Research NK1

Provide a synopsis of one completed institutional review board-approved (IRB-approved) nursing research study.

NOTE: The nursing research study must have been conducted within the applicant organization.

Use required format provided below:

Study overview

- Title of study
- IRB approval date and type of review (i.e., full board, expedited, exempt)
- Study start date
- Study completed date

Research team

- Nurse(s) at the organization who is (are) the principal investigator(s) (PI), co-PI, or the site PI involved in the conduct of the study
- Other key personnel on research team

Study aim(s)

- Study purpose, what new knowledge will be generated, or both

Significance of the literature review (two pages maximum)

- Key references to support the significance
- Why the study is important to nursing (e.g., the patient experience of care, patient or health outcomes, cost of care, nursing practice).
- What is currently known about the topic if an intervention study, what evidence supports the intervention or innovation.
- Summarize the gap in current knowledge about the topic being addressed by the study.

Innovation

- How the study will produce actionable information for nursing

Study design

- Describe the study design: Qualitative, quantitative (descriptive, correlational, quasi-experimental, experimental, or other).
- Research questions(s), hypothesis, or both

Sample description

- Type of sample (e.g. convenience, cohort, random)
- Inclusion and exclusion criteria
- Sample size
Location of study (within the applicant organization)
- Hospital, units(s) ambulatory care area(s) that apply

Study procedures
- Procedures from initial screening through end of contact with subjects
- Data collection methods

Results
- Results of data analysis (description of sample characteristics and analysis for research questions or hypotheses)

Discussion
- Discussion and interpretation of the findings
- Implications of the findings and recommendations to the organization

Study Overview
- Title of study:
  - Decreasing opioid utilization in rehabilitation patients through the use of an APRN pain consultant role
- IRB approval date and type of review (i.e., full board, expedited, exempt):
  - Expedited IRB approval, April 5, 2016
- Study start date:
  - April 30, 2016
- Study completed date:
  - February 8, 2017

Research Team
- Nurse(s) at the organization who is (are) the principal investigator(s) (PI), co-PI, or the site PI involved in the conduct of the study:
  - Michael Urton, MSN, APRN, AGCNS-BC (PI), Clinical Nurse Specialist, Rehabilitation, WakeMed Health & Hospitals
- Other key personnel on research team:
  - Elaine Rohlik, PhD, LCSW (Co-PI), Executive Director, Rehab & Trauma Services, WakeMed Health & Hospitals
  - Meagan Farrell, PhD (Co-PI), Trauma Researcher, WakeMed Health & Hospitals
  - Wing Ng, MD (Co-PI), Physical Medicine & Rehabilitation, Carolina Rehabilitation Associates

Study Aim(s)
- Study purpose, what new knowledge will be generated, or both:
  - The purpose of this study was to examine whether the use of a clinical nurse specialist (CNS) as a pain management consultant would result in more rapid declines in opioid use during inpatient rehabilitation.

Significance of the Literature Review (two pages maximum)
• Key references to support the significance:

• Why the study is important to nursing (e.g., the patient experience of care, patient or health outcomes, cost of care, nursing practice):
  o Pain can have dramatic effects on most aspects of the rehabilitation process, often limiting patient success when left unmanaged (Zanca et al., 2013). Nurses in the rehabilitation setting, as in most inpatient settings, serve at the frontline of safe, effective pain management. The additional knowledge and expertise provided by a CNS pain consultant could improve patient satisfaction, function and overall safety while improving nurses’ knowledge and competency in pain management using multimodal approaches.

• What is currently known about the topic if an intervention study, what evidence supports the intervention or innovation:
  o Pain can have dramatic effects on every aspect of the rehabilitation process, often limiting patient success when not treated. Poorly managed pain can reduce the effectiveness of therapy, extend length of stay and decrease patients’ satisfaction with their overall care (Zuccaro et al, 2012; Chapman et al., 2011). Pain management can also be challenging, fraught with opportunities to harm patients using traditional opioid-based methods. The recent public concerns about opioid-related overdose and addiction have created further interest in methods for improving pain management while using the safest modalities possible.
Despite growing concerns regarding the use of opioids for pain, this class of medications continues to be the most commonly used for moderate to severe pain during acute hospitalizations (Ladak et al., 2013). Minimizing opioids while maintaining effective pain management requires comprehensive pain assessment combined with a multimodal pain management strategy (Glowacki, 2015).

Summarize the gap in current knowledge about the topic being addressed by the study:
- Following the addition of a CNS pain consultant, there were anecdotal reports of improved patient outcomes and more effective pain management provided to patients. It was unclear what, if any, effect the pain consultant was having on the use of opioids for pain.

Innovation
- How the study will produce actionable information for nursing:
  - An advanced practice nurse who provides pain management consultations can improve the efficacy and safety of pain management through direct patient assessment along with education and mentoring for nurses in rehabilitation.

Study Design
- Describe the study design: Qualitative, quantitative (descriptive, correlational, quasi-experimental, experimental, or other):
  - Quantitative, retrospective, cross-sectional design
- Research questions(s), hypothesis, or both:
  - For inpatient rehabilitation patients experiencing pain, will access to an advanced practice registered nurse (APRN) with expertise in pain management result in more rapid declines in opioid use across the rehabilitation hospitalization?

Sample Description
- Type of sample (e.g. convenience, cohort, random):
  - Population-based convenience sample of adult, inpatient rehabilitation patients
- Inclusion and exclusion criteria:
  - Study included adult (≥ 18 years), inpatient rehabilitation patients discharged between March 1, 2015 and March 31, 2016 with a length of stay of seven days or longer and a daily average opioid use of ≥ 30 mg morphine equivalent doses (MED)/day. Patients not meeting these inclusion criteria were excluded. No other exclusion criteria were applied.
- Sample size:
  - 1,632 patients were screened for inclusion, with a final sample size of 72 patients (37 in No CNS group, 35 in CNS group).

Location of Study (within the applicant organization):
Hospital, unit(s) ambulatory care area(s) that apply:
  - The study was conducted at WakeMed Rehabilitation Hospital, Raleigh, North Carolina.

Study Procedures
  - Procedures from initial screening through end of contact with subjects:
    - Following the screening of patient records from the identified time frame, 72 patients who met the sample inclusion criteria were identified.
    - Patients were grouped based on discharge date: prior to (No CNS) and after (CNS) the addition of a single clinical nurse specialist pain consultant. The pain consultant role was established on September 1, 2015.
    - Using retrospective chart reviews, data was manually abstracted for opioid intake (MED), demographic data, length of stay, diagnosis and use of adjuvant medications for the first three weeks of their hospitalization.
    - Data were analyzed using chi-square and linear mixed modeling to explore group and individual differences in opioid trajectories for the No CNS and CNS groups.
  - Data collection methods:
    - The primary outcome measure was the change in daily opioid over a three-week period. This value was calculated by converting each opioid received to its oral morphine equivalent dose in milligrams using a standard opioid equivalency chart, and then adding the values to create a daily morphine-equivalent dose total (mg MED). Daily opioid use was sampled at four time points: admission (MED<sub>AD</sub>), week 1 (MED<sub>WK1</sub>), week 2 (MED<sub>WK2</sub>), and week 3 (MED<sub>WK3</sub>). Opioid totals were calculated by using a three-day average at each time point.

Results
  - Results of data analysis (description of sample characteristics and analysis for research questions or hypotheses):
    - Descriptive statistics revealed that the Pre-Consult and Post-Consult groups were adequately matched in terms of age and mean length of rehab stay. The sample groups did not differ significantly in the distribution of gender, race or admitting diagnosis. However, patients in the Post-Consult group (82.4 mg MED/day) had higher opioid use at rehab admission compared to the Pre-Consult group (50.6 mg MED/day; Figure 1). Participants represented a variety of diagnoses, all common in inpatient rehabilitation, with spinal cord injury and spinal surgery representing the largest proportions of patients with increased daily opioid intake.
    - In each model, the Post-Consult group is treated as the reference category, so the reported fixed effects estimates for intercept and slope represent the Post-Consult group, while the Group and Group X Time
interaction effects represent the difference between Pre- and Post-Consult groups. The linear change model revealed considerable individual differences in baseline opioid use (intercepts) and trajectories (slopes) ($\beta < .001$). The covariance (correlation) between slopes and intercepts was not significant (-79.20, $p=.38$), indicating that an individual’s baseline opioid use was not associated with his or her slope of opioid use over time. There were significant fixed effects of group, $F (1, 72) =8.26, p<.005$, revealing higher overall consumption of opioids in the Post-Consult group. There was also a marginally significant effect Time, $F (1, 72) =3.9, p=.052$, suggesting a change in opioid use across weeks. The slope of linear change did not differ between groups, as shown by a nonsignificant group X time interaction, $p=.326$.

- Adding a quadratic slope to the model significantly improved model fit, $\chi^2 (2) = 12.5, p<.01$, indicating that the pattern of opioid use can best be explained by a quadratic curve. As with the linear model, there were significant individual differences in patient intercepts and slopes ($\beta < .001$), but the covariance term was not significant, (-89.4, $p=.32$). There were significant main effects of Group and $\text{Time}^2$, as well as a significant Group X $\text{Time}^2$ interaction, $F (1,144) =6.34, p<.013$.

Patients in the Post-Consult group experienced an initial increase in opioid use from Admission to Week 1, followed by a decline from Week 1 to Week 3 (quadratic slope= -5.91). Conversely, the quadratic slope of patients in the Pre-Consult group was -0.15, suggesting relatively minimal change over time. The interaction between Group and the linear effect of Time was approaching significance ($p=.06$), and can be interpreted in much the same way, with a greater magnitude of linear change in the Post- versus Pre-Consult group.

**Discussion**

- Discussion and interpretation of the findings:
  - The goal of this study was to explore how opioid use changed over time between groups of patients with and without access to an APRN pain consultant. While there were limitations in the design and sample of this study, findings indicated that opioid use declined more quickly in patients following the introduction of CNS pain consult service. This was attributed to a variety of possible causes, such as greater use of non-opioid multimodal therapies, improved patient assessment and education, and improved nurse education and mentoring on pain management.
  - Analysis of opioid use in these two patient populations also revealed some interesting findings regarding the opioid use trajectory. It was observed that, for both No CNS and CNS groups, opioid use increased during the first three days of rehabilitation before beginning a downward trajectory. Patients participating in inpatient rehabilitation must participate in three hours of therapy per day, and it is believed
this increase was a result of the change in patient activity and mobility with subsequent increased opioid use for pain.

- Implications of the findings and recommendations to the organization:
  o Greater understanding of the pain and opioid use trajectories for patients admitted for inpatient rehabilitation can impact nursing knowledge and competency. Patient education and goal-setting are critical tasks for pain management, and these findings will allow nurses to better prepare patients and family members for pain at different points along the rehabilitation continuum.
  o Having a pain consultant, especially an APRN, provides a variety of services to the rehabilitation staff and patients. First, by applying clinical expertise in pain management, the APRN improves the pain management plan of care by ensuring appropriate, multimodal, non-opioid interventions are applied. Second, recommendations for medical management of pain improve provider knowledge and competency, resulting in more effective pain management in patients not seen by the consultant. Finally, through formal and informal nursing education and role modeling, nurses become more comfortable in assessing and managing rehabilitation pain.
  o When patients feel they are getting better and are functionally improving, they are better able to carry forward the gains achieved in pain management from the inpatient rehabilitation setting to the home environment. For healthcare providers, making the decrease in use of opioids sustainable for the long-term is the key to success, and the CNS pain consultant can certainly play a critical role. For the patients, however, a sense of overcoming the pain and reclaiming quality of life are what matters most.