The Symptom Experience of Postpartum Pain after Cesarean Birth

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THESIS

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This thesis is dedicated to my wonderfully supportive husband and family. Their encouragement and patience made this journey possible.
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SUMMARY

Pain is a common experience after all births, particularly after cesarean birth, where pain has been reported as more intense and longer lasting when compared to vaginal birth. Postpartum pain has detrimental implications for both the infant and mother by interfering with infant care, breastfeeding exclusivity, and maternal sleep. This study was guided by the University of California at San Francisco (UCSF) symptom management theory, focusing on the symptom experience components of perception, evaluation, and response. The study aim was to comprehensively describe the symptom experience of postpartum pain after cesarean birth, reflecting the 4 dimensions (sensory, affective, cognitive, and behavioral) and 2 types (nociceptive and neuropathic) of pain.

In this concurrent mixed-methods study, thirty participants scheduled for a cesarean birth at an academic medical center were recruited. Data were collected at 24 to 48 hours after birth and at 6 weeks postpartum. Through the PAINReportIt (computerized McGill Pain Questionnaire) and an open ended interviews, participants described their pain in terms of the 3 symptom experience components, 4 pain dimensions, and words reflective of the 2 pain types. Regarding pain symptom experience, participants perceived the change in sensation, evaluated the impact on their lives, and responded with behavioral changes. For pain dimensions, participants reported mild pain intensity; on a 0-10 scale, at 24 to 48 hours mean pain score was 2.75 (+/- 1.8) and at 6 weeks 1.1 (+/- 2.4). In spite of these mild pain scores, most participants described their pain as aching, cramping, tender, and sore; for many, these descriptions persisted at 6 weeks. Most participants expected their pain and were satisfied with their pain level. Pain affected participants’ actions such as lifting and affected their roles with partners and children. Participants selected pain descriptors associated with nociceptive (e.g., cramping, tender, and sore) and neuropathic (e.g., aching) pain at both visits.

The symptom experience of pain is multidimensional, individual, and complex. The symptom management theory provided a valuable framework and PAINReportIt and interview comprehensive measures to describe this phenomenon.
SUMMARY (continued)

This dissertation is comprised of one original research study, written as two publishable papers. In this document, the two manuscripts are presented including references, tables, and figures included in the body of the work. In the appendices, the full research proposal is presented. The first paper primarily presents the quantitative results, while the second paper primarily presents the qualitative results. Permission has been requested to publish the Symptom Management Theory model. Also included are the approval letters from the Institutional Review Boards at the University of Illinois at Chicago and Northwestern Memorial Hospital. Last is a copy of my curriculum vitae.
I. POSTPARTUM PAIN AFTER CESAREAN BIRTH: A COMPREHENSIVE DESCRIPTION

Cesarean births occurred at a record high in 2009 (Martin, 2011). Pain following this event is one of the most frequently reported problems by postpartum women (Lansakara, Brown, & Gartland, 2010); this pain is considered ‘major’ for up to one third of these women (Declercq, Cunningham, Johnson, & Sakala, 2008). Both mother and infant are affected by postpartum pain (Karlstrom, Engstrom-Olofsson, Norbergh, Sjoling, & Hildingsson, 2007; Karlstrom, Engstrom-Olofsson, Nystedt, Sjoling, & Hildingsson, 2010). Despite this impact, previous postpartum pain research has not comprehensively described this experience and researchers have failed to examine postpartum pain after cesarean birth in terms of dimension and type. In this study, we described postpartum pain in terms of the sensory, affective, cognitive, and behavioral pain dimensions and the nociceptive and neuropathic pain types.

A. Background

There were over 4.1 million births in the United States in 2009 of which, 32.9% were cesarean births (Martin, 2011). Pain is a common experience after all births, with up to 92% of women reporting pain (Andrews, Thakar, Sultan, & Jones, 2008) and up to 78% of women rating their pain intensity as moderate to severe (Karlstrom et al., 2007). Postpartum pain has detrimental implications for both the infant and mother. Women experiencing postpartum pain took longer to initiate interactions with their infants (Karacam & Eroglu, 2003), reported that it negatively affected breastfeeding (East, Dube, & Perreault, 2007; Karlstrom et al., 2007; Karlstrom et al., 2010), and interfered with infant care (Borg-Stein & Dugan, 2007; Gustafsson & Nilsson-Wikmar, 2008; Karlstrom et al., 2010). Postpartum pain following a cesarean birth, when compared to vaginal birth, has been reported as more intense (Schindl et al., 2003), longer lasting (Kainu, Sarvela, Tiippana, Halmesmaki, & Korttila, 2010), had a greater impact on activities of daily living, including infant care, (Declercq et al., 2008; Karlstrom et al., 2007), and reduced breastfeeding exclusivity (Sayyah Melli et al., 2007). It is for these reasons that we focused this research on the experience of pain after a cesarean birth.

There are two types of pain—nociceptive and neuropathic, experienced when pain pathways are triggered. Nociceptive pain is “pain that arises from actual or threatened damage to non-neural tissue and
is due to the activation of nociceptors” (Loeser, 2012). Neuropathic pain is “pain caused by a lesion or disease of the somatosensory nervous system” (Loeser, 2012). In addition to these two types of pain, there are four dimensions to evaluate—sensory, affective, cognitive, and behavioral (Ahles, Blanchard, & Ruckdeschel, 1983). Nociceptive and neuropathic pain have not been differentiated in postpartum research, and the main focus has been the sensory dimension of pain, centering on pain intensity and location, primarily through the use of the Visual Analogue Scale or a similar instrument (Goodman et al., 2005; Gustafsson & Nilsson-Wikmar, 2008). Only two research teams examined the affective dimension of pain with a formal instrument (Dodd, Hedayati, Pearce, Hotham, & Crowther, 2004; Kindberg, Stehouwer, Hvidman, & Henriksen, 2008). The cognitive dimension of pain was measured to a limited extent by researchers examining pain management satisfaction expectations (Dodd et al., 2004; Karlstrom et al., 2007; Kindberg et al., 2008). Researchers have examined the behavioral dimension of pain by observing pain’s impact on activities of daily living (e.g., walking, sitting, voiding, or passing stool) and infant care tasks (e.g., breastfeeding, lifting infant) (Eisenach et al., 2008; Gustafsson & Nilsson-Wikmar, 2008; Karlstrom et al., 2007).

Postpartum pain research lags behind the state of the science in other pain research areas due to an inconsistent description of pain in terms of type and dimension. A better understanding of the type of pain will help guide more directed therapies and offer potential options for pain management. Better postpartum pain management can facilitate mother-infant interaction, breastfeeding, infant care, and mothers’ rest and sleep, concentration, and learning. Although postpartum researchers have included some elements of the pain dimensions, the sensory, affective, cognitive, and behavioral dimensions have not been addressed comprehensively with a psychometrically sound instrument. Furthermore, the impact of postpartum pain on mothers and infants has not been well established.

The University of California San Francisco symptom management theory guided this descriptive study. Model concepts include: symptom experience, symptom management, and symptom outcome. Symptom experience—this study’s focus, consists of three components: symptom perception (noticing a change), evaluation (judgments about symptoms), and response (feelings, thoughts, and behaviors

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secondary to symptoms). The two types of pain and the four dimensions of pain can be conceptualized within the symptom experience components.

The primary aim of this research was to describe women’s experiences with the perception of, evaluation of, and response to postpartum pain through the sensory, affective, cognitive, and behavioral dimensions of pain after a cesarean birth. The secondary aim of this research was to differentiate pain described with nociceptive and neuropathic pain descriptors.

B. Methods

1. Design and Data Collection

In this study, we used a longitudinal, concurrent mixed methods design (Giddings, 2006; Sandelowski, 2000) to better describe women’s experience of postpartum pain. We used PAINReportIt (Huang et al., 2003; Wilkie et al., 2003), a computerized version of the McGill Pain Questionnaire (MPQ) (Melzack, 1975), to gather descriptors of the sensory, affective, evaluative, and behavioral dimensions. The evaluative dimension was later renamed as cognitive (Melzack, 2005). In this paper we report our quantitative findings; the qualitative results are presented elsewhere (Chin, In Review).

Approvals from appropriate Institutional Review Boards were attained prior to the start of the research. Participants were recruited from one provider group delivering babies at a large, university-based, Midwestern medical center. Once, between 24 and 48 hours post-cesarean birth, during the inpatient postpartum period, women were asked to complete the PAINReportIt (Huang et al., 2003; Wilkie et al., 2003). At 6 weeks (the traditional postpartum period), at a location scheduled for the convenience of the mother (i.e., the participant’s home, the primary provider’s office, or public meeting places), this measure was repeated.

2. Measures

The PAINReportIt (Huang et al., 2003; Wilkie et al., 2003) is a computerized version of the MPQ (Melzack, 1975), which is driven by a touch screen. The PAINReportIt covers the paper and pencil version of the instrument in 13 screens, and also includes an additional 21 items which measure goals for pain, pain satisfaction, and expectations (Huang et al., 2003). The equivalence of the PAINReportIt and
the MPQ as well as the reliability of the PAINReportIt have been supported through focus groups and sequential completion of the two instruments (Wilkie et al., 2003). The computerized PAINReportIt has been demonstrated as a useable version of the MPQ, with up to 86% of participants reporting that it was a good way to report pain to their provider (Huang et al., 2003; Wilkie et al., 2003) and 93% of participants reporting it was easy to use (Huang et al., 2003).

The McGill Pain Questionnaire (Melzack, 1975) is a four page, multidimensional measurement of pain, measuring the sensory, affective, cognitive, and behavioral dimensions of pain. In Part 1 of the instrument, participants answer the question, “where is your pain?” (Melzack, 1975), measuring the sensory (location) dimension of pain. This part of the instrument includes a line drawing of a body outline. Participants are instructed to mark the places where pain is felt, and indicate if the pain felt at that location is internal, external, or both. The total number of places marked is tallied and indicates the spatial distribution of the pain experienced.

In Part 2 of the instrument, participants answer the question, “what does your pain feel like?” (Melzack, 1975), measuring the sensory (quality), affective, and cognitive dimensions of pain. This part of the instrument includes a list of 78 words, separated into four major classes: sensory, affective, cognitive, and miscellaneous descriptor words. These four classes are broken down into 20 subclasses; each including 3-6 pain descriptor words. In the PAINReportIt, participants are instructed to mark as many words as necessary to describe their pain; any subclass that does not describe pain should be omitted. For analysis, each subclass’s individual words are assigned a rank, indicating increasing pain with subsequent words. For example, subclass 2 includes: jumping, flashing, and shooting, listed in this order (Melzack, 1975). “Jumping” is assigned a value of 1, “flashing” is assigned a value of 2, and “shooting” is assigned a value of 3. When these values are summed for each subclass, the Pain Rating Index (PRI) score is obtained. Scores for the total PRI range from 0 to 78; 0 indicating the minimum and 78 indicating the maximum pain rating score. The PRI can be further divided for each class, yielding individual scores for PRI-Sensory, PRI-Affective, PRI-Evaluative, and PRI-Miscellaneous. An additional score for part 2 of the MPQ is obtained by tallying the number of words chosen (NWC) for the 20
subclasses. The scores range from 0, indicating no pain descriptors were employed, to 20, indicating that at least one word per category was chosen by the participant.

In Part 3 of the instrument, participants answer the question, “how does your pain change with time?” (Melzack, 1975), measuring the sensory (temporal) dimension of pain. Part 3 of the instrument includes three groups of three words each that describe the pattern of pain experienced. For example, the first group of words include the descriptors: “continuous, steady, or constant” (Melzack, 1975). Participants are instructed to choose the word or words that best describe their pain. Two additional questions solicit information regarding activities that relieve or increase pain, measuring the behavioral dimension of pain. These are open-ended questions for participants to provide responses. Although not specified in the MPQ, examples of the relieving or increasing factors may include items such as: movement, heat/cold, and social interaction. No numerical scores are obtained from this part of the MPQ; however, the information collected does provide context for understanding the participant’s pain by addressing the sensory (temporal) and behavioral dimensions of pain.

In Part 4 of the instrument, participants answer the question, “how strong is your pain?” (Melzack, 1975), measuring the sensory (intensity) dimension of pain. Three questions solicit baseline pain comparisons for the participant (worst toothache, worst headache, and worst stomach-ache). These questions give context for the individual participant’s general pain ratings, indicating how severe of pain this participant has experienced in the past.

Internal consistency reliability of the MPQ is supported by the correlation between the PRI and the number of words chosen ($r = 0.89$) (Melzack, 1975). Factor analysis revealed the three dimensions: sensory, affective, and cognitive were found to be inter-correlated ($r = 0.64$ to 0.81) and measured the same pain concept (Turk, Rudy, & Salovey, 1985). Test re-test reliability resulted in a mean consistency of 70.3% over a 3 to 7 day span (Melzack, 1983) and mean consistency of 66% to 80.4% was achieved over four administrations of the MPQ, each a week apart (Graham, Bond, Gerkovich, & Cook, 1980). Construct validity was supported by several researchers (Dubuisson & Melzack, 1976; Klepac, Dowling, & Hauge, 1981; Turk et al., 1985).
3. Sample and Setting

A convenience sample of 30 participants was recruited from one provider group. Inclusion criteria were: women at least 18 years of age, scheduled for cesarean section, and experiencing a singleton pregnancy. Exclusion criteria included women who had any prior labor with this pregnancy, or pregnancies complicated by risk factors such as: multiple gestation, preterm labor, pre-eclampsia, and diabetes.

The number of recruited participants was intended to capture the variation in the experience of postpartum pain and provide a representative description of the phenomenon. The sample was not intended to meet statistical requirements, but rather to fulfill informational requirements of the phenomenon of interest (Sandelowski, 1995).

4. Data Analysis

The PAINReportIt (Huang et al., 2003; Wilkie et al., 2003) records responses in a computerized database as it is collected from each participant. Descriptive statistics (frequencies, means, standard deviations, t-tests, and $\chi^2$ tests) were calculated from these data and summarized to describe the symptom experience of postpartum pain. These descriptive statistics were calculated for both data collection points (inpatient and at 6 weeks postpartum) to observe the pattern of postpartum pain after cesarean birth.

The secondary aim of this research was to differentiate pain described with nociceptive and neuropathic pain descriptors. Pain descriptor word selection frequency were analyzed and compared with established lists of nociceptive and neuropathic pain descriptors (Wilkie, 2001; Wilkie, Huang, Reilly, & Cain, 2001).

C. Results

1. Sample Characteristics

Participant characteristics are reported in Table 1. This sample was largely white, educated, affluent, and experiencing a second birth.
2. Pain Dimensions

a. Sensory

The sensory dimension of pain includes: location, intensity, quality, and pattern of pain. Participants reported that pain occurred in a number of locations as shown in Table 2. All participants experienced a low transverse cesarean birth; the abdomen was the most common location for pain at both visits (97% and 93%, respectively), followed by the upper back, and the chest. The lower back was the only pain location not selected during either visit.

Overall pain intensity decreased between the first and second visits. It should be noted that participants were on a postpartum medication protocol, so they were likely consuming analgesics to relieve pain. Participants’ current mean pain was 2.75 +/- 1.8 (mild pain, on a scale of 0 to 10) while inpatient; by six weeks, reported mean pain decreased to 1.1 +/- 2.4 (mild pain), a statistically significant difference ($t = 4.18$ (29), $p < 0.05$). Median current pain decreased from 2 to 0 between visits. In regard to worst pain in the last 24 hours, participants’ reported as a mean of 5.8 +/- 2.2 (moderate pain) while inpatient; by six weeks, 1.5 +/- 2.9 (mild pain), a statistically significant difference ($t = 9.07$ (29), $p < 0.05$). Worst headache, stomachache, and toothache were reported to place the intensity of postpartum pain in context. See Table 2 for a complete report of pain intensity scores.

Pain quality, as measured by the PRI-Sensory scores, reflects the sensory qualities of the pain experience, including: temporal, spatial, pressure, and thermal (Melzack, 1975). As seen in Table 2, of a possible maximum score of 42, participants reported mean PRI-S scores of 15.1 +/- 5.0 while inpatient and 11.0 +/- 6.2 at 6 weeks, a statistically significant difference ($t = 3.56$ (29), $p < 0.05$).

When participants were asked to select words to describe how pain changes with time, they most often reported an intermittent pain pattern; 12 (40%) participants chose this pattern at both visits. Complete pain pattern frequencies and can be found in Table 2.

b. Affective

The mean Pain Rating Index-Affective score is reflective of affective qualities (tension, fear, and autonomic) of the pain experience (Melzack, 1975). As seen in Table 2, out of a possible
maximum score of 14, participants reported mean PRI-A scores of 1.2 +/- 1.5 while inpatient and 0.9 +/- 1.6 at 6 weeks; this difference was not statistically significant.

c. Cognitive

The cognitive dimension of pain includes three parts. These parts include the: PRI-Evaluative score, pain goal, pain expectations, and pain satisfaction.

The PRI-Evaluative subscale is reflective of the subjective intensity of the pain experience and considers the brain’s ability to make a judgment about the pain experience (Melzack & Torgerson, 1971). Participants select from five descriptors: “annoying, troublesome, miserable, intense, and unbearable” (Melzack, 1975). As shown in Table 2, the mean PRI-Evaluative scores, out of a possible maximum score of 5, decreased between the inpatient (4.6 +/- 0.5) and the 6-week (1.7 +/- 1.9) visits, a statistically significant difference (t = 8.11 (29), p < 0.05).

When asked to provide a goal for pain management, as shown in Table 3, participants reported an optimal pain mean score of 0.6 (+/- 0.9) out of 10 for pain level at the inpatient visit. These responses decreased to 0.1 (+/- 0.4) at the 6-week visit, a statistically significant difference between visits (t = 2.9 (29), p < 0.05).

When asked about pain expectation, pain was worse than expected for 5 (17%) participants at the inpatient visit. The remaining participants at the inpatient visit and all participants at the 6-week visit reported their pain was the same or not as bad as expected. Complete pain expectation scores are found in Table 3.

Also seen in Table 3, 23 (77%) participants reported satisfaction with their pain level at the inpatient visit. This report increased to 29 (97%) participants by the 6-week visit.

The PRI-Total score represents the comprehensive score of all of the pain descriptors and the rank values associated with these pain qualities (Melzack, 1983). The PRI-Total scores, out of a possible maximum score of 78, are a summation of the PRI-Sensory, PRI-Affective, PRI-Evaluative, and PRI-Miscellaneous scores. These scores decreased statistically significantly from the inpatient visit (24.3 +/- 8.7) to the 6-week visit (16.1 +/- 9.2) (t = 4.78 (29), p < 0.05). Table 2 shows all PRI scores.
d. Behavioral

At the inpatient visit, sleep or rest relieved pain for 8 (27%) participants. Walking was an activity that relieved pain for 7 (23%) participants, but increased pain for 4 (13%) participants. Common activities that increased pain included: getting in and out of bed or positioning (sitting/standing) (13 [43%]) and moving too much, or too quickly (7 [23%]). At the 6-week visit, rest was the most commonly chosen activity that relieved pain, selected by 20 (67%) participants, and lifting, carrying, or picking up items (including the baby) was the most common activity that increased pain, selected by 18 (60%) participants. Participants identified the importance of sleep and rest in their pain management in the 6-week recovery period. Early on, simple activities like position change were most troublesome, but as the postpartum period lengthened, activities of daily living became sources of pain.

3. Nociceptive/Neuropathic Descriptors

Number of words chosen is a measure of pain quality without the influence of intensity (Wilkie et al., 2010). Out of a possible maximum score of 20, participants chose a mean of 8.3 +/- 3.0 words while inpatient and 6.5 +/- 2.9 words at 6 weeks, a statistically significant difference ($t = 2.88 (29), p < 0.05$).

Nociceptive pain, pain that is experienced with somatic or visceral injury (Bonica, 1991; Portenoy, 1989), was represented by 26 nociceptive descriptors such as cramping, tender, and sharp. At the inpatient visit, participants chose a mean of 5.8 +/- 2.3 descriptors and 4.6 +/- 2.7 descriptors at 6 weeks, a statistically significantly difference ($t = 2.30 (29), p < 0.05$). All 30 participants selected at least one nociceptive descriptor at both visits. These scores indicate these pain descriptors were used by all participants to describe the pain they experienced throughout the 6-week period.

Neuropathic pain, pain that is experienced with nerve injury (Bonica, 1991; Portenoy, 1989), was represented by 28 neuropathic descriptors such as aching, itchy, or shooting. At the inpatient visit, participants chose a mean of (+/-1.2) descriptors and to 2.5 (+/- 2.1) descriptors at 6 weeks, a statistically significant difference ($t = 2.60 (29), p < 0.05$). At the inpatient and 6-week visits, 29 (97%) and 26 (87%) participants, respectively, selected neuropathic descriptors. These scores indicate that a majority of women described the pain they experienced with neuropathic pain descriptors.
Figures 1 through 3 show the frequency of neuropathic, nociceptive, and other pain descriptors selected by participants at both visits. The six pain descriptors participants selected most frequently at the inpatient visit were a mix of nociceptive and neuropathic words. At the inpatient visit, nociceptive words included: ‘cramping’ 25 (83%), ‘tender’ 22 (73%), ‘sore’ 21 (70%), and ‘sharp’ 19 (63%). Neuropathic words included: ‘aching’ 21 (70%) and ‘itchy’ 17 (57%). By six weeks, ‘tender’ 18 (60%) and ‘sore’ 15 (50%) (nociceptive pain) and ‘aching’ 14 (47%) (neuropathic pain) continued to be frequently chosen; ‘annoying’ 16 (53%) (‘other’ descriptor) was also a frequent choice. Participants’ selections reflect the change in pain sensation through the 6-week recovery period and indicate that nociceptive and neuropathic pain descriptors were used to describe pain experienced after cesarean birth.

D. Discussion

Our primary aim was to describe women’s experiences with the perception of, evaluation of, and response to postpartum pain while inpatient and at six weeks following a cesarean birth. Our secondary aim was to differentiate nociceptive and neuropathic pain. We were fully able to describe postpartum pain after cesarean birth in terms of all four pain dimensions (sensory, affective, cognitive, and behavioral) and by pain type (nociceptive and neuropathic). This is the first study in which pain has been measured with a comprehensive instrument and the complete findings have been reported. There are few postpartum studies to compare with the pain dimension findings from this study and no postpartum studies to compare with pain type. Thus, in order to offer context, our findings about the dimensions and types of postpartum pain after cesarean birth will also be compared to other types of pain (sickle cell, cancer, and surgical).

Regarding the sensory dimension of pain, location and intensity are considered. Participants reported pain as primarily occurring in the abdomen. This location is expected with the cesarean procedure and findings are consistent with Declercq, et al. (2008) who found that 85.5% of primiparous and 68.4 to 97.3% of multiparous participants reported pain at the incision site. Overall, in the current study, pain intensity decreased over time between the inpatient and 6-week visits. For this sample, the inpatient postpartum pain report was mild and contrasted with other samples where the median VAS pain
score was 6 out of 10, on the first day after cesarean birth, although, by the second day, the median pain score was 3 (Karlstrom et al., 2007). However, in another sample, mean pain intensity was 2.5 out of 10 in the first 24 hours after cesarean birth (Woods et al., 2012), more similar to the intensity reported by our participants.

Additionally, the quality and pattern of the sensory dimension should also be examined. Regarding pain quality, median PRI-Total scores for our participants, 22 inpatient and 14.5 at 6 weeks, were much higher than the median PRI-Total scores of 11 at 1-2 days post vaginal delivery and median PRI-Total scores of 4 at 10 days post delivery reported by Kindberg et al. (2008). This comparison supports Schindl, et al.’s (2003) previous research findings that the postpartum period following cesarean birth is more painful than vaginal birth. For additional comparison, the mean PRI-Total for patients after abdominal surgery ranged from 2.5 to 9.6 over the 3 days post surgery (Katz et al., 1994); the mean PRI-Total for the cesarean sample is much higher, indicating more pain in the sensory, affective, and cognitive dimensions. Pain pattern for our participants was intermittent, but was not reported by other postpartum researchers for comparison. The intermittent pain pattern was selected by 24% of outpatients with cancer (Ngamkham, Holden, & Wilkie, 2011); less frequently than the response from this study’s participants. Although no previous postpartum pain investigators reported PRI-Affective scores, Wilkie et al. (2010) reported mean PRI-Affective scores for a sample of patients with sickle cell disease (SCD). In comparison to the mean score of 4.7 reported by patients with SCD, our participants experienced less affective qualities surrounding the post-cesarean pain when compared to the sickle cell sample. It is possible that the presence of a newborn reduces some of the affective impact of the pain experience for postpartum women, whereas patients with sickle cell may view their pain much more negatively.

Similarly, no previous postpartum pain investigators reported PRI-Evaluative scores; however, the same patients with SCD reported a mean PRI-Evaluative scores of 3.5 (Wilkie et al., 2010). Our participants reported a higher intensity of evaluative pain than the participants with sickle cell at the inpatient visit; however, by 6 weeks, the postpartum sample reported scores below the scores of the sickle cell sample, indicating a downward shift in the overall intensity of pain. Although, the patients with SCD
were not currently in crisis, they were living with a painful condition, whereas our participants were surveyed at multiple points, after healing had occurred.

Participants in this postpartum study largely expected the pain that they experienced, and most were satisfied with their pain level at both the inpatient and six week visits. Only 17% of participants reported pain to be worse than expected at the inpatient visit. These findings are consistent with a Karlstrom et al.’s (2007) Swedish sample that reported 11 (18%) participants experienced more pain than expected in the 2 days following a cesarean birth. Most women in the Swedish study were satisfied with their pain treatment; similarly, most women in this study were satisfied with their pain level.

The behavioral dimension of pain was examined by other postpartum pain researchers. In one prior study, postpartum pain after cesarean negatively affected 62% of participants’ ability to care for their infant and 33% of participants’ ability to breastfeed (Karlstrom et al., 2007). In a follow up study, researchers strengthened these findings, reporting that high pain scores after cesarean negatively impacted breastfeeding ability and infant care (Karlstrom et al., 2010). While this study’s participants did not report difficulty with these activities explicitly, they did report difficulty with positioning and movement early in recovery; these activity challenges could impact the ability to get out of bed to provide infant care, or proper positioning for successful breastfeeding. By 6 weeks, lifting items, including the infant was most painful for participants in this study. Similarly, at 2 months, 22% of post-cesarean birth participants reported that pain interfered with routine activities (Declercq et al., 2008). At 6 to 10 months after delivery, participants reported heavy lifting, heavy work, and standing bent over a sink as the top three most limited activities (Nilsson-Wikmar, Pilo, Pahlback, & Harms-Ringdahl, 2003). Difficulty with lifting and household work may make the care giving tasks of motherhood a struggle; responding to a newborn independently can be a challenge, at best. This issue is multiplied for multiparous mothers whose toddlers need attention in addition to the newborn. Taken together, these findings show that pain after caesarian birth can affect mothers’ activities and make newborn care a challenge.

Participants in this study frequently identified sleep and rest as one of the most important activities to help relieve pain. And yet, women experiencing a cesarean birth have been shown to sleep
less than women who gave birth vaginally (Lee & Lee, 2007). Sleep is an example of a simple management strategy that may be effective for managing pain; however, with a newborn, sleep and rest may not be the most feasible strategy. If at all possible, health care providers and family members should find ways to support new mothers and offer them opportunities to rest.

To our knowledge, this is the first time that nociceptive and neuropathic descriptors have been reported for postpartum pain after cesarean birth. During a cesarean birth, somatosensory non-neural and neural tissue is damaged (Loeser, 2012); our participants selected descriptors indicative of both types of pain. Participants in this study selected fewer nociceptive descriptors compared to patients with sickle cell pain who selected a mean of 6.8 nociceptive words (Wilkie et al., 2010), but more words than patients with head and neck cancer pain who selected a mean of 1.8 nociceptive words (Epstein, Wilkie, Fischer, Kim, & Villines, 2009). With the neuropathic descriptors, participants in this current sample selected fewer words compared to patients with sickle cell pain who selected a mean of 4.5 neuropathic words (Wilkie et al., 2010), but more words than patients with head and neck cancer pain who selected a mean of 1.5 neuropathic words (Epstein et al., 2009). Possibly, patients with sickle cell have a wider pain experience with a greater number of procedures over the duration of their illness, compared to postpartum women whose birth is a new event with fewer cumulative procedures. Patients with head and neck cancer may have similar pain, but women undergoing cesarean birth have an expectation for infant care almost immediately after surgery that doesn’t allow for rest and healing.

The most common nociceptive word selected by our participants at the first visit was ‘cramping’; compare this to ‘cramping’ for 64 (100%) participants after a laparoscopic tubal ligation (De Santana, Sluka, & Lauretti, 2009), ‘throbbing’ for 111 (77%) participants with sickle cell (Wilkie et al., 2010) or ‘tender’ for 22 (52%) participants after abdominal surgery (Katz et al., 1994) and 43 (34.7%) participants with head and neck cancer (Epstein et al., 2009). The most common neuropathic word, at the first visit, for the postpartum sample was ‘aching’; compare this to ‘aching’ for 98 (68%) participants with sickle cell or ‘burning’ for 33 (26.6%) participants with head and neck cancer. In regard to nociceptive and
neuropathic pain, postpartum pain after cesarean birth is not unlike sickle cell pain or cancer pain as all
three exhibit both pain quality types.

**E. Limitations**

Limitations of this study include sample size, sample composition, and timing. This sample is small, includes primiparas and multiparas, and mostly white, older, and educated. Because of this sample, the pain experiences of all women delivering by cesarean or vaginal births cannot be generalized. The timing of the data collection at 6 weeks may also be a limitation. Participants often indicated that they were experiencing little pain at this visit and were asked to retrospectively recall the pain they felt throughout the entire 6-week period. At both visits, the interview was conducted prior to the questionnaire to minimize the possibility of PAINReportIT descriptors being introduced to participants’ interviews. Thus without randomization we do not know the order effect on data collection. In spite of these limitations, this work is novel and the findings are informative, especially as an important first step in comprehensively describing postpartum pain. This study needs to be replicated with a larger sample, with more frequent measurement between the inpatient and 6-week visits, and with vaginal births and non-scheduled cesarean births. Together, these studies would provide a broad picture of the experience of postpartum pain.

**F. Implications for Nursing Practice and Research**

For nursing practice, the most important finding is that postpartum pain after cesarean is multidimensional and has been described with words indicative of nociceptive and neuropathic pain. Just because patients report mild pain intensity, doesn’t mean another dimension of pain may not impact their lives. A new mother with a pain score of 2 of 10 (sensory dimension) may still find it difficult to get out of bed, or to reposition herself to care for her new baby (behavioral dimension). Although nurses may have an expectation for the pain trajectory and recovery of a patient, the experience is individualized and complex; nurses should be aware of this and complete a thorough and comprehensive pain assessment. The PAINReportIT is a viable option for practice. Completion time has been reported in as few as 10 minutes (Ngamkham et al., 2011) up to a mean time of 15.8 minutes (Wilkie et al., 2003). However, after
an initial orientation to the program, patients could make use of the portable laptop format of the PAINReportIt and may not require any additional nursing assistance to complete the assessment. The information that could be collected from postpartum mothers regarding their pain experience is valuable. The ability to differentiate pain type can have implications for treatment; these treatments could be tailored to the pain experience while inpatient and for discharge. Nurses have the ability and the position to recognize pain at the earliest stages, treat it, and educate patients about appropriate management as they recover from a cesarean birth. For example, supporting sleep and rest for new mothers is a simple management strategy that could be helpful to deal with pain.

For research, the fact that postpartum pain after cesarean birth is multidimensional and complex has implications. It is important to examine postpartum pain with the same level of scrutiny and rigor that is given to painful conditions like sickle cell disease, cancer, and post-surgery. Future research is necessary to further understand the experience of postpartum pain after all births and the impact this pain may have on mothers and infants. With a better understanding of the pain experience, new management strategies may be developed specifically targeted to the type of pain and the dimensions experienced.

**G. Conclusion**

Participants in this study reported that the postpartum pain after cesarean birth they experienced impacted the sensory, affective, cognitive, and behavioral dimensions of pain at both the inpatient and 6-week visits. In addition, these participants also reported nociceptive and neuropathic qualities at both visits. Pain improved over time in all aspects measured, but was still present at the end of 6 weeks, the traditional postpartum period.
**H. References**


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<thead>
<tr>
<th>Variable</th>
<th>Number (%)</th>
<th>Mean (SD)</th>
<th>Min-Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
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<td>35.4 (3.7)</td>
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</tr>
<tr>
<td>Race/Ethnicity</td>
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<td></td>
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<tr>
<td>White</td>
<td>20 (66%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black, not of Hispanic origin</td>
<td>5 (17%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>2 (7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>3 (10%)</td>
<td></td>
<td></td>
</tr>
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<td>Education</td>
<td></td>
<td>17.4 yrs (2.7)</td>
<td>12-23 yrs</td>
</tr>
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<td>Income</td>
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<td>$113,577 ($69,770)</td>
<td>$25,000-350,000</td>
</tr>
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<td>Cesarean Section #</td>
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<td>1st</td>
<td>6 (20%)</td>
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</tr>
<tr>
<td>2nd</td>
<td>21 (70%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd or more</td>
<td>3 (10%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary Indication</td>
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<td></td>
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</tr>
<tr>
<td>Repeat</td>
<td>24 (80%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malpresentation</td>
<td>3 (10%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>3 (10%)</td>
<td></td>
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</table>
### TABLE II

**SENSORY PAIN CHARACTERISTICS**

<table>
<thead>
<tr>
<th>Location</th>
<th>1st Visit</th>
<th>2nd Visit</th>
<th>( \chi^2 )</th>
<th>( p \text{ value} )</th>
<th>T-test Value</th>
<th>Two-tailed P-Value</th>
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<tbody>
<tr>
<td></td>
<td>No (%)</td>
<td>Mean (SD)</td>
<td>Min-Max</td>
<td>No (%)</td>
<td>Mean (SD)</td>
<td>Min-Max</td>
</tr>
<tr>
<td>Abdomen</td>
<td>29 (97%)</td>
<td>28 (93%)</td>
<td>0.07</td>
<td>NS</td>
<td>4.18*</td>
<td>0.0002*</td>
</tr>
<tr>
<td>Upper Back</td>
<td>10 (33%)</td>
<td>4 (13%)</td>
<td>3.61</td>
<td>NS</td>
<td>9.07*</td>
<td>5.78 E-10*</td>
</tr>
<tr>
<td>Chest</td>
<td>6 (20%)</td>
<td>3 (10%)</td>
<td>0.37</td>
<td>NS</td>
<td>-1.2</td>
<td>NS</td>
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<tr>
<td>Right Arm</td>
<td>2 (7%)</td>
<td>1 (3%)</td>
<td>0.07</td>
<td>NS</td>
<td>-0.44</td>
<td>NS</td>
</tr>
<tr>
<td>Left Arm</td>
<td>1 (3%)</td>
<td>0 (0%)</td>
<td></td>
<td></td>
<td>0.41</td>
<td>NS</td>
</tr>
<tr>
<td>Right Leg</td>
<td>0 (0%)</td>
<td>2 (7%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left Leg</td>
<td>0 (0%)</td>
<td>1 (3%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head</td>
<td>0 (0%)</td>
<td>3 (10%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Back</td>
<td>0 (0%)</td>
<td>0 (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of pain sites</td>
<td>1.9 (1.0)</td>
<td>1-4 sites</td>
<td>1.7 (0.9)</td>
<td>1-4 sites</td>
<td>1.07</td>
<td>0.29</td>
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<tr>
<td><strong>Intensity</strong> (0-10 possible)</td>
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<td></td>
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<tr>
<td>Current Pain</td>
<td>2.75 (1.8)</td>
<td>0-6</td>
<td>1.1 (2.4)</td>
<td>0-10</td>
<td>4.18*</td>
<td>0.0002*</td>
</tr>
<tr>
<td>Worst pain in last 24 hr</td>
<td>5.8 (2.2)</td>
<td>3-10.</td>
<td>1.5 (2.8)</td>
<td>0-10</td>
<td>9.07*</td>
<td>5.78 E-10*</td>
</tr>
<tr>
<td>Least pain in last 24 hr</td>
<td>1.7 (1.6)</td>
<td>0-6</td>
<td>0.5 (1.5)</td>
<td>0-6</td>
<td>3.39*</td>
<td>0.002*</td>
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<tr>
<td>Worst ever headache</td>
<td>6.6 (2.5)</td>
<td>1-10.</td>
<td>7.0 (2.0)</td>
<td>2-10.</td>
<td>-1.2</td>
<td>NS</td>
</tr>
<tr>
<td>Worst ever stomachache</td>
<td>6.8 (2.2)</td>
<td>2-10.</td>
<td>7.0 (2.3)</td>
<td>4-10.</td>
<td>-0.44</td>
<td>NS</td>
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<tr>
<td>Worst ever toothache</td>
<td>6.5 (3.0)</td>
<td>0-10</td>
<td>6.3 (3.2)</td>
<td>0-10</td>
<td>0.41</td>
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<tr>
<td><strong>Quality</strong> Pain Rating Index (PRI)</td>
<td></td>
<td></td>
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<tr>
<td>PRI-S: Sensory (0-42 possible)</td>
<td>15.1 (5.0)</td>
<td>5-24.</td>
<td>11.0 (6.2)</td>
<td>4-35.</td>
<td>3.56*</td>
<td>0.001*</td>
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<tr>
<td>PRI-A: Affective (0-14 possible)</td>
<td>1.2 (1.5)</td>
<td>0-6</td>
<td>0.9 (1.6)</td>
<td>0-6</td>
<td>0.79</td>
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<tr>
<td>PRI-E: Evaluative (0-5 possible)</td>
<td>4.6 (0.5)</td>
<td>4-5.</td>
<td>1.7 (1.9)</td>
<td>0-5</td>
<td>8.11*</td>
<td>(6.06E-09)*</td>
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<tr>
<td>PRI-M: Miscellaneous (0-17 possible)</td>
<td>3.4 (3.8)</td>
<td>0-14</td>
<td>2.5 (2.5)</td>
<td>0-9</td>
<td>1.47</td>
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<tr>
<td>PRI-T: Total (0-78 possible)</td>
<td>24.3 (8.7)</td>
<td>11-44.</td>
<td>16.1 (9.2)</td>
<td>4-47.</td>
<td>4.78</td>
<td>(4.65E-05)*</td>
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22
TABLE II (continued)

SENSORY PAIN CHARACTERISTICS

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<tr>
<th></th>
<th>1st Visit</th>
<th>2nd Visit</th>
<th>χ²</th>
<th>pvalue</th>
<th>T-test Value</th>
<th>Two-tailed P-Value</th>
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<tr>
<td>Number of words chosen</td>
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<tr>
<td>(0-20 possible)</td>
<td>8.3 (3.0)</td>
<td>6.5 (2.9)</td>
<td>2.88*</td>
<td>0.007*</td>
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<td>Number of Nociceptive</td>
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<td>words chosen</td>
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<td>4.6 (2.7)</td>
<td>2.30*</td>
<td>0.029*</td>
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<td>Number of Neuropathic</td>
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<td>Total pattern score</td>
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<tr>
<td>Constant group</td>
<td>5 (17%)</td>
<td>6 (20%)</td>
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<td>Intermittent group</td>
<td>12</td>
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<td>Transient group</td>
<td>5 (17%)</td>
<td>3 (10%)</td>
<td></td>
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<tr>
<td>Constant/Intermittent</td>
<td>2 (7%)</td>
<td>3 (10%)</td>
<td></td>
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<tr>
<td>Constant/Transient</td>
<td>0 (0%)</td>
<td>1 (3%)</td>
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<tr>
<td>Intermittent/Transient</td>
<td>5 (17%)</td>
<td>4 (13%)</td>
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<tr>
<td>Constant/Intermittent</td>
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<td>1 (3%)</td>
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<td>Goal for Pain Management</td>
<td>1st Visit</td>
<td>2nd Visit</td>
<td>$\chi^2$</td>
<td>p-value</td>
<td>T-test Value</td>
<td>Two-tailed P-Value</td>
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<tr>
<td>------------------------------------------</td>
<td>-----------</td>
<td>-----------</td>
<td>----------</td>
<td>----------</td>
<td>--------------</td>
<td>--------------------</td>
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<tr>
<td>Optimal goal for pain level</td>
<td>0.6 (0.9)</td>
<td>0.1 (0.4)</td>
<td>2.9*</td>
<td>0.007*</td>
<td></td>
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</tr>
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<td>Tolerable pain level</td>
<td>3.0 (1.5)</td>
<td>2.9 (1.3)</td>
<td>0.8</td>
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<td>Pain Expectation</td>
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<td></td>
<td>8.64*</td>
<td>0.013*</td>
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<tr>
<td>Worse than expected</td>
<td>5 (17%)</td>
<td>0 (0%)</td>
<td></td>
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<tr>
<td>Same as expected</td>
<td>14 (47%)</td>
<td>15 (50%)</td>
<td></td>
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<tr>
<td>Not as bad as expected</td>
<td>11 (37%)</td>
<td>15 (50%)</td>
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<tr>
<td>Satisfaction with Pain Level</td>
<td></td>
<td></td>
<td>9.31*</td>
<td>0.010*</td>
<td></td>
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<tr>
<td>Yes</td>
<td>23 (77%)</td>
<td>29 (97%)</td>
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<tr>
<td>No</td>
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<td>1 (3%)</td>
<td></td>
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<tr>
<td>Not sure</td>
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<td>0 (0%)</td>
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<td>Number of hours in last 24 that pain was less than tolerable level</td>
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<td></td>
<td>2.56</td>
<td>NS</td>
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<td>0-6 hours</td>
<td>10 (33%)</td>
<td>6 (20%)</td>
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<td>7-12 hours</td>
<td>8 (27%)</td>
<td>0 (0%)</td>
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<td>13-18 hours</td>
<td>3 (10%)</td>
<td>2 (7%)</td>
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<tr>
<td>19-24 hours</td>
<td>9 (30%)</td>
<td>22 (73%)</td>
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Figure 1. Frequency of neuropathic descriptors selected by 30 participants from the PAINReportIt.
Figure 2. Frequency of nociceptive descriptors selected by 30 participants from the PAINReportIt.
Figure 3. Frequency of other descriptors selected from the PAINReportIt.
II. THE SYMPTOM EXPERIENCE OF POSTPARTUM PAIN AFTER CESAREAN BIRTH

A. Introduction

In this study, we addressed the problem of postpartum pain following cesarean birth, which is one of the most common physical health issues for women in the postpartum period. There were over 4.1 million births in the United States in 2009 of which, 32.9% were cesarean births. Compared to women giving birth vaginally, women giving birth by cesarean report more intense pain within the first 3 days and longer enduring pain, lasting out to 6 months and 1 year after birth. The presence of pain is a problem on its own; however, postpartum pain following cesarean birth can have detrimental effects for both the infant and the mother. Women reported that postpartum pain interfered with breastfeeding, women with moderate to severe levels of pain breastfed fewer times in the first 24 hours than those with mild pain, and fewer women breastfed exclusively as a result of postpartum pain after cesarean birth. Activities of daily living, including infant care, were negatively affected by postpartum pain. For mothers, postpartum pain has been reported to impact rest and sleep; women experiencing a cesarean birth achieved only 4 hours of total sleep time in the hospital, compared with over 6 hours of total sleep time for women experiencing vaginal births.

Despite the impact of postpartum pain following cesarean birth, there is a lack of comprehensive measurement of this experience. Few researchers measured postpartum pain with an instrument that addressed both pain types (nociceptive and neuropathic) and all pain dimensions (sensory, affective, cognitive, and behavioral). Nociceptive pain is “pain that arises from actual or threatened damage to non-neural tissue and is due to the activation of nociceptors”. Neuropathic pain is “pain caused by a lesion or disease of the somatosensory nervous system”. Postpartum pain researchers have not differentiated nociceptive and neuropathic pain types. Additionally, pain dimensions have been assessed to a limited capacity. Researchers have measured the sensory dimension of pain, primarily focusing on pain intensity and location, the other pain dimensions were occasionally studied. Although some elements of each of the four dimensions of pain have been addressed, no researcher has examined all four
dimensions of pain in one postpartum group. In this study, we described postpartum pain after cesarean birth in a comprehensive way, reflecting all dimensions and types of pain.

**B. Theory**

The University of California San Francisco Symptom Management Theory\(^2^2\) (SMT) guided this descriptive study. This framework offers a comprehensive way to examine symptoms, as well as follow a symptom’s trajectory through symptom experience, symptom management, and symptom status outcomes—the major theoretical concepts. The relationships among these concepts are shown in the model in Figure 1.

Symptom experience, the focus of this study, includes three components—perception, evaluation, and response to a sensation that is outside of the norm for an individual. These processes occur simultaneously. Perception of symptoms occurs when an individual, “notices a change from the way he or she usually feels or behaves”\(^2^3(p\ 671)\). Evaluation is “making judgments about the severity, cause, treatability and the effect of symptoms on their lives”\(^2^3(p\ 671)\) and includes elements of: intensity, location, temporal nature, frequency, affective impact, and evaluation of threat posed by a symptom.\(^2^3\) Response to symptoms includes elements of, “physiologic, psychological, sociocultural, and behavioral components”\(^2^3(p\ 672)\).

Symptom management strategies are efforts to “avert, or delay a negative outcome through biomedical, professional and self-care strategies”\(^2^3(p\ 673)\). The essential elements of symptom management strategies—what, when, where, why, how much, to whom, and how\(^2^3\)—should be considered when developing management strategies. These efforts include strategies performed by the individual, both self-initiated or at the prompting of a healthcare provider.\(^2^3\)

Symptom status outcomes are the, “clear and measurable outcomes to assess following the implementation of a strategy”\(^2^2(p\ 148)\) with elements of: functional status, emotional status, mortality, morbidity and co-morbidity, quality of life, cost, and self-care.\(^2^2\)

These three concepts—symptom experience, symptom management strategies, and symptom status outcomes, simultaneously interact with one another in an iterative process that continues until
symptoms are resolved or brought under control. If the symptom experience changes, or worsens, the interaction between the theoretical concepts begins anew.22

Because there is a lack of thorough description of postpartum pain in the literature, we focused this study on the symptom experience component of the SMT. It is essential to develop an understanding of the phenomenon of postpartum pain before developing management strategies and evaluating outcomes. The use of this theory for our study was novel. No researchers used the theory to guide an examination of postpartum pain, yet is an excellent fit for this research as pain is one of the most common symptoms experienced by women in the postpartum period6. In this study of postpartum pain, we conceptualized the dimensions of pain within symptom experience as follows: symptom perception—recognition of the change in sensation, evaluation—sensory, affective, and cognitive dimensions of pain, and response—behavioral dimension of pain.

C. Purpose

In this study, we described the dimensions of postpartum pain through the use of a comprehensive psychometrically sound instrument as well as through interviews. For the first time, all four pain dimensions were measured together, resulting in a fuller picture of postpartum pain. By achieving the specific aims of this study and gaining a better understanding of the experience, findings from this study can help improve the detrimental impact of postpartum pain for mothers and infants. The specific aim was to describe women’s:

(a) perception of postpartum pain (recognition of the change in sensation)

(b) evaluation of postpartum pain (sensory, affective, cognitive dimensions of pain)

(c) response to postpartum pain (behavioral dimension of pain)

D. Methods

1. Research Design

In this aspect of a larger study,24 we used a concurrent mixed methods design25,26 to address a gap in postpartum pain research. Concurrent mixed methods include a simultaneous collection of quantitative and qualitative data to capture the broadest view of the complex postpartum pain phenomenon.25,26 Using
this method, we were able to measure all of the dimensions of pain at once. Qualitative findings are reported here.

2. Procedure

After approvals from the appropriate Institutional Review Boards were attained, we recruited participants from one obstetrical practice affiliated with a Midwestern teaching hospital. Based on the surgery schedule, participants were screened for eligibility and approached prior to delivery to explain the study and gauge interest. Consent was obtained and interviews were conducted with participants 1 to 2 days after delivery while inpatient on the postpartum floor. Additionally, a pain questionnaire, the PAINReportIt, a computerized version of the multidimensional McGill Pain Questionnaire was administered after the interview. These measures were repeated at the end of the 6-week postpartum period. Interviews were conducted with participants in a comfortable location (postpartum room, provider’s office, participant’s home), audio taped, and transcribed. This research design allowed women a chance to discuss the impact of postpartum pain on their lives, yielding a richer picture of postpartum pain than would be possible with quantitative measures alone.

3. Measures

Participants were asked to discuss their experience of pain after cesarean birth. Questions were developed to reflect the four pain dimensions (sensory, affective, cognitive, and behavioral) framed within the symptom experience concept (perception, evaluation, and response to a symptom) of the Symptom Management Theory. For example, the question: “Are there any activities that you’ve changed as a result of your pain experience?” reflects the behavioral dimension of pain as well as symptom experience response within the theory. Other postpartum topics identified by previous researchers were included, such as breastfeeding and afterpains. The interview guide was tested with 2-3 volunteers, prior to data collection. To reflect elements of the symptom experience, perception of symptoms was measured with questions such as, “What would you like to tell me about your pain?” Evaluation of symptoms interview questions included questions such as: “How has your pain experience influenced your
relationship with other family members or friends?” Response to symptoms was measured with questions such as, “How has your pain experience influenced your life?”

The PAINReportIt\textsuperscript{27, 28} is a computerized version of the McGill Pain Questionnaire, a multi-dimensional (cognitive, affective, evaluative, behavioral) pain instrument.\textsuperscript{29} The equivalence of the PAINReportIt and the McGill Pain Questionnaire and the reliability of the PAINReportIt have been supported,\textsuperscript{28} reliability details are described elsewhere.\textsuperscript{24}

4. Data Management and Analysis

Qualitative interviews were audio-recorded, transcribed, then checked for accuracy against the recordings. Theory and previous research were combined to guide the initial codes in directed content analysis\textsuperscript{30}. The primary author (EC) identified codes that were consistent with the symptom management theory. Participant responses were coded by the symptom experience components—perception, evaluation, and response—and the elements of these components. Symptom experience-perception was coded as such when participants reported a change in sensation, regarding pain, either noting the sensation of pain or absence of sensation change. Symptom experience-evaluation was coded as such when participants reported information about any of the evaluation elements: severity, cause, treatability, effect of symptom on life, intensity, location, temporal nature, frequency, affective impact, and evaluation of threat. Symptom experience-response was coded as such when participants reported information about any of the response elements: physiological, psychological, socio-cultural, and behavioral. New codes were added as necessary. Using ATLAS.ti (6.2) software program, the primary author and an independent analyst coded a sample of transcripts separately and compared results until discrepancies were resolved and both coders agreed on the application of codes. The remaining interview data were coded by the primary author and all coded data were checked for agreement of application with the independent analyst.
E. Results

1. Sample
A convenience sample of 30 participants undergoing a scheduled cesarean birth was recruited from a large Midwest hospital. This sample majority was older than the national average, white, highly educated, affluent, and experiencing a repeat cesarean birth (Table 1).

2. Symptom Experience-Perception of Symptoms
While inpatient participants reported, “I’m definitely feeling pain today” or “I have no pain,” almost one third of the participants also reported sensations of “pressure,” “pushing,” “pulling,” or “tugging,” especially during anesthesia placement or the cesarean procedure. Participants also reported noticing a change in sensation regarding fatigue. While inpatient, half of the participants reported not feeling rested and being tired, making remarks like, “so, but today I just…even like right from the start just hit a wall of being tired.” In contrast, a third of the participants reported no fatigue, reporting feeling “pretty well rested. I mean, she did okay last night, so I got some sleep.” After caring for a newborn for 6 weeks, over half of the participants reported feeling “tired” or “sleep deprived” and then often relayed the infant’s sleep or feeding schedule, for example, one participant said, “there are a couple days on and off where I can get a good five-hour sleep, but it’s not very often.”

3. Symptom Experience-Evaluation of Symptoms
   a. Severity
While inpatient, most participants reported their pain was mild, describing it as “not bad,” “tolerable,” “manageable,” “bearable,” or “doable.” At the opposite extreme, several participants reported severe pain, saying it was, “excruciating,” or “unacceptable.” By 6 weeks, 24 (80%) participants had “very little” or “minimal” pain, but almost all women reported initial pain in the immediate weeks after discharge. For 14 (47%) participants, the recovery progressed in a manner such as one participant described, “so it was after my c-section the first couple weeks were, you know, noticeable discomfort…and then after two weeks out I would say it was a lot more minimal and like kind of every day after that got like better and better and now it’s like nonexistent.”
b. Cause

Participants reported causes of pain in three categories: physical activities, procedural or surgical sources, or indirect causes. While inpatient, participants reported physical activities such as getting in and out of bed, bending, or uterine cramping from breastfeeding all caused noticeable pain. A number of women recalled the pain they experienced with a procedure like the epidural or IV placement, or pain felt during the surgery itself. Stress or having visitors might not have been painful by themselves, but women reported these as causes that may have indirectly made pain worse. One participant said, “Even when you are on top of your meds, and then the other thing is like yesterday I had a lot of visitors and I feel like that was just sort of stressful and it made the pain worse.” At 6 weeks, there were still physical activities that caused pain, lifting or carrying items was most painful, but stairs were troublesome as well. What was different at 6 weeks was not just the activity, but the amount of activity. Many of the participants reported “overdoing it” or “doing too much” as a pain trigger.

c. Effect of symptom on life

While inpatient one third of the women reported that they had not noticed any major changes on their lives. For the women whose lives were impacted while hospitalized, the biggest problems reported were that pain made it difficult to position for breastfeeding or to be responsive to the newborn’s needs. One woman discussed her challenge with breastfeeding, “Just getting the right position is difficult because of the pain and because I haven’t been able to get up right away and I feel like I can’t help as much with the diapering and getting the baby in and out of the bassinet.” Self-care issues resulted from pain, especially using the bathroom. One woman said, “I have to go to the bathroom, but I don’t want to because it hurts.” At 6 weeks, the biggest impact that pain had on life was caring for an older sibling. Lifting a toddler was difficult and many participants reported the strain caused in their daily routine. One participant said, “I think one of the reasons why it just took a little bit longer to recover this time too is because I have a toddler…and even though I would try to lift her as little as possible, there’s always times where you still have to, so I think that probably is what extended the recovery period.” Carrying the baby, especially in a car seat, was a challenge. One participant reported, “I don’t act like I’m superwoman. I
don’t carry the baby as often, you know, in a car seat and stuff. I don’t act like I can do it all [because I can’t].” Additionally, women reported impaired mobility because of pain, or recognizing a need to “slow down.”

d. Intensity

Occasionally, while inpatient, participants rated their pain with an intensity score. Those who did reported their pain was 4 to 5 out of 10 at the most intense. No intensity scores were reported at 6 weeks. Energy levels, also rated by two participants with this same 0 to 10 scale was reported as 5 out of 10.

e. Location

Participants often described where their pain was located. At the inpatient and 6 week visits, the abdomen was the most frequently reported location (the “incision site” and the “abdominal muscles”) followed by the back. The uterus was also mentioned at the inpatient visit.

f. Temporal nature

Occasionally, participants made reference to time when describing their pain. While inpatient, participants made reference to “yesterday,” “last night,” or “today” and how their pain changed. At 6 weeks, a majority of the participants reported that 1.5 to 2 weeks was the threshold when their pain resolved. One participant reported, “I feel like for me the pain didn’t last very long after I was home. I’m not sure if that’s because you just get so busy, but I feel like after the first week and a half I didn’t have any more pain.”

g. Frequency

Pain pattern was reported, although not by many participants. Participants mostly reported an intermittent pattern, often pain coming in “waves,” or pain returning as medication wore off.

h. Affective impact

Participants would describe the relationship between pain and feelings or emotions which varied by individual. Many women reported that their pain had no impact on their bonding ability, but for others, pain was a factor. For one participant, pain was extremely negative, impacting the initial bonding
time with her newborn immediately after cesarean birth; she said, “I was worried because I was so miserable during the procedure and they really wanted us to bond together…and they like brought the baby over and I was like, I can’t even look at him. Like, just, I’ll, you know—I’ll deal with that later.” Pain also brought out unexpected emotions. One participant reported, “and you know to be honest with you, I think it brought up some grief for me because my mom is deceased and I really needed her, you know…during those first couple weeks and so I think because I didn’t have anyone to take care of me during that time I was sad. You know, I was really sad and kind of resentful and I don’t know of who. I was just angry, you know, because I’m like, you know, no one’s taking care of me.”

4. Symptom Experience- Response to Symptoms

a. Psychological

Psychological responses included affective changes like mood changes or altered self-esteem. For this sample, women mostly reported feeling more “emotional” or “attitudey,” although, one participant reported feeling, “probably just maybe a little bit of depression, you know, just because I couldn’t do a lot at first.”

b. Socio-cultural

The majority of participants reported that their relationships with their newborn, family, and friends hadn’t changed in response to the pain experience. At both visits, asking for assistance from partners and family members was the most common and biggest change in the relationships that participants reported. Oftentimes the shift was perceived as helpful and positive. One woman said, “I think, you know, for the people that were here the first couple weeks…My mom was here for awhile and, you know, my husband being here and stuff and having friends stop by, it kind of strengthened relationships because they were, you know, helping so much and, you know, they were telling me, you know, like don’t do that, sit down, you’re doing too much. You know, to have the people actually looking out for me when I was like ‘oh no, it’s fine’ and they kind of knew better, you know.” However, occasionally the assistance was not helpful and left a negative impression. One woman reported, “So, instead of just enjoying being taken care of, you know, because my husband has been really good about
that. I just wanted to, like, do it myself. You know, the whole independent woman thing.” One other relationship affected by postpartum pain was with toddler siblings of the newborn. One woman reported, “I had to send my son with my mom for three weeks and he was gone which during hormone times that’s a bit hard. I feel like if I could’ve had more pain control I could’ve dealt with him better…but I just had to change what I was doing.”

c. Behavioral

Within the behavioral responses to pain there were two areas that patients reported—activities affected by pain and role changes affected by pain. Behavioral-activities included any activity affected by pain. While inpatient, the affected actions were mostly simple movements like getting out of bed, or walking were affected and a number of participants reported that they had to “take it easy” or be careful to “move slowly”. By 6 weeks, activities like lifting (including picking up a toddler, or carrying a car seat) had proved troublesome because of pain. Participants also reported they found it “harder to get around” or were “doing less” and were less inclined to go out; sometimes this response was isolating. One participant reported, “And I’d say I’ve been actually outside a lot less than I normally would be because it was hard for me to lift the car seat, which is her stroller as well, so I was just kind of like…I’ve definitely been kind of a shut-in almost at my house, yeah. I mean, I’d be getting out by myself but I haven’t been taking her out very much.” Exercise was another activity either affected or put on hold because of postpartum pain. For example, one participant said, “You know, they said I could’ve been walking and we’ve had such nice weather. I really wish I could’ve done more walking and been in…you know, working toward, you know, weight loss and getting back in shape more.”

In regard to breastfeeding, pain initially made it difficult to get into position, but very few participants reported that pain prevented them from breastfeeding altogether. Most of the participants in this study started breastfeeding while inpatient; by 6 weeks roughly half were still exclusively breastfeeding. For those who had switched to formula feeding, the biggest reason was milk production, not pain.
Behavioral-role change included any change in role. Asking for help, either from a partner, or from family/friends was an adjustment in normal role performance for many participants. Women expressed a desire to do things for themselves, but feeling limited by pain. There seemed to be an internal struggle between needing and accepting help. One participant reported, “And made me really dependent on other people which, you know, just for my particular personality is not a comfortable position to be in. You know, it’s always nice to have help, but you know, when it came to like could I just lift her up and take her on a walk or something to get out of the house and it was just I couldn’t really do all of that. You know, toss her in the car and go for a ride or something. It was just very limiting.”

5. Omitted and Added Elements

Based on participant responses, there were several omissions or additions to the codes. Omitted codes, those elements of the symptom management theory that were not reported by participants, included: symptom experience-evaluation-treatability and evaluation of threat, and symptom experience-response-physiological. Additional codes resulted from participants’ report of information about their pain experience that corresponded with the symptom experience concept, but did not match an existing element, these included: quality and expectation.

a. Quality

Participants often described the pain they were feeling, using specific words, to complete a picture of their pain. Women verbalized a number of words, indicating nociceptive pain type, such as “sore,” “cramping,” “tender,” and “sharp”. Women also verbalized pain descriptors that indicated neuropathic pain type such as “stinging,” “burning,” “numb,” and “aching”. Women also used descriptor words to report their experience that have not yet been associated with a specific type of pain, including: “raw,” “diffuse,” “stretching,” “bruised,” and “stiff”.

b. Expectation

When asked the question, “How does your pain experience compare to what you had expected?” women’s responses varied. While inpatient, about a third of participants reported their pain was the same as expected, a third felt their pain was better than expected, the remaining respondents felt
their pain was worse than expected. At 6 weeks, over one third of participants felt their pain was the same as expected, over one third felt their pain was better than expected, and a select few felt their pain was worse than expected. Nearly all participants indicated they were okay with their level of pain and satisfied with pain control at both the inpatient and 6 week visits.

Knowing what to expect (having a prior cesarean birth) was important; most of the participants, reported that this was an advantage. One participant remarked, “You know what? I think again like this time around I probably knew what to expect and then just I think I would say even though the pain I would say is probably the same as the last time around, but this time just having that…just knowing what I’ll be going into helps a lot….” Even first time mothers reported the value of being prepared. One participant said, “Well and I know that everybody says that it’s much easier to have a C-section when you plan it than to have it as, you know, a last resort after the fact. So, I think that probably really helped too, going into it well-rested and knowing what I was having happen and, you know, being mentally prepared for it.”

6. Remaining Symptom Management Theory Concepts and Domains

The symptom experience concept was the focus of this research. However, women also reported elements of the other components of the theory—symptom management strategies and symptom status outcomes.

a. Symptom management strategies

Participants reported a few strategies that corresponded to who, what, how, when, where and how much, but not specifically for why, and to whom. For this study, why (for pain) and to whom (the participant) is implicit. “Who” as identified by participants, administered symptom management strategies were mostly partners and family members, both at the inpatient and 6-week visits. The two most common “what” strategies as reported by participants were taking medications and accepting help from others—this was true for both the inpatient and 6 week visits. By 6 weeks, taking it easy and trying to rest or sleep were often cited management strategies; one participant reported “I don’t think there is any particular activities that has helped but I think rest…as much sleep as I can really helped.” “How,”
“when,” “where,” and “how much” as identified by participants was the oral pain medication (usually acetaminophen/hydrocodone or ibuprofen), taken as prescribed while inpatient. Once home and pain was decreasing, participants reported often taking only partial doses, especially of acetaminophen/hydrocodone, and also cutting back the prescription dose of ibuprofen in favor of over-the-counter doses for an average of 2 weeks after being discharged home. The longest duration for pain medication was for a month; the shortest 4 to 5 days. Help from others was offered throughout the 6 weeks.

b. Symptom status outcomes

Participants reported few outcomes that corresponded to functional status, emotional status, mortality, morbidity and co-morbidity, quality of life, costs, or self care. In this study, participants’ outcomes reports reflected pain relief and side effects. Nearly all participants reported decreased pain after their use of analgesic medications. The other symptom status outcomes were the side effects after taking pain medication, particularly acetaminophen/hydrocodone; the biggest concern was the effect the medications might have on breastfeeding and the risk of being passed to the baby. A number of women reported not liking the way they felt while taking acetaminophen/hydrocodone—usually “groggy,” “light-headed,” or “drowsy.” Additionally, this drug caused constipation. Even with the use of prescribed over-the-counter stool softeners, some women reported constipation as the most painful part of postpartum and caused other women to stop taking acetaminophen/hydrocodone altogether. For example, one participant said, “And it was really bad because I couldn’t go to the bathroom. So I made the decision, like, maybe four days after I came back not to take the pain medication but it just, I couldn’t take it. It was too painful.” Addiction or dependency were also potential concerns reported by several participants; one participant said, “Getting addicted to pain medicine [Norco]. Yeah…because, you know; that’s all you hear is people getting addicted. That’s why I don’t even take it all”.

7. Comparisons with PAINReportIt Data

The PAINReportIt measures the four dimensions of pain (sensory, affective, cognitive, behavioral); in these interviews, participants reported information about all dimensions. Within the
sensory dimension of pain, women reported pain was located at the abdomen, at worst was moderate in intensity, was represented by descriptors like sore, cramping, numb, and aching, and was intermittent in pattern. Within the affective dimension of pain, women reported that pain had little impact on bonding with their newborns, but pain still affected emotions, sometimes bringing out unexpected feelings, like grief. Within the cognitive dimension, most participants expected the pain they experienced, were okay with their pain level, and were satisfied with pain control. The response to pain was largely reflected in behaviors. There were a number of activities that were impacted by pain, including getting in and out of bed and lifting items; pain did not prohibit breastfeeding. See Table 2 for a comparison between the PAINReportIt results\textsuperscript{24} and this study’s results.

F. Discussion

The specific aim of this research, using the University of California San Francisco symptom management theory, was to describe women’s: perception of postpartum pain (recognition of the change in sensation), evaluation of postpartum pain (sensory, affective, cognitive dimensions of pain), and response to postpartum pain (behavioral dimension of pain). Using interviews and conceptualizing the dimensions of pain within the symptom experience components, we were able to provide a comprehensive description of women’s experiences of postpartum pain after cesarean birth.

Women eagerly provided information for all components of symptom experience. Participants perceived changes in sensations and were aware of the pain they experienced after cesarean birth. For most participants in this study, pain overall was not severe, even so, the experience of pain impacted their lives, as seen in their evaluation of the pain. For example, most women didn’t report pain affected their emotions; however, a select few were impacted greatly. Even for the typical participant, postpartum pain’s effect on their lives was notable; pain had social (not going out, changing relationships) and self care (delaying going to the bathroom) implications. Additionally, pain made it more challenging for many of these women to care for their newborns and impacted care of their toddler children. Women in this study reported that toddler care lengthened their recovery; this is similar to Tulman and Fawcett’s\textsuperscript{31} findings where 20% of multiparas reported other children were a hindrance to their postpartum recovery.
The response to the symptom experience of pain was mostly behavioral. Many women reported being able to do less and the need to rely on others for tasks. Husbands/partners and friends and family members were oftentimes relied upon for assistance to help manage pain. This was a challenge for a number of women because it changed their normal relationships and was so different than their normal functioning. The women in this study reported they found it difficult to accept assistance, even though it was needed. Several women mentioned being “independent” or “superwoman/supermom”, and attempting to continue performing tasks the way they did before. Although no women expressed this, it may be possible that pain was protective. Women reported that the initial pain made them move slower or do less—maybe this decreased activity prevented women from doing too much, too early. Asking for help after giving birth is a common practice; in two studies, researchers reported nearly all women identified at least one helper in the postpartum period.31,32

In addition to symptom experience descriptions—the focus of this study, participants also shared information regarding the other concepts of the theory; participants reported some symptom management strategies and symptom status outcomes. Asking for help with tasks at home is one example of a response to pain that is also a management strategy; the other most common management strategy was taking medications. Nearly all of the women in this study managed their pain with pain medications, usually acetaminophen/hydrocodone and ibuprofen. Even though this practice was common, women expressed a number of concerns with taking drugs. Constipation was a major issue for a number of women and this condition was sometimes more painful than the cesarean incision. A concern of addiction and a concern of transmitting the effects of the drugs to the newborn were also identified by the participants. Side effects and concerns such as these made some women forgo pain management in efforts to alleviate the problem, leaving the possibility that pain went undertreated, or untreated.

Not all components of the symptom management theory were addressed by participants in this study; however, this theory is a global model for all symptoms. Postpartum pain after cesarean birth is only one symptom, thus all of the elements of this theory were not represented in our participant responses. Additionally, there were reports of pain details from participants that corresponded with the
symptom management theory, but did not match with current components or elements such as pain quality and expectation in the evaluation of pain. The majority of women in this study were second-time mothers; their expectations were different because of their first birth experiences. This prior knowledge was considered an asset to most of the women. A number of mothers in this study compared this birth to their previous experience and reported that this birth was much easier; also, women reported having a mental picture of what the delivery and the recovery trajectory at home upon discharge was helpful. Even the first-time mothers in this study were able to plan for this event as these cesarean births were scheduled. This finding suggesting that preparation is important was supported by other investigators; a lack of preparation was associated with more physical symptoms and physical limitation in the postpartum period.33

The dimensions of pain were reported in interviews, providing a comprehensive description of pain similar to the PAINReportIt. The qualitative interviews and quantitative PAINReportIt both measured the postpartum pain symptom thoroughly, although interviews presented less sensory pain detail but more affective and behavioral pain detail. The two methods of assessing pain complement one another and demonstrate the multidimensional nature of pain. Similar reports were gathered through interviews and the PAINReportIt. Additionally, women in another study7 used descriptors such as “aching,” “tender,” and “numb” to describe sensations at or around their cesarean incision, similar to participants in this study, lending further support to the applicability of the PAINReportIt with postpartum women.

G. Limitations

The limitations of this study include the small sample, the order of data collection, and the timing of interviews. Because of the sample composition, results cannot be generalized to all women after birth. Interviews were conducted prior to the administration of the PAINReportIt for all participants; order of data collection was not randomly assigned. However, this was performed to avoid introducing pain descriptors to participants via the questionnaire that they may not have used to describe their experience in the interview. By 6 weeks, most participants reported pain was almost resolved, but many reported that
their first 1 to 2 weeks were more painful. Participants were asked to recall pain in the entire 6 weeks; remembering pain from several weeks prior may not be the most accurate representation of their experience. The strengths of this study lie in the use of the SMT to guide the study and the comprehensive measure of postpartum pain. The findings from this research are useful for advancing the knowledge of postpartum pain.

**H. Implications for Practice and Research**

Pain after cesarean birth was not severe for most of our participants, but even so, the pain still impacted their lives. The symptom experience of postpartum pain after a cesarean birth is complex and individual; nurses should be cognizant of this fact and complete thorough assessments of pain, focusing not just on the physical dimension of pain. Effect on life and behavioral responses are two of the biggest areas of pain impact that may not be evaluated during routine care. Nurses have the ability to support and better prepare patients for the postpartum period. The findings from this study help us to begin anticipating their needs—mothers need to know what to expect during and after delivery from a physical perspective, they need to be supported for the changes that the pain and recovery may have on relationships, and they need to be educated on pain management options like asking for help and prioritizing sleep. Candid discussions with all moms may help set expectations and decrease anxiety about the process.

Using a theory to guide this study prepares the way for the next step in research. With our understanding of postpartum pain after scheduled cesarean sections, much information could be gained by replicating this study with vaginal births and unscheduled cesarean births so that our understanding of the symptom experience of postpartum pain can be generalized to all postpartum experiences and to study the other 2 concepts of the SMT (symptom management strategies and symptom status outcomes). The knowledge of the symptom experience of postpartum pain, gained through this work, has the potential to generate new symptom management strategies to relieve pain and result in better symptom outcomes.
The similar report of postpartum pain across all dimensions in interviews indicates that the use of the PAINReportIt with this population is appropriate to describe this pain experience. This PAINReportIt instrument would be useful as a clinical tool used to thoroughly measure postpartum pain.

I. Conclusion

Using the Symptom Management Theory as a comprehensive framework to measure postpartum pain after cesarean birth, we discovered rich information reported by participants in regards to the symptom experience. Perception, evaluation, and response to pain are individual and complex experiences. By sharing their evaluation and response to postpartum pain, we now better understand how pain impacts women's lives and their behaviors.
J. References


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<td>21 (70%)</td>
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<td>3rd or more</td>
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<td>Malpresentation</td>
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<td>Cognitive</td>
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<td>66% Pain is same as or better than expected</td>
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<tr>
<td></td>
<td>than expected</td>
<td>97% Satisfied with level of pain right now</td>
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<td>Made pain worse</td>
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Appendix A

Research Proposal

I. SPECIFIC AIMS
My goal is to describe the complex phenomenon of postpartum (traditionally defined as the 6 weeks after delivery) pain in women experiencing a cesarean birth. There were over 4.1 million births in the United States in 2009 [1] of which, 32.3% were cesarean births [2]; the pain experienced by women in the postpartum period impacts many. Pain is a common experience after all births, with up to 92% of women reporting pain [3] and up to 78% of women rating the intensity as moderate to severe [4-14]. Postpartum pain has detrimental implications for both the infant and mother. Women experiencing postpartum pain took longer to initiate interactions with their infants [15], reported that it negatively affected breastfeeding [7, 11], and also interfered with infant care [11, 16, 17]. Mothers’ postpartum pain negatively affected their rest and sleep [8, 14] and concentration and learning [7, 8]. Severe pain was associated with a 2.5-fold increased risk of persistent pain, up to 8 weeks, and a 3-fold increased risk of depression [8]. Postpartum pain following a cesarean birth has been reported as ‘more intense’ or ‘worse than expected’ when compared to vaginal births [11, 18-20]. Postpartum pain following cesarean birth affected activities of daily living, including infant care, more than pain after vaginal birth [11, 21] and reduced breastfeeding exclusivity [22]. At 5 to 6 weeks after a cesarean birth, women reported worse physical health than those women experiencing a vaginal birth [23] and fewer women reported that they had regained full energy [24]. It is for these reasons that I will focus my research on the experience of pain after a cesarean birth.

There are two types of pain: nociceptive and neuropathic, experienced when pain pathways are triggered. Nociceptive pain is experienced when there is somatic or visceral injury that stimulates nociceptors [25, 26]. Neuropathic pain is experienced when there is nerve injury [25, 26]. When considering these two types of pain, there are four dimensions to evaluate: sensory, affective, cognitive, and behavioral [27]. The main focus of postpartum pain research has been the sensory dimension of pain, centering on pain intensity and location, primarily through the use of the Visual Analogue Scale or a similar instrument [e.g.,17, 28, 29]. Only two research teams examined the affective dimension of pain with a formal instrument [6, 30]. However, a few researchers included the affective dimension of postpartum pain to a limited degree, by examining the ‘unpleasantness’ of pain [28, 31, 32], symptom distress [9, 33], or degree that the pain ‘bothered’ or was ‘difficult’ [34-36]. The cognitive dimension of pain was measured to a limited extent by researchers by examining satisfaction with pain management or expectations of pain [6, 7, 11, 19, 29, 30, 37, 38]. Researchers have examined the behavioral dimension of pain by observing pain’s impact on activities of daily living (e.g., walking, sitting, voiding, or passing stool) and infant care tasks (e.g., breastfeeding, lifting infant) [5, 6, 8, 11, 16, 17, 21, 22, 29, 34, 39-42].

Postpartum pain research lags behind the state of science in other pain research areas due to an inconsistent description of pain in terms of type and dimension. Pain types, nociceptive and neuropathic, have not been specifically differentiated by postpartum pain researchers. A better understanding of the type of pain will help guide more directed therapies and offer potential options for pain management. Better postpartum pain management can facilitate mother-infant interaction, breastfeeding, infant care, mothers’ rest and sleep, concentration, and learning. Although researchers have included some elements of the pain dimensions, the sensory, affective, cognitive, and behavioral dimensions have not been addressed comprehensively in postpartum women. Furthermore, the impact of postpartum pain on mothers and infants has not been well established. What is lacking is a comprehensive postpartum pain measurement that evaluates pain type and dimensions with a
psychometrically sound instrument. With too little knowledge about the postpartum pain symptom experience, nurses cannot adequately understand or appropriately treat postpartum pain.

The University of California San Francisco symptom management theory (SMT) [43] will guide this descriptive study. The SMT approaches symptom experience in a comprehensive way. Concepts in the model include: symptom experience, symptom management, and symptom outcome. Within the symptom experience concept, there are three components: symptom perception (noticing a change), evaluation (judgments about symptoms), and response (feelings, thoughts, behaviors secondary to symptoms). The two types of pain and the four dimensions of pain can be conceptualized within the components of symptom experience. Thus, symptom experience will be the focus of this research; it is essential to develop an understanding of the phenomenon of postpartum pain before developing management strategies and evaluating outcomes. Using a concurrent mixed methods design [44, 45], I will use both quantitative and qualitative measures to better describe women’s experience of postpartum pain. I will use PAINReportIt [46, 47], a computerized version of the McGill Pain Questionnaire (MPQ) [48], to gather descriptors of the sensory, affective, evaluative (cognitive), and behavioral dimensions of pain. Conducting interviews with participants at the beginning and end of the 6-week postpartum period will allow women a chance to discuss the impact of postpartum pain on their lives, yielding a richer picture of postpartum pain than would be possible with quantitative measures alone. The symptom experience of postpartum pain is complex; using concurrent mixed methods to examine postpartum pain will provide the most information to better understand symptom perception, evaluation, and response. Participants (30) will be recruited and complete interviews and the PAINReportIt twice. The first time will be during their inpatient stay and it will be repeated at the 6 week postpartum follow up visit.

The specific aim is to describe women’s:
(a) perception of postpartum pain (recognition of the change in sensation) by conducting qualitative interviews
(b) evaluation of postpartum pain (sensory, affective, and cognitive dimensions of pain) using the PAINReportIt instrument and qualitative interviews to understand pain intensity, quality, pattern, and location
(c) response to postpartum pain (behavioral dimension of pain) using the PAINReportIt instrument and qualitative interviews to understand what activities relieve/increase pain, and what changes in behavior result from postpartum pain

A secondary aim of this research is to differentiate nociceptive and neuropathic pain from the pain descriptors within the PAINReportIt.

II. RESEARCH STRATEGY
A. Significance
The proposed study will address the problem of postpartum pain following cesarean birth. There were over 4.1 million births in the United States in 2009 [1], of which, 32.3% were cesarean births [2]; postpartum pain has the potential to impact up to 1.3 million women [2]. More intense pain has been reported by women after a cesarean birth when compared to vaginal births within the first three days [11, 19, 20]. Additionally, postpartum pain following cesarean birth endures; at two and six months after birth, more women continued to report pain following a cesarean birth than women experiencing vaginal birth [21]. At six months, 18% of 484 women continued to report incisional pain from cesarean birth, compared with 1% of women reporting perineal pain from spontaneous vaginal birth [21]. The presence of pain is a problem on its own; however, postpartum pain following cesarean birth can have detrimental effects for both the infant and the mother. The initial period following birth is
critical to the developing relationship between mother and infant; interaction within the immediate postpartum period has effects for up to one year after birth [50]. The importance of early mother and infant interaction is especially significant in premature infants, where this interaction has implications for feeding success [51]. Women experiencing postpartum pain took longer to initiate interactions with their infants [15]; this delay could be detrimental to their relationship with their infants. Additionally, women reported that postpartum pain interfered with breastfeeding [7, 11]. When compared with vaginal births, fewer women breastfed exclusively as a result of postpartum pain after cesarean birth [22]. Activities of daily living, including infant care, were negatively affected by postpartum pain [11, 16, 17, 21]. For mothers, postpartum pain has been reported to impact rest and sleep [8, 14]; women experiencing a cesarean birth achieved only four hours of total sleep time in the hospital, compared with over six hours of total sleep time for women experiencing vaginal births [52]. At eight weeks postpartum, up to 50% of women reported sleep was negatively affected by persistent postpartum pain [8]. Physical health [23] and energy [24] were negatively affected by postpartum pain; concentration and learning [7, 8] also suffered as a result of postpartum pain.

Despite the impact of postpartum pain following cesarean birth, hereafter referred to as postpartum pain, there are two critical barriers to the advancement of science in this area: lack of comprehensive measurement and lack of appropriate pain terminology use. Very few researchers measure postpartum pain with an instrument that comprehensively addresses pain types and includes all pain dimensions. Additionally, postpartum pain researchers have not used the pain terminology that reflects the mechanisms or pathophysiology of pain, specifically, the types and dimensions of pain. Together, these two barriers have prevented postpartum pain researchers from providing a comprehensive postpartum pain measurement.

Postpartum pain researchers have examined some elements of pain dimensions, but primarily have done so without a comprehensive approach. Only two researchers [6, 30] have employed the MPQ [48] and measured the sensory, affective, cognitive, and behavioral dimensions of pain [49]. Although these researchers measured postpartum pain with the MPQ, they did not analyze the data to its full potential. Kindberg et al. [30] administered the MPQ in its entirety, but reported total Pain Rating Index scores only, a 0-78 point scale. None of the pain descriptors chosen by participants were included in the publication and the dimensions of pain were not analyzed or not reported. Dodd et al. [6] employed the Short-Form MPQ which measures sensory and affective pain dimensions only. Again, only total scores, and no pain descriptors, were reported from these data. This was a missed opportunity to describe postpartum pain using pain dimensions. Brown [53], in the Maternal Health Study proposed the use of an adapted MPQ and the Brief Pain Inventory, but results have not been published. Scharff [33] employed the Multidimensional Pain Inventory which measures pain intensity and life impact (behavioral pain dimension). This instrument measures more than the sensory dimension of pain, but does not consider all dimensions. The few research teams that have used a comprehensive instrument that measures all pain dimensions have not reported all of their findings, missing an opportunity to advance the understanding of postpartum pain. The lack of a full report or the use of a comprehensive instrument is one of the largest gaps in this science.

Postpartum pain researchers have not employed appropriate terminology to reflect the mechanisms or the pathophysiology of pain. Nociceptive pain is experienced when there is somatic or visceral injury that stimulates nociceptors [25, 26]. Neuropathic pain is experienced when there is nerve injury [25, 26]. In postpartum pain research, researchers have not separated nociceptive or neuropathic pain. Additionally, pain dimensions have been assessed to a limited capacity. Many researchers have measured the sensory dimension of pain, primarily focusing on pain intensity and location [e.g., 17, 34, 53] which decreases with time. The other pain dimensions were only
occasionally included by researchers. The affective pain dimension was indirectly assessed by including “unpleasantness” [28, 31, 32], “symptom distress” [9], or “symptom bother” [35, 36]; these complaints peaked during the first week, but were sustained out to one year. The behavioral pain dimension was partially addressed by assessing the degree to which postpartum pain affected activities of daily living [5, 8, 11, 16, 17, 21, 34, 39], breastfeeding [11, 22, 41, 54, 55], or sexual function [32, 56]. Activities were less affected by pain over time; however, pain continued to impact activities of daily living for 10% (54) of women [5]. The cognitive pain dimension was assessed through questions soliciting satisfaction with pain management or pain expectations [6, 7, 11, 14, 37, 38]. Although elements of each of the four dimensions of pain have been included, no researcher has examined all four dimensions of pain in one postpartum group. Pain type (nociceptive or neuropathic [25, 26]) and pain dimensions (sensory, affective, cognitive, behavioral [27]) are commonly used in other areas such as cancer [57] or sickle cell disease [58]. However, these terms are not used by postpartum pain research teams. Postpartum pain researchers are limited in their measurement of pain dimensions. This lack of common language hinders the progress of science, as postpartum pain researchers cannot build on the progress made by other pain researchers.

In the proposed study, I will address these critical barriers by examining the type and dimension of postpartum pain, through the use of a comprehensive, psychometrically sound instrument as well as interviews. For the first time, all four pain dimensions (sensory, affective, cognitive, and behavioral) will be measured together, resulting in a fuller picture of postpartum pain. By gaining a better understanding of the experience, this study can help improve the detrimental impact of postpartum pain. By achieving the specific aims of this study, the knowledge gained of the symptom experience of postpartum pain has the potential to generate new symptom management strategies to relieve pain and result in better symptom outcomes. These outcomes include: improved maternal and infant interaction, successful breastfeeding, and improved maternal infant care could result. Symptom management strategies could also improve maternal outcomes in sleep/rest, concentration/learning, and decrease risk of depression.

B. Innovation
The proposed research study is innovative because of the use of: a theoretical framework, an instrument that measures all dimensions of pain, and a combined quantitative and qualitative approach. The novel application of theory, instrument, and research approach will further our understanding of postpartum pain.

The novel theoretical framework is the UCSF symptom management theory [43]; this framework provides organization that has not been evident in prior research. This framework offers a comprehensive way to examine symptoms, as well as follow a symptom’s trajectory through symptom experience, symptom management, and symptom status outcomes, the major theoretical concepts.
Figure 1. UCSF Symptom Management Theory Model.

The relationships of the major theoretical concepts are depicted here. The focus of this research will be on the symptom experience concept, including the perception, evaluation, and response to symptoms.


Symptom experience includes three components: perception, evaluation, and response to a sensation that is outside of the norm for an individual. Perception is noticing a change in status. Evaluation is the appraisal of the impact the status change has on the individual’s life and ability to function. Response is the action taken as a result of the symptom experience and evaluation. These processes occur simultaneously. Symptom management strategies are efforts to decrease or eliminate the sensation noticed in symptom experience. Within this theory, the essential components of symptom management strategies are: who (delivers), what, how, when, where, to whom, how much, and why [43]. These include strategies performed by the individual, both self-initiated or at the prompting of a healthcare provider. The importance of self-management in this theory represents an important shift towards the individual acting as his or her own caregiver. Symptom status outcomes are the measurable results of a symptom management strategy. Within the theory, the areas that are measured are: functional status,
emotional status, mortality, morbidity and co-morbidity, quality of life, costs, and self-care [43]. These three concepts: symptom experience, symptom management strategies, and symptom status outcomes, simultaneously interact with one another; for example symptom experience is affected by symptom management strategies and symptom outcomes in an iterative process that continues until symptoms are resolved or brought under control. If the symptom experience changes, or worsens, the interaction between the theoretical concepts begins anew.

Because there is a lack of a comprehensive description of postpartum pain, the proposed study will center on symptom experience, one portion of the SMT. This portion consists of three components: symptom perception (noticing a change), evaluation (judgments about symptoms), and response (feelings, thoughts, behaviors secondary to symptoms). Once we gain a better understanding of the symptom experience, then appropriate symptom management strategies can be developed. The use of this theory for my proposed study is novel. No researcher has used the theory to guide an examination of postpartum pain, yet is an excellent fit for this task as pain is one of the most common symptoms experienced in postpartum [21]. The theory concepts are conceptualized in this study as follows: symptom perception of postpartum pain is conceptualized as the recognition of the change in sensation. Evaluation of postpartum pain is conceptualized as the sensory, affective, and cognitive dimensions of pain. Response to postpartum pain is conceptualized as the behavioral dimension of pain.

This study uses novel instrumentation, a computerized MPQ [48], the PAINReportIt [46, 47], to examine postpartum pain. Previous researchers have not described all of the dimensions of postpartum pain: the sensory, affective, cognitive, and behavioral dimensions. The sensory dimension has been the primary focus of previous research and researchers have used instruments that measured this dimension alone, resulting in an incomplete symptom experience description. Although this instrument has been used extensively to assess other pain types (e.g., cancer [57] and sickle cell [58]), the use of the MPQ for assessing postpartum pain is rare [6, 30]. The PAINReportIt [46, 47], a computerized version of the instrument, has been successful with cancer [59] and sickle cell [58] participants, but has not yet been administered to a postpartum population. The MPQ is a multidimensional pain measurement, evaluating the sensory, affective, cognitive, and behavioral dimensions of pain [48].

In this study, I will use a novel approach, concurrent mixed methods [44, 45], to address a gap in postpartum pain research. Previous researchers have employed a one-dimensional methodology in research designs, for example, examining the sensory dimension alone. Primarily quantitative studies have been completed to date. For example, previous researchers have trialed pain interventions (such as lidocaine ointment for perineal pain [37]) or compared pharmaceutical options [13, 60]. Few qualitative approaches have been taken to examine the pain experience. Concurrent mixed methods include a simultaneous collection of quantitative and qualitative data to capture the broadest view of the complex postpartum pain phenomenon. With this method, I will be able to measure all of the dimensions of pain at once as well as explore the interaction of: symptom perception, evaluation, and response, within the symptom experience. The qualitative data will expand the understanding of postpartum pain gathered from quantitative data. This is in contrast to prior research which has been limited in perspective, focusing primarily on the sensory dimension of postpartum pain. Postpartum pain researchers have not examined the experience in a comprehensive way and have not included the types of pain or the pain descriptors in their measurements. In my proposed study, I will address this gap by using the PAINReportIt to measure the sensory, affective, cognitive, and behavioral dimensions of pain. Participant interviews will be conducted as well, to examine the pain dimensions not captured by the PAINReportIt and to allow participants an
opportunity to elaborate on their pain experience in a way that may not be possible with a written instrument alone. By taking this novel approach, through concurrent mixed method design, the proposed study will yield the greatest understanding of the complex phenomenon of postpartum pain.

C. Approach

Design
In this study, I will use a longitudinal, concurrent mixed methods design [44, 45] to describe women’s perception of, evaluation of, and response to postpartum pain. I will recruit participants from one provider group delivering babies at a large, university-based, Chicago medical center. Recruitment will occur in one of three ways: in the provider’s office prior to admission to the labor and delivery floor; in the preoperative room, prior to scheduled cesarean birth; or, on the postpartum floor, after scheduled cesarean birth. Once, between 24-48 hours post-cesarean, during the inpatient postpartum period, I will interview women, using a piloted interview guide, and administer the PAINReportIt [46, 47]. This interview will be conducted prior to administration of the PAINReportIt. At the six-week postpartum check up at a location scheduled for the convenience of the mother, I will again interview and administer the PAINReportIt. Locations for six-week data collection may include: the participant’s home, the primary provider’s office, or agreed upon public meeting places. This time frame has been chosen because it is the traditional postpartum period. The inpatient and six-week results of the PAINReportIt will be compared to observe the change in postpartum pain and to discover the extent of pain six weeks after birth. The design is appropriate because the entire pain experience may not be captured by the PAINReportIt alone. Offering participants the opportunity to share their story via interviews will provide additional information about postpartum pain.

Setting and Sample
I will recruit a convenience sample of 30 participants from one labor and delivery unit. This clinical site oversees 12,000 births annually and provides services to a wide range of diverse patients. The participants will all be patients with the largest practice at this hospital to facilitate contact at the six-week office visit. Inclusion criteria include women who are: at least 18 years of age, scheduled for cesarean section, and experiencing a singleton pregnancy. Exclusion criteria include women who have any prior labor with this pregnancy to avoid any effect that labor pain might have on postpartum pain. Pregnancies complicated by risk factors such as: multiple gestation, preterm labor, pre-eclampsia, and diabetes will also be excluded because they may result in situations that affect postpartum pain. For example, fatigue from a prolonged inpatient hospital stay, or medications/treatments necessary for complicated pregnancies may impact postpartum pain experienced. Non-English speaking patients will be excluded from participation as the MPQ has been validated in English only and interviews can only be conducted in English by this researcher.

There will be a maximum of 30 participants recruited for this study because the goals of this research are to describe postpartum pain only. This number is intended to capture the variation in the experience of postpartum pain and should provide a representative description of the phenomenon. The purposeful sample is not intended to meet statistical requirements, but rather to fulfill informational requirements of the phenomenon of interest, postpartum pain [61].

Measures—Quantitative
The perception of (recognition of change in sensation), evaluation of (sensory, affective, and cognitive dimensions of pain), and the response to (behavioral dimension of pain) postpartum pain will be described using two measures. I will employ the McGill Pain Questionnaire [48], computerized version, the PAINReportIt [46,
47] for the quantitative portion of this research. I will conduct interviews with participants for the qualitative portion of this research. Together, these instruments will measure the sensory, affective, cognitive, and behavioral dimensions of pain.

The MPQ [48] is a four page, multidimensional measurement of pain, measuring the sensory, affective, cognitive, and behavioral dimensions of pain. In Part 1 of the instrument, participants answer the question, “where is your pain?” [48], measuring the sensory (location) dimension of pain. This part of the instrument includes a line drawing of a body outline. Participants are instructed to mark the places where pain is felt, as well as indicate if the pain felt at that location is internal, external, or both. The total number of places marked is tallied and helps to indicate the spatial distribution of the pain experienced.

In Part 2 of the instrument, participants answer the question, “what does your pain feel like?” [48], measuring the sensory (quality), affective, and cognitive dimensions of pain. This part of the instrument includes a list of 78 words, separated into four major classes: sensory, affective, cognitive, and miscellaneous descriptor words. These four classes are broken down into 20 subclasses, which each include 3-6 pain descriptor words. Participants are instructed to mark one word only per subclass that best describes their pain; any subclass that does not describe pain should be omitted. For analysis, the individual words in each subclass are assigned a rank, indicating increasing pain with subsequent words. For example, subclass 2 includes the words: jumping, flashing, and shooting listed in this order [48]. “Jumping” is assigned a value of 1, “flashing” is assigned a value of 2, and “shooting” is assigned a value of 3. When these values are summed for each subclass, the Pain Rating Index (PRI) score is obtained. Scores for the total PRI range from 0-78; 0 indicating the minimum pain score and 78 indicating the maximum pain score. The PRI can be further divided for each class, yielding individual scores for PRI-Sensory, PRI-Affective, PRI-Evaluative, and PRI-Miscellaneous. An additional score for part 2 of the MPQ is obtained by tallying the number of words chosen (NWC), indicating the extent to which pain descriptors were employed by the participant.

In Part 3 of the instrument, participants answer the question, "how does your pain change with time?" [48], measuring the sensory (temporal) dimension of pain. Part 3 of the instrument includes three groups of 3 words each that describe the pattern of pain experienced. For example, the first group of words include the descriptors: “continuous, steady, or constant” [48]. Participants are instructed to choose the word or words that best describe their pain. Two additional questions solicit information regarding factors that relieve or increase pain, measuring the behavioral dimension of pain. These are open-ended questions for participants to provide responses. Although not specified in the MPQ, examples of the relieving or increasing factors may include items such as: movement, heat/cold, and social interaction. No numerical scores are obtained from this part of the MPQ; however, the information collected does provide context for understanding the participant’s pain by addressing the sensory (temporal) and behavioral dimensions of pain.

In Part 4 of the instrument, participants answer the question, “how strong is your pain?” [48], measuring the sensory (intensity) dimension of pain. This part of the instrument includes six questions. Three questions solicit a description of the current pain (right now, at its worst, at its least), three questions solicit a baseline pain comparisons for the participant (worst toothache, worst headache, worst stomach-ache). Participants are instructed to choose one number-word combination that best describes the pain in each question; the 0 to 5 point scale offers choices of 0 is none; 1 is mild; 2 is discomforting; 3 is distressing; 4 is horrible; and 5 is excruciating. These six questions are not summed; the Present Pain Intensity (PPI) score is obtained by considering each item response
separately. This 0-5 score, a single item self-report, indicates an increase in pain intensity with higher numbers. The PPI provides information about the pain currently, at its worst, and at its least with this condition. The remaining questions give context for the individual participant’s general pain ratings, indicating how severe of pain this participant has experienced in the past.

Internal consistency reliability is supported by the correlation between the PRI and the number of words chosen ($r = 0.89$) indicating the close relationship between these portions of the instrument [48]. Factor analysis revealed that the three dimensions: sensory, affective, and cognitive were found to be inter-correlated with each other ($r=0.64$ to 0.81) and all measured the same pain concept [62]. Test re-test reliability resulted in a mean consistency of 70.3% over a 3 to 7 day span [63]. Additionally, a mean consistency of 66% to 80.4% was achieved over four administrations of the MPQ, each spaced a week apart [64]. Construct validity is supported by several researchers. The three dimensions: sensory, affective, and cognitive were found to support and adequately describe the theoretical view of pain [62] as first indicated by Melzack [65]. Varying intensities, qualities, and pain descriptors of different types of pain were reported as significantly different on the MPQ; the instrument was able to accurately differentiate pain experiences in sensory, affective, and cognitive dimensions [66, 67]. A significant correlation was found between the PRI-affective and the Brief Symptom Inventory measure of depression [68], supporting construct validity for this dimension of pain.

The PAINReportIt [46, 47] is a computerized version of the MPQ [48], which is driven by a touch screen. The PAINReportIt covers the paper and pencil version of the instrument in 13 screens, and also includes an additional 21 items which measure goals for pain, pain satisfaction, and expectations [46]. The equivalence of the PAINReportIt and the MPQ as well as the reliability of the PAINReportIt have been supported through focus groups and sequential completion of the two instruments [47]. The computerized PAINReportIt has been demonstrated as a useable version of the MPQ, with up to 86% of participants reporting that it was a good way to report pain to their provider [46, 47] and 93% of participants reporting it was easy to use [46].

Measures—Qualitative
This interview guide will be tested with 2-3 volunteers, prior to data collection. Interviews will be conducted with participants in a comfortable location and audio taped for analysis. Participants will be asked to discuss their experience of pain after cesarean birth. Questions were developed to reflect pain dimensions, as well as topics identified in by previous researchers. The interview guide for the qualitative section includes the interview guide found in Appendix A.

Procedure
Approval from appropriate Institutional Review Boards will be attained prior to the start of the research. I will widely publicize the study to assist in identifying and recruiting eligible participants. Fliers, inservices, and face to face discussions will be employed to boost recruitment efforts. Recruitment will occur in one of three ways: in the provider’s office prior to admission to the labor and delivery floor; in the preoperative room, prior to scheduled cesarean birth; or, on the postpartum floor, after scheduled cesarean birth. Working with labor and delivery schedulers and primary provider schedulers, I will visit the office and the hospital units at least 2 to 3 times weekly, until a maximum of 30 participants are enrolled. Between the months of November and July 2010, between 87 and 139 scheduled cesarean cases occurred per month (personal communication); thus, the recruitment period is anticipated to last up to four months. Participants will be contacted on postpartum floors 24 to 48 hours postoperative. At this time, I will conduct the tape-recorded interview, using the interview guide
Appendix A (continued)

tested with volunteers, not part of the sample, and administer the computerized MPQ [48], the PAINReportIt [46, 47] in the patient room. Participants will be taught how to use the tablet computer and the PAINReportIt. I will make every effort to ensure that privacy and comfort are provided. Completion of the PAINReportIt averages 17 minutes or less [46, 47]; interviews are anticipated to be conducted in 30 minutes. Thus, anticipated time commitment from participants is roughly 45 minutes. At six weeks, the same data collection procedure will be used. At a location scheduled for the convenience of the mother, I will again interview and administer the PAINReportIt. Locations for six-week data collection may include: the participant’s home, the primary provider’s office, or agreeable public meeting places. Every effort will be made to provide a comfortable, private environment. If possible, participants will be compensated with a $20 gift card.

A HIPAA waiver/Chart review will be collected to support the pain data obtained from participants. Analgesic administration patterns (type, dose, timing of dose) and type of incision will be helpful in providing context to participant pain report.

Anticipated difficulties with this procedure include timing issues. At the hospital, potential participants may be anxious or focused solely on the birth prior to their scheduled cesarean. If participants feel unable to give consent just prior to their birth, I will request permission to meet with them again after birth on the postpartum unit. I also anticipate there may be difficulty coordinating time with participants while at the office. Juggling infant care and time with the provider may prove less than ideal for data collection. I will request that participants arrive 45 minutes prior to their scheduled visit in order to complete the PAINReportIt and interviews in a relaxed manner. I will reschedule any meetings that cannot occur prior to scheduled office visits.

Analysis
The specific aims of this research are to describe the perception of, evaluation of, and the response to postpartum pain. These aims will be accomplished by using the McGill Pain Questionnaire [48] computerized version, the PAINReportIt [46, 47] and qualitative interviews.

The PAINReportIt [46, 47] records responses in a computerized database as it is collected from each participant. I will assess for missing data before beginning analysis. Descriptive statistics (frequencies, means, standard deviations, and normality of distribution), as appropriate for the level of data, will be calculated from these data and summarized to describe the symptom experience of postpartum pain. These descriptive statistics will be calculated for both data collection points (inpatient and at 6-weeks postpartum) to observe the pattern of postpartum pain after cesarean birth. From Part 1 of the PAINReportIt, pain locations (selected from the body outline) will be evaluated. This will help provide data on “where pain is” experienced by participants. From Part 2 of the PAINReportIt, the total Pain Rating Index will be calculated, but each component will also be scored separately. The individual PRI-Sensory, PRI-Affective, PRI-Evaluative (cognitive) will also provide information on the multidimensional nature of postpartum pain. This will help provide data on “what pain feels like” for participants. From Part 3 of the PAINReportIt, the open ended answers will be summarized to provide data on “how pain changes with time” for participants. From Part 4 of the PAINReportIt, the Present Pain Intensity scores will be calculated, providing data on “how strong is your pain” for participants.

Qualitative interviews will be audio-recorded and transcribed. These transcripts will be checked for accuracy against the recordings. I will use directed content analysis [69], which combines theory and previous research to guide the initial codes, with the goal of advancing prior research. I will identify codes that are consistent with the
portion of the SMT I am examining, the symptom experience. These preliminary codes will include: symptom perception (recognition of the change in sensation), evaluation (sensory, affective, and cognitive dimensions of pain), and response (behavioral dimension of pain). A research associate and I will code a sample of transcriptions separately, using the theory-derived codes. Both readers will meet to compare notes and clarify codes and definitions. Any new themes noted from the data will be evaluated, defined, and added to the list; all transcripts will be coded. With the assistance of an excel database, the codes will be sorted; we will develop categories from the codes to organize data and interpret relationships within the data. These will be processed into a descriptive summary for each category that reflects the symptom experience of postpartum pain after cesarean birth in the inpatient period and at six-weeks after cesarean birth.

A secondary aim of this research is to differentiate nociceptive and neuropathic pain from the pain descriptors within the PAINReportIt. Pain descriptor word selection frequency will be analyzed and compared with established lists of nociceptive and neuropathic pain descriptors [57, 70]

Strengths and Limitations
One advantage of the proposed sample for addressing this research question is that women experiencing cesarean birth are expected to experience postpartum pain, more so than women experiencing vaginal birth. Examining only cesarean births, I will get a focused description of this phenomenon through the postpartum period. One disadvantage of the proposed sample is that I will be unable to describe all postpartum pain or generalize to vaginal births. Additionally, all pain experiences for cesarean birth may not be described here since labor and complicated pregnancies have been excluded. In the proposed design, participants will not be contacted in the 6 week period between discharge from the hospital and their follow up contact in their provider’s office. Thus, one possible limitation to this design is attrition from lack of contact.

The projected timeframe for the proposed research is just over one year. IRB approval is anticipated to be attained in spring 2011. Anticipated recruitment will commence in the summer of 2011 and last until late fall 2011. Analysis will be conducted during the fall/winter of 2011/2012. Analysis and manuscript preparation will occur in winter/spring of 2012. Anticipated dissertation defense will occur in the spring of 2012.

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Appendix A
Interview Guides

Interview 1 (inpatient): It is important for this kind of research to ask questions in the same way, so I will use a script. Speaking with you will help me understand the experience of postpartum pain following a cesarean birth. You can help me by sharing your story.
How have you been? How is your baby doing?
How is feeding going? Are you breast or bottle feeding?
Do you feel rested?
What would you like to tell me about your pain? How does your pain experience compare to what you had expected? What do you expect your pain experience to be like in the next 6 weeks?
(For repeat cesarean birth) How does this experience compare with your previous C-section? How have the afterpains been?
How has your pain experience influenced your life?
How has your pain experience influenced your relationship with your baby?
How has your pain experience influenced your relationship with other family members or friends?
Are there any activities you’ve changed as a result of your pain experience?
Are there any activities that make your pain experience better? Are there any activities that make your pain experience worse?
Are you OK with your level of pain? Are you satisfied with pain control?

Interview 2 (home, office, alternate meeting place; completed at 6 weeks postpartum): It is important for this kind of research to ask questions in the same way, so I will use a script. I’m going to ask you the same questions from our previous visit in order to compare your pain experience from then to now. Speaking with you will help me understand the experience of postpartum pain following a cesarean birth. You can help me by sharing your story.
How have you been since we last met? How your baby is doing?
How is feeding going? Are you breast or bottle feeding?
Do you feel rested?
What would you like to tell me about your pain? How does your pain experience compare to what you had expected?
(For repeat cesarean birth) How does this experience compare with your previous C-section?
How has your pain experience influenced your life?
How has your pain experience influenced your relationship with your new baby?
How has your pain experience influenced your relationship with other family members or friends?
Since the baby’s birth, has pain influenced your relationship with your partner? How about intercourse?
Are there any activities that you’ve changed as a result of your pain experience?
Are there any activities that make your pain experience better? Are there any activities that make your pain experience worse?
Have you taken any medication for your pain? Did you have any concerns about pain medication?
Are you OK with your level of pain? Are you satisfied with pain control?
D. References
IRB Approval Letters

Office for the Protection of Research Subjects
Northwestern University
750 North Lake Shore Drive
Suite 700
Chicago, Illinois 60611
irb@northwestern.edu
Phone 312-503-9338
Fax 312-503-0555

7/22/2011

Ms. Carol Burke
Advanced Practice Nurse
Nursing Administration
250 E. Superior Office 08-2116
Chicago IL 60611
cburke@nmh.org

IRB Project Number: STU00048447
Project Title: The Symptom Experience of Postpartum Pain after Cesarean Birth
Project Sites:

Northwestern Memorial Physician's Group (NMPG)
Northwestern University (NU)
Northwestern Memorial Hospital (NMH)

Submission Considered: New Submission Submission Number: STU00048447
Review Type: Expedited
Review Date: 7/22/2011

Status: APPROVED Approval Period: (7/22/2011 - 7/21/2012)

Dear Ms. Burke,

The IRB considered and approved your submission referenced above through 7/21/2012. As Principal Investigator (P.I.), you have ultimate responsibility for the conduct of this study, the ethical performance of the project, and the protection of the rights and welfare of human subjects. You are required to comply with all NU policies and procedures, as well as with all applicable Federal, State and local laws regarding the protection of human subjects in research including, but not limited to the following:

- Not changing the approved protocol or consent form without prior IRB approval (except in an emergency, if necessary, to safeguard the well-being of human subjects).
- Obtaining proper informed consent from human subjects or their legally responsible representative, using only the currently approved, stamped consent form.
• Promptly reporting unanticipated problems involving risks to subjects or others, or promptly reportable non-compliance in accordance with IRB guidelines.

• Submit a continuing review application 45 days prior to the expiration of IRB approval. If IRB re-approval is not obtained by the end of the approval period indicated above, all research related activities must stop and no new subjects may be enrolled.

**IRB approval includes the following:**

**Written Consent Form/Consent Form and Authorization for Research:**
Name
[clean copy revised consent 7/21/2011](#)

**Protocol Document:**
Name
Protocol document

**Recruitment Materials:**
Name
flyer

**Survey/Questionnaires:**
Name
painless survey screen shots

**Interview Scripts:**
Name
interview script

For more information regarding OPRS submissions and guidelines, please consult [http://www.northwestern.edu/research/OPRS/irb](http://www.northwestern.edu/research/OPRS/irb).

This Institution has an approved Federalwide Assurance with the Department of Health and Human Services: FWA00001549.
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7/9/2012

Ms. Carol Burke
Advanced Practice Nurse
**Nursing Administration**
250 E. Superior
Office 08-2116
Chicago, IL 60611
cburke@nmh.org

**IRB Project Number:** CR1_STU00048447  
**Project Title:** The Symptom Experience of Postpartum Pain after Cesarean Birth  
**Project Sites:**  
Northwestern Memorial Physician's Group (NMPG)  
Northwestern University (NU)  
Northwestern Memorial Hospital (NMH)

**Sponsor Information (Grant #, if applicable):**
There are no items to display

**Submission Considered:** Continuing Review  
**Submission Number:** CR1_STU00048447  
**Submission Review Type:** Expedited  
**Review Date** (for Expedited Review): 7/9/2012

**Status:** CLOSED TO ACCRUAL: Subject involvement is complete, but data analysis is ongoing.

**Approval Period:** (7/22/2012 - 7/21/2013)

Dear Ms. Burke,

The IRB considered and approved your submission referenced above through 7/21/2013.

As Principal Investigator (P.I.), you have ultimate responsibility for the conduct of this study, the ethical performance of the project, and the protection of the rights and welfare of human subjects. You are required to comply with all NU policies and procedures, as well as with all applicable Federal, State and local laws regarding the protection of human subjects in research including, but not limited to the following:

- Not changing the approved protocol or consent form without prior IRB approval (except in an emergency, if necessary, to safeguard the well-being of human subjects).
- Obtaining proper informed consent from human subjects or their legally responsible representative, using only the currently approved, stamped consent form.
• Promptly reporting unanticipated problems involving risks to subjects or others, or promptly reportable non-compliance in accordance with IRB guidelines.
• Submit a continuing review application 45 days prior to the expiration of IRB approval. If IRB re-approval is not obtained by the end of the approval period indicated above, all research related activities must stop and no new subjects may be enrolled.

**IRB approval includes the following:**

**Protocol:**

Name

[Protocol document]
Appendix B (continued)

Office for the Protection of Research Subjects (OPRS)
Office of the Vice Chancellor for Research (MC 672)
203 Administrative Office Building
1737 West Polk Street
Chicago, Illinois 60612-7227

Approval Notice
Initial Review (Response To Modifications)

August 29, 2011

Emily Chin, RN, BS, BSN
Women, Child, & Family Health Science
1922 N Oakley Ave
Chicago, IL 60647
Phone: (312) 318-0978 / Fax: (312) 996-8871

RE: Protocol # 2011-0615
“The Symptom Experience of Postpartum Pain after Cesarean Birth”

Dear Ms. Chin:

Your Initial Review application (Response To Modifications) was reviewed and approved by the Expedited review process on August 18, 2011. You may now begin your research.

Please note the following information about your approved research protocol:

**Protocol Approval Period:** August 18, 2011 - August 16, 2012

**Approved Subject Enrollment #:** 30

**Additional Determinations for Research Involving Minors:** These determinations have not been made for this study since it has not been approved for enrollment of minors.

**Performance Sites:**
- UIC, Northwestern Memorial Medical Center
- Chapman Nursing Research
- Scholarship/Northwestern Memorial Hospital

**Sponsor:**

**Research Protocol:**
- a) Doctoral Dissertation Research Proposal

**Recruitment Material:**
- a) Recruitment Flyer; Version 1; 07/06/2011

**Informed Consents:**
- a) Consent Form and Authorization for Research (Northwestern University document); Version 2; 08/14/2011
- b) A waiver of informed consent has been granted under 45 CFR 46.116(d) for recruitment purposes only (minimal risk; scheduling records will be used to identify potential subjects; signed consent will be obtained from subjects at enrollment)

Your research meets the criteria for expedited review as defined in 45 CFR 46.110(b)(1) under the following specific category:

Phone: 312-996-1711  http://www.uic.edu/depts/ovcr/oprs/  FAX: 312-413-2929
(5) Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for non-research purposes (such as medical treatment or diagnosis),

(6) Collection of data from voice, video, digital, or image recordings made for research purposes,

(7) Research on individual or group characteristics or behavior (including but not limited to research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

**Please note the Review History of this submission:**

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Please remember to:

→ Use your **research protocol number** (2011-0615) on any documents or correspondence with the IRB concerning your research protocol.

→ Review and comply with all requirements on the enclosure,

**"UIC Investigator Responsibilities, Protection of Human Research Subjects"**

Please note that the UIC IRB has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

Please be aware that if the scope of work in the grant/project changes, the protocol must be amended and approved by the UIC IRB before the initiation of the change.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact OPRS at (312) 996-1711 or me at (312) 996-2014. Please send any correspondence about this protocol to OPRS at 203 AOB, M/C 672.

Sincerely,

[Signature]

Sandra Costello
Assistant Director, IRB #2
Office for the Protection of Research Subjects

**Enclosures:**

1. **UIC Investigator Responsibilities, Protection of Human Research Subjects**
2. **Informed Consent Document:**
   a) Consent Form and Authorization for Research (Northwestern University document); Version 2; 08/14/2011
3. **Recruiting Material:**
   a) Recruitment Flyer; Version 1; 07/06/2011
4. **Data Security Enclosure**

cc: Rosemary C. White-Traut, Women, Child, & Family Health Science, M/C 802
    Catherine Vincent (faculty advisor), Women, Child, & Family Health Science, M/C 802
Appendix B (continued)

University of Illinois
at Chicago

Office for the Protection of Research Subjects (OPRS)
Office of the Vice Chancellor for Research (MC 672)
203 Administrative Office Building
1737 West Polk Street
Chicago, Illinois 60612-7227

Approval Notice
Continuing Review

July 17, 2012

Emily Chin, RN, BS, BSN
Women, Child, & Family Health Science
1922 N Oakley Ave
Chicago, IL 60647
Phone: (312) 318-0978 / Fax: (312) 996-8871

RE: Protocol # 2011-0615
“The Symptom Experience of Postpartum Pain after Cesarean Birth”

Dear Ms. Chin:

Your Continuing Review was reviewed and approved by the Expedited review process on July 16, 2012. You may now continue your research.

Please note the following information about your approved research protocol:

Protocol Approval Period: July 16, 2012 - July 15, 2013
Approved Subject Enrollment #: 30 (limited to data analysis for 30 enrolled subjects)
Additional Determinations for Research Involving Minors: These determinations have not been made for this study since it has not been approved for enrollment of minors.
Performance Sites: UIC, Northwestern Memorial Medical Center
Sponsor: Chapman Nursing Research
PAF#: Not available
Grant/Contract No: Not available
Grant/Contract Title: Not available
Research Protocol(s):
  a) Doctoral Dissertation Research Proposal
Recruitment Material(s):
  a) N/A: Limited to data analysis only
Informed Consent(s):
  a) N/A: Limited to data analysis only

Your research meets the criteria for expedited review as defined in 45 CFR 46.110(b)(1) under the following specific category(ies):

Phone: 312-996-1711 http://www.uic.edu/depts/ovcr/opr/ FAX: 312-413-2929
(5) Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for nonresearch purposes (such as medical treatment or diagnosis), (6) Collection of data from voice, video, digital, or image recordings made for research purposes, (7) Research on individual or group characteristics or behavior (including but not limited to research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

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Please remember to:

→ Use your research protocol number (2011-0615) on any documents or correspondence with the IRB concerning your research protocol.

→ Review and comply with all requirements on the enclosure, "UIC Investigator Responsibilities, Protection of Human Research Subjects"

Please note that the UIC IRB has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

Please be aware that if the scope of work in the grant/project changes, the protocol must be amended and approved by the UIC IRB before the initiation of the change.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact OPRS at (312) 996-1711 or me at (312) 355-0816. Please send any correspondence about this protocol to OPRS at 203 AOB, M/C 672.

Sincerely,

Alison Santiago, MSW, MJ
IRB Coordinator, IRB #2
Office for the Protection of Research Subjects

Enclosure(s):

1. UIC Investigator Responsibilities, Protection of Human Research Subjects
2. Data Security Enclosure

cc: Rosemary C. White-Traut, Women, Child, & Family Health Science, M/C 802
    Catherine Vincent (Faculty Sponsor), Women, Child, & Family Health Science, M/C 802
    OVCR Administration, M/C 672
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Curriculum Vitae
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EDUCATIONAL PREPARATION
2006-2012 Doctorate of Philosophy in Nursing
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R01 NR009418
Participants were retained and data was collected for the duration of this study.

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