

Characteristics of Patients Reviewed by a Nurse Practitioner within an Outpatient
Palliative Radiation Oncology Clinic

by

Hope Rabel

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Abstract

Introduction

Cancer is a highly prevalent illness in Canada, with half of Canadians developing cancer and one quarter dying of the disease. In spite of significant advancements in cancer diagnosis and treatments, many cancers still have a poor prognosis. Palliative radiotherapy (PRT) is a common and effective therapy for painful bone metastases. Unfortunately, radiation therapy is only offered at specialized cancer centers throughout Canada, and often treatments can be unplanned, time sensitive, and patients have to travel to receive their treatments. Radiation departments are often overwhelmed with patients needing this vital service, leading to decreased quality of care, increased pain and suffering due to a lack of resources and staff to treat this population on a rapid basis. We hypothesized that the addition of a nurse practitioner (NP) to a PRT clinic would improve the functioning of the clinic by increasing efficiency and accessibility.

Objectives

To prospectively evaluate symptom burden including patient complexity and severity in palliative oncology patients requiring PRT assessed by an NP or radiation oncologist (RO).

Methods

Patients (PTS) attending the PRT clinic were randomly assessed by the NP or the RO utilizing history, examination, and validated tools (Edmonton Symptom Assessment System [ESAS], Karnofsky Performance Status [KPS], Edmonton Classification System for Cancer Pain [ECS-CP]) to determine eligibility for PRT. Patients assessed by trainees or with missing data were excluded. Data was prospectively entered into an ethics approved database.

Results

From January 1, 2008 to December 31, 2010, 235 patients had a consultation in the PRT clinic. The NP assessed 137 and 98 were assessed by the RO. When compared between the two providers, patient severity (ESAS, KPS) and complexity (ECS-CP, RT) were not significantly different between those assessed by NP compared to RO.

Regarding the patients that received radiation, 72/98 PTS (73%) assessed by RO and 108/137 (79%) assessed by NP, when compared were also not statistically significant.

The addition of the NP to this clinic allowed the clinic to complete consultations for 58% (137/235) more patients than if the RO was working alone.

Conclusion

Our study is the first to quantitatively describe the characteristics, symptom severity, and complexity of patient seen by an NP in a PRT clinic. Our results demonstrate that the addition of the NP to this clinic improved the efficiency and accessibility of these services. Our findings warrant replication in other settings to encourage the greater utilization of NP's in the Canadian health care system.

Preface

The project was reviewed and approved by the Health Research Ethics Board of Alberta, HREBA #23653, prior to initiation.

The abstract of this thesis has been published in Supportive Care in Cancer journal (2017) within the Abstracts of the MASCC/ISOO 2017 Annual Meeting publication, entitled ‘Proficiency of nurse practitioner assessment in outpatient palliative radiotherapy: a prospective descriptive study’, authors H Rabel, A Fairchild, T O’Rourke, W Duggleby, S Ghosh & E Pituskin. Chapter 3 sections are presented in format for submission to Supportive Care in Cancer.

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Table of Contents

Abstract.....	ii
Preface.....	iii
Acknowledgements.....	iv
List of Tables.....	vi
Chapter 1: Understanding the Needs of Palliative Radiation Oncology Patients	1
Palliative Care.....	1
Symptom Burden.....	3
Purpose.....	5
Conceptual Framework.....	6
Significance.....	9
Chapter 2: Literature Review.....	10
Background.....	10
Table 1.....	14
Clinical.....	30
Collaboration.....	32
Education.....	34
Leadership.....	35
Barriers.....	37
Accessibility.....	40
Conclusion.....	44
Chapter 3.....	46
Introduction.....	46
Setting and participants.....	47
Design.....	48
Data Analysis.....	49
Discussion.....	54
Strengths and limitations.....	57
Conclusion.....	57
Chapter 4: Conclusion.....	58
Major Discussion Points.....	58
Recommendations for Practice, Future Research and Policy.....	59
Strengths.....	60
Limitations.....	61
Conclusion.....	62
References for Thesis.....	63
Appendix A: Patient Flow and Assessments.....	72
Appendix B: ESAS.....	73
Appendix C: KPS.....	74

Appendix D: ECS-CP.....	75
Appendix E: Data Analysis.....	76

List of Tables

Table 1: Summary of Studies Included in Integrative Review

Table 2: Patient Demographics

Table 3: Average ESAS and KPS Scores by Consultant, Mean and Standard Deviation

Table 4: ESCS-CP Score Frequency and Analgesic Type by Consultant

Table 5: Radiation Chi Squared Analysis

Chapter 1: Understanding the Needs of Palliative Radiation Oncology Patients

Introduction

Cancer is a highly prevalent illness in Canada, with almost half of Canadians developing cancer and one quarter dying of the disease. The Canadian Cancer Society (CCS) (2017) report estimates in 2017 that 206,200 people in Canada will be diagnosed with cancer and 80,800 people will die of any type of cancer. The Canadian population is ageing and because of this, the CCS (2017) also predicts that the incidence of people living with cancer 5 years after diagnosis will be 60%. In spite of significant advancements in cancer diagnosis and treatments, many cancers still have a poor prognosis. Patients with terminal cancer frequently require specialized care as disease advances, including expert palliative care and if indicated, radiation therapy to relieve painful bone metastases.

Palliative Care

The Canadian Hospice Palliative Care Association (CHPCA) (2014) recommends that palliative care is “ appropriate for any person and/or family living with, or at risk of developing a life threatening illness due to any diagnosis, with any prognosis, regardless of age, and at any time they have unmet expectations and/or needs, and are prepared to accept care” (Canadian Hospice Palliative Care Association, 2014, p.6). They also recommend that the earlier the palliative care is initiated, the patient and their family will experience greater quality of care (CHPCA, 2014). Patients with terminal cancer have diverse and complex needs that require time and sensitivity when receiving health care services from health professionals (Gorman, Balboni, Taylor, & Krishnan, 2015; Sussman, Barbera, Bainbridge, Howell, Yang, Husain, & ... Walker, 2012). The CHPCA

describes all of the domains of illness that affect a patients' life during palliation to include: Disease management, physical symptoms, psychological effects, thoughts of loss and grief, social factors, end of life care, daily activities, and spiritual beliefs, all of which need to be considered by health professionals when caring for palliative cancer patients (Vallurupalli et al., 2012; Voogt et al., 2005). The CHPCA recommends health care providers to have universal goals when caring for palliative patients. These goals include reduction of pain and symptoms, providing care that is sensitive to the patient's psychological and spiritual wellbeing, supporting the patient to live actively before death, supporting the patient's family, including suggestions and resources to improve quality of life (CHPCA, 2014).

The main goals of palliative care are similar to the ideals of nursing, which include prevention and mitigation of suffering, and advocating care for quality family centered care (Dahlin, 2015). Quill and Abernathy (2013) believe that all health professionals should have some level of palliative care training influenced by their care environment. They delineate between skills required by health professionals providing primary and specialty palliative care. Primary care providers should have basic palliative care skills that include: "Management of pain, symptoms, depression, anxiety", as well as the ability to have discussions with patients and their families about "prognosis, Goals of treatment, suffering, and code status" (Quill & Abernathy, 2013, p.2). Specialty palliative care services should include; "Management of complex pain, symptoms, depression, anxiety, grief, and existential distress", with the provider having the ability to provide "conflict resolution and assistance in addressing futility" (Quill & Abernathy, 2013, p.2).

Symptom Burden

Due to the disease process, palliative patients experience discomfoting symptoms such as: pain, fatigue, drowsiness, nausea, lack of appetite, shortness of breath, depression, anxiety, and alterations in wellbeing (Bruera, Kuehn, Miller, Selmsler, & Macmillan, 1991; Watanabe, Nekolaichuk, Beaumont, Johnson, Myers, & Strasser 2011). Bruera, Kuehn, Miller, Selmsler, & Macmillan (1991) have used these nine symptoms to create a scale to measure the amount of distress that each one of these symptoms creates for palliative patients called, the Edmonton Symptom Assessment System (ESAS). Of these symptoms, Bradley, Davis, and Chow (2005) report the symptoms most commonly expressed by this population are alterations in wellbeing (93%), fatigue (92%), and pain (77%), which are percentages that are relatively consistent with percentages reported by other studies (Fitch 2012; Johnson, Teno, Bourbonniere, & Mor, 2005). Bradley, Davis, & Chow (2005) reported that patients with a poorer scores on the Karnofsky Performance Status (KPS), which is another tool to measure the daily functioning of palliative care patients, or patients that experienced a 10% weight loss in 6 months tended to experience “higher symptom distress” with all nine of the symptoms listed on the ESAS. Alterations in wellbeing include emotional and psychosocial distress, that patients and their families feel when their prognosis is palliative.

As mentioned, one of the most common and debilitating symptoms that palliative cancer patients experience is pain. Pereira & Pallium Project (2008) reports that 85% of palliative patients live with pain, caused by the primary disease or metastases. In many of the common types of cancer, including breast, prostate, lung and colorectal cancer,

malignant cells spread to the bone, called 'bone metastases' (Nguyen, Chow, Cramarossa, Finkelstein, & Goh, 2011). In addition to appropriate analgesics, radiation is highly effective for pain relief, with 80-90 percent of patients experiencing varying degrees of pain relief (Moghanaki & Smith, 2013).

Radiotherapy is effective for treatment of pain attributable to bone metastases, prevention of fractures, the healing of pathological fractures, or treatment of compression of the spinal cord caused by primary tumor or metastases (Nguyen et al., 2011). Radiation therapy is only offered at specialized cancer centers throughout Canada, and often patients have to travel considerable distance to receive their treatments. Treatments can be unplanned and time sensitive, depending on the patient's condition. Radiation departments are often overwhelmed with patients needing this vital service, leading to decreased quality of care, increased pain and suffering, due to a lack of resources and staff to treat this population on a rapid basis. The demand for this service is great, as up to 50% of cancer patients will require palliative radiation therapy to bone at some point of their disease (Nguyen et al., 2011). The longer the patient has to wait to receive therapy, the worse the pain and disability may become (Nguyen et al., 2011; Pereira & Pallium Project, 2008). For patients with terminal cancer, living the last portion of their lives with significant pain and disability is unacceptable, especially when treatment for bone pain is available.

The needs of palliative care patients with pain attributable to bone metastases are well known and documented yet remain unmet, in particular, rapid access to radiotherapy expertise. One potential solution is provision of expert care by nurse practitioners (NP). Nurse Practitioners are not legislated in Alberta to order radiation at this time, but the

expert evaluation of the patient by the NP can increase the efficiency of the radiotherapy process (Carper & Haas, 2006; Kaplow, 1996; Kelvin, Moore-Higgs, Maher, Dubey, Austin-Seymour, Daly, & ... Kuehn, 1999). Before, during, and after the patients' radiation treatment the NP may be available to provide teaching, answer questions and address any symptoms that the patient is experiencing (Gorman, Balboni, Taylor, & Krishnan, 2015). Because of their close involvement within the patients care, NP's are in a unique situation to provide greater health promotion and holistic supportive care to patients and their families (Carper & Haas, 2006; Hollis, & McMEnamin, 2014; Kaplow, 1996; Kelvin, Moore-Higgs, Maher, Dubey, Austin-Seymour, Daly, & ... Kuehn, 1999). NP's also may complete the patients follow up care, as well as following them throughout their palliation, if this is within their role (Carper & Haas, 2006; Hollis, & McMEnamin, 2014; Kaplow, 1996; Kelvin, Moore-Higgs, Maher, Dubey, Austin-Seymour, Daly, & ... Kuehn, 1999). Efficiency is defined by the Health Quality Council of Alberta (HQCA) as "Resources [used] optimally in achieving desired outcomes" (HQCA, 2005, p.6). They also define accessibility as "Health services are obtained in the most suitable setting in a reasonable time and distance" (HQCA, 2005, p.6). Keeping in line with these dimensions of quality, NP's are a viable solution to improve the efficiency and accessibility of palliative radiation services.

Purpose

The purpose of this study was to describe the characteristics of patients seen by a Nurse Practitioner (NP) consultant in an outpatient palliative radiation oncology clinic. The characteristics of the patients seen by the NP will be compared to the characteristics of the patients seen by the radiation oncologist (RO). We hypothesize that there would be

no significant differences in the characteristics of the patients seen by the NP when compared to those seen by the RO.

The research questions addressed were:

- 1) What are the characteristics, severity, and complexity of patients assessed by a NP in a multidisciplinary rapid access palliative radiotherapy consultation clinic?
- 2) Is there a difference in the patient severity and complexity as measured by ESAS pain scores, KPS scores, and ECS-CP scores between patients that were assessed by the NP when compared to the patients assessed by the RO?

Conceptual Framework

Bryant-Lukosius and DiCenso (2004) offers a nine-step framework for the successful implementation of the NP role across a variety of settings which is titled the merged framework, the **P**articipatory, **E**vidence-based, **P**atient-centered **P**rocess, for **APN** role development, implementation, and evaluation (PEPPA). Their framework can be applied to the role of the advanced practice nurse (APN), an umbrella term that encompasses NP's. The steps are (a) define patient population and describe current model of care, (b) identify stakeholders and recruit participants, (c) determine need for a new model of care, (d) identify priority problems and goals, (e) define the new model of care and APN role (f) plan implementation strategies, (g) initiate APN role implementation, (h) evaluate APN role and new model of care and (i) long term monitoring of the APN role and model of care (Bryant-Lukosius & DiCenso, 2004, p.532). The authors recommend utilization of this framework prior to implementation of NP roles, however, in the RAPRP setting

the PEPPA framework was not formally utilized in advance of NP deployment. Rather, the philosophy that contributions by a multidisciplinary team bringing multiple holistic aspects of expertise, given that, “if a patient needs palliative radiotherapy, we can be fairly sure that radiotherapy is not all the patient needs” guided the RAPRP clinic development and team complement (Fairchild et al. 2008). Here, surveys from radiation oncology providers, community family physicians and the patients attending RAPRP clinic addressed steps (a - g), however, from the perspective of RAPRP clinic development and evaluation, and not specifically the APN role. Given the established applicability of the PEPPA framework to NP work and utility in the Canadian health care system, this framework guided the literature review and analysis of the data.

The first step in the PEPPA framework is to assess the population; the patients within the population, and the effectiveness of the current care methods. As described previously, the needs of patient that require palliative radiotherapy are complex, and underserved currently. As a second step in the initiation of the role of the NP, Bryant-Lukosius and DiCenso (2004) recommend “identifying stakeholders and recruiting participants” (p.533). This ensures that the stakeholders are included in the entire process of the implementation of the role, allowing them to express and address all of their expectations of the role leading to greater satisfaction with the implementation of the role. If stakeholders help to define the role, they can help to increase awareness of the role.

The third step is to decide how, based upon the first two steps, NPs can improve care moving forward. The fourth step is to identify the current problems and the future goals (Bryant-Lukosius and DiCenso, 2004, p.534). Both the third and fourth steps of this

framework seemed to be acknowledged by the implementation of the NP to improve accessibility and efficiency of these services. It is unclear if within this clinic if the process was formalized or, ad hoc. The PEPPA framework describes that acknowledging problems and goals ensures that these factors are accounted for when moving on to the next step: creating new methods for delivering care and implementing the NP role.

Bryant-Lukosius and DiCenso (2004) reports that the initial steps in the framework are important to complete before creating a new method for delivering care because these actions “generat[e] a depth and breadth of strategies to improve [and] strengthen [care] because patient needs have been examined from multiple viewpoints” (p.534). Including many stakeholders within the planning phase ensures that they have a vested interest in the success of the new method and role of the NP because they assisted in the creation.

The next two steps in the PEPPA framework are to make a plan for implementation and follow through with this plan (Bryant-Lukosius and DiCenso, 2004, p. 535-537).

They warn that successful implementation takes time. An important way to ensure the success of the method is to evaluate, which are the last two steps of the framework.

Evaluation needs to occur throughout implementation but a plan needs to be created to continue this evaluation for the long term (Bryant-Lukosius and DiCenso, 2004, p. 537-538). They suggest that not only does the organization need to monitor the new method, but the NP also needs to be responsible for monitoring their own contributions. The framework is lengthy, but it recognizes and includes all of the factors that will make the transformation and implementation of the NP role successful.

This thesis contributes to the overall goal behind the creation of the PEPPA framework, which is to improve the successful implementation, appropriate evaluation, and

expansion of the body of research that support NP as part of advanced practice nursing roles. Information presented here will demonstrate the first and the eighth step within the PEPPA framework, which is to evaluate the needs of the population and the NP role.

Significance

Disease prevalence and barriers to access have been identified as potential contributors to the need for increasing service availability. People with terminal cancer have diverse and complex needs that require time and sensitivity when receiving health care services from health professionals (Gorman, Balboni, Taylor, & Krishnan, 2015; Sussman, Barbera, Bainbridge, Howell, Yang, Husain, & ... Walker, 2012).

The addition of NPs into to the multidisciplinary team that provides care to palliative radiation patients can help to increase access and decrease wait times to receive essential services. The results of this study have the potential to inform the types and characteristics of patients eligible for nurse practitioner clinical assessments in the palliative radiotherapy setting.

Chapter Two: Literature Review

Background

Canada takes pride in its universal health care system, which is intended to be accessible to all citizens. Unfortunately, the Canadian health care system is fraught with issues, namely accessibility of services. The role of the Nurse Practitioner (NP) was introduced in Canada with the intention of increasing accessibility of a health care provider in remote areas of Canada. Kaasalainen et al. (2010) describes the history of the NP role. They present the first advanced practice nurses to be the out-post nurses working in remote settings in the 1890's. Due to a lack of staff and resources these nurses had expanded roles when working with patients. The outpost nurses were often the most senior on site, performing many of the same functions as a physician until a physician arrived or was available for consultation.

The role of the NP became more formal in the 1960's (Kaasalainen et al. 2010, p.39). This shift was caused by a physician shortage, along with the implementation of universal healthcare, medical specialization, and the introduction of primary health care. This formalization included a statement released in 1973 by the Canadian Nurses Association and the Canadian Medical Association that listed the roles and responsibilities of advanced nursing practice. During this time, education programs for advanced nursing care were created, although differing curriculum requirements lead to differing levels of training, which created problems with allowing advanced nurses' entry to practice. Schreiber et al. (2005) argued that this was one of the reasons that advanced nursing roles have been slow to fruition.

Provincial NP associations were created across Canada in the late 1970's to legislate and regulate the profession (Kaasalainen et al. 2010). Unfortunately,

implementation of NPs failed at this time due to a lack of responsibility by the provinces to fund the positions, as well as a lack of support from the medical community.

In 1998 the role of the NP was further legitimized by the “first legal recognition of the NP scope of practice” (Kaasalainen et al. 2010, p.47) created in Ontario in 1998, with other provinces following shortly thereafter. In 2005, the federal government demonstrated their support for the sustainability of the NP role by creating the Canadian Nurse Practitioner Initiative (CNPI), sponsored by the CNA (Canadian Nurses Association, 2010). This description of the tumultuous history of the NP role demonstrates the need for greater more varied research into the role of the NP, to demonstrate how implementation of NP’s can improve the service provided by the Canadian Health care system.

Stahlke Wall and Rawson (2016) describe nurse practitioners (NP’s) as “high level providers who infuse a new perspective on health and health care [of whom] provide thorough, holistic care that reduces unnecessary resource use by responding proactively to patient need” (p.495). NP responsibilities include: “holistic assessments, psychosocial and supportive care, ordering diagnostic testing and prescribing chemotherapy, surveillance, patient education, consulting with families, developing policy and programs, responding to survivorship issues and needs, providing palliative care and advanced planning, ensuring continuity of care across settings and levels of care” (Stahlke Wall & Rawson, 2016, p.492). All such activities are legislated in Alberta as autonomous competencies in oncology NP practice (Canadian Nurses Association, 2010). It is important to explore the nurse practitioner role in depth to outline how this

role can be effectively utilized within the Canadian health care system, as means of improving health care services accessibility.

The purpose of this integrative review was to describe the findings of the scientific literature and offer a description of the role of the nurse practitioner in Canada. Using an adaptation of Whitemore and Knafl (2005), a literature review was completed using the EBSCO University of Alberta Libraries list of databases of which included CINAHL plus, Cochrane, Medline, PsychINFO, and Scopus. A university librarian provided necessary expertise for the search. Search terms used and cross-referenced were: “nurse practitioner role”, ‘nurse practitioner clinical’, and “Canada” completed December 2016 and January 2017. This search resulted in 601 articles. Inclusion criteria were publications limited to full text, peer reviewed, and English sources. Articles included had dates between 2008 and 2017 to ensure the citations were current and applicable.

There is much variability in the role of NP’s cross the world, therefore only articles that focused on the nurse practitioner role in Canada were considered to maintain applicability of literature review findings to our study findings. Articles were excluded if they lacked description of their methods and data collection activities. Articles that included specific frameworks or philosophical applications were also excluded, as the purpose of this search was to establish the clinical role of the nurse practitioner and a conceptual framework had already been identified for this study. NP’s in Canada are included under the umbrella term ‘advanced practice nursing’, a term, which also encompasses many other advanced nursing roles as well. Kilpatrick et al. (2010) reports this umbrella term causes much confusion for health care professionals and the public as

to the various roles of nurses encompassed by this term. Therefore, articles reviewing advanced practice nursing roles as a whole were excluded from this integrative review.

After a thorough and systematic review of the articles with inclusion and exclusion criterion in mind, 21 articles were identified. Reference lists of all of the papers were reviewed and hand searched resulting in the addition of 3 articles. Recent publication from the Canadian Journal of Nursing Leadership was also hand searched resulting in the addition of 2 more articles. The total numbers of articles included within the literature review are 26.

Table 1: Summary of Studies Included in Integrative Review

Author/ Year	Title	Design	Key Findings about NP role	Considerations
Brault, et al. (2014).	Role Clarification Processes for Better Integration of Nurse Practitioners into Primary Healthcare Teams: A Multiple-Case Study.	Qualitative case study	<ul style="list-style-type: none"> • Role clarification needs to occur prior to role initiation and continue throughout implementation. • NP's needed to understand their role and be able to explain the role to others. 	None.
Browne and Tarlier (2008)	Examining the potential of nurse practitioners from a critical social justice perspective.	Quantitative	<ul style="list-style-type: none"> • The role and the training of the NP place this profession within an ideal position to influence health care social injustice, for marginalized groups. 	Description of how information was gathered is not clear.
Burgess, & Purkis, (2010).	The power and politics of collaboration in nurse practitioner role development.	Participatory action research, qualitative	<ul style="list-style-type: none"> • Collaboration is essential to the functioning of the NP role. • Collaboration can foster respect and trust leading to greater role acceptance. • Allowed patients to feel empowered to make their own health care decisions. • Connected patients with community resources. • Provided care with a nursing philosophy, integrated with 	Info collected in BC, many of the NP's were new to profession.

Author/ Year	Title	Design	Key Findings about NP role	Considerations
			<p>advanced clinical education to extend their ability to provide holistic care.</p> <ul style="list-style-type: none"> • Modeled leadership behaviors including willingness to mentor others, through sharing and exchanging knowledge. • Current lack of measurements in NP practice standards is a barrier to greater implementation. • NP role needs to supported in development 	
Dahrouge, Muldoon, Ward, Hogg, Russell, & Taylor-Sussex, (2014).	Roles of nurse practitioners and family physicians in community health centers.	Quantitative	<ul style="list-style-type: none"> • NP's provided more walk-in care and fewer same-day appointments than FPs. • NP's also performed more street outreach functions. • Community health centers might have made NPs responsible for walk-in and outreach care because the tasks aligned well with functions they could carry out independently. • Compared with FPs, NPs saw patient panels that were less medically complex but more 	Unclear of how patients were divided into care groups. Clinic manager estimated model of NP practice. Limitations on NP practice at time of study.

Author/ Year	Title	Design	Key Findings about NP role	Considerations
			socially complex.	
Dietrick et al. (2011)	Delivering Specialized Palliative Care in the Community A New Role for Nurse Practitioners	Qualitative grounded theory 6 interviews	<ul style="list-style-type: none"> • Four pillars to NP care: Care management and coordination, medical management, psychosocial support, and education. • In home holistic patient care. • Encouraged greater collaboration between family and physician. • Effective multidisciplinary management improving patient care. • Linkage of patients and families with community resources. • Expert palliative assessment. • Respect for dignity and allowed patients to receive care based on their wishes. • Greater understanding of the total patient condition. • Environment and adequate scheduling allow the NP to build a trusting and therapeutic relationship. • Individualized patient education based on 	Community palliative care service focus.

Author/ Year	Title	Design	Key Findings about NP role	Considerations
			<p>relationship and trust already built.</p> <ul style="list-style-type: none"> • The trustworthiness of a nurse with medical expertise. 	
Donald, et al. (2010).	The primary healthcare nurse practitioner role in Canada.	Scoping review	<ul style="list-style-type: none"> • Consistent Canadian legislation and education standards would improve role understanding, credibility and portability. • Education requirements and processes should be standardized. • Greater research on the outcomes of the implementation of NP's. 	None.
Gresley-Jones, Green, Wade, & Gillespie, (2015)	Inspiring Change: How a Nurse Practitioner-Led Model of Care Can Improve Access and Quality of Care for Children With Medical Complexity.	Mixed methods	<ul style="list-style-type: none"> • Reduction of the number of complex follow-up visits for the developmental pediatricians. • Increased appointment availability. • Reduced wait time. • Flexible consultation settings. • Decreased missed visit rate. • Extra time spent allowed greater understanding and more effective communication. 	Pediatric, used PEPPA framework. NP led clinic.

Author/ Year	Title	Design	Key Findings about NP role	Considerations
			<ul style="list-style-type: none"> • Connection to community resources. 	
Heale, (2012).	Overcoming barriers to practice: A nurse practitioner-led model.	Clinic description	<ul style="list-style-type: none"> • Full scope of practise. • Patients see the provider available, which allowed them to benefit from multiple providers expertise. • If a staff member leaves, patients are never without a provider. 	Paper is a description of the clinic
Heale, James, & Garceau, (2016).	A Multiple-Case Study in Nurse Practitioner-Led Clinics: An Exploration of the Quality of Care for Patients with Multimorbidity.	Case study Mixed methods	<ul style="list-style-type: none"> • Patients are not restricted to a certain number of clinic visits and scheduling is appropriate to allow multiple issues to be addressed during the visit. • Many patients in the clinic have not had a provider for a long period of time and have presented to the clinic with complex medical and social issues. • Clinic is publically funded and therefore staff wages are lower then that of the private clinics, leading to difficulty retaining staff to treat an underserved and medically complex clientele. 	Study completed in Ontario.

Author/ Year	Title	Design	Key Findings about NP role	Considerations
Hunter, Murphy, Babb, & Vallee, (2016).	Benefits and Challenges Faced by a Nurse Practitioner Working in an Interprofessional Setting in Rural Alberta.	Mixed Methods	<ul style="list-style-type: none"> • Patients were satisfied with the NP’s explanations of: treatment choices, management, illness/injury prevention, and follow up. • Patients were satisfied with the assessment and care the NP provided. • Physicians agreed that communication to patients was effective and the NP was competent in assessment and management of patient concerns. • Introduction of NP role improved accessibility of services. • Barriers included access to ongoing education and role isolation. 	Small study, rural setting.
Hurlock-Chorostecki, Forchuk, Orchard, van Soeren, & Reeves, (2014).	Labour saver or building a cohesive interprofessional team? The role of the nurse practitioner within hospitals.	Qualitative	<ul style="list-style-type: none"> • Flexibility and adaptation of the role to address health care gaps. • Many barriers, requiring leadership skills. • Value teamwork and interprofessional practice. • Enabling team efficiency 	Differences between what NP’s perceived their role is and that of the interprofessional team.

Author/ Year	Title	Design	Key Findings about NP role	Considerations
			<p>through acknowledgement of multidisciplinary expertise.</p> <ul style="list-style-type: none"> • Reducing patient and family burden through holistic assessment and care. • Engaged in invisible work including vigilance, mentorship, relationship building, encouraging change, quality improvement, and community activism. 	
Kaasalainen, et al., 2013	Role of the nurse practitioner in providing palliative care in long-term care homes.	Qualitative Descriptive design	<ul style="list-style-type: none"> • Involved caring for residents throughout the dying process, including managing co-morbidities and medications, controlling pain, supporting families, and pronouncing death. • Provided information, education, and support to families, patients, and staff. • Provided holistic patient care. • Improves accessibility and timeliness of care. • Improved staff morality by being present and available for staff acknowledgement and support. • Excellent in pain assessment 	Article focused on palliative geriatric NP's specifically.

Author/ Year	Title	Design	Key Findings about NP role and management.	Considerations
Kaasalainen, et al. (2016).	The effectiveness of a nurse practitioner-led pain management team in long-term care: A mixed methods study.	Mixed Methods	<ul style="list-style-type: none"> • Resident pain, functional status, and clinical practice behaviors of LTC staff were improved. • The health-care team and nursing managers viewed NP role positively. • There were statistically significant improvements in functional status in both the partial intervention ($p < 0.001$) and full intervention group ($p=0.002$). • Greater trends in reductions of moderate and severe pain in both the full and partial intervention groups compared to the control group. • Most often the pain medication prescribed was non-opiate. • NP was described as approachable, dependable, knowledgeable and having clinical expertise by the staff. • Effective in their roles and drivers for positive change. 	Long term care population only.

Author/ Year	Title	Design	Key Findings about NP role	Considerations
			<ul style="list-style-type: none"> • Great resources and committed to residents' pain issues. • Improved resident and staff access to timely primary care, pain assessment and follow-up management. • Less resident hospitalizations. 	
Kilpatrick, et al. (2010)	The acute care nurse practitioner role in Canada.	Scoping review	<ul style="list-style-type: none"> • Clear vision for the role and identification of the non-clinical activities is important to advance the role. • Consistent NP scope of practice and legislation across Canada would encourage greater utilization. • Greater research to prove the benefit of the role to support the utilization of NP's. 	None.
Kilpatrick, Lavoie-Tremblay, Ritchie, Lamothe, & Doran, (2012).	Boundary work and the introduction of acute care nurse practitioners in healthcare teams.	Qualitative	<ul style="list-style-type: none"> • Boundary work for the NP to overcome barriers includes creating space, loss of valued function, trust, time, and interpersonal dynamics. • Facilitated by being approachable, listening, promoting the work of other providers and being 	Only conducted at two sites, did not include patients or families.

Author/ Year	Title	Design	Key Findings about NP role	Considerations
			<p>sufficiently assertive to set appropriate limits.</p> <ul style="list-style-type: none"> • Dependent upon role clarification and knowledge or ones limits. • Current barriers include unclear legislation and licensing board policies, and medical influence on scope of practice. • Clearly defined roles within the team and required. 	
Leipert, Delaney, Forbes, & Forchuk, (2011).	Canadian Rural Women’s Experiences with Rural Primary Health Care Nurse Practitioners.	Qualitative	<ul style="list-style-type: none"> • Provide thorough wellness care, treatment, screening, and monitoring. • Improved access to services. • Appropriate patient education. • Increased quantity and quality of time allowing patients to feel their health is valued • Facilitated trust and respectful working relationships. • Provided a sense of individualized personal care. • Made quality health care accessible. 	One research site, rural sample only consisting of women.

Author/ Year	Title	Design	Key Findings about NP role	Considerations
Martin-Misener, et al., (2015a)	A mixed methods study of the work patterns of full-time nurse practitioners in nursing homes	Mixed Methods	<ul style="list-style-type: none"> • Work activities were mostly direct clinical activities. • Collaboration and education with all members of healthcare team, patients, and families. • Facilitated an open dialogue between patient's families and staff regarding patient care. • Leadership through implementation of evidenced based practice. 	Article focused on geriatric NP's specifically.
Martin-Misener, et al. (2015b).	Cost-effectiveness of nurse practitioners in primary and specialized ambulatory care: systematic review.	Systematic review	<ul style="list-style-type: none"> • Able to provide similar services to those for whom they are substituting, or be utilized within complementary provide additional services that are intended to complement or extend existing services. • In alternative provider ambulatory primary care roles, NP's have equivalent or better patient outcomes are potentially cost saving. • Evidence cost-effectiveness is promising, but limited. 	Systematic review.
Martin-Misener, et	Nurse practitioner caseload in primary	Scoping Review	<ul style="list-style-type: none"> • Determination of appropriate patient panel/caseload sizes is 	

Author/ Year	Title	Design	Key Findings about NP role	Considerations
al. (2016).	health care: Scoping review.		<p>important to ensure safe and effective care for patients, families, and communities.</p> <ul style="list-style-type: none"> • There is limited research on how to determine appropriate caseload numbers. • Workload is influence by factors such as patient characteristics, health conditions, provider and organizational characteristics. 	
Roots, & MacDonald, (2014).	Outcomes associated with nurse practitioners in collaborative practice with general practitioners in rural settings in Canada: a mixed methods study.	Mixed methods	<ul style="list-style-type: none"> • Role consisted of primary care, educational activities, administrative activities and research. • Had time to complete tasks not normally completed by the physicians. • Comprehensive patient care including health promotion, illness prevention, and in-depth examination of patient's situation. • Improved care planning, patient engagement and working partnerships. • Reduced need for future appointments, improved 	Small sample size, potential for confounding variable in the decrease in ER visits and hospital admissions, and only focused on primary care.

Author/ Year	Title	Design	Key Findings about NP role	Considerations
			<p>patient engagement, and helped to develop a better partnership between provider and patient.</p> <ul style="list-style-type: none"> • Improved interprofessional collaboration within the clinic. • Appropriate caseloads lead to improved job satisfaction for providers. • Accessibility of services was improved. • Decreased referrals to ER departments. • Greater choice of provider and could see the provider most appropriate for their needs. • Improved staff communication and education. • Link between practice and the community resulting in a greater understanding of community services. • Decreased hospital admissions. 	
Sangster et al. (2011)	Factors affecting nurse practitioner role implementation in Canadian practice settings: an integrative	Integrative review	<ul style="list-style-type: none"> • Barriers to implementation of nurse practitioners occur at multiple levels including systems, organizational, and practice setting levels. 	Secondary source

Author/ Year	Title	Design	Key Findings about NP role	Considerations
	review		<ul style="list-style-type: none"> • Successful implementation needs to include involvement, of stakeholders, appropriate predetermination of intention for role implementation, acceptance from colleagues and public. 	
Sangster-Gormley, (2015).	Interprofessional Collaboration: Co-workers' Perceptions of Adding Nurse Practitioners to Primary Care Teams.	Mixed methods	<ul style="list-style-type: none"> • Independently providing care where there are disparities. • Respected and described as integral to the health care team. • No duplication of work between providers, rather provider's roles complemented each other. • Effective team functioning. • Greater role understanding and acceptance needs to be addressed. 	None.
Sarro, Rampersaud, & Lewis, (2010)	Nurse practitioner-led surgical spine consultation clinic.	Quantitative descriptive design	<ul style="list-style-type: none"> • High levels of overall satisfaction with NP consultation. • NP improved wait times and patients were satisfied with seeing the NP quicker than having to wait to see the specialist directly. • Physician agreement with the 	Shadow billing approach

Author/ Year	Title	Design	Key Findings about NP role	Considerations
			<p>NP's working diagnosis was 100%, and with specific patient management options was 95%.</p> <ul style="list-style-type: none"> • Only 10% of the patients that completed their initial consult with the NP were required to go on to see the specialist. • Timely consultations and the initiation of appropriate investigations or additional consultations specific to individual patients. 	
Stahlke Wall, & Rawson, (2016).	The nurse practitioner role in oncology: Advancing patient care.	Qualitative: Interpretive Description	<ul style="list-style-type: none"> • NP role clarity needs to be determined and discussed within the setting. • Traditional hierarchies and expectations of the role limit its potential. 	Oncology setting in Alberta.
Thrasher, & Purc-Stephenson, (2008).	Patient satisfaction with nurse practitioner care in emergency departments in Canada.	Quantitative	<ul style="list-style-type: none"> • The majority of patients surveyed approved of the care provided by the NP. • The length of the consultation and the attentiveness of the NP were listed as strengths. • Patients were satisfied with the treatment and health 	ER setting only, Ontario only, small sample size over a period of 1 week.

Author/ Year	Title	Design	Key Findings about NP role	Considerations
			information the NP provided.	
Van Soeren, Hurlock-Chorostecki, & Reeves, (2011).	The role of nurse practitioners in hospital settings: implications for interprofessional practice.	Mixed methods	<ul style="list-style-type: none"> • Role was patient focused. • Positive attributes included being approachability, enhanced patient knowledge consistent provision of care and contribution to improvements in patient safety. • Greater information sharing with other professionals, patients, and families. • Prevention of things from ‘falling through the cracks’ thus improving patient safety (p.248). • Enhanced communication, consultation, and bridging across disciplines. 	Ontario study.

Articles included a variety of research methods including qualitative, quantitative, mixed methods, integrative reviews, and systematic reviews. The role of the nurse practitioner was not only described by nurse practitioner themselves, as well as a variety of perspectives on the role were examined within the articles chosen including the opinions of patients, families, health care aides, medical office assistants, physicians, managers, and stakeholders. NP roles from a variety of settings, working with a variety of age groups were reviewed, settings included long term care, primary care, emergency and specialist NP's. Results of the included studies were compiled and summarized into six dimensions and issues associated with the nurse practitioner role in Canada: clinical, collaboration, education, leadership, barriers, and accessibility. While few NP roles would have undergone the PEPPA developmental steps recommended by Bryant-Lukosius and DiCenso (2004) as a framework PEPPA describes key considerations in the success (or failure) of NP roles. As applicable, PEPPA Framework items are identified. Overall the description of the current roles that NP's are fulfilling addresses PEPPA item a) which is assessing the population served by NP's; the patients within the population, and the effectiveness of the current care methods.

Clinical

Completing clinical duties is described as a primary dimension of the NP role where the most time is spent (Dietrick et al., 2011; Kaasalainen, et al., 2013; Leipert, Delaney, Forbes, & Forchuk, 2011; Martin-Misener, et al., 2015; Roots, & MacDonald, 2014). It is also the dimension of NP practice that has been most thoroughly researched and described within the literature. NP's are armed with the trustworthiness of nurse and the medical training to analyze the patients health within the context of their life, to

provide holistic patient care, which decreases patient and family burden caused by health alterations (Dietrick et al., 2011; Roots, & MacDonald, 2014; Hurlock-Chorostecki, Forchuk, Orchard, van Soeren, & Reeves, 2014). Within the NP role clinical duties encompasses activities of direct patient care which include comprehensive assessments, ordering and interpreting diagnostic testing, disseminating and discussing diagnosis with patients, completing minor procedures, management and treatment of various clinical conditions, health promotion teaching and patient education, as well as ongoing follow up and management of various health conditions (Dietrick et al., 2011; Kaasalainen, et al., 2013; Hurlock-Chorostecki, Forchuk, Orchard, van Soeren, & Reeves, 2014; Leipert, Delaney, Forbes, & Forchuk, 2011; Heale, R., James, S., & Garceau, M. L., 2016; Martin-Misener, et al., 2015; Roots, & MacDonald, 2014; Sarro, A., Rampersaud, Y. R., & Lewis, S., 2010).

Dietrick et al. (2011) completed a qualitative study utilizing grounded theory to analyze the role of the NP in specialized community based palliative care. They completed 6 interviews with the staff including the views of NP's, medical director, clinical director and program coordinator. Interviewing stakeholders and evaluating a new model of care is congruent with PEPPA framework items a) through h). Dietrick et al. (2011) describe the care of the NP as thorough, because the NP deals with the timely aspects of care such as expert palliative assessment, working through sensitive medical issues with families, and ensuring that the patients receive care that is individualized. This description demonstrates PEPPA framework item of evaluating the NP role and the value that NP's can add to clinical care. Other articles substantiated these results as well. Overall, patients and their families appreciate the time that the NP spends with them to

understand their health condition and the consideration of the NP to collaborate with the patient to create individualized treatment plans (Dietrick et al., 2011; Leipert, Delaney, Forbes, & Forchuk, 2011; Roots, & MacDonald, 2014). The time spent and the attentiveness of the NP helps to foster trust leading to better care relationships, effective care planning, and increased patient engagement between the patient leading to more effective patient provider encounters (Dietrick et al., 2011; Leipert, Delaney, Forbes, & Forchuk, 2011; Roots, & MacDonald, 2014; Thrasher & Purc-Stephenson, 2008). Across the variety of settings within which the selected studies took place, overall patients and their families were satisfied with the clinical care provided by NP's (Dietrick et al., 2011; Gresley-Jones, Green, Wade, & Gillespie, 2015; Hunter, Murphy, Babb, & Vallee, 2016; Hurlock-Chorostecki, Forchuk, Orchard, van Soeren, & Reeves, 2014; Leipert, Delaney, Forbes, & Forchuk, 2011; Sarro, Rampersaud, & Lewis, 2010; Thrasher & Purc-Stephenson, 2008; Van Soeren, Hurlock-Chorostecki, & Reeves, 2011).

Collaboration

Collaboration is foundational to NP education and practice (Burgess, & Purkis, 2010; Hurlock-Chorostecki, Forchuk, Orchard, van Soeren, & Reeves, 2014; Van Soeren, Hurlock-Chorostecki, & Reeves, 2011). Collaboration is also the foundation of the PEPPA framework, which includes defining the population, working with stakeholders to determine an appropriate APN role, as well as seeking feedback from patients and stakeholders to evaluate the role. NP's value the expertise of other providers and encourage multidisciplinary collaboration to improve the quality of patient care (Burgess, & Purkis, 2010; Dietrick et al., 2011; Hurlock-Chorostecki, Forchuk, Orchard, van Soeren, & Reeves, 2014; Kaasalainen, et al., 2016). This collaboration also serves to

facilitate respect and trust between the NP, patients, and colleagues, which contributes to greater role acceptance (Burgess, & Purkis, 2010; Kilpatrick, et al., 2012; Roots, & MacDonald, 2014). While working in a multidisciplinary team it was noted by Hurlock-Chorostecki, Forchuk, Orchard, van Soeren, & Reeves, (2014) that the NP sought opportunities to “ease the workload” of other health care professionals (p.263). These actions serve to improve working relationships and to improve the satisfaction of the other care providers (Roots, & MacDonald, 2014; Sangster-Gormley, 2015) and address PEPPA Framework item (d) ‘identify priority problems and goals’ and enhancing workplace efficiency. After trust and respect had been established, multidisciplinary teams describe the NP’s as a “bridge” between the various staff included within the health care team (Roots, & MacDonald, 2014). NP’s were identified as easily accessible, allowing them to serve as a resource person for staff and a “repository” of patient knowledge (Hurlock-Chorostecki et al., 2014, p.262). This perceived accessibility encouraged staff to seek out the NP as a resource person, which allowed the NP moments to provide valuable information and education to these staff members (Hurlock-Chorostecki, Forchuk, Orchard, van Soeren, & Reeves, 2014; Kaasalainen, et al., 2016; Kilpatrick, et al., 2012; Roots, & MacDonald, 2014; Van Soeren, Hurlock-Chorostecki, & Reeves, 2011). Overall the addition of the NP was noted to be a positive contribution to the efficiency and functioning of healthcare teams (Dietrick et al., 2011; Hurlock-Chorostecki, Forchuk, Orchard, van Soeren,& Reeves, 2014; Kaasalainen, et al., 2016; Kilpatrick, et al., 2012; Martin-Misener, et al., 2015; Roots, & MacDonald, 2014; Van Soeren, Hurlock-Chorostecki, & Reeves, 2011).

Nurse practitioners also collaborated with patients, families, and communities

(Dietrick et al., 2011; Van Soeren, Hurlock-Chorostecki, & Reeves, 2011). The knowledge and accessibility of the NP allowed them to be a resource person for patients and their families, keeping them informed and up to date on their health concerns (Dietrick et al., 2011; Gresley-Jones, Green, Wade, & Gillespie, 2015; Van Soeren, Hurlock-Chorostecki, & Reeves, 2011). The NP's that participated in the mixed methods study completed by Gresley-Jones, Green, Wade, & Gillespie, (2015) utilized collaboration by allowing families with medically complex children to choose where they would like to have their appointments, to improve accessibility and wait times. Settings included the patient's home, rehabilitation hospital, community and telephone follow-ups. This collaboration resulted in a decrease of the missed visit rate from 30% down to 11% (Gresley-Jones, Green, Wade, & Gillespie, 2015), representing a successful PEPPA Framework item (h) 'evaluate APN role and new model of care'. Here, the flexibility of the setting in which the NP met with the family allowed the NP to connect patients and their caregivers with appropriate resources within the community. NP's value self-care and enable self care through recommendation of appropriate resources within communities to patients and their families (Dietrick et al., 2011; Gresley-Jones, Green, Wade, & Gillespie, 2015; Van Soeren, Hurlock-Chorostecki, & Reeves, 2011)

Education

The time spent by NP's during clinical encounters allows NP's to strategize with patients and their families to provide individualized and appropriate patient education (Dietrick et al., 2011; Leipert, Delaney, Forbes, & Forchuk, 2011; Martin-Misener, et al., 2015a). Leipert, Delaney, Forbes, & Forchuk's (2011) study participants described that the NP "explained things in understandable language and sought additional resources

when needed” (p.44). The patients appreciated it when the NP had to seek references as they felt that they were getting the most up to date and correct information, rather than if the NP had relied on memory alone (Leipert, Delaney, Forbes, & Forchuk’s, 2011). Utilizing a mixed methods participatory action design Hunter, Murphy, Babb, & Vallee, (2016) had 41 patients complete a survey after their visit with the NP. They found that after being seen by the NP ninety percent of the patients participating in the study “strongly agreed or agreed” that they were satisfied with the nurse practitioners explanation of the patients presenting illness or injury, as well as eighty seven percent were satisfied with treatment explanation and follow up care (p.65). In this work, PEPPA Framework items (b) and (h) are met. Although education was not described as being as important as clinical duties, NP’s described themselves as valuing this aspect of providing care (Martin-Misener, et al., 2015).

Leadership

Nurse practitioners demonstrate leadership within their practice utilizing a variety of methods. One of the most basic and essential demonstration of leadership within NP practice is role clarification (Kilpatrick, et al., 2012). In order to facilitate effective professional working relationships with patients and other health care professionals, NP’s need to be able to clearly articulate their role, strengths, and competencies (Brault, et al., 2014; Kilpatrick, et al., 2012; Kilpatrick, et al., 2010). In many settings implementation of this role is still in its infancy, which requires the NP to remain flexible and adaptable, while still knowing their own competency limits (Brault, et al., 2014; Hurlock-Chorostecki, Forchuk, Orchard, van Soeren, & Reeves, 2014; Kilpatrick, et al., 2012). NP’s can maintain and demonstrate competency through acquisition and utilization of

evidenced based practice, which is another foundational dimension of the NP role (Martin-Misener, et al., 2015a). Evidence based practice will allow the NP to be a more informed leader, capable of keeping the education of staff, as well as policies and practices up to date (Burgess, & Purkis, 2010; Kilpatrick, et al., 2010; Martin-Misener, et al., 2015a).

Leadership practices of NP's are not always apparent and visible. Hurlock-Chorostecki et al. (2014) completed a qualitative study on the views of hospital based NP's. These NP's described leadership activities that were completed "behind the scenes" termed within this study as "invisible work" (p.261). Invisible work included "constant vigilance to create trust, commitment to mentor others, advocacy for team member roles, relationship building to enable connections with community and other specialty areas, completing complex paperwork for patients, pushing boundaries of change and knowledge, leading quality improvements at the organization level, being active in municipal, provincial and national committees, and widely translating knowledge as an expert in their specialty" (p. 263). Invisible work is important to note as it is a major contributing factor to the successful implementation of the NP role and it should not go unnoticed within the literature.

Browne and Tarlier (2008) completed a literature review examining the role of the NP from a social justice perspective. They believe that another leadership aspect of the NPs role includes "providing primary care in ways that mitigate the impact of health and healthcare inequities using critical social justice approaches" (p.89). This includes addressing current health care gaps by examining the reasons why some populations are underserved, and providing quality care to these populations by acknowledging and

addressing the social constraints such as health determinants that are impeding their access to improve the quality of their health. Acknowledging current healthcare gaps is part of PEPPA item a), describing the current model of care. It is important for the NP to acknowledge that an effective way to demonstrate leadership is through modeling behaviors. Such behaviors can be modeled through some of the activities that have already been discussed previously such as respectful clinical interactions, promotion and acknowledgment of team accomplishments, as well as effective communication and collaborative interactions (Burgess, & Purkis, 2010; Hurlock-Chorostecki, Forchuk, Orchard, van Soeren, & Reeves, 2014; Kaasalainen, et al., 2013; Martin-Misener, et al., 2015a). Taken together, NP leadership considers all aspects of the PEPPA framework, as NP roles continue to develop, to be clarified, and continue to be challenged in the ever-changing health and political climates across Canada.

Barriers

The NP role is deeply rooted in the same history as nursing, of which is both advantageous and disadvantageous. The differences between the NP role and other nursing roles cause confusion (Kilpatrick, et al., 2012; Kilpatrick, et al., 2010; Sangster-Gormley, Martin-Misener, Downe-Wamboldt, & DiCenso, 2011). Sangster-Gormley, Martin-Misener, Downe-Wamboldt, & DiCenso, (2011) completed an integrative literature review to compile the various barriers affecting the acceptance and progression of the NP role. They divided the barriers into three levels: (a) systems, (b) organizational, and (c) practice setting (Sangster-Gormley et al. 2011). Throughout the history of the NP role there has been deficient funding, regulation, and legislation factors that are classified by Sangster-Gormley et al. (2011) within the systems level. With the creation of

provincial associations and the release of the Canadian Nurse Practitioner Initiative, these barriers are dissolving. An appropriate funding model is one of the major systemic barriers to the sustainability and advancement of the NP role (Burgess, & Purkis, 2010; Hunter, Murphy, Babb, & Vallee, 2016; Kilpatrick, et al., 2010; Leipert, Delaney, Forbes, & Forchuk, 2011; Sangster-Gormley, Martin-Misener, Downe-Wamboldt, & DiCenso, 2011). NP's have the autonomy to work as an independent practitioner but no such funding model to support independent practices. At this time, the organization that hires the NP determines the wage. Burgess, & Purkis (2010) utilized participatory action qualitative research to collect data on the politics that affect NP practice. They present that lack of funding is hindering the realization the “breadth of and comprehensiveness” of the NP role within primary care and that the NP role should be “championed as a complementary function” (p. 305). Although funding is a major barrier, it is not the only barrier that NP's currently face.

Continuing with Sangster-Gormley et al. (2011) classification of barriers, another level at which barriers needs to be addressed is at the organizational level. Currently, the role of the NP is varied according to provincial legislation and the setting in which the NP practice is located (Kilpatrick, et al., 2012; Kilpatrick, et al., 2010; Sangster-Gormley, Martin-Misener, Downe-Wamboldt, & DiCenso, 2011). This perpetuates a cycle of organizational level problems including differing expectations of the role of the NP by physicians, patients, and administrative staff (Kilpatrick, et al., 2012; Kilpatrick, et al., 2010; Leipert, Delaney, Forbes, & Forchuk, 2011; Sangster-Gormley, Martin-Misener, Downe-Wamboldt, & DiCenso, 2011). This leads to incorrect assignment of workload and multiple administration inadequacies such as remuneration. Donald et al. (2010)

completed a scoping review of advanced practice nursing roles, which included analysis of 468 articles, with this publication focusing on the role of the NP in primary healthcare. They recommend that a solution to improving NP role confusion is the implementation of “clear consistent legislation and education standards across all provinces and territories” an action that would also improve NP “credibility and portability” (p.104). Although this scoping review was published 7 years ago, this recommendation remains a viable solution. In 2015 the Canadian Council of Registered Nurse Regulators published a practice analysis, completed with intentions to create consistent practice requirements for licensure of all NP’s across Canada, which will assist in addressing this barrier.

The lack of NP role clarity also continues into the practice level. This lack of role understanding leads to resistance in practice settings by health professional colleagues when integrating and accepting the role of the NP (Kilpatrick, et al., 2012; Kilpatrick, et al., 2010; Stahlke Wall, & Rawson, 2016). Historically, physicians have assumed that NPs are comparable to physician assistants and have deemed them as “the help”, assigning them the tasks and duties that they themselves would choose not to complete (Stahlke Wall & Rawson, 2016, p.11). NP roles need to be clearly defined and created in consultation with other health professionals in order to seamlessly integrate them into the common practices in the healthcare setting.

Another practice consideration that is currently a barrier for NP’s includes a lack of research to assist the NP in determining an appropriate caseload. Martin-Misener et al (2016) completed a scoping review and report that determining the appropriate caseload is influenced by factors such as patient characteristics, socioeconomic status, health conditions, provider experience, and organizational characteristics. They suggest that

more research is needed to assist the NP in determining an appropriate caseload that does not affect the quality, safety or effectiveness of the care provided. Taken together, the system, organizational and practice barriers described by (Sangster-Gormley et al. 2011) are explicated by PEPPA Framework items relating to stakeholder engagement (b); need for a new model of care in the face of rigid health systems (c); urgent need to address priority health problems and goal of sustainable health care (d); and NP-delivered care as a new role to be integrated and evaluated across settings with multiple health care providers (h, i).

Accessibility

Accessibility was the most prominent topic throughout the NP literature. As discussed in the background section, ultimately the goal of the creation of the NP role was to improve accessibility. NP's not only improve accessibility, they improve healthcare interdisciplinary collaboration, communication with patients and families, as well as improving the service provided to underserved populations by seeking out gaps within the current system and making these gaps their niche (Browne and Tarlier, 2008; Dahrouge, et al., 2014; Gresley-Jones, Green, Wade, & Gillespie, 2015; Hurlock-Chorostecki, Forchuk, Orchard, van Soeren, & Reeves, 2014; Kaasalainen, et al., 2016; Leipert, Delaney, Forbes, & Forchuk, 2011; Martin-Misener, et al., 2015a; Roots, & MacDonald, 2014; Sarro, Rampersaud, & Lewis, 2010; Van Soeren, Hurlock-Chorostecki, & Reeves, 2011). Leipert, Delaney, Forbes, & Forchuk, (2011) completed qualitative interviews with nine women living in a rural area receiving their primary health services from an NP. Overall the women were very pleased with services provided by the NP reporting that the NP was trustworthy and respectful, and the NP took the time

to understand the women and her needs, of which led to the development of an effective working relationship. The women within this study describe that the attentiveness of the NP made the care more personal and allowed them to feel valued. One participant was even quoted as stating “ NP’s make it more accessible to get good healthcare”, a statement that embodies the foundation of NP practice (p.48). This study was not the only study to have these results. Similar results were found by Kaasalainen et al (2013), of whom completed a similar study of NP’s working in long term care with a palliative specialization, Hurlock-Chorostecki et al. (2014) of whom completed a similar study of NP’s working within hospitals, and Gresley-Jones et al. (2015) of whom completed a similar study of NP’s working in ambulatory care with the families of children with medical complexity, only to list a few. These study echo the statement that NP’s provide quality care while improving accessibility.

A common argument against the implementation of NP’s is the duplication of services between the NP and other healthcare providers. Roots & MacDonald (2014) completed a mixed methods study utilizing a case study design including interviews, documents, community health data pre and post implementation of NP’s to elicit the effect that the implementation of salaried NP’s into three different family physician (FP), fee for service, primary health clinics. The NP’s in this study were utilized within a collaborative practice model meaning that the NP’s and FP’s see separate patients and consult each other as required. This practice model allowed the patients to see the provider with the skills most suitable for their health needs. Overall Roots & MacDonald (2014) found that the services between the NP and the FP were not duplicated rather the NP augmented the services that were provided by the FP, as they were the provider able

to spend more time with patients. Within these communities, this model of service delivery was successful, so much so that the post NP implementation data revealed that hospital admissions and emergency visits had decreased within this time. The decrease was attributed by Roots & MacDonald (2014) to the increased availability of services. Van Soeren, M., Hurlock-Chorostecki, C., & Reeves, S. (2011) completed a mixed methods study and also suggest a similar role for NP's working within hospital settings. They reported that the NP was accessible, with enhanced knowledge of the patient's condition, which allowed for consistency in care, and improvements in patient care safety. Within this study the NP also was described as augmenting the services provided by other health care professionals.

Another viable method to improve the accessibility of healthcare services is through the creation of NP led clinics. Heale (2012) describes the implementation of the first NP-led clinic in Canada and the benefits it has provided to the community it serves. This clinic allows NPs to work to their full scope of practice and abilities. In this clinic the NP defines their own role within their specialized knowledge, skills, and scope of practice. The clinic includes a multidisciplinary team that the NP can collaborate with to achieve optimal health outcomes. The NP serves as a guide for services, which acknowledges each professions unique role in assisting patients to achieve holistic health. Each patient that presents to the clinic is registered to the clinic not specifically to a care provider. Heale (2012) describes another benefit of this method of service provision is it allows the patient to see multiple providers within the clinic to benefit from different points of view. The benefit of this clinic is even if a team member leaves, patients are never without a service provider. In a later publication of a mixed methods study of the

functioning of the same clinic, Heale, James, & Garceau, (2016) described that the clinic had indeed improved access for underserved populations. Unfortunately due to the complexity of care required by patients that have been without a service provider and the current inadequate funding of the clinic, have led to difficulties retaining qualified NP's and therefore the NP's are unable to provide the quality of care they would like to provide. These results reflect the current state of the implementation of more NP led clinics in Canada, which is halted by the lack of a sustainable funding model.

Dahrouge et al. (2014) completed a quantitative study on the role of NP's in family practices. They describe that the NP saw less medically complex patients and more socially complex patients than the FP's. Unfortunately, the process of how patients were assigned to providers within the clinic is not well described within the article and the data collection was completed when NP's prescribing practices were more restricted than they are at this present time, affecting the current applicability of results.

NP's also increase the accessibility of specialist care. Sarro, Rampersaud, & Lewis, (2010) completed a quantitative descriptive design study by prospectively surveying patients that had been seen within a spine consultation ambulatory clinic. The NP within this clinic saw people prior to consultations with surgeons to determine whether their condition was operable and to complete the appropriate preparations needed prior to surgical consultation. The NP improved the wait time for specialist consultation with the mean wait time for assessment by the NP being 12 weeks, in comparison to a range of 10-52 week wait time to be seen in a regular specialist clinic. Decrease in wait times increased patients' satisfaction, as well as decreasing the unnecessary utilization of specialist referrals, as within this study only 10 percent of the

patients seen by the NP were referred forward for surgical consultation. The results of this study exemplify the value of the NP role in improving accessibility of services while increasing efficiency of current health care services. These results also provide insight into the factors that contribute to the systematic review findings of Martin-Misener et al. (2015) of whom synthesize that NP's working within ambulatory provider roles have "equivalent or better outcomes than comparators and are potentially cost saving" (p.13). Similar to 'Barriers', multiple PEPPA items apply to the issues identified in 'Accessibility' related to system, organizational and clinical practice barriers (Sangster-Gormley et al. 2011)

Conclusion

Through an integrative review of the literature, the role of the NP within Canada was explored with intent to exemplify how the role can be effectively utilized within the Canadian health care system. This was presented through an analysis of the main dimensions of the NP role including a depiction of clinical responsibilities, education opportunities, effective collaboration, valuable leadership roles, barriers affecting the advancement of the role, and a description of accessibility of health care services that are improved through the implementation of the NP role. Based upon the literature reviewed we can hypothesize that incorporating NPs into different practice settings across Canada can improve accessibility, increase efficiency along with the potential to decrease health care cost over the long term.

Based on the results of this review it was apparent that there is no Canadian literature published that describes the role of the NP in care of palliative radiation oncology patients. In the following chapter we will explore the NP role within this setting

and quantitatively describe characteristics, symptom severity and complexity of patients that were evaluated by an NP. This report will contribute to the body of literature of NP clinical work within oncology and other health care settings, in keeping with PEPPA Item (h) evaluate APN role and new model of care.

With adequate knowledge of the strengths of the nurse practitioner role, these roles can be implemented where NP's can work with patients that are appropriately matched to the services they provide. In this role the NP can augment the services provided by other health care professionals. This will improve efficiency and effectiveness of health care by matching the provider best suited to provide for the patients current health care needs. By examining the characteristics and outcomes of the patient evaluated by an experienced NP within the outpatient radiation oncology clinic, we will add to the increasing body of literature supporting greater implementation of Nurse Practitioners within oncology and other health care settings.

Chapter Three: Proficiency of Nurse Practitioner Assessment in Outpatient

Palliative Radiotherapy: A Prospective Descriptive Study

Introduction

Cancer is a highly prevalent illness in Canada, with 50% of Canadians projected to develop cancer within their lifetime and one quarter dying of the disease (Canadian Cancer Society's Advisory Committee on Cancer Statistics [CCSAC], 2017). In spite of significant advancements in cancer diagnosis and treatments, many cancers still have a poor prognosis. Patients with terminal cancer frequently require specialized care as disease advances, including expert palliative care and if indicated, radiation therapy to relieve painful bone metastases.

Challenges associated with palliative radiation are that it is only offered at specialized cancer centers throughout Canada, accordingly, patients frequently must travel considerable distance to receive their treatments. Furthermore, radiation therapy can be unplanned and time sensitive, depending on the patient's condition and symptom burden. Radiation departments are often overwhelmed with patients needing this vital service, leading to decreased quality of care and increased pain and suffering due to a lack of resources and staff to treat this population on a rapid basis.

Radiation oncologists are the usual care provider in this setting, however, there is potential to extend capacity with the addition of care providers such as a nurse practitioner (NP). One such rapid access palliative radiotherapy program undertook this approach.

The primary aim of this study was to examine the characteristics and symptom profile of patients assessed by the NP in a rapid access palliative radiotherapy clinic. Our

secondary aim was to explore any differences in patient complexity compared to those assessed by the RO.

Setting and Participants

Participants in this cohort study attended the rapid-access palliative radiation oncology clinic (RAPRP) at the Cross Cancer Institute in Edmonton Alberta, referred for pain presumed to be attributable to bone metastases. This clinic has been previously described. In brief, RAPRP consisted of a multidisciplinary team, including Radiation Oncologist (RO), Nurse Practitioner (NP), Pharmacist (PH), Social Worker (SW), Registered Dietician (RD), and Occupational Therapist (OT). Given that many patients are required to travel long distances to receive these specialized services, the aim of RAPRP was to provide holistic multidisciplinary care and palliative radiotherapy assessment, all within the same day (Fairchild, et al. 2009). Upon arrival, patients underwent systematic symptom review with validated tools by an RAPRP team member (Appendix A).

Following symptom review, the NP or the RO individually and randomly attended to the patient consultation, completing the health history, review of systems and physical assessment. As clinically indicated, the consulting NP or RO would also order diagnostic testing such as additional diagnostic imaging or laboratory investigations. Based on the initial assessment and diagnostic testing results, the RO would prescribe radiation as indicated. When appropriate, patients would receive their radiation the same day. Some patients had multiple sites of bone metastases requiring radiation, or had to undergo multiple radiation treatments for one site of bone metastases. When the NP or RO

consultation was completed, patients would receive assessments and recommendations by the PH, OT, RD, and SW, guided by initial assessments.

Design

Sample. Patient data, including age and cancer type, were retrieved from the RAPRP dataset from 1 January 2008 – 31 December 2010. This specific timeframe was chosen because the NP and RO providers were consistent RAPRP consultants. Symptom severity was assessed by the Edmonton Symptom Assessment System (ESAS completed by patients or if they were unable, family members) (Appendix B). The ESAS includes symptoms of pain, tiredness, nausea, depression, anxiety, drowsiness, appetite, well-being, and shortness of breath rated on a 10 point scale with 0 equal to none and 10/10 equal to “worst possible” (Bruera, Kuehn, Miller, Selmsler, & Macmillan, 1991; Watanabe, Nekolaichuk, Beaumont, Johnson, Myers, & Strasser 2011). This provided the team a quick overview of the symptoms most severe or distressing to the patients and allowed the team to prioritize patient acuity accordingly during the visit. Mobility and functional capacity was measured using Karnofsky Performance Status (KPS) evaluated by the consultant NP or RO (Appendix C). This scale rates patients on a scale between 100-0 based on the patients activity level, ability to work, and the amount of assistance they needed on a daily basis (Karnofsky, Abelmann, Craver, & Burchenal, 1984). The type of analgesic that the patient was taking on the clinic day was categorized according to the World Health Organization (WHO) categories as non-opioid, mild to moderate opioid, and moderate to severe opioid.

Pain complexity was evaluated using the Edmonton Classification System for Cancer Pain (ECS-CP) (Appendix D). This scale considers the additional contributions

off actors such as mechanism, presence and severity of incidental pain, level of psychological distress, presence of addictive behavior, and cognitive function on patients' pain levels (Fainsinger, Nekolaichuk, Lawlor, & Neumann, 2012). This system has also thoroughly been evaluated and concurrent validity has been demonstrated (Nekolaichuk, Fainsinger, & Lawlor, 2005).

Radiation is prescribed based on the size and type of radiologic confirmed metastatic bone lesion and the amount tissue involvement (Johnstone & Lutz, 2016). Patient with larger lesions may have more distressing symptoms that may require more than a single RT treatment, with larger doses (Johnstone & Lutz, 2016). Therefore data on RT dose and number of fractions were also included to demonstrate the complexity of the patients underlying disease process.

Ethical considerations. Data was collected in an ethics-reviewed, prospective database (HREBA File #23653) The trainee's project was reviewed and determined to be within the scope of the current ethical approval (Appendix E).

Data Analysis

Patients were grouped based on the consultant health professional (NP or RO). Descriptive characteristics identified sex and cancer type, ESAS and KPS scores between the two groups where compared using t-tests. Whether or not radiotherapy was prescribed was compared between groups with Chi-square test. Statistical analyses were performed using SAS 9.3 (SAS Institute Inc., Cary, NC) software and using SPSS Version 15.0 software (SPSS for Windows, SPSS Inc. Released 2006, Chicago, SPSS Inc.). The p-value for statistical significance for all tests was set at 0.05

Results. From January 1, 2008 through to December 31, 2010, a total of 316 patients attended a consultation, in the RAPRP clinic. Two patients out of the 316 were not included in the data analysis because their data was missing and 79 patients were not included because a visiting physician or resident completed the consult. In total 235 patients were included in this data analysis. Overall, the NP completed the consults for a total of 137 patients, 115 of these patients were initial consults, the remaining 22 were repeat consults for further RT. Of the 137 patients seen by the NP, 28 were ineligible for RT treatment. In total the RO completed the consults for 98 patients, 80 were initial consults and 18 were repeat consults for further RT. Of the 98 patient consults completed by the RO, 26 were ineligible for RT treatment. Visual representation is presented in Appendix F.

Demographics. The mean age of patients presenting to the clinic was 72 years, with 71% of the patients being male. The type of cancer seen by each provider, ordered by frequency of occurrence was prostate cancer (43%), lung (27%), gastrointestinal (GI, 10%), breast (10%), unknown primary (PRUNK, 7%), genitourinary (GU, 2%), and hematologic (1%). Descriptive statistics of the patients divided into the two provider groups are included in Table 2.

	NP		RO	
n	137		98	
Average Age	71		74	
Gender	M 99 (72%)	F 38 (28%)	M 68 (69%)	F 30 (31%)
	Cancer Type			
Prostate	59(43%)		42(43%)	
Lung	33(24%)		31(32%)	
Gastrointestinal	17(13%)		6(6%)	
Breast	15(11%)		8(8%)	
PRUNK	6(4%)		11(11%)	
Genitourinary	4(3%)		0	
Hematologic	3(2%)		0	

Patient severity. Patient severity was measured by comparing patient variables such as, ESAS and KPS scores between the two groups. The ESAS symptoms experienced by the group of patients seen by the NP in order of frequency was pain, fatigue, alterations in appetite, alterations in wellbeing, drowsiness, depression, shortness of breath (SOB), anxiety, and nausea. The ESAS symptoms experienced most by the patients seen by the RO were similar except anxiety scores were higher than depression, SOB, and nausea scores. Mean KPS scores for the two groups were NP 60.4 (SD 17.3) and RO 56.4 (SD 24.4) indicating that the patients had a moderate level of disability. Karnofsky, Abelmann, Craver, & Burchenal (1984) describe patients with scores between 70-50 are experiencing enough disability that they are not able to maintain employment, may still be living within their own residence, completing most of their own personal care, with variable levels of support required (Appendix 3). Means and p-values of the ESAS symptoms and KPS showed that there was no statistically significant difference

between the two groups across all of the variables (Table 3). A trend for more severe pain was noted in patients in the NP group.

Table 3: Average ESAS and KPS Scores by Consultant, Mean and Standard Deviation			
	NP	RO	p-value
Pain	6.1 (2.8)	5.3(3)	0.067
Fatigue	5.4(2.8)	5.7(2.7)	0.391
Appetite	4.9(3)	4.7(3.2)	0.622
Wellbeing	4.2(3)	4(2.8)	0.471
Depression	2.8(2.7)	2.8(3)	0.953
SOB	2.7(3)	2.7(2.8)	0.892
Anxiety	2.6(2.7)	3.2(2.9)	0.118
Nausea	1.4(2.1)	1.8(2.5)	0.174
KPS	60.4(17.3)	56.4(24.4)	0.191

Patient complexity. Although the ESAS does measure pain experienced by the patient, pain is multifactorial and adds to the complexity of the patient’s condition (Fainsinger, Nekolaichuk, Lawlor, & Neumann, 2012). As described previously, patient’s pain was classified according to the ECS-CP as displayed in Table 4. In both groups the most common mechanism of pain was nociceptive pain combined with visceral, soft tissue, and/or bone, experienced by 79% of the patients seen by the NP and 68% of patients seen by the RO. Incidental pain was common in both groups NP (73%) and RO (77%). Physiological distress was a more common in the RO group (22%) compared to the NP (9%) group. Most of the patients in both groups experienced no impairment in cognitive function NP (90%) and RO (83%). The type of pain medication used by patients at the time of the consultation was classified into the WHO (1996) pain ladder categories, non-opioid, weak opioid, and strong opioid. Both groups, NP (65%) and RO (64%), had similar numbers of patients using strong opioids to control their pain. All of these factors demonstrate that the complexity of the patients seen by the NP was similar

to that of the RO. Due to the complexity and categorical nature of the ESCS-CP variables as direct statistical comparison of the provider groups could not be completed.

Table 4: ESCS-CP Score Frequency and Analgesic Type by Consultant			
		NP	RO
Pain Mechanism			
	Nc	108	67
	Ne	23	23
	No	5	6
	Nx	1	2
Incidental Pain			
	Lo	37	17
	Lx	0	6
Psychological Distress			
	Po	114	67
	Pp	12	22
	Px	11	9
Addictive			
	Aa	3	5
	Ao	131	87
	Ax	3	6
Cognitive Function			
	Co	123	81
	Cu	0	1
	Cx	1	2
Analgesic			
	Non opioid	28	22
	Weak opioid	20	13
	Strong opioid	89	63

Disease complexity was also evaluated by whether or not RT was prescribed. 28 patients out of the 137 seen by the NP did not receive radiation therapy and 26 patients out of the 98 assessed by the RO also did not receive radiation therapy. Table 5 is a visual representation of the RT data. In the NP group the average dose was 13 and average fractions were 2.5. In the RO group the average dose was 14.3 and average fractions were 2. T-test comparison of the average dose compared between the two consultant groups

was insignificant at $p=0.497$. Chi Squared analysis of the radiation dose received by the NP and RO patient groups showed no statistical significance.

Table 5: Radiation Chi Squared analysis			
Provider	RT yes	RT no	n=
NP	108	29	137
RO	72	26	98
P value	0.64325589	0.40210243	

Discussion

Radiation departments are often overwhelmed with patients needing this vital service, leading to decreased quality of care and increased pain and suffering due to a lack of resources and staff to treat this population on a rapid and unpredictable basis. Treatments can be unplanned, time sensitive, and depend on the patient's condition. Our study showed that the implementation of an NP into the multidisciplinary care team allowed more patients to be seen in a timely manner. With the NP and the RO working as a consultant team, this allowed the RAPRP clinic to assess 58% (137/235) more patients than if the RO was working alone.

As mentioned in chapter one, efficiency is as "Resources [used] optimally in achieving desired outcomes" (HQCA, 2005, p.6). The NP contributed to the efficiency of the clinic by completing the initial consult for 28 patients that would not go on to receive treatment. Furthermore this allowed the RO to use their specialized skills to practice more efficiently. These results were corroborated by Sarro, Rampersaud, & Lewis, (2010), of who also found that the implementation of an NP into a specialty spine ambulatory clinic, improved the efficiency and accessibility of specialty services provided to this patient population by improving wait times from 10-52 weeks for initial consult to 12 weeks. The authors also found that the utilization of the NP dramatically decreased the

unnecessary utilization of specialist referrals, as within this study only 10 percent of the patients seen by the NP were referred forward for surgical consultation (Sarro, Rampersaud, & Lewis, 2010).

In this study we showed that the NP is able to provide consultation services to a population that is comparable to the population of patients evaluated by the RO. It is well documented within the literature that the skill set of an NP is well suited to contribute to care of palliative radiation oncology patients (Carper & Haas, 2006; Hollis, & McMEnamin, 2014). Recommendations for the role of the NP from the literature includes: accurate and timely triage of the initial appointment in relation to disease severity and coordinating RT, consultation with other disciplines, access to facilities for patients to complete required lab work and diagnostic imaging in a timely manner, and consideration of other concurrent oncology treatment modalities (Carper & Haas, 2006; Hollis, & McMEnamin, 2014; Kelvin, Moore-Higgs, Maher, Dubey, Austin-Seymour, Daly, & ... Kuehn, 1999). Upon the initial patient visit NP's can complete detailed histories and patient physical assessments independently. Based upon these assessments and the current scope of practice of NP's in Alberta, they can coordinate simulations, order diagnostic testing, provide treatment for multiple symptoms and coordinate with the oncology team to provide for all of the patients' needs (Carper & Haas, 2006; Hollis, & McMEnamin, 2014; Kelvin, Moore-Higgs, Maher, Dubey, Austin-Seymour, Daly, & ... Kuehn, 1999; Pituskin, et al., 2010). All such activities are legislated in Alberta as autonomous competencies in NP practice (Canadian Nurses Association, 2010).

Although, NP's are not legislated in Canada to order radiation at this time, the expert evaluation of the patient by the NP can increase the efficiency of the radiotherapy

process (Carper & Haas, 2006; Hollis, & McMnamin, 2014; Kelvin, Moore-Higgs, Maher, Dubey, Austin-Seymour, Daly, & ... Kuehn, 1999). These findings were similar to that of Hurlock-Chorostecki, Forchuk, Orchard, van Soeren, & Reeves, (2014) of whom found that NP's actively sought to "ease the workload" of other healthcare professionals, in order to improve accessibility and delivery of healthcare services.

Our results confirm and extend this body of literature by showing that NP's are able to complete the listed tasks independently with the addition of RT prescribed by the RO to optimize and improve the accessibility of PRT services. One of the barriers listed to the implementation of NP practice is the perceived duplication of services between NP's and other health care providers. Our study, as well as the study completed by Roots & MacDonald (2014) demonstrates that the NP does not duplicate the services of the other providers, but augments these services to improve the quality and accessibility.

Our study is the first to quantitatively describe in detail the characteristics and symptom complexity of palliative radiation patients seen within an outpatient clinic by a consultant NP. Other studies have described the role, but have not quantitatively presented the characteristic of patients seen by the NP. It is possible that the patients seen by the NP specifically have not been previously described because the NP role is quite often very embedded in collaboration and optimal functioning of the multidisciplinary team, a process called "invisible work" by Hurlock-Chorostecki et al. (2014). Through our description of patients seen by the NP and the improvement of the efficiency of the clinic, we aim to make the work of the NP more visible.

Overall the addition of the NP improved access to this vital service for these patients suffering with daily pain. Our study quantifies the impact of the NP and

describes those characteristics of patients seen by the NP with intent to demonstrate that the NP and RO can work collaboratively to improve timeliness and efficiency of services provided to the palliative radiation population.

Strengths and Limitations

There was no formal randomization to which provider would see the patient. The consultant team member available saw patients at the time of their appointment, which is how clinical practice actually functions. Conversely this could also be considered strength as the patients were seen in random consultation, which reflects how clinical care is delivered.

The NP consultant in this study had 20+ years of oncology experience. The results of this study may have been different if an NP with less experience occupied this role. This study was completed in Alberta, Canada, where the legislated NP scope of practice may be different then the scope of practice of NP's from other provinces or countries.

Conclusion

Our study demonstrated the benefits of the addition of a nurse practitioner to a multidisciplinary palliative radiation oncology clinic. We recommend that further detailed research be completed on the work completed by nurse practitioners in a variety of clinical practice settings. We expect this research will inform and enhance the greater utilization of nurse practitioners in a multitude of settings to improve the accessibility and efficiency of patient care.

Chapter Four: Conclusion

This chapter will serve as a summary and concluding chapter of the information presented within this thesis. The purpose of this research was to examine the patients seen by the NP in the rapid-access palliative radiation oncology clinic (RAPRP) at the Cross Cancer Institute in Edmonton Alberta from 1 January 2008 to the 31st of December 2010 to describe the characteristics of patients assessed by an NP within this setting. Further we quantitatively compared the patients seen by the NP to the patients seen by the RO using t-tests and found no statistical significance. These results demonstrate that the NP is an excellent addition to a multidisciplinary team within this setting. Ultimately the NP aided to improve accessibility and efficiency of this overextended service to patients in need.

Major discussion points

- 1) Cancer is a highly prevalent illness in Canada and up to as many as 50% of this population may require palliative radiation treatments.
- 2) The needs of the palliative radiation patient population are complex and need to be met within a timely manner by a multidisciplinary team with specialized training.
- 3) Current radiation services are overextended, leading to increased wait times.
- 4) The integrative review presented that NP's are an independent practitioner with the skills to improve accessibility of services to patients in need by providing quality care through engaged clinical skills, effective leadership ability, with high prioritization of collaboration and education.

- 5) An NP can augment the services of the RO by independently completing the initial assessments of patients requiring PRT services including a complete history and physical exam, ordering diagnostic testing, radiation preparation, as well as any concerns during treatment and follow up.
- 6) Our study demonstrated that having an NP augment the services of the RO increased the amount of patients seen in the clinic by 58% within the two year time period, improving accessibility of the service.

Implications for Nursing Practice

As demonstrated within the integrative review section of this thesis, it is apparent that Nurse Practitioners are a branch of advanced nursing practice that contribute to the demonstration of the clinical excellence that advanced nurses can provide. The PEPPA framework by created by Bryant-Lukosius and DiCenso (2004) was used to guide the analysis and evaluation of the implementation of an NP into this setting. Currently there are no studies to date that quantitatively examine the characteristics of the patients seen by an NP in this setting with a comparison to patient seen by the RO. Our work fills this gap, and addresses PEPPA Framework item a) which is assessing the population served by NP's; the patients within the population, and the effectiveness of the current care methods and (h) evaluation of APN role and new model of care. We expect this work to inform the greater implementation of NP's within the Canadian health care system.

Recommendations for Practice, Future Research, and Policy

As presented within our study, as well as the literature review section, the ability of the NP to improve efficiency and accessibility of healthcare services with a variety of settings has continually been demonstrated. It was noted that the patients seen by the NP

specifically have not been previously described because the NP role is quite often very embedded in collaborative practice and optimal functioning of the multidisciplinary team likely due to a phenomenon known as “invisible work” described by Hurlock-Chorostecki et al. (2014) in the literature review. Through our quantitative description of patients evaluated by the NP as well as the improvement of the efficiency of the clinic, we aim to make the work of the NP more visible. Although collaboration is a necessity in efficient health care, description of the patients seen by the NP as well as detailed descriptions of NP roles need to continue in order to accurately evaluate and improve NP practice moving forward.

An area that has not been well studied is the health economics of NP work. Analysis of economics of short term and long term costs of implementation of NP's, if shown to be favorable, would be another way to encourage greater utilization of NP's. Consistent demonstration of improved efficiency, accessibility, coupled with economic evidence to support the implementation of NP's would encourage governments and health care consumers to examine current policies and consider NP's as a viable solution to improve health services.

Strengths

The data collected for this thesis was collected within a functioning outpatient palliative radiotherapy clinic. Therefore our results are indicative of real world clinical practice. This is strength because the patients, setting, and operations of the clinic were not adapted to meet the needs of the research study, but the study was informed by clinical practice and need.

First author was not involved in the clinic or the research study, and is therefore able to analyze and present the data with an outsiders lens and perspective, serving to limit bias.

Limitations

As mentioned, the first author completing data analysis did not collect the data, but guidance was provided by one of the primary data collectors to ensure the accuracy of description of the clinic. Data cannot be altered or revisited because many of the patients in the original study are deceased. Data is from a cohort study prospectively collected between 2008-2010, but the results are still relevant because the overall goals of the clinic and treatment of pain caused by bone metastases remain the same. Current cancer statistics are similar to the demographics within the RAPRP clinic, with the most prevalent cancer diagnosed in males being prostate, followed by lung and colorectal (CCSAC, 2017). The CCSAC (2017) reports that 45% of cancer diagnoses are people between the age of 70 and over, with this population also having the highest estimated death rate, which is congruent with the average age of the people seen within the RAPRP clinic which was 72. These statistics demonstrate that the population within the RAPRP clinic is similar to the oncology population today.

The nurse practitioner in this study had many years of oncology experience and a specialty oncology nursing background. Therefore her experience and expertise likely influenced her ability to perform consultations on patients that were comparable to those of the RO. The results may have been different if a nurse practitioner with less experience occupied this role.

This study was completed in Alberta, Canada, where the legislated NP scope of practice may be different than the scope of practice of NP's from other provinces or countries. It is always advised that the NP practice within their current legislative scope of practice.

Originally we had planned to include 4 week post treatment ESAS scores of the patients and compare the two groups for statistical significance. Unfortunately the clinic runs for 1 half day per week, and there was not enough time or staff to complete the phone calls. One attempt was made to contact the patient, and if the patient was not contacted on the first attempt, no further attempts were made. The number of patients that were actually reached was not sufficient to enough to test for statistical significance.

Conclusion

Our study is the first to quantitatively describe the characteristics of patients receiving NP consultation within an outpatient palliative radiation clinic. Our data analysis showed there were no statistical differences in patient characteristics and complexity between the patients seen by the NP and the patients seen by the RO. This helped to improve the accessibility and efficiency of the clinic because the NP was able to assist in initial consult and preparation of patients for palliative radiation therapy. This improved the efficiency of the clinic and allowed 58% more patients to be assessed and treated, thus improving the wait times for this vital service. We recommend that more detailed research be completed on the characteristics of patients appropriate to be seen by the NP, aiming to influence greater utilization of NP's across a wide variety of health care settings. We firmly believe that globally health care services could be improved with greater implementation of NP's.

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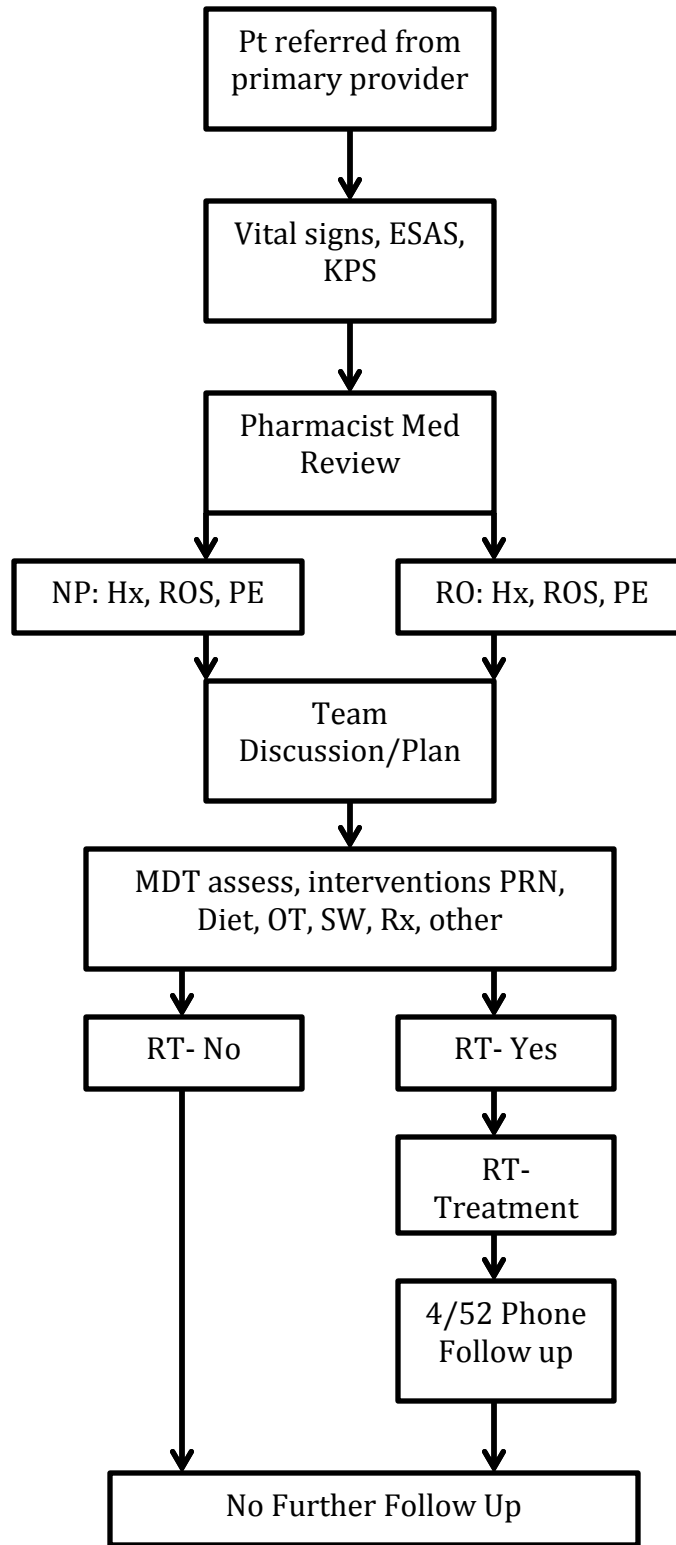
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Appendix A: Patient Flow and Assessments



Appendix B: ESAS

Screening tools were included in the initial assessment including Edmonton Symptom Assessment System (ESAS) which included symptoms such as pain, tiredness, nausea, depression, anxiety, drowsiness, appetite, well-being, and shortness of breath, with the patients rating on a 10 point scale with 0 equal to none and 10/10 equal to “worst possible” (Bruera, Kuehn, Miller, Selmsler, & Macmillan, 1991; Watanabe, Nekolaichuk, Beaumont, Johnson, Myers, & Strasser 2011).

Guidelines – Revised
Edmonton Symptom Assessment System (ESAS-r)

Edmonton Symptom Assessment System: (revised version) (ESAS-R)												
Please circle the number that best describes how you feel NOW:												
No Pain	0	1	2	3	4	5	6	7	8	9	10	Worst Possible Pain
No Tiredness <i>(Tiredness = lack of energy)</i>	0	1	2	3	4	5	6	7	8	9	10	Worst Possible Tiredness
No Drowsiness <i>(Drowsiness = feeling sleepy)</i>	0	1	2	3	4	5	6	7	8	9	10	Worst Possible Drowsiness
No Nausea	0	1	2	3	4	5	6	7	8	9	10	Worst Possible Nausea
No Lack of Appetite	0	1	2	3	4	5	6	7	8	9	10	Worst Possible Lack of Appetite
No Shortness of Breath	0	1	2	3	4	5	6	7	8	9	10	Worst Possible Shortness of Breath
No Depression <i>(Depression = feeling sad)</i>	0	1	2	3	4	5	6	7	8	9	10	Worst Possible Depression
No Anxiety <i>(Anxiety = feeling nervous)</i>	0	1	2	3	4	5	6	7	8	9	10	Worst Possible Anxiety
Best Wellbeing <i>(Wellbeing = how you feel overall)</i>	0	1	2	3	4	5	6	7	8	9	10	Worst Possible Wellbeing
No _____ Other Problem <i>(for example constipation)</i>	0	1	2	3	4	5	6	7	8	9	10	Worst Possible _____

Patient's Name _____ Date _____ Time _____	Completed by (check one): <input type="checkbox"/> Patient <input type="checkbox"/> Family caregiver <input type="checkbox"/> Health care professional caregiver <input type="checkbox"/> Caregiver-assisted
---	--

ESAS-r **BODY DIAGRAM ON REVERSE SIDE**

Appendix C: Karnofsky Performance Status

Patient's mobility and functional capacity would be measured using Karnofsky Performance Status (KPS). This scale rates patients on a scale between 100-0 based on the patients activity level, ability to work, and the amount of assistance they needed on a daily basis (Karnofsky, Abelmann, Craver, & Burchenal, 1984).

KARNOFSKY PERFORMANCE STATUS SCALE DEFINITIONS RATING (%) CRITERIA

Able to carry on normal activity and to work; no special care needed.	100	Normal no complaints; no evidence of disease.
	90	Able to carry on normal activity; minor signs or symptoms of disease.
	80	Normal activity with effort; some signs or symptoms of disease.
Unable to work; able to live at home and care for most personal needs; varying amount of assistance needed.	70	Cares for self; unable to carry on normal activity or to do active work.
	60	Requires occasional assistance, but is able to care for most of his personal needs.
	50	Requires considerable assistance and frequent medical care.
Unable to care for self; requires equivalent of institutional or hospital care; disease may be progressing rapidly.	40	Disabled; requires special care and assistance.
	30	Severely disabled; hospital admission is indicated although death not imminent.
	20	Very sick; hospital admission necessary; active supportive treatment necessary.
	10	Moribund; fatal processes progressing rapidly.
	0	Dead

Appendix D: ECS-CP

Patient's pain would be assessed using the Edmonton Classification System for Cancer Pain (ECS-CP). This scale considers the effects of factors such as mechanism, presence and severity of incident pain, level of psychological distress, presence of addictive behavior, and cognitive function on patients pain levels (Fainsinger, Nekolaichuk, Lawlor, & Neumann, 2012).

Edmonton Classification System for Cancer Pain

Patient Name: _____

Patient ID No: _____

For each of the following features, circle the response that is most appropriate, based on your clinical assessment of the patient.

1. Mechanism of Pain

- No No pain syndrome
- Nc Any nociceptive combination of visceral and/or bone or soft tissue pain
- Ne Neuropathic pain syndrome with or without any combination of nociceptive pain
- Nx Insufficient information to classify

2. Incident Pain

- lo No incident pain
- li Incident pain present
- lx Insufficient information to classify

3. Psychological Distress

- Po No psychological distress
- Pp Psychological distress present
- Px Insufficient information to classify

4. Addictive Behavior

- Ao No addictive behavior
- Aa Addictive behavior present
- Ax Insufficient information to classify

5. Cognitive Function

- Co No impairment. Patient able to provide accurate present and past pain history unimpaired
- Ci Partial impairment. Sufficient impairment to affect patient's ability to provide accurate present and/or past pain history
- Cu Total impairment. Patient unresponsive, delirious or demented to the stage of being unable to provide any present and past pain history
- Cx Insufficient information to classify.

ECS-CP profile: N _ I _ P _ A _ C _ (combination of the five responses, one for each category)

Assessed by: _____

Date: _____

Appendix E: Ethical Review

HREBA – Cancer Committee
1500, 10104 - 103 Avenue NW
Edmonton, Alberta, T5J 4A7

29 December 2015

Dr. Alysa Fairchild
Alberta Health Services
Department of Radiation Oncology
Cross Cancer Institute

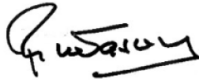
RE: 23653: Multidisciplinary Assessment in a Rapid Access Radiotherapy Clinic

Thank you for the submission of an Addition of Co-Investigator Form in reference to the above named study.

On behalf of the Health Research Ethics Board of Alberta (HREBA) - Cancer Committee, I acknowledge receipt of this document and have reviewed it as of 04 December 2015. It is noted that Dr. E Pituskin and Dr. Hope Rabel have been added to the study as Co-Investigators as of 24 and 25 November 2015 (respectively). Our records have been updated accordingly.

If there are any changes to the protocol or consent form during the year, or if any adverse reactions to the treatment are found, the Cancer Committee requests that you forward a letter describing the changes/reactions, together with an updated protocol and/or consent form **to the HREBA – Cancer Committee Office**.

Sincerely,



Raul Urtasun, M.D.
Associate Chair, Health Research Ethics Board of Alberta – Cancer Committee
/mp

cc: Clinical Research Unit-CCI

Health Research Ethics Board of Alberta – Cancer Committee
Tel: (780) 423-5727 Email: cancer@hreba.ca

1. The membership of this Research Ethics Committee complies with the membership requirements for Research Ethics Boards defined in Part C Division 5 of the *Food and Drug Regulations*;
2. This Research Ethics Committee carries out its functions in a manner consistent with Good Clinical Practices; and
3. This Research Ethics Committee has reviewed and approved the clinical trial protocol and informed consent form for the trial which is to be conducted by the qualified investigator named above at the specified clinical trial site(s). This approval and the views of this Research Ethics Committee have been documented in writing.

HREBA – Cancer Committee
1500, 10104 - 103 Avenue NW
Edmonton, Alberta, T5J 4A7

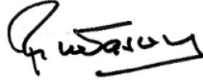
09 August 2016

Dr. Alys Fairchild
Alberta Health Services
Department of Radiation Oncology
Cross Cancer Institute

RE: 23653: Multidisciplinary Assessment in a Rapid Access Radiotherapy Clinic

In response to your letter enquiring if a modification needs to be submitted for the above study in order to permit Hope Rabel to review the dataset for her Capstone Project, a modification wouldn't be necessary in this case. It is noted that Hope Rabel is already named as a Co-Investigator on this project. Thank you for letter in reference to the above named study.

Sincerely,



Raul Urtaun, M.D.
Associate Chair, Health Research Ethics Board of Alberta – Cancer Committee
/bm

cc: Clinical Research Unit-CCI

Health Research Ethics Board of Alberta – Cancer Committee
Tel: (780) 423-5727 Email: cancer@hreba.ca

1. The membership of this Research Ethics Committee complies with the membership requirements for Research Ethics Boards defined in Part C Division 5 of the *Food and Drug Regulations*;
2. This Research Ethics Committee carries out its functions in a manner consistent with Good Clinical Practices; and
3. This Research Ethics Committee has reviewed and approved the clinical trial protocol and informed consent form for the trial which is to be conducted by the qualified investigator named above at the specified clinical trial site(s). This approval and the views of this Research Ethics Committee have been documented in writing.

Appendix F: Data Analysis

