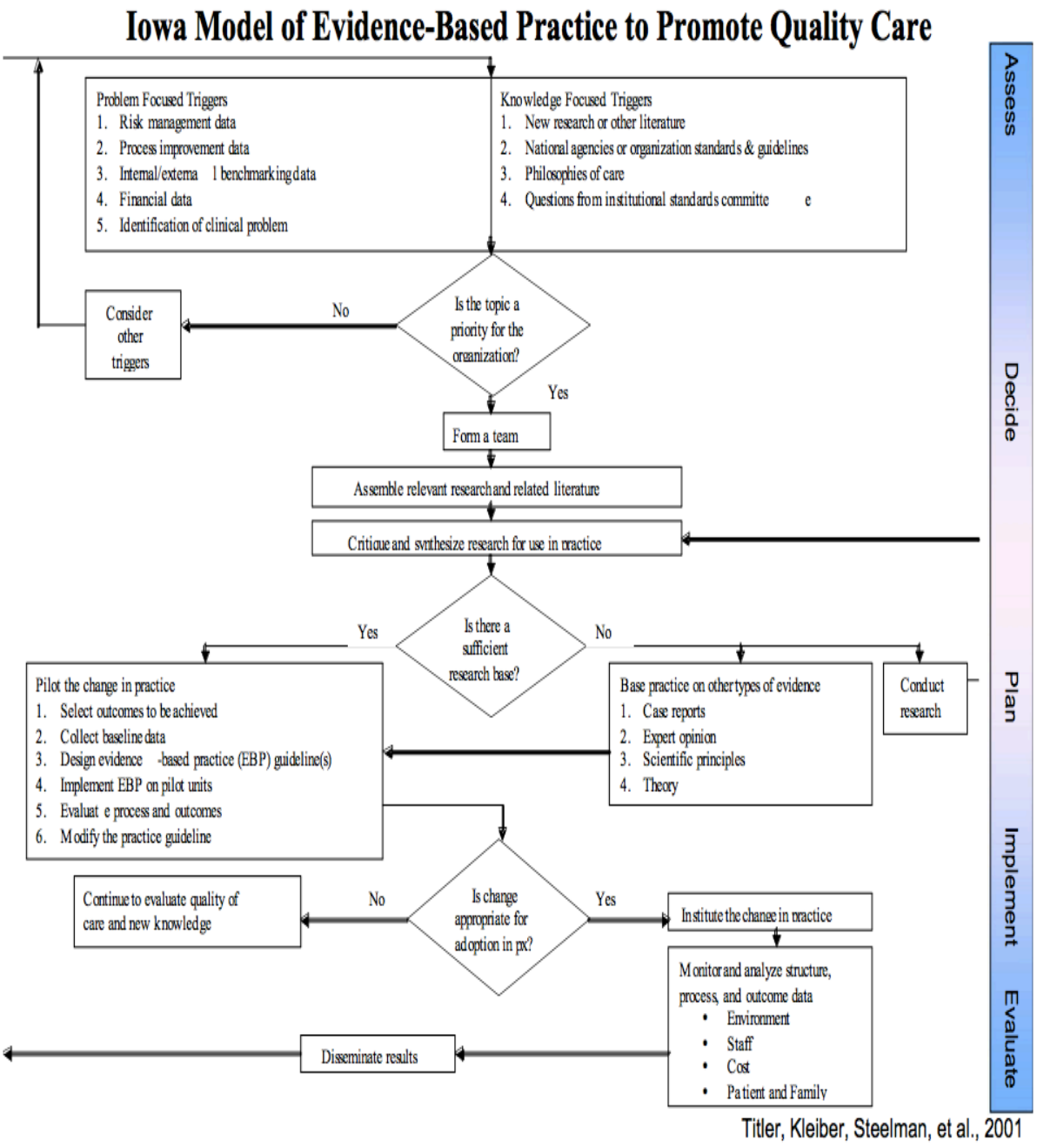
Appendix A

Pain Management Protocol to Use BTDS

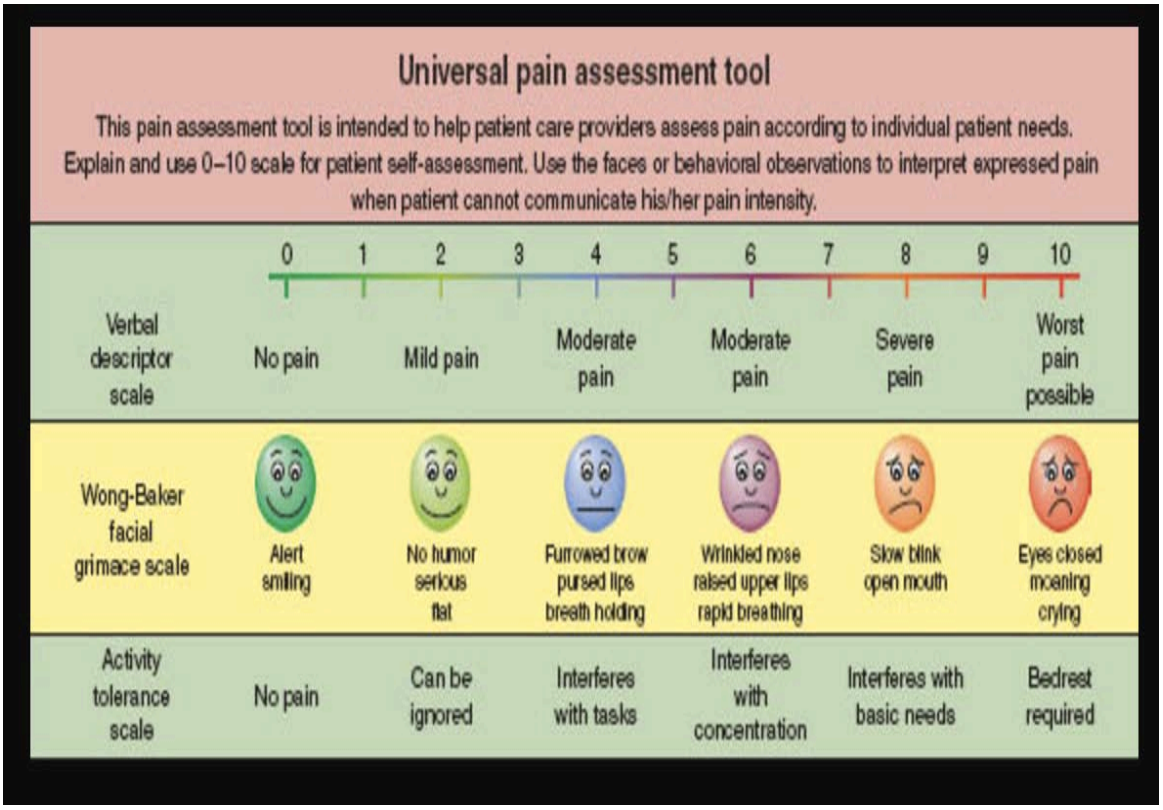


Appendix B


Iowa Model of Evidence-Based Practice to Promote Quality Care
Problem Focused Triggers
1. Risk management data
2. Process improvement data
3. Internal/externa l benchmarking data
4. Financial data
5. Identification of clinical problem
Knowledge Focused Triggers
1. New research or other literature
2. National agencies or organization standards & guidelines
3. Philosophies of care
4. Questions from institutional standards committe e
Is the topic a priority for the organization?
No
Consider other triggers
Yes
Form a team
Assemble relevant research and related literature
Critique and synthesize research for use in practice
Is there a sufficient research base?
Yes
No
Pilot the change in practice
1. Select outcomes to be achieved
2. Collect baseline data
3. Design evidence -based practice (EBP) guideline(s)
4. Implement EBP on pilot units
5. Evaluat e process and outcomes
6. Modify the practice guideline
Base practice on other types of evidence
1. Case reports
2. Expert opinion
3. Scientific principles
4. Theory
Conduct research
Is change appropriate for adoption in px?
No
Yes
Continue to evaluate quality of care and new knowledge
Institute the change in practice
Monitor and analyze structure, process, and outcome data
• Environment
• Staff
• Cost
• Patient and Family
Disseminate results
Assess
Decide
Plan
Implement
Evaluate
Titler, Kleiber, Steelman, et al., 2001

Appendix C

The Universal Pain Assessment Tool



Appendix D

Organizational Change Readiness Assessment

This assessment is designed to reveal your organization's ability to change when change is needed. Read the following questions and indicate your level of agreement with each statement using the following scale.

5 We are excellent at this. I am confident we would succeed.
4 We are good at this. I believe we can manage.
3 We are okay at this. I believe we could manage.
2 We need help with this. I don't think we would manage very well.
1 We have problems with this. I don't think we can do this.

Sponsorship regularly comes from a senior level such as the President.	4
Leadership is provided from the highest senior levels that have direct responsibility for change.	5
There is a strong sense of urgency for change from the senior staff.	5
The organization has a culture that emphasizes continues improvement.	4
Any planned change initiative has clear objectives that are consistently communicated.	3
Management strongly believe the future should look different from the past.	4
Management has a clear vision of the future and can mobilize the necessary resources.	4
The change effort connects to other major initiatives underway or being planned within the organization.	3
Management is willing to change critical business processes.	4
All employees are supported when taking risks, being innovative and looking for new solutions.	3
The organization has successfully implemented major changes in the past 12 months.	4
Employees enjoy working in the organization and the level of individual responsibility and team spirit is high.	3
The organization is always experimenting and new ideas are easily implemented.	3
Organizational decisions use a participatory process, are made quickly and it's clear when the decision is made.	4
Employees have been extensively cross trained and have a good understanding of each others role in the organization	3
Employees view change as an opportunity	3
Employees work across boundaries with little trouble	3
Total Points	62

Appendix E

Demographics of Population Sample

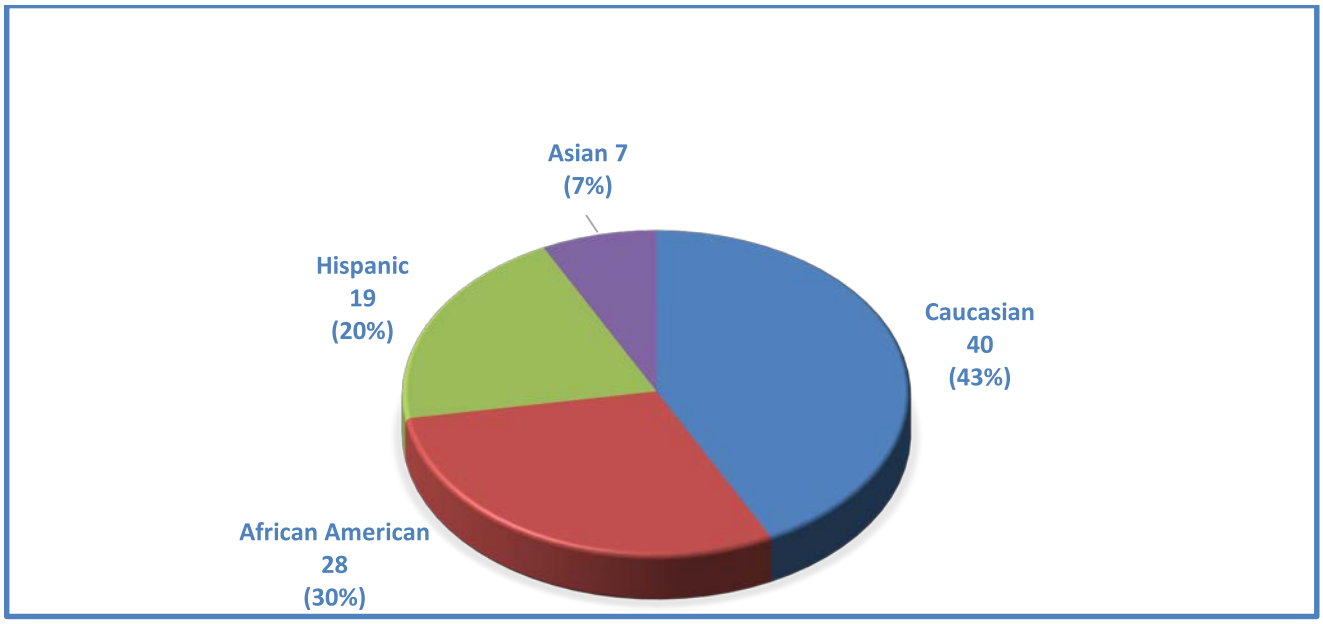


Figure 1. Ethnicity of population sample.

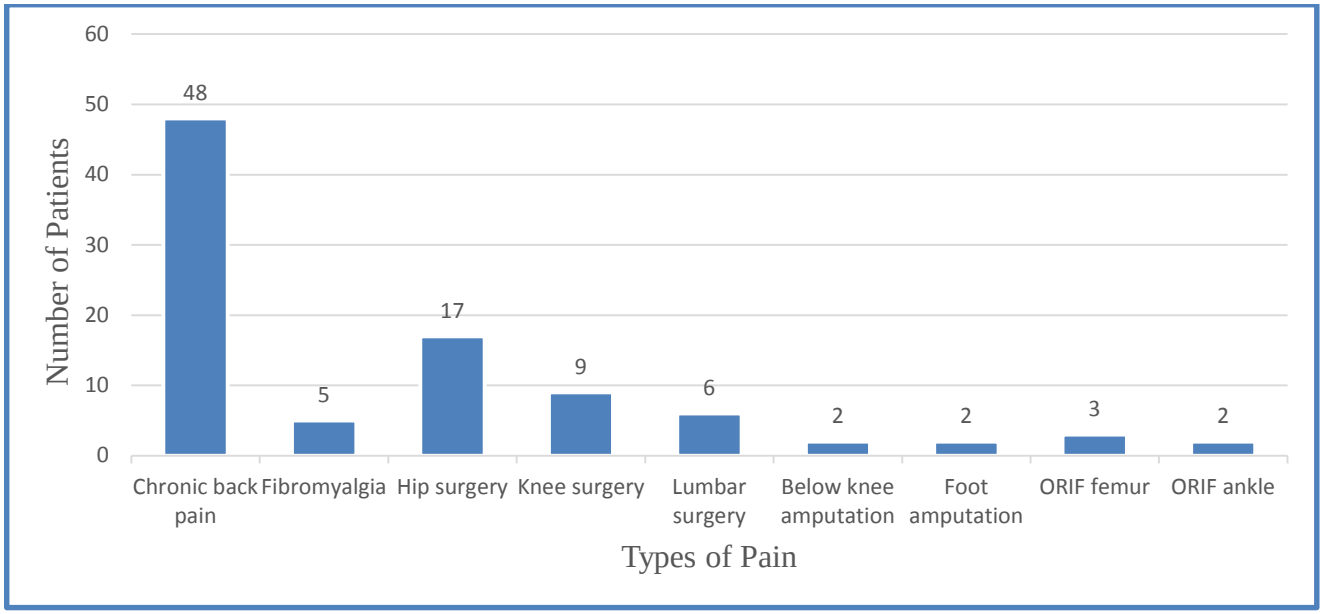


Figure 2. Nomenclature of pain among population sample.

Appendix F

BTDS Dosage and Titration

Table 1

Frequency of maximum dose of BTDS used

Maximum BTDS Dosage	Frequency (Patients)	Percent	Valid Percent	Cumulative Percent
5 mcg/hr	3	3.2	3.2	3.2
10 mcg/hr	73	77.7	77.7	80.9
15 mcg/hr	18	19.1	19.1	100.0
Total	94	100.0	100.0	

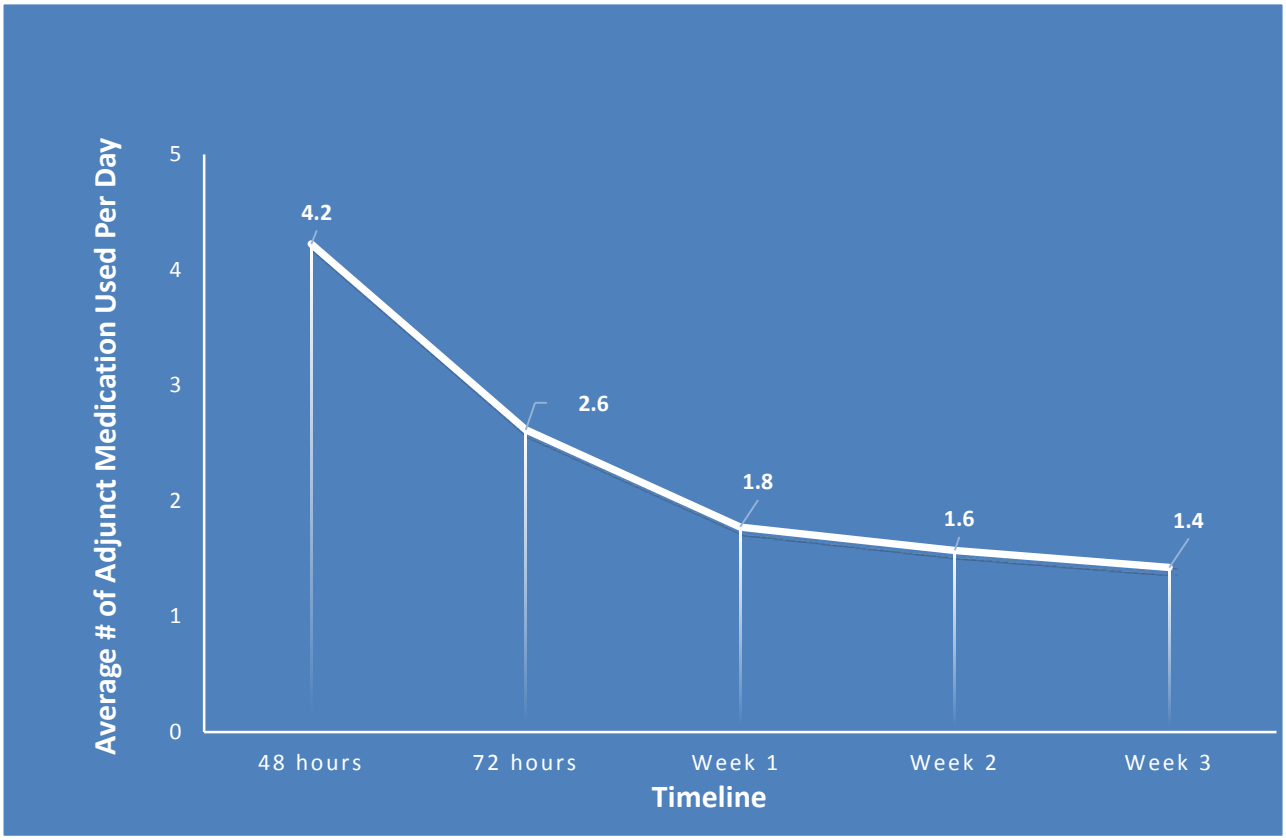
Table 2

Titration of BTDS at various points on the timeline

BTDS Titrated at	Frequency (Patients)	Percent	Valid Percent	Cumulative Percent
48 hours	62	66	66	66
48 hours and week 1	13	13.8	13.8	79.8
48 hours and 72 hours	4	4.3	4.3	84.1
72 hours	10	10.6	10.6	94.7
72 hours and week 2	2	2.1	2.1	96.8
None	3	3.2	3.2	100.0
Total	94	100.0	100.0	

Appendix G

Frequency of Adjunct Pain Medications Used



Appendix H

Pain Scores of Different Groups at Various Points on the Timeline

Table 1

Pain scores of total samples

	Admission Pain Score	Pain Score in 48 hours	Pain Score in 72 hours	Pain Score in Week 1	Pain Score in Week 2	Pain Score in Week 3
Mean	8.30	4.77	3.47	2.73	1.90	1.72
Median	8.00	5.00	3.00	3.00	2.00	2.00
Mode	8	4	3	2	2	2
Standard Deviation	0.636	0.966	0.758	0.882	0.588	0.495
Range	3	4	4	3	3	2
Minimum	7	3	2	2	1	1
Maximum	10	7	6	5	4	3

Table 2

Pain scores of chronic pain group

	Admission Pain Score	Pain Score in 48 hours	Pain Score in 72 hours	Pain Score in Week 1	Pain Score in Week 2	Pain Score in Week 3
Mean	8.17	4.92	3.58	2.98	2.00	1.77
Median	8.00	5.00	4.00	3.00	2.00	2.00
Mode	8	4	3	3	2	2
Standard Deviation	0.672	1.035	0.865	0.971	0.679	0.505
Range	2	4	4	3	3	2
Minimum	7	3	2	2	1	1
Maximum	9	7	6	5	4	3

Table 3

Pain scores of post-operative group

	Admission Pain Score	Pain Score in 48 hours	Pain Score in 72 hours	Pain Score in Week 1	Pain Score in Week 2	Pain Score in Week 3
Mean	8.46	4.56	3.32	2.41	1.78	1.66
Median	8.00	4.00	3.00	2.00	2.00	2.00
Mode	8	4	3	2	2	2
Standard Deviation	0.552	0.838	0.567	0.631	0.419	0.480
Range	2	4	3	2	1	1
Minimum	8	3	2	2	1	1
Maximum	10	7	5	4	2	2

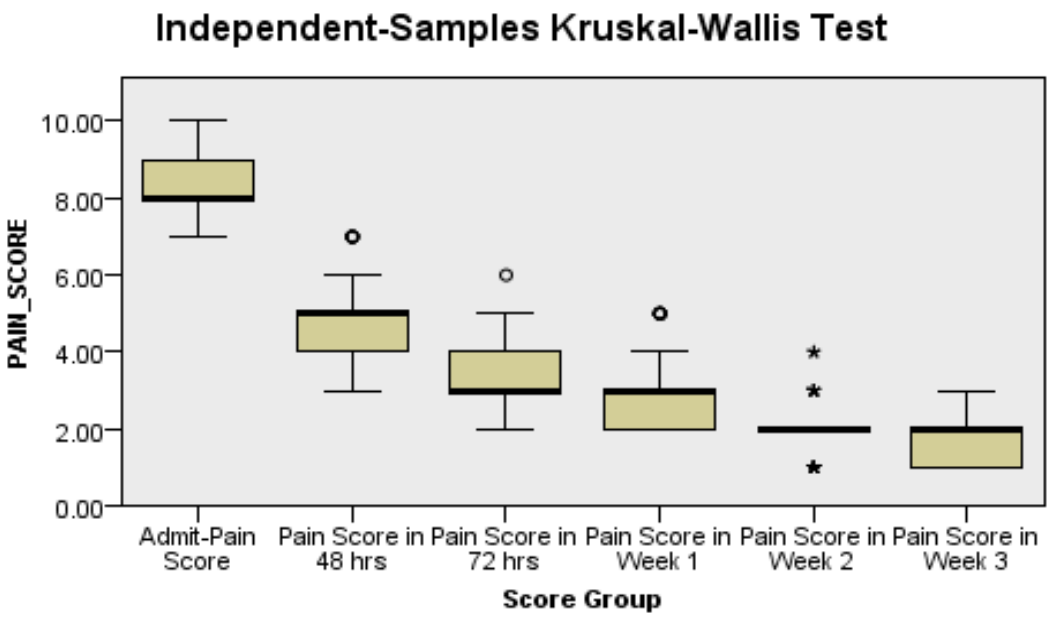
Appendix I

Kruskal-Wallis Test for the Total Sample

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of PAIN_SCORE is the same across categories of Score Group.	Independent-Samples Kruskal-Wallis Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.



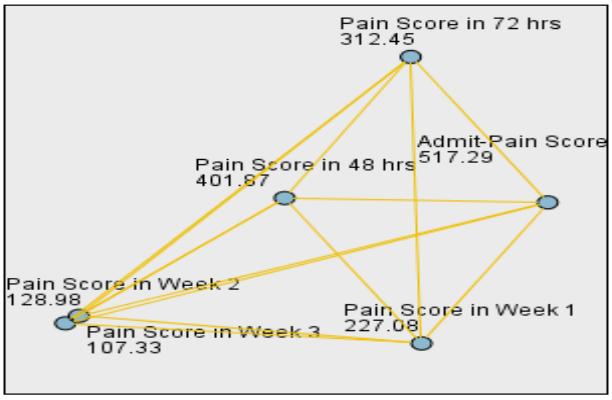
Total N	564
Test Statistic	472.154
Degrees of Freedom	5
Asymptotic Sig. (2-sided test)	.000

1. The test statistic is adjusted for ties.

Appendix J

Post-hoc Analysis for the Total Sample

Pairwise Comparisons of Score Group



Each node shows the sample average rank of Score Group.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
Pain Score in Week 3-Pain Score in Week 2	21.654	23.248	.931	.352	1.000
Pain Score in Week 3-Pain Score in Week 1	119.750	23.248	5.151	.000	.000
Pain Score in Week 3-Pain Score in 72 hrs	205.122	23.248	8.823	.000	.000
Pain Score in Week 3-Pain Score in 48 hrs	294.537	23.248	12.669	.000	.000
Pain Score in Week 3-Admit-Pain Score	409.957	23.248	17.634	.000	.000
Pain Score in Week 2-Pain Score in Week 1	98.096	23.248	4.220	.000	.000
Pain Score in Week 2-Pain Score in 72 hrs	183.468	23.248	7.892	.000	.000
Pain Score in Week 2-Pain Score in 48 hrs	272.883	23.248	11.738	.000	.000
Pain Score in Week 2-Admit-Pain Score	388.303	23.248	16.703	.000	.000
Pain Score in Week 1-Pain Score in 72 hrs	85.372	23.248	3.672	.000	.004
Pain Score in Week 1-Pain Score in 48 hrs	174.787	23.248	7.518	.000	.000
Pain Score in Week 1-Admit-Pain Score	290.207	23.248	12.483	.000	.000
Pain Score in 72 hrs-Pain Score in 48 hrs	89.415	23.248	3.846	.000	.002
Pain Score in 72 hrs-Admit-Pain Score	204.835	23.248	8.811	.000	.000
Pain Score in 48 hrs-Admit-Pain Score	115.420	23.248	4.965	.000	.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

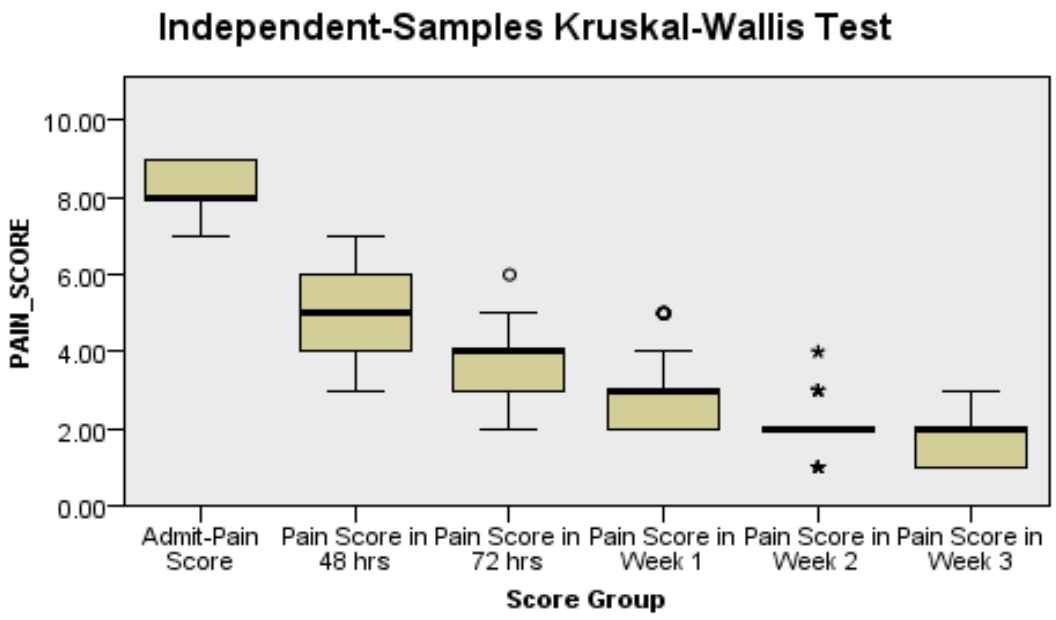
Appendix K

Kruskal-Wallis Test for Chronic Pain Group

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of PAIN_SCORE is the same across categories of Score Group.	Independent-Samples Kruskal-Wallis Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.



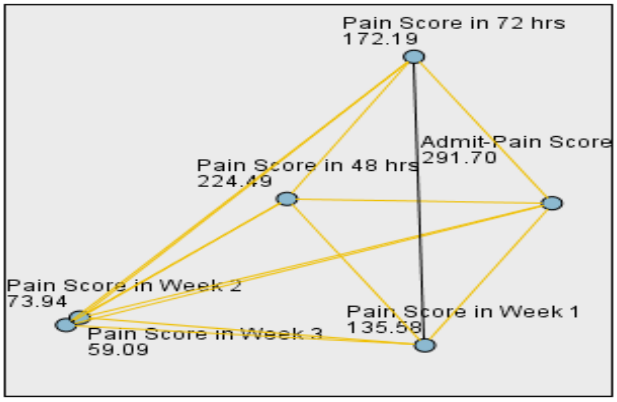
Total N	318
Test Statistic	259.337
Degrees of Freedom	5
Asymptotic Sig. (2-sided test)	.000

1. The test statistic is adjusted for ties.

Appendix L

Post-hoc Analysis for Chronic Pain Group

Pairwise Comparisons of Score Group



Each node shows the sample average rank of Score Group.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
Pain Score in Week 3-Pain Score in Week 2	14.849	17.527	.847	.397	1.000
Pain Score in Week 3-Pain Score in Week 1	76.491	17.527	4.364	.000	.000
Pain Score in Week 3-Pain Score in 72 hrs	113.094	17.527	6.453	.000	.000
Pain Score in Week 3-Pain Score in 48 hrs	165.396	17.527	9.437	.000	.000
Pain Score in Week 3-Admit-Pain Score	232.604	17.527	13.271	.000	.000
Pain Score in Week 2-Pain Score in Week 1	61.642	17.527	3.517	.000	.007
Pain Score in Week 2-Pain Score in 72 hrs	98.245	17.527	5.605	.000	.000
Pain Score in Week 2-Pain Score in 48 hrs	150.547	17.527	8.589	.000	.000
Pain Score in Week 2-Admit-Pain Score	217.755	17.527	12.424	.000	.000
Pain Score in Week 1-Pain Score in 72 hrs	36.604	17.527	2.088	.037	.551
Pain Score in Week 1-Pain Score in 48 hrs	88.906	17.527	5.072	.000	.000
Pain Score in Week 1-Admit-Pain Score	156.113	17.527	8.907	.000	.000
Pain Score in 72 hrs-Pain Score in 48 hrs	52.302	17.527	2.984	.003	.043
Pain Score in 72 hrs-Admit-Pain Score	119.509	17.527	6.819	.000	.000
Pain Score in 48 hrs-Admit-Pain Score	67.208	17.527	3.834	.000	.002

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

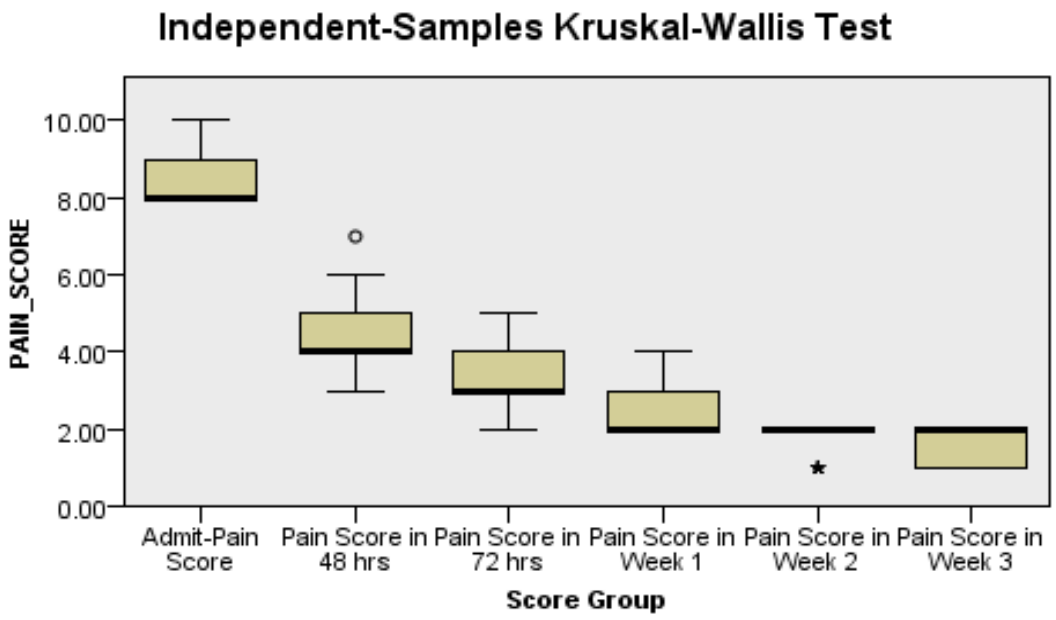
Appendix M

Kruskal-Wallis Test for Post-Operative Group

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of PAIN_SCORE is the same across categories of Score Group.	Independent-Samples Kruskal-Wallis Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.



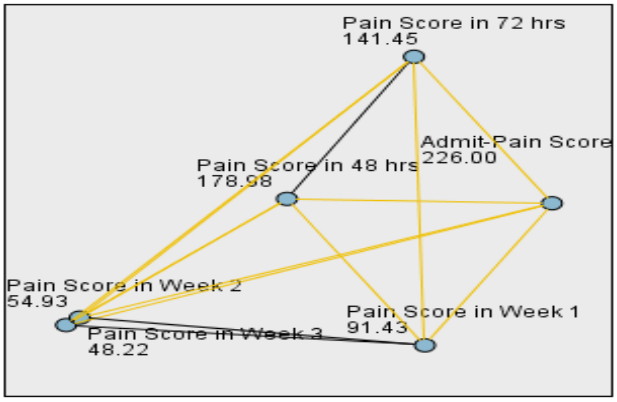
Total N	246
Test Statistic	216.495
Degrees of Freedom	5
Asymptotic Sig. (2-sided test)	.000

1. The test statistic is adjusted for ties.

Appendix N

Post-hoc Analysis for Post-Operative Group

Pairwise Comparisons of Score Group



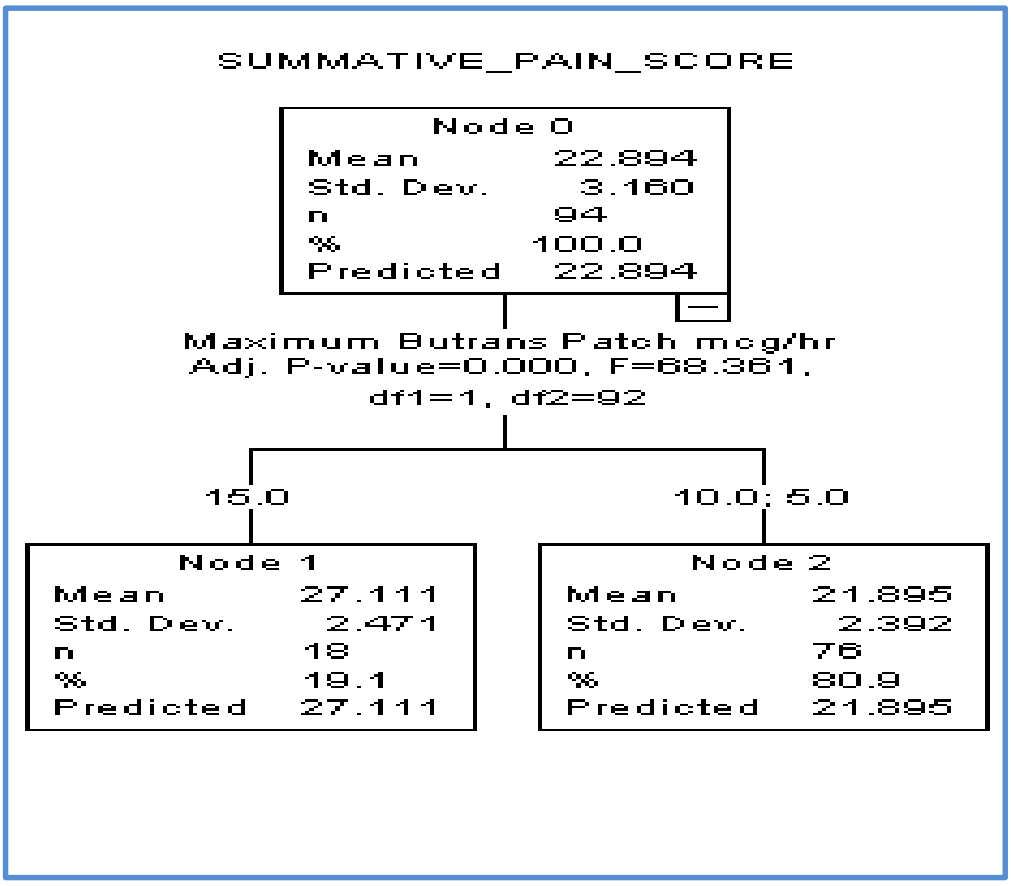
Each node shows the sample average rank of Score Group.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
Pain Score in Week 3-Pain Score in Week 2	6.707	15.289	.439	.661	1.000
Pain Score in Week 3-Pain Score in Week 1	43.207	15.289	2.826	.005	.071
Pain Score in Week 3-Pain Score in 72 hrs	93.232	15.289	6.098	.000	.000
Pain Score in Week 3-Pain Score in 48 hrs	130.756	15.289	8.552	.000	.000
Pain Score in Week 3-Admit-Pain Score	177.780	15.289	11.628	.000	.000
Pain Score in Week 2-Pain Score in Week 1	36.500	15.289	2.387	.017	.255
Pain Score in Week 2-Pain Score in 72 hrs	86.524	15.289	5.659	.000	.000
Pain Score in Week 2-Pain Score in 48 hrs	124.049	15.289	8.113	.000	.000
Pain Score in Week 2-Admit-Pain Score	171.073	15.289	11.189	.000	.000
Pain Score in Week 1-Pain Score in 72 hrs	50.024	15.289	3.272	.001	.016
Pain Score in Week 1-Pain Score in 48 hrs	87.549	15.289	5.726	.000	.000
Pain Score in Week 1-Admit-Pain Score	134.573	15.289	8.802	.000	.000
Pain Score in 72 hrs-Pain Score in 48 hrs	37.524	15.289	2.454	.014	.212
Pain Score in 72 hrs-Admit-Pain Score	84.549	15.289	5.530	.000	.000
Pain Score in 48 hrs-Admit-Pain Score	47.024	15.289	3.076	.002	.032

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

Appendix O

CHAID Analysis



Appendix P

UTA Institutional Review Board Approval

DNP Project Approval Template for the Graduate Nursing Department Review Committee

Student completes the top portion only

Student ID number: 1000569588

Project Title: Pain Management in Nursing Home

Project Summary (Brief): Patients who take Schedule II pain medications need a signed triplicate by their attending physician in order for pharmacy to deliver the medications. Physicians do not round in nursing homes every day. Therefore, patients who need Schedule II pain medications do not receive their medications in time. This project aims to utilize pain management pathway to address the pain in nursing home patients who do not receive Schedule II pain medication in a timely manner. Pain scores will be recorded using the Universal Pain Assessment Tool and data will be analyzed using SPSS software. Pain management pathway can be used an analgesic armamentarium to provide adequate pain relief for nursing home patients.

Setting: Nursing Home

Population: Patients in nursing home requiring Schedule II medications

The project will use the following model: The IOWA model of evidence-based practice.

Committee Use Only

The results will be disseminated, but they are not generalizable knowledge. The results will include use of the most current research to translate the knowledge into practice, thus it is not new generalizable knowledge. _x__Agree ___Disagree

This project is a quality improvement _x_____ or evidence-based project_____ and will translate the knowledge into the clinical setting. It is not generalizable because it is not generated from a research study that is being conducted.

____Yes ____No This project is not considered Human Subjects Research and does not require IRB HSR review.

This quality improvement project did not satisfy the *definition of research* under 45 CFR 46.102(d). Therefore, it was not subject to the Health and Human Services regulations for the protection of human subjects in research (45 CFR part 46, 2009) or require Institutional Review Board approval.

_x__ I recommend approval of this QI project

_____ I recommend approval of this EBP project

GNRC Form 1: January, 2017

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or

I do not recommend approval of this project for the following:

_____ I recommend the student send this project to the University IRB for review

Reason:

_____ I do not recommend this project to be implemented

Reason:

Committee Member Signature

5-8-17

Date

GNRC Form 1: January, 2017