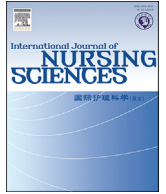


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Contents lists available at ScienceDirect

## International Journal of Nursing Sciences

journal homepage: <http://www.elsevier.com/journals/international-journal-of-nursing-sciences/2352-0132>

Special Issue: Advanced Practice Nursing

## Perceptions of the effectiveness of Advanced Practice Nurses on a neurosurgery unit in a Canadian Tertiary Care Centre: A pre-and-post implementation design

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## ARTICLE INFO

## Article history:

Received 1 November 2017  
 Received in revised form  
 31 January 2018  
 Accepted 27 March 2018  
 Available online xxx

## Keywords:

Advanced practice nursing  
 Delivery of health care  
 Patient care team  
 Pre-post tests  
 Professional practice gaps

## ABSTRACT

**Objectives:** A framework for the advanced practice nurse (APN) role was developed in our Canadian Tertiary Care Centre, delineating five domains of advanced nursing practice: clinical practice, consultation, research, education and leadership. The goal of this study was to evaluate perceptions of the effectiveness of the implementation of an innovative APN role on an in-patient Neurosurgery unit.

**Methods:** A pre-and-post implementation design, incorporating both qualitative and quantitative data, was utilized. An innovative APN role was implemented within the Neurosurgery program focusing on the clinical domain and required the successful candidates to be NP prepared. This APN role was designed to improve patient flow, documentation, communication and patient and staff satisfaction. Three primary outcomes were measured: pre-implementation questionnaire (nurses), post-implementation questionnaire (nurses and residents) and number of pages to the on-call resident.

**Results:** Survey scores by nurses and residents indicated improvement across all aspects studied. Average scores increased from 1.1 to 2.6, reflecting an overall statistically significant increase. The number of pages to the on-call resident also showed a decrease.

**Conclusion:** Perceptions of patient care delivery and professional collaboration improved following implementation of the APN role. Responses indicated that APNs significantly impacted patient care and improved nurses and residents' job satisfaction.

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## 1. Introduction

As healthcare needs evolve, in the context of rising costs, an aging population, and associated increases in chronic disease prevalence, so has the presence and demand for Advanced Practice Nurses (APNs) [1]. For over a decade, there has been renewed interest in the APN role by federal and provincial governments as a way to influence changes in Canada's healthcare system [2–4]. Nursing has responded to increasingly complex patient needs and technological innovations with the introduction of more advanced

practice roles. These roles have been implemented in all domains of health care, including acute care [5].

The title Advanced Practice Nurse is an umbrella term describing an advanced level of nursing practice. Only two of these roles are currently recognized in Canada: the clinical nurse specialist (CNS) and the nurse practitioner (NP). According to the Canadian Nurses Association, APNs use critical thinking to guide their practice, employing theoretical and empirical explanations to "... enhance the provision of timely, accessible, cost-effective and quality healthcare for all Canadians" [6]. The APN role in the Canadian healthcare system has become increasingly important, as APNs play a vital role in contributing to a sustainable and effective health care system. Although there are underlying differences, both the NP and CNS significantly contribute to healthcare and positive patient outcomes through evidence-based practice [7,8]. APNs are Master's prepared nurses whose primary focus is clinical; however, they also

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Peer review under responsibility of Chinese Nursing Association.

<https://doi.org/10.1016/j.ijnss.2018.03.008>

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provide expertise in research, leadership and collaboration/consultation [9].

Numerous studies have demonstrated the benefits of enacting the APN role. Enhanced patient care, reduced length of stay (LOS) and financial savings were cited by Collins et al. [10], while improvement in timely care and patient and staff satisfaction were demonstrated by Johnson [11]. Fry's literature review [12] found a reduction in patient complication, morbidity and mortality rates, in addition to positive financial outcomes with reduced intensive care unit LOS, hospital LOS and readmission rates. Kleinpell [13] reported that the use of APNs in the acute care setting shortened LOS, reduced readmission rates, and lowered rates of urinary tract infections (UTI), pneumonia and skin breakdown among patients. Despite the benefits of the APN role, some uncertainty around the nature of their role still remains, necessitating ongoing study and clarification of their function [14].

Over the past few years, several studies have emerged from the US, Canada and UK which have recommended the creation of new provider models in response to restrictions in surgical residents' work-hours and changing health care environments, especially for acute care units where more intensive monitoring is needed [15–17]. Kahn et al. in their 2015 study [16] on the impact of advanced practice providers found that "teaching hospitals often employ advanced practice providers (APP), including nurse practitioners and physician assistants to counteract residents' work-hour restrictions" (p 8). In addition, they found that residents' perceptions were improved regarding workload, teaching protocols, patient care and communication. Previous studies show that collaboration between physicians and nurses can optimize patient care and decrease wait times [18,19].

Following the merger of three tertiary care hospitals in Ottawa, Canada, a task force was established to identify a framework for the role of the Advanced Practice Nurse. This advanced role at The Ottawa Hospital (TOH) was designed to improve outcomes for complex patient populations through advanced nursing practice in the four competencies identified by the Canadian Nursing Association: clinical, collaboration/consultation, research, and leadership. In addition, TOH highlighted education as a separate component, for a total of five domains [20]. The APN Task Force determined that both CNS and NPs would fall under the title APN, regardless of differing educational preparation. This allowed for flexibility within individual programs to determine which APN competency would be the prioritized focus of practice. A standardized tool was developed and utilized for clinical programs to evaluate the need for an APN within specific programs [20]. One of the areas identifying a need for an APN was the neurosurgery program, where high volumes, acuity of patients and the relative lack of neurosurgery residents contributed to ongoing challenges to the delivery of services.

Nursing staff felt these challenges had resulted in a number of patient-care issues: delays in the response to clinical questions about patient's care; gaps in documentation in the interdisciplinary progress notes, delays in the writing of treatment orders and consultations to the multi-disciplinary team and other specialists. These inefficiencies in patient flow resulted in perceptions of decreased patient and staff satisfaction. The goal of introducing clinical APN roles was to provide continuity of patient-focused care through an APN model. This would allow for continual advanced clinical expertise on the unit, would expand collaborative practice with the nursing staff and would effectively respond to individual patient care needs. The introduction of a new APN role was an important initiative to address the previously identified gaps.

The purpose of this study was to evaluate the impact and perceptions of nursing staff and neurosurgery residents following the

implementation of two NP-prepared APN positions on an inpatient neurosurgery unit at a Canadian Tertiary Care Centre. Clinical staff's perceptions of the care delivery pre-implementation were compared to the care-delivery model post-implementation. In addition, the number of patient related calls received by the neurosurgery on-call resident was evaluated as a primary outcome of the APN role implementation.

## 2. Methods

### 2.1. Study design and intervention

Two NP's were selected to fill these newly implemented APN positions. Responsibilities for these positions focused on the clinical domain and required the successful candidates to be NP prepared. These APNs completed advanced health assessments, ordered and interpreted laboratory tests and diagnostic imaging, ordered medications (with the exception of benzodiazepines and opioids) and discharged patients. The APNs rounded with the neurosurgery residents each morning to review and update patients' treatment plans and to clarify questions regarding patients' conditions. The APNs were present on the unit for eight hours daily on weekdays and were involved in decision-making involving patients' medical care. Additional responsibilities included consulting other medical services, meeting with allied health team members to clarify patients' plan of care, leading family meetings and discharge planning. Their role also focused on continual open communication with all members of the health care team, allowing for the transfer of timely information to nurses and families regarding care plans. The neurosurgery APN role had an 80% clinical and consulting component, with the remaining 20% evenly divided amongst the other three domains: education, research and leadership. The implementation of this APN role within a tertiary setting provided the ideal opportunity to evaluate the perceived impact of the role. The "Participatory, Evidence-based, Patient-focused process, for guidance in the development, implementation and evaluation of advanced practice nursing" (PEPPA framework), which recommends evaluation of progress in achieving pre-determined outcomes based goals, reflects the framework that was utilized to guide this research project [21].

The study utilized a pre-test post-test design to survey staff perceptions of the newly implemented APN role. Given that no standardized measures to assess acute APN roles were available, a study-specific questionnaire was designed by the two neurosurgery APN researchers. Informal consultations with nursing staff had identified gaps in care, inspiring the APN to explore the impact of the role implementation. Relevant questions were formulated, based on the APN's clinical expertise and specific to the acute neurosurgical environment. A third APN, with expertise in a related field assessed the questions and acted as an independent reviewer, analyzing the responses for consistency and validity.

The questionnaire utilized for the survey was primarily quantitative with a qualitative component consisting of open-ended questions. The goal was to derive categories from the qualitative responses, in order to more fully understand the quantitative results. In addition to the questionnaires completed by nursing staff and neurosurgery residents, LOS and resident call logs were examined.

### 2.2. Study outcomes

The primary outcomes from the study were measured through the pre- and post-implementation questionnaires completed by the staff nurses, the post-questionnaires completed by the residents, and the number of patient related calls the on-call resident

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