Massage Therapy to Reduce Postoperative Pain in Spinal Surgery Patients

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A Capstone Presented to the Graduate Faculty of the University of Virginia in Candidacy for the Degree of Doctor of Nursing Practice

School of Nursing

University of Virginia

April 2018

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Abstract

Purpose of the study: The purpose of this study is to assess whether the use of Complementary Alternative Medicine (CAM) specifically massage therapy, will reduce pain and opioid use in post-operative spinal surgery patients in an acute care neurosurgical unit, as well as improve overall patient satisfaction.

Research Question/hypothesis: Does the use of Complementary Alternative Medicine, specifically massage therapy, compared to usual care, reduce patient's pain perception, the amount of opioid medications used and improve patient satisfaction in postoperative spinal surgery patients?

Setting, sample: The study was conducted on an acute care Neurosurgical unit in a large academic medical center in central Virginia. The study sample of 17 participants included English speaking post-operative spinal surgery patients, who were 18 years or older, admitted directly from PACU to the neurosurgical unit.

Measures: Using the electronic Medication Administration Record (eMAR), narcotic administration was tracked during the three- day postoperative period. Pain was assessed using a numeric pain scale. Patient satisfaction was assessed using questions taken from the HCAHPS Quality Assurance Guidelines.

Method: This study employed a pre-test/post-test design with a convenience sample.

Procedures: Pain was assessed in those patients who consented to receive massage in a progress note before and after the intervention by the massage therapist. The assigned RN assessed the pain score before and after opioid administration per unit standards. Pain scores of the patients who received massage as well as patients who did not receive massage were collected by review of the electronic medical record. In addition, to assess overall satisfaction with pain

management, all patients participating in the study completed a 6- question survey

Results: There was a statistically significant difference in reported pain scores before and after massage therapy on each postoperative day, as well as overall patient satisfaction with pain management in the massage group. However, there was no significant difference in the number of opioid doses given between the massage group and UC group, or total mean pain scores.

Nursing implications: This study evaluated whether massage therapy reduced postoperative pain and improved patient satisfaction following spinal surgery. While there was a significant difference in pain scores compared to before massage and after massage on each postoperative day, there was not a significant difference in the mean pain scores nor opioid use between the massage group and the no massage group. This study found that patients who received massage therapy reported higher patient satisfaction than those who did not receive massage. Further study is needed to better determine how alternative therapies such as massage can be incorporated into holistic approaches to pain management.

Table of Content

Acknowledgements

I would like to thank Susan Prather, the unit manager for allowing me to conduct this study, as well as the unit staff for their support in conducting this study. I would like to give a special thanks to the massage therapist, Franciska Pocanic. I would like to thank my DNP advisor, Dr. Mary Deivert for her expertise in guiding this Scholarly project, as well as Amy Johnson, my practice mentor. I would like to thank Dr. Catherine Kane for providing feedback and advice throughout the writing process. Lastly, I would like to thank all my family and friends for supporting me through this endeavor, without your encouragement this would not have been possible. This study did not receive funding.

Massage Therapy to Reduce Postoperative Pain in Spinal Surgery Patients

Pain continues to be a universal theme for hospitalized patients, as it begins preadmission and extends past discharge encompassing patients both in the surgical and general medicine realm. As a result, managing pain has become a crucial aspect in healthcare, and has been associated with better patient outcomes. Historically, opioids have been used as the primary intervention in pain control, dating back to the "1850s, when injectable morphine was first used to treat both acute and chronic pain" (Cobaugh, et al., 2014). Opioids act at the *mu, kappa,* and *delta* receptors in the Central Nervous System, with the analgesic properties being primarily mediated by the *mu* receptor (Li, 2015). Along with analgesia, opioids generate effects of euphoria, cause respiratory depression, cough depression, and decreased GI motility, proving useful in the treatment of certain conditions. However, the *mu* and *kappa* receptors are also responsible for physical dependence and opioid dependence (Cobaugh, et al., 2014), which has contributed to the abuse and misuse of opioids.

Opioid addiction and overdose have developed into a nationwide epidemic. "The Centers for Disease Control and Prevention (CDC) has identified prescription drug abuse and overdose as one of the top five health threats for 2014" (Cobaugh, et al., 2014). According to the CDC, at least half of all opioid overdose deaths involve a prescription opioid. In 2014 alone, nearly two million Americans either abused or were dependent on prescription opioid pain relievers, leading to more than 14,000 deaths with rates highest among men and people aged 25 to 54 years (CDC, 2016).

The risk for addiction after surgery is significant, some research has shown that "opioid-naïve patients undergoing surgery are at an increased risk for subsequent chronic opioid use,

suggesting that opioid use should be monitored closely in the postoperative period" (Sun, et al., 2016). A study conducted by Smith et al. (2015), revealed that a sample of patients being treated for acute pain "identified a deficit of communication around opioid risk and pain management options in the ED", therefore contributing to a higher risk of addiction and social acceptance of opioid use. Deaths from prescription opioids alone have quadrupled since 1999 (CDC, 2016), exhibiting the extent to which the epidemic has grown.

The misuse and abuse of opioids at an individual level "occurs for a variety of reasons, including self- medication, use for reward, and compulsive use because of addiction" (Sehgal, Manchikanti, & Smith, 2012). The lack of knowledge or personal attitudes about the potential consequences of this health behavior only contribute to the overall opioid epidemic, as well as the "stigma that discourages people from seeking treatment and views substance use disorders as a moral failure" (Gale, 2016). The growing epidemic raises concern for the effects it has on society as well. Based on the literature, there is a common argument about policies or laws that govern the prescription of opioids. According to the CDC, in 2013 providers wrote enough opioid prescriptions for every American adult to have their own bottle (CDC, 2016).

Different Complementary Alternative Medicine or Therapies (CAM) have become increasingly popular in the outpatient setting and in hospital settings to manage pain. The purpose of this study is to address postsurgical pain in hospitalized patients by incorporating CAM therapies such as massage while assessing opioid use and patient satisfaction with pain control.

DNP Project Question: Does the use of Complementary Alternative Medicine, specifically massage therapy, reduce post-spinal surgery patients' self-reported pain level, the amount of narcotic medications used and improve patient satisfaction scores?

Literature Review

While complementary alternative medicine (CAM) therapy is becoming more popular in the outpatient setting, it is not readily used in the inpatient setting so there is a lack of knowledge in its effectiveness in the hospital setting or in the postoperative period. Therefore, in order to evaluate CAM therapy as an intervention to reduce pain and potentially decrease narcotic use a systematic review of the literature was conducted.

The literature was systematically reviewed from 2008 to present. The search began using the electronic databases CINAHL and PubMed. The keywords "complementary and alternative therapy" and "pain management or relief or pain control or pain reduction" were used in the CINAHL search. Additional search criteria included full text, adult population, English language, and randomized control trials. This search yielded 1360 citations. A title search was then conducted, in which articles were excluded that did not pertain to the hospital setting or postoperative period. Since many CAM therapy modalities exist, articles that were included were limited to massage, therapeutic touch, music therapy, pet therapy, and guided imagery. Excluded CAM therapies included acupuncture, herbal or alternative medicine and aromatherapy. Studies that addressed cancer pain and labor pain were also excluded. The search phrase "complementary alternative therapy" and "pain", as well as "massage therapy" were used in the PubMed search. Again, additional search terms included clinical trials, English language, adults 18 or older, and free full text. This search yielded 119 citations. After the same title search was conducted, 45 articles from both databases remained. Abstracts from the remaining articles were reviewed to determine if the previously mentioned inclusion criteria still applied, such as hospital setting or postoperative period. Randomized control trials, case studies, and descriptive studies were included in this review. A total of 7 studies remained from this

original search criteria.

A second literature review was then conducted to further assess the benefits of massage therapy in the acute setting. The search began using electronic data bases, CINAHL and PubMed. The search terms "massage therapy" and "back pain" were used in both the CINAHL and PubMed data bases. Additional search terms included adults 18 years or older, free full text, English language, and published within the last 10 years. The PubMed search resulted in 29 articles. A title search was then conducted to exclude articles that did not relate to massage and pain management. Due to limited articles relating to both massage and back pain, other articles involving different modalities of acute pain were included, 3 articles remained. The CINAHL search resulted in 956 articles using the same search criteria. After a title search was conducted 4 articles remained.

A cross sectional study conducted by Dubois, et al. (2017) that addressed patients' use of CAM therapy in managing chronic back pain and perceived benefits found that 45.2% of the patients surveyed used and found massage therapy helpful in controlling their pain. Another prospective randomized control trial conducted by Majchrzycki, et al. (2014) found that both deep tissue massage alone and the use of NSAIDS in combination with deep tissue massage in patients with low back pain had a significant effect on pain reduction. Pain scores decreased from 58.3 +/- 18.2 to 42.2 +/- 21.1 in the treatment group and from 51.8 +/- 18.8 to 30.6 +/- 21.9 in the control group, ($p < 0.001$). The study was conducted with 59 participants, randomly assigned to treatment or control group. Both the treatment group and the control group underwent daily 30-minute deep tissue massage for 2 weeks, in addition the control group was given NSAIDs. The results indicated that both interventions had a significant effect on pain reduction ($p < 0.001$).

The results of these studies indicated that massage therapy can have an effect on reducing pain, however, further study is needed to understand whether massage is effective in reducing the number of narcotics administered during the postoperative period and improve patient satisfaction. Thus, studies evaluating different CAM therapies were also reviewed to gain a better understanding of the effects of CAM treatments on narcotic use and patient reported pain scores post-surgery.

A study by Harper, et al. (2014), assessed the effect of therapy dogs in reducing pain in patients after joint arthroplasty. Patients were randomized into two groups, the intervention group received a 15- minute visit from a certified therapy dog and handler prior to their physical therapy session and the control group received physical therapy per hospital routine or usual care. Using a visual analog scale to measure pain, the study found that patients in the intervention group had lower pain scores than did the usual care group (VAS, 7.2; SD, 1.4; [95% CI, 6.71–7.3], $p< 0.001$). They also found that Patient satisfaction scores on HCAPS regarding pain management increased in the intervention group ($p= 0.02$). This study was limited in that it was non-blinded and only used one therapy dog and handler, which could reduce generalizability. However, Bauer, et al. (2011) reported mixed results in a randomized control trial that compared pain scores in cardiac surgical patients using music therapy. The study found a significant decrease in mean pain scores only after one of the interventions ($p= 0.001$). Mean differences of narcotic use were also measured between the music therapy group and control group, with no statistical significant difference noted on any of the intervention days.

MacIntyre, et al. (2008) conducted an RCT to assess the use of healing touch (HT) in hospitalized patients after coronary artery bypass in reducing narcotic use. The study compared a HT (intervention) group to two control groups, a visitor group (patients received a scheduled

visit from a companion) and usual care group. The study concluded that there was no significant reduction in narcotic use between the three groups (p= 0.97). This study was limited as individual pain scores were not assessed, and only measured narcotic use, which could have been affected by the individual nurses administering the narcotics.

Forward, et al., (2015) conducted a study that assessed the "M" technique, which can be described as structured touch and guided imagery, as a means to reduce pain and anxiety in patients undergoing elective hip or knee surgery. The study measured pain in each group starting on postoperative day 0 through postoperative day 2. The M group showed significant decreases in pain compared to the usual care group on each postoperative day (POD0: p= 0.0001, POD1: rddid not show a significant decrease between groups (p= 0.213). However, the M group showed significantly higher patient satisfaction scores than the other groups (p= 0.0001). In another study that involved hip and knee surgical patients, Seers, et al (2008) compared total body relaxation and jaw relaxation to usual care as a method to reduce pain. The study found that mean pain scores immediately postoperatively were statistically different between groups (p= 0.043), yet the result of relaxation was not sustained even at 1 hour postoperatively.

One study by Cherkin, et al (2011) compared the effects of two different types of massage in patients with non-specific chronic back pain by using the Roland Disability Questionnaire (RDQ). 401 patients were randomized into either a structural massage group, a relaxation massage group or the control group. The study found that the adjusted mean RDQ scores were 2.9 and 2.4 points lower for the relaxation and structural massage groups compared to usual care or control group (95% CIs: [1.8,4.0] and [1.4,3.5]). Even though this study is more focused on chronic back pain, it shows that there are potential therapeutic benefits to massage therapy in relation to back pain.

In a randomized control trial conducted by Mitchinson, et al (2007) that took place in VA hospitals in Michigan and Indiana studied 605 veterans that underwent major surgery. The study consisted of 3 groups, a control group, a group that received individualized attention from a massage therapist and a third group that received a back massage by a massage therapist each day up to POD 5. Findings indicated that patients who received massage experienced short-term decreases in pain intensity ($p = .001$), pain unpleasantness ($p < .001$), and anxiety ($p = .007$). However, no differences were found for length of stay, opiate use or complications between the study groups. The study concluded that massage therapy was effective and safe in the acute postoperative period as an adjuvant therapy in pain management.

Dreyer, et al. (2015) also conducted a randomized control trial evaluating postoperative massage. 127 patients undergoing abdominal colorectal surgery were randomized into 2 groups, a 20-minute massage group and a group that received a social visit and relaxation session on POD 2 and 3. The results showed that patients in the massage group had significantly less pain ($p < .001$) on both POD 2 and 3 after the massage compared with before the massage. The study did not find a significant difference in the number of opiates used on day 1 ($p = 0.12$) or day 2 ($p = .45$) between the 2 groups. Another randomized control trial conducted by Albert, et al., (2009), examined whether massage therapy in heart surgery patients reduced pain, anxiety and the length of stay. In this study 252 patients undergoing cardiac surgery were randomized into a usual care group or a usual care group plus 2 massages group. The study concluded that there were no postoperative differences between groups for any measure ($p = .11$), and that while massage was feasible in cardiac surgical patients it showed no therapeutic benefit.

A randomized controlled clinical trial conducted by Ghezelijeh, et al., (2017) evaluated the effects of massage and music on pain intensity, anxiety intensity and relaxation level in burn

patients. In this study patients were randomized into either a control group that received usual care, a music group, a massage group and a group that received both music and massage. The groups that included massage received a 20-minute massage once a day for three consecutive days. The study concluded that there was a significant difference in the mean pain scores between the massage group and control group ($p < .001$). Also, they found no statistical difference in mean pain scores between the massage and music groups. There was no statistically significant difference regarding pain in the control group before and after the usual care intervention. This leads to the conclusion that massage therapy can play a role in reducing pain in the acute setting, and is more effective than usual care alone.

Seers, et al., (2008) conducted a randomized controlled trial to assess the effectiveness of a single session nurse administered massage on chronic pain. The patients were randomized to either a control group or massage group. The control group received an appointment to discuss their pain and the massage group received one 15-minute massage. Pain was measured immediately post intervention, and at 1, 2, 3 and 4 hours post intervention. The study found that patients in the massage group had a statistically significant difference in mean pain reduction immediately post intervention ($p < 0.001$). The control group did not experience a significant difference in pain reduction ($p = .985$). The study concluded that massage is effective in the short term for chronic pain. Even though this study assesses chronic pain, it found massage to be effective immediately after administration. This may confer that massage would be further effective in acute postoperative pain if received daily over the hospital stay.

The final study reviewed in this literature review is a systematic review conducted by Brosseau, et al (2012) to establish evidence-based clinical practice guidelines on therapeutic massage for low back pain. A literature search was conducted for articles between January 1st,

1948 and December 31st, 2010. The authors identified that the eligibility criteria focused on the participants, interventions, controls and outcomes of the reviewed studies. The recommendations were then based on the strength of the study, which were graded. 11 articles met the eligibility criteria and 100 recommendations were formulated consisting of 37 positive recommendations (25 grade A and 12 grade C+), and 63 neutral recommendations (49 grade C, 12 grade D, and 2 grade D+). The panel concluded that massage interventions are effective in providing short term improvement in patients with sub-acute low back pain.

In conclusion, the information obtained from this literature review provides a foundation for further research in the use of CAM therapy, specifically massage to reduce patients' perception of pain, and opioid use, as well as increase patient satisfaction scores. In combination, the studies reviewed revealed that CAM therapy is effective in reducing a patients perception of pain, but not effective in reducing the amount of opioids used during the postoperative period, because the effects of massage were not sustained. The findings also show great promise as a modality to improve patient satisfaction scores. While this data provides information, there is still need for further research in postsurgical patients, such as spinal surgery. There have been multiple studies conducted on the use of CAM therapies in chronic back pain, but not in the acute care setting. As we continue to combat the opioid epidemic, CAM therapy, especially massage could provide a useful tool in controlling pain in postsurgical patients that would carry through to after discharge.

Theoretical Framework

An appropriate theoretical framework to evaluate the quality of massage therapy interventions to determine its effectiveness on pain management and patient satisfaction is the Donabedian conceptual model (Ayanian & Markel, 2016) model. Hickey & Brosnan, (2017)

describe the Donabedian conceptual model as a framework for evaluating quality and health care services using three approaches either independently or in combination. These approaches are known as structure, process and outcome. Structure consists of factors that affect the quality of care and the environment where health care is delivered. Process refers to the patient-provider interactions and relationships, including treatments, diagnostic tests and patient education. Outcomes are the result of the treatment or intervention delivered by a measurable change in the patient condition or symptoms. The Donabedian Model provides the framework needed to formulate and assess an intervention that will evaluate the use of massage therapy as a way to manage pain with less need for opioid medication and improve patient satisfaction.

Methods

Introduction: With the growing opioid epidemic throughout the nation it is important to evaluate different modalities of pain management in the inpatient setting. Postoperative pain can be difficult to manage leading to overuse of narcotics and decreased patient satisfaction scores. A literature review on the use of CAM therapy in postoperative patients was conducted and concluded mixed results.

Purpose of the Study: The purpose of this study was to improve patient care and patient satisfaction by improving pain management in postoperative spinal surgical patients. The effects of massage, in addition to standard care, on the amount of narcotic medications given during the postoperative period was assessed.

Hypothesis: Patients receiving massage in addition to standard care will report lower scores on the numeric pain scale, use less narcotics, and report higher patient satisfaction scores than usual care.

Definition of Terms: Massage Therapy can be defined as manual manipulation of soft

body tissues (muscle, connective tissue, tendons and ligaments) to enhance a person's health and well-being. POD is postoperative day, POD 1 refers to the first day after surgery whereas POD 0 refers to the same day of surgery. PSIF refers to Posterior Spinal Instrumentation and Fusion, PLIF refers to Posterior Lumbar Interbody Fusion, TLIF refers to Transforaminal Lumbar Interbody Fusion, and ACDF refers to Anterior Cervical Discectomy and Fusion.

Research Design: This study employed a pre-test/post-test design with a convenience sample.

Description of the Sample: Adult patients who underwent elective spinal surgeries including Posterior Spinal Instrumentation Fusion (PSIF's), Posterior Lumbar Interbody Fusion (PLIF's), Transforaminal Lumbar Interbody Fusion (TLIF's), as well as laminectomies or decompressions and discectomies were asked if they would like to receive a massage during their hospital stay. Inclusion criteria consisted of adult patients 18 years or older, in sound mind that are English speaking admitted to the acute care neurosurgical unit directly from the Post Anesthesia Care Unit (PACU) postoperative elective spine surgery. Patients were excluded from the study if they have had previous spinal surgery, were pregnant, unable to consent to the study and if they had a history of chronic pain syndromes. Patients that were on PCA pumps (patient controlled analgesia) were also excluded from the study as this is not standard unit pain control. A total of 17 patients participated in the study, with 7 who received a massage and 10 that did not, 8 were male and 9 were female. The mean age in the massage group was 57, and 51.7 in the UC group, and 75% of the participants were white (Table 1).

Setting: The study took place in a 30-bed inpatient acute care neurosurgical unit at a large academic medical center in central Virginia. Unit staff consists of 4 APRN's, a neurosurgery resident, 44 Registered Nurses (RN), 16 Patient Care Technicians (PCT) a case

manager, and social worker, as well as the unit manager and assistant manager. RN's range from Clinician I to Clinician IV with 50% being Baccalaureate prepared. Typical surgeries on the unit include, but are not limited to, posterior spinal fusions and laminectomies as well as anterior fusions and laminectomies. Permission of the study setting was obtained from the unit manager. (Appendix C)

Procedures: Patients admitted to the acute care neurosurgical unit meeting the inclusion criteria were asked if they would like to receive a massage on POD 0, if they agreed to massage they were placed in the massage group, if not they were placed in the usual care group. Participants in the Massage group received a 15-minute massage daily on POD 1, 2 and 3 in addition to usual care. Participants opting to not receive massage, received usual care. For all participants, an information sheet was given explaining the study along with a satisfaction survey, noting that completion of the survey gave their consent to use their answers for research. (See Appendix D for Consent Form approved by the IRB). Participants in the Massage group received a 15-minute massage from a licensed massage therapist employed by the academic medical center each day starting on POD 1 and ending on POD 3. No patients in this study that received massage were discharged before POD 3. Participants received the massage at no specific time during the day. Participants were given the choice of where anatomically they received the massage. The massage therapist assessed the patients pain score using a numeric pain scale before delivering the intervention and then again immediately after the intervention in a progress note. The patients assigned RN also recorded the pain scores in the electronic medical record. In addition, participants received unit standard postoperative pain management. Standard postoperative pain management on the unit consists of Oxycodone 5mg for a pain score of 3-6 or Oxycodone 10mg for a pain score of 7-10 every 4 hours as needed, Tylenol 975mg

every 8 hours as needed, and Baclofen 10mg 3 times daily as needed. Prior to administration of pain medication, the assigned RN obtains the pain score, and reassesses pain after medication administration per unit protocol, using the electronic medical record. The UC group received only the standard postoperative pain management as described.

At the end of POD 3 or discharge, all participants were given the information sheet again along with the patient satisfaction survey. The survey questions were formulated from questions used in the national Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey (Appendix A). The surveys were collected by the study coordinator or the patients' assigned RN. Completed surveys were locked in a file inside the unit clinician III office. The study coordinator reviewed the eMAR of each participant in both Massage and UC group to collect the type and total amount of times narcotics were given from POD 1 to POD 3, as well as the mean corresponding pain scores for POD 1, 2 & 3.

Protection of Human Subjects: Patients were invited to participate in the study and presented an information sheet approved by the institution's IRB that noted their consent by answering the survey questions, given by the study coordinator or the patients' assigned RN on POD 0, (see Appendix B). Patient identifiers such as name, address, and medical record number were not used in data analysis or included in patient satisfaction surveys. All other patient data for analysis was stored in a secure F-drive on a computer located in the unit's clinician III office that was approved by the institution's IRB. The benefits of the study include reducing the use of narcotics and providing nursing staff with alternative means to control postoperative pain.

Measures: Patient demographics including age, race, gender, and type of surgery were collected at time of consent via chart review to verify they met inclusion criteria. Data collected including satisfaction surveys and information from the electronic medical record were input in a

secure Excel spreadsheet with all patient identifiers removed. To measure participants' pain, the Numeric Pain Rating Scale, (NPRS) a version of the visual analog scale (VAS) was used (Figure 2). The participant was asked to rate their pain on a scale of 0-10, with 10 representing the worst possible pain. The NPRS has shown high test reliability (r= 0.96 and 0.95), as well as validity highly correlated to the VAS (correlations range from 0.86 to 0.95) (Pagare, n.d.). Patient satisfaction was measured using questions from the HCAHPS Quality Assurance Guidelines (Appendix A).

Data Analysis: Data was analyzed using IBM SPSS v. 24. Descriptive statistics were used to analyze patient demographics. The Wilcoxon test was used to assess pain scores before and after massage. The Mann-Whitney U test was used to assess the difference in pain scores on admission between the two groups, the difference of total number of opioids given between the two groups, and the mean pain scores each postoperative day between the groups. The Chi Square exact was used to assess patient satisfaction questions.

Results: In the massage group a significant difference in pain scores was found before and after massage on each postoperative day (POD1: M= 1.71 (.756), p=.016, POD 2: M= 2.14, (.378), p=.011, POD 3: M= 2.29 (.488), p=.014). There was no difference in pain scores between the massage group and UC group on admission (p=.417). There was no statistical difference in the total number of opioid doses given between the two groups on each POD, however the massage group showed that total mean opioid doses decreased after each postoperative day (POD 1: M=5.29, SD= 1.496, POD 2: M=4.86, SD= 1.215, POD 3: M=3.57, SD= 1.902) compared to the UC group whose total mean narcotic doses increased from POD 1 to POD 2 and from POD 1 to POD 3 (POD 1: M=4.80, POD 2, M=5.20, POD 3, M= 4.90). (See figure 3). There was also no significant difference in the mean morphine milligram equivalents (MME)

between groups (usual care M=228.75, SD= 4.64 massage group M=205.71, SD= 2.28, p=.134). There was no significant difference of total mean pain scores for each postoperative day between groups (POD1: UC- M= 7.31(2.72), Massage- M= 7.50(1.98) p= .813. POD2: UC- M= 6.95(1.76), Massage- M= 6.62(1.39) p=.417. POD3: UC- M= 5.86(1.61), Massage- M= 4.81(.92), p=.161). Data collected from satisfaction surveys showed there was no significant difference in how often pain was well controlled between the groups (p=.392), or how often the staff did everything they could to help with pain (p=.134), however there was a significant difference in the overall satisfaction of pain management between the groups (p=.003). (Figure 5).

Strengths and Limitations: One strength of the study was having only one licensed massage therapist throughout the study, which maintained reliability with the patients receiving massage. Another strength of this study was that there was no missing data from any of the participants, and no patients were discharged before POD 3, thus allowing analysis on a full data set. This study was not blinded or randomized which could have contributed to a selection bias, in that patients may have refused a massage if they were experiencing too much pain. Similarly, patients who chose massage may have been more likely to believe massage to be beneficial regarding their pain management and therefore may have been more likely to report their pain was being addressed at greater frequencies. A second limitation of the study was that different staff nurses assessed the participants' pain levels and administered narcotics, resulting in a difference in the number of narcotics given depending on the individual nurse's practice. Another limitation of the study was that it took place in only one inpatient postsurgical unit, which may limit generalizability. The greatest limitation of this study was the small sample size, which may have contributed to the lack of statistically significant results.

Discussion: This study did not show a statistical significant difference between groups in improving overall self-reported pain scores. However, massage therapy did show to significantly improve pain scores immediately after the massage intervention. This may indicate that massage therapy is effective acutely, but the effects are not sustained long term. This study did not find massage to significantly reduce the number of opioids given throughout the three-day postoperative period, although there appeared to be a decreasing trend in the massage groups mean opioid use. This could be due to a small sample size. Even though there was no statistically significant decrease in opioids, this could prove to be important clinically because adding massage as an adjunctive therapy could provide more resources for patients to better cope with and manage their surgical pain. Patient satisfaction is also an important measure on how patients perceive their overall care, and an important aspect of planning care and managing pain. This study found that massage greatly improved patient satisfaction in overall management of pain. During the study period, for unseen reasons one of the surgeons did not perform any spinal surgeries, which likely contributed to the small sample size. Also, a greater number of patients were admitted to the ICU postoperatively before being transferred to the floor, whether this was related to a practice change or surgical complications is unknown.

Nursing Practice Implications: The results of the study contribute to improving nursing practice by providing data on massage as an alternative or additional modality to manage pain in postoperative spinal surgery patients. The study also provides an additional means to improve patient satisfaction scores related to pain management. While there was not a statistically significant reduction in opioid use there seemed to be a trend in decreasing the number of opioids used in the postoperative setting.

Future Research: In order to achieve a larger sample, it may have been beneficial to

include patients in the study who were admitted to the intermediate care unit as well as the acute care unit and had a patient controlled analgesia pump (PCA pump). To reduce the possibility of selection bias, further studies may be better designed as a randomized control trial. In order to reduce the likelihood of differences in individual nursing practice, it would be important to include pre-study education on usual care such as, how often a patient's pain is assessed and what dose of narcotics is given based on the reported pain score. It may also be helpful to enroll participants in the study during their pre-operative clinic visit. To better facilitate nurse compliance, a soft stop could be added to the eMAR that would ask if the patient would like to receive a massage when the nurse is assessing the pain score.

Products of the Capstone: Products of this Capstone include the final scholarly project report and a manuscript for potential publication to The Journal of Neuroscience Nursing (AANN) (See Appendix D for publication guidelines). Results of the study showed there was no statistical significance in reducing narcotic use or improving overall pain scores, but massage therapy did greatly improve patient satisfaction scores in overall pain management.

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Table 1

Demographic Characteristics

Variable	**(Massage Group) N=7**		**(Usual Care Group) N=10**	
	Mean (SD)	**N (%)**	**Mean (SD)**	**N (%)**
Age at study entry (years)	57 (15.1)		51.70 (8.65)	
Male		1 (14.3%)		7 (70.0%)
Female		6 (85.7%)		3 (30.0%)
Race /Ethnicity				
White, non-Hispanic		6 (65.7%)		7 (70.0%)
African American/Black, non-Hispanic		1 (14.3%)		3 (30.0%)
Hispanic/Latino		0 (0.0%)		0 (0.0%)
Native American		0 (0.0%)		0 (0.0%)
Other/Unknown		0 (0.0%)		0 (0.0%)
Missing		0 (0.0%)		0 (0.0%0
Type of Surgery				
PSIF		2		7
TLIF		3		0
ACDF		2		3

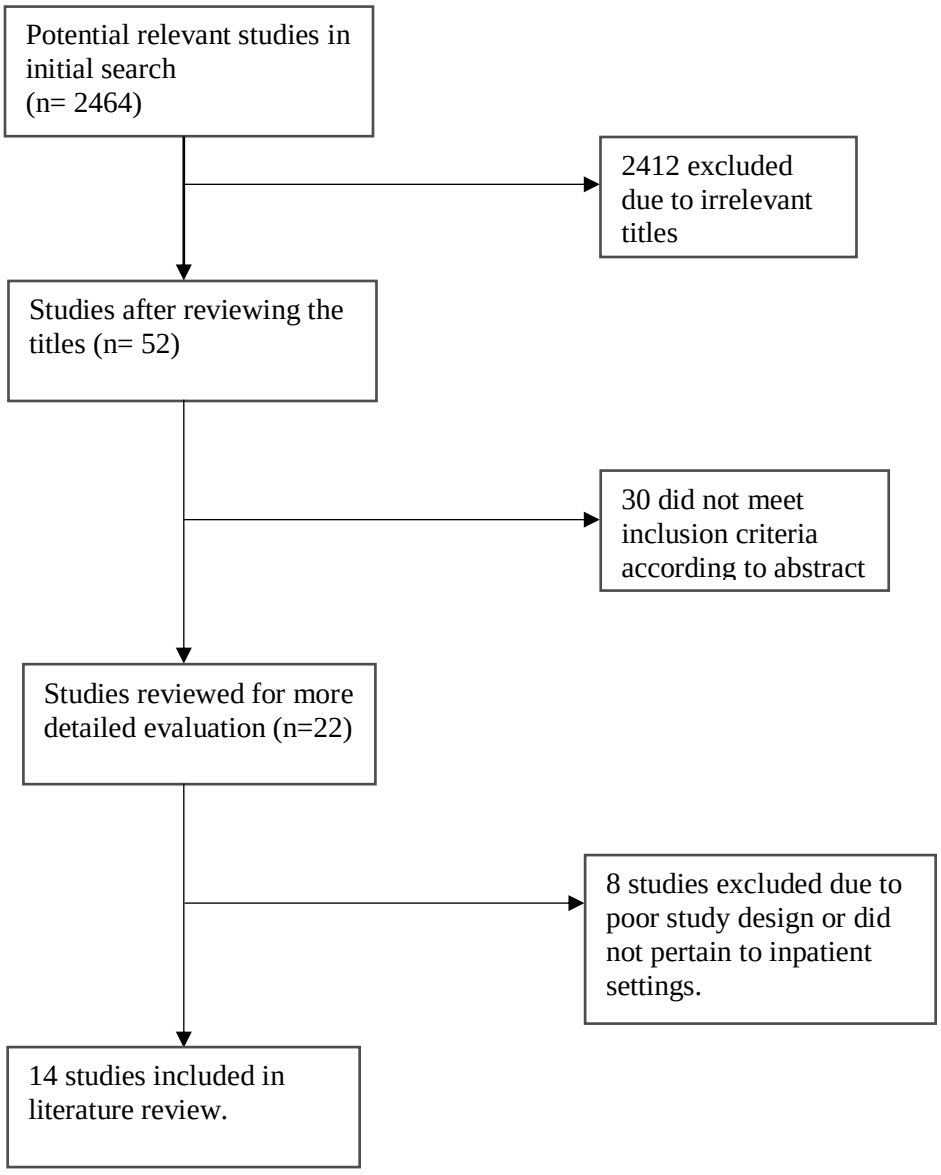


Figure 1. *Flow Chart*

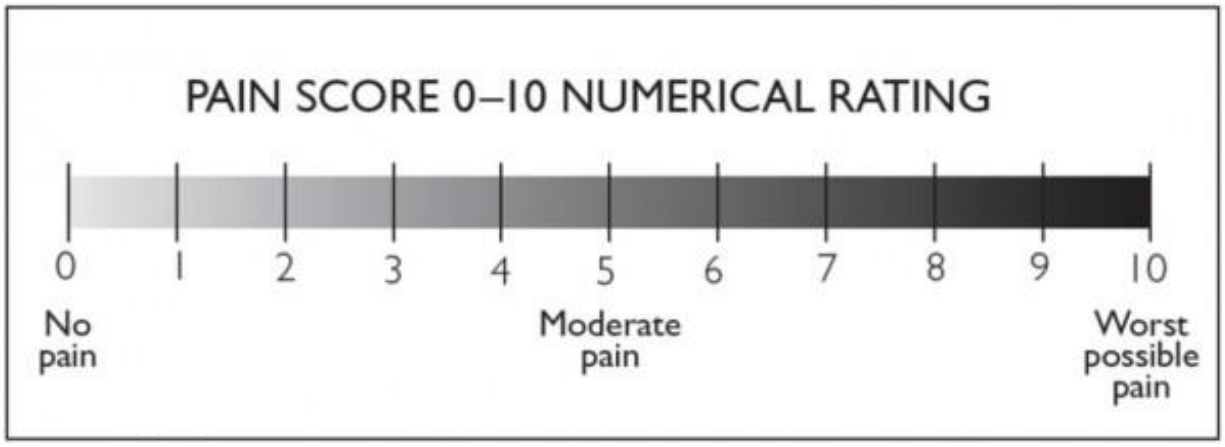


Figure 2*: Numeric pain scale.*

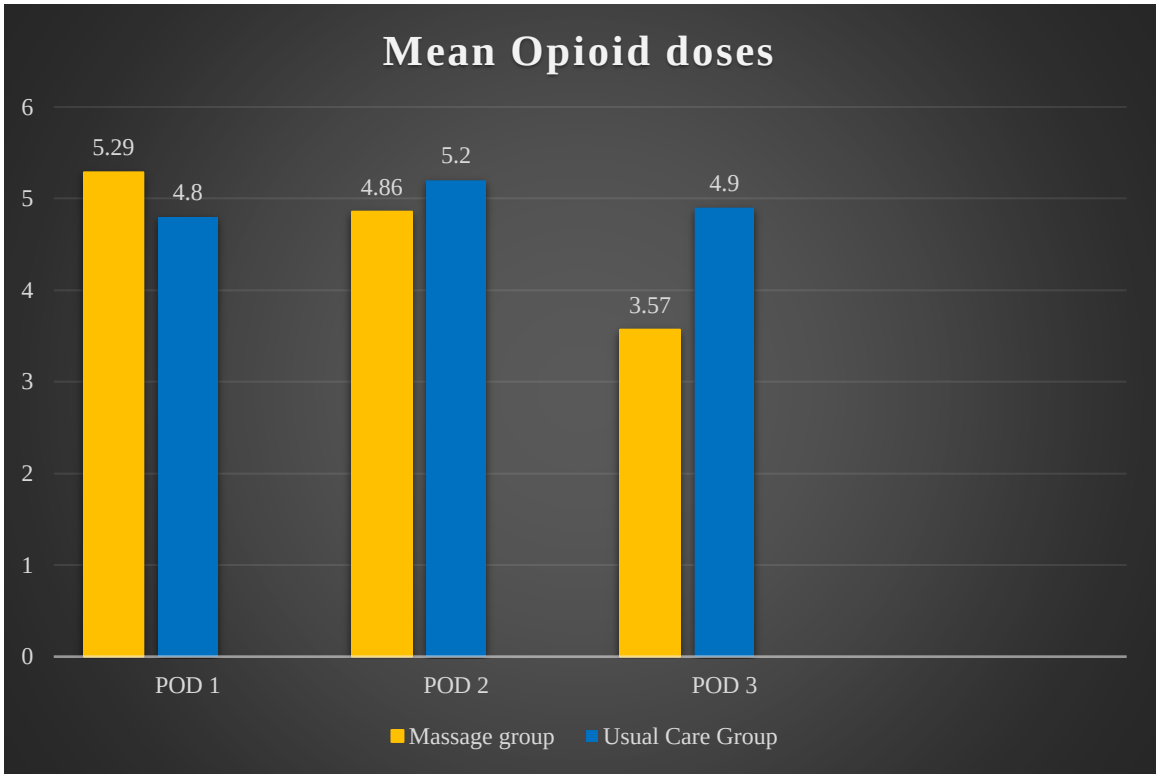


Figure 3. Mean opioid doses per population representing each Postoperative Day.

Note: POD is postoperative day, POD 1 refers to the first day after surgery

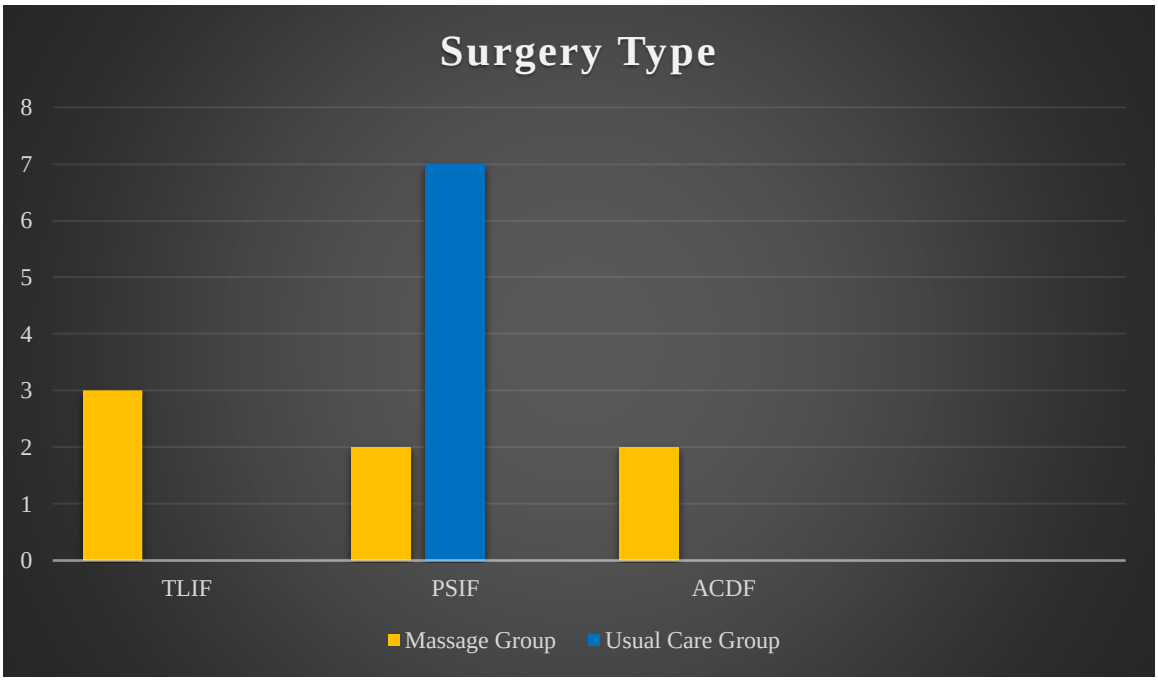


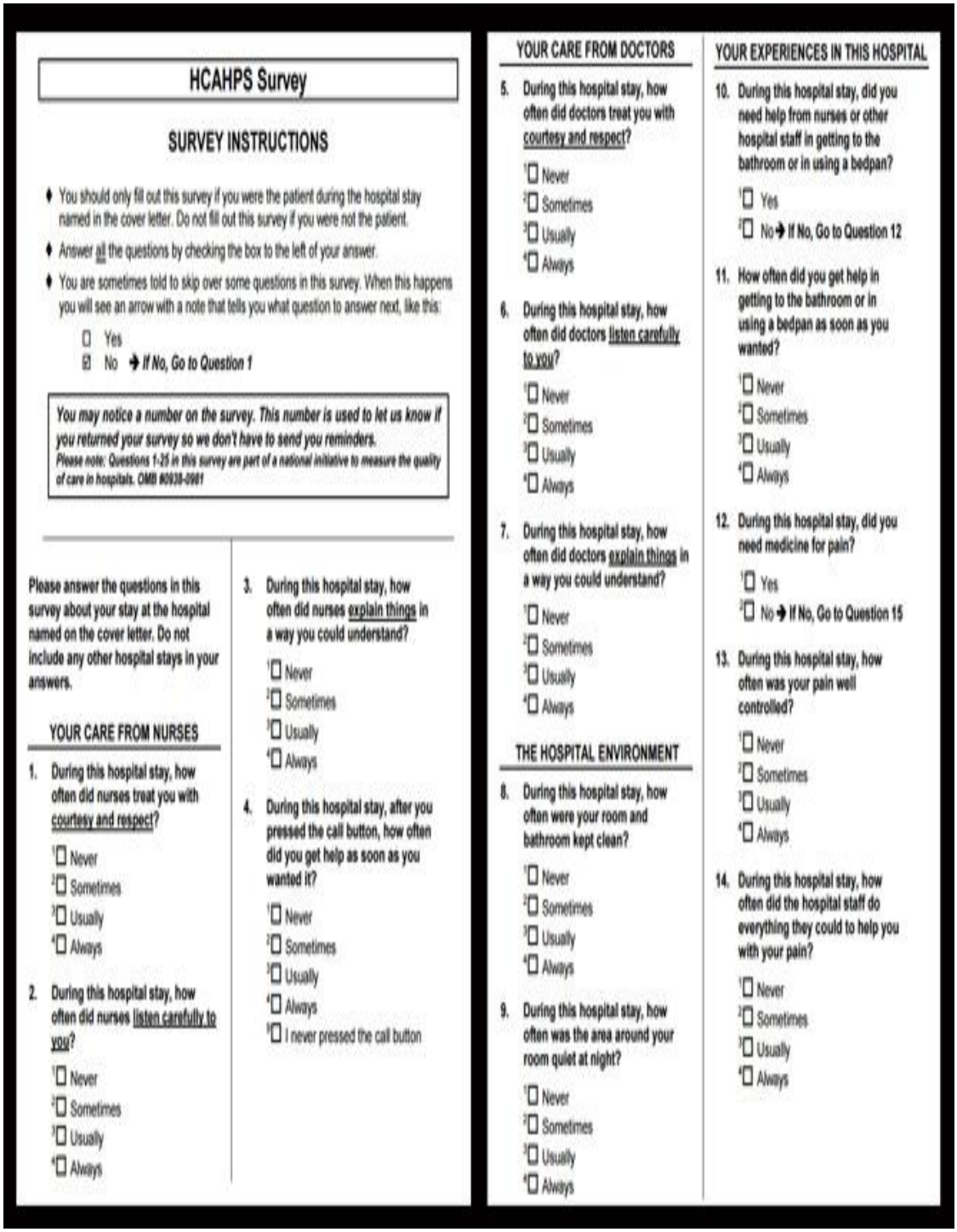
Figure 4. Specific surgical procedure for massage and usual care groups.

Note: TLIF refers to Transforaminal Lumbar Interbody Fusion, PSIF refers to Posterior Spinal Instrumentation and Fusion, and ACDF refers to Anterior Cervical Discectomy and Fusion.

During this hospital stay, how satisfied are you with the management of your pain?	Usual Care	Massage	Totals
Somewhat satisfied	3	1	4
Satisfied	6	0	6
Very Satisfied	1	**6**	7
Totals	10	7	17

Figure 5. Patient satisfaction question results.

Appendix A



HCAHPS Survey

SURVEY INSTRUCTIONS

- You should only fill out this survey if you were the patient during the hospital stay named in the cover letter. Do not fill out this survey if you were not the patient.
- Answer all the questions by checking the box to the left of your answer.
- You are sometimes told to skip over some questions in this survey. When this happens you will see an arrow with a note that tells you what question to answer next, like this:

☐ Yes
☑ No → *If No, Go to Question 1*

You may notice a number on the survey. This number is used to let us know if you returned your survey so we don't have to send you reminders.
Please note: Questions 1-25 in this survey are part of a national initiative to measure the quality of care in hospitals. OMB #0938-0981

Please answer the questions in this survey about your stay at the hospital named on the cover letter. Do not include any other hospital stays in your answers.

YOUR CARE FROM NURSES

1. During this hospital stay, how often did nurses treat you with courtesy and respect?
   1 ☐ Never
   2 ☐ Sometimes
   3 ☐ Usually
   4 ☐ Always
2. During this hospital stay, how often did nurses listen carefully to you?
   1 ☐ Never
   2 ☐ Sometimes
   3 ☐ Usually
   4 ☐ Always
3. During this hospital stay, how often did nurses explain things in a way you could understand?
   1 ☐ Never
   2 ☐ Sometimes
   3 ☐ Usually
   4 ☐ Always
4. During this hospital stay, after you pressed the call button, how often did you get help as soon as you wanted it?
   1 ☐ Never
   2 ☐ Sometimes
   3 ☐ Usually
   4 ☐ Always
   5 ☐ I never pressed the call button

YOUR CARE FROM DOCTORS

5. During this hospital stay, how often did doctors treat you with courtesy and respect?
   1 ☐ Never
   2 ☐ Sometimes
   3 ☐ Usually
   4 ☐ Always
6. During this hospital stay, how often did doctors listen carefully to you?
   1 ☐ Never
   2 ☐ Sometimes
   3 ☐ Usually
   4 ☐ Always
7. During this hospital stay, how often did doctors explain things in a way you could understand?
   1 ☐ Never
   2 ☐ Sometimes
   3 ☐ Usually
   4 ☐ Always

THE HOSPITAL ENVIRONMENT

8. During this hospital stay, how often were your room and bathroom kept clean?
   1 ☐ Never
   2 ☐ Sometimes
   3 ☐ Usually
   4 ☐ Always
9. During this hospital stay, how often was the area around your room quiet at night?
   1 ☐ Never
   2 ☐ Sometimes
   3 ☐ Usually
   4 ☐ Always

YOUR EXPERIENCES IN THIS HOSPITAL

10. During this hospital stay, did you need help from nurses or other hospital staff in getting to the bathroom or in using a bedpan?
    1 ☐ Yes
    2 ☐ No → If No, Go to Question 12
11. How often did you get help in getting to the bathroom or in using a bedpan as soon as you wanted?
    1 ☐ Never
    2 ☐ Sometimes
    3 ☐ Usually
    4 ☐ Always
12. During this hospital stay, did you need medicine for pain?
    1 ☐ Yes
    2 ☐ No → If No, Go to Question 15
13. During this hospital stay, how often was your pain well controlled?
    1 ☐ Never
    2 ☐ Sometimes
    3 ☐ Usually
    4 ☐ Always
14. During this hospital stay, how often did the hospital staff do everything they could to help you with your pain?
    1 ☐ Never
    2 ☐ Sometimes
    3 ☐ Usually
    4 ☐ Always

Patient satisfaction Survey

Patient Name:

1) During this hospital stay were you offered massage therapy?
   ____ Yes
   ____ No

2) If yes, did you receive a massage?
   _____ Yes
   _____ No

3) During this hospital stay, did you need medication for pain?
   ____ Yes
   ____ No

4) During this hospital stay, how often was your pain well controlled?
   ____ Never
   ____ Sometimes
   ____ Usually
   ____ Always

5) During this hospital stay, how often did the staff do everything they could to help you with your pain?
   ____ Never
   ____ Sometimes
   ____ Usually
   ____ Always

6) During this hospital stay, how satisfied are you with the management of your pain?
   ____ Not at all satisfied
   ____ Somewhat satisfied
   ____ Satisfied
   ____ Very satisfied

Appendix B

Information sheet

****

The purpose of this information sheet is to describe a research study. The purpose of the study is to assess patient satisfaction related to pain management in the postoperative period.

You are receiving this information sheet because you have undergone a spinal surgery. It is a goal in our department to keep our patients informed of research in which they may be interested while carefully protecting your confidentiality. To do both we follow federal regulation called HIPAA.

By answering the survey questions, you agree that the information you provide may be used for research purposes. All information will be confidential.

You will not benefit from being in this study and you will not receive any compensation. We do not anticipate any risks. Your information will not be shared outside of this study team except to those groups inside and outside of UVa who are responsible for making sure studies are conducted correctly and ethically.

Your decision to be in any study is totally voluntary. Your care at UVA will not be altered by your decision to participate or not participate in this survey.

If you have any questions about this survey or the research study, please contact me, Kevin Dunivan, at kd3ff@virginia.edu. Your nurse you may also attempt to contact me directly by phone.

If you choose to participate, please complete the enclosed questionnaire and give it back to your nurse. Your nurse will place the survey in a secure location.

Thank you,

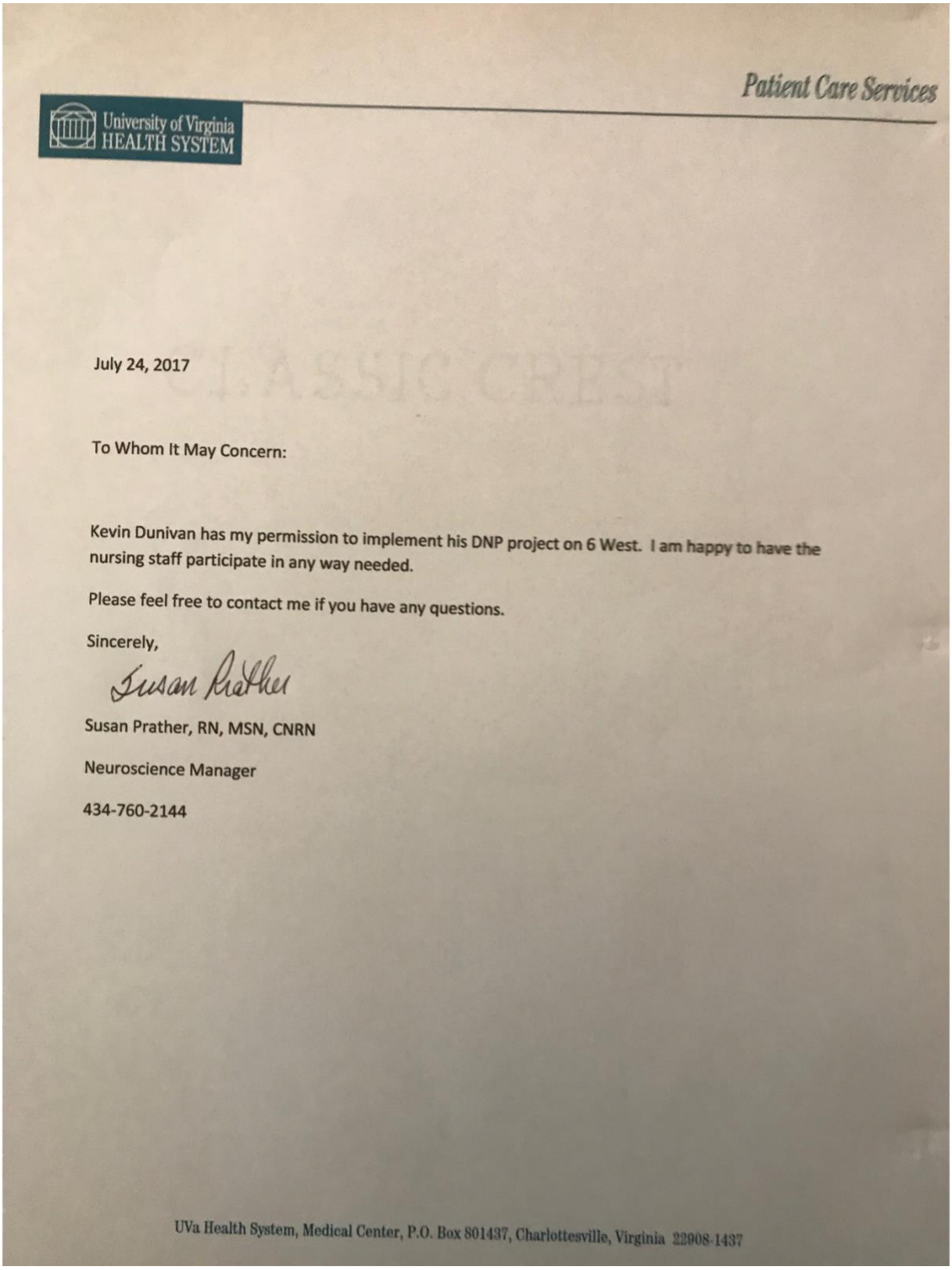
Kevin Dunivan, MSN, RN (DNP Student)

PI: Mary Deivert, MSN, RN

IRB/HSR # 20186

Inpatient Massage Therapy for Postoperative Pain Management

Appendix C



Patient Care Services

University of Virginia HEALTH SYSTEM

July 24, 2017

To Whom It May Concern:

Kevin Dunivan has my permission to implement his DNP project on 6 West. I am happy to have the nursing staff participate in any way needed.

Please feel free to contact me if you have any questions.

Sincerely,

Susan Prather

Susan Prather, RN, MSN, CNRN

Neuroscience Manager

434-760-2144

UVa Health System, Medical Center, P.O. Box 801437, Charlottesville, Virginia 22908-1437

Appendix D

Journal of Neuroscience Nursing

http://www.editorialmanager.com/neuronurse/default.aspx