`WHAT IS THE READINESS OF REGISTERED NURSES WHO PROVIDE CARE FOR PATIENTS WITH DIABETES IN A PRIMARY CARE SETTING FOR REGISTERED NURSE PRESCRIBING?

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Abstract

Objective: To determine the readiness of registered nurses (RNs) who provide care for patients with diabetes in a primary care setting for RN prescribing.

Setting: Canadian provinces and territories.

Participants: Canadian RNs working in primary care settings who provide care to patients with diabetes.

Methods: A cross-sectional survey design was used to examine the readiness of RNs by measuring the attributes of readiness (value, confidence and willingness). The survey included questions on the demographic profile of participants including their age, education level and whether or not they had obtained additional certifications. This data was used to describe the sample and to determine whether there were differences between RNs who were ready to prescribe and RNs who were not ready to prescribe.

Results: Almost 75% of the respondents were "ready" for RN prescribing. There were high positive correlations between "value" and "confidence", "value" and "willingness", and "confidence" and "willingness". There were no statistically significant differences in age, level of education and certifications for respondents who were ready to prescribe compared to those who were not ready to prescribe.

Conclusions: The results of the present study indicate that RNs who provide care for patients with diabetes in a primary care setting are ready for prescribing. This practice has the potential to make more effective use of health human resources, allowing RNs to work to their full potential and increase accessibility to care for patients with diabetes.

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CHAPTER ONE

Introduction

During a clinical placement for the Primary Health Care course in the Master of Science (Nursing) program at the University of Ottawa, I had the opportunity to work under the preceptorship of Ms. Lisa Ashley, Nurse Advisor, Nursing and Leadership with the Canadian Nurses Association (CNA). Ms. Ashley was initiating dialogue with nurse leaders across Canada regarding registered nurse (RN) prescribing. RN prescribing has been practiced in the United Kingdom (UK) since 1994 and UK RNs, who choose to continue their education in order to be able to prescribe, can now prescribe any licensed medicine for any medical condition within their area of practice, including some controlled drugs (Courtenay, Carey & Burke, 2007b). There is evidence from the UK to show that RN prescribing increases accessibility to medications, improves the quality of care for patients, and increases RN's job satisfaction and autonomy (Berry, Courtenay & Bersellini, 2006; Carey & Courtenay, 2007; Courtenay, 2007; Courtenay & Carey, 2008a; Latter & Courtenay, 2004; Luker, Austin, Hogg, Ferguson & Smith, 1998).

In Canada, RN prescribing is a new and relatively unknown practice. As part of my clinical placement to learn the Advanced Practice Nurse role in policy development, I assisted the CNA in exploring the issue of RN prescribing that is practiced in other countries by conducting an assessment with key informants across Canada. Key informants were nurse leaders of provincial, territorial and associate members of the CNA. The majority of respondents held positions as executive directors, practice consultants or directors and possessed a graduate degree in nursing or related discipline.

The CNA assessment of RN prescribing consisted of telephone interviews. Respondents were asked four open-ended questions: (1) what their thoughts and views were on RN prescribing; (2) what the key contributing factors were to RN prescribing; (3) whether they could

provide specific examples of how the contributing factors would affect other health care professionals; (4) whether there were any specific factors that would benefit health care consumers; in addition, they were asked to provide any additional comments regarding RN prescribing. The responses were transcribed verbatim and content analyzed by Ms. Ashley and me. Five main themes emerged from our analysis: (a) support/lack of support for RN prescribing; (b) key contributing factors; (c) perceived impact of RN prescribing on health care consumers, in particular individuals with chronic conditions; (d) perceived impact of RN prescribing on RNs; and (e) perceived impact of RN prescribing on other health care professionals (MacKenzie, 2009). The themes and the perceived benefits were similar to those identified in comparable studies conducted in the UK (Berry, et al., 2006; Courtenay, 2007; Latter & Courtenay, 2004; Lewis-Evans & Jester, 2004). Most respondents were aware of the RN prescribing practices in other countries, but due to differing provincial or territorial legislation, each province was at a different stage of researching the issue. In Newfoundland, nurse practitioners were not yet prescribing; in Manitoba, research into RN prescribing was in progress; in British Columbia RNs were prescribing medications that did not require a physician's prescription (MacKenzie, 2009).

My interest in RN prescribing was piqued during this clinical placement by the information obtained through the literature review on the history and benefits of RN prescribing in the UK and during analysis of the CNA assessment of RN prescribing (MacKenzie, 2009). My nursing background is diverse and includes public health and diabetes research. I have a solid foundation in primary care and a passionate interest in the determinants of health and the role they play in the health of Canadians. Through my clinical practice as an RN, I have met people with diabetes who did not have a family physician and therefore were unable to receive follow-up care or prescriptions for medication to control their diabetes. It is evident that the practice of RN

prescribing may have a place in the Canadian health care system by increasing healthcare consumers' access to care and necessary medications.

Primary care (PC) is usually the patient's first point of contact in the healthcare system and is where basic care and management of most chronic conditions occurs (Health Council of Canada, 2005). RNs working in primary care settings, who provide care to patients with diabetes, are often responsible for such tasks as education, tests and appointments, monitoring for potential complications of diabetes, and medications. In some countries, such as the UK, Ireland and Sweden, they can also prescribe oral hypoglycemic medications and insulin (Peters, et al., 2001).

In Canada, if we were to consider the practice of RN prescribing, it would be necessary to determine Canadian nurses' readiness for change, since changing current practice can be challenging. Although the requirements in the UK for pursuing RN prescribing training state that RNs must be in a position that requires them to prescribe, have at least three years of nursing experience with one year in the clinical specialty in which they will prescribe, and have the ability to study at the degree level (Nursing and Midwifery Council (NMC), 2006), there is no research to date in which the readiness of individual RNs for prescribing is discussed.

Purpose

The purpose of the study was to determine the readiness of RNs who provide care for patients with diabetes in a primary care setting for RN prescribing and to determine whether factors such as age and education levels affect the level of readiness.

Definitions

- Primary health care (PHC) is an approach to health involving a range of services beyond the traditional health care system. Income, housing, education, and environment all affect

the health of Canadians. PHC provides the first contact with services as well as helps maintain continuity of care (Health Canada, 2006).

- Health Canada defines primary care as "the element within primary health care that focuses on health care services, including health promotion, illness and injury prevention, and the diagnosis and treatment of illness and injury" (Health Canada, 2006).
- Diabetes is a disease in which the body is unable to produce insulin or has increased insulin resistance, resulting in high blood sugar (Green, Hirsch & Pramming, 2003). It is most commonly divided into type 1 or type 2 diabetes. Type 1 diabetes affects approximately 5% to 10% of individuals with diabetes, often occurs before age 30 and has an acute onset. It is caused by an autoimmune process that prevents the pancreatic beta cells from producing insulin and is controlled by insulin injections (Smeltzer & Bare, 2000). Type 2 diabetes is a result of decreased insulin production or decreased sensitivity to insulin (Smeltzer & Bare, 2000). It affects 90% to 95% of individuals with diabetes, usually occurs after age 40 although it is now being diagnosed in children and adolescents, and has a slow onset (Public Health Agency of Canada, 2008). Control of blood glucose levels may be obtained by following a healthy diet and exercise plan. If this is unsuccessful, individuals may require oral hypoglycemic medications and/or insulin to lower blood glucose levels (Public Health Agency of Canada, 2008).
- The Canadian Nurses Association (CNA) defines RNs as "self- regulated health-care professionals who work autonomously and in collaboration with others. RNs enable individuals, families, groups, communities and populations to achieve their optimal level of health. RNs coordinate health care, deliver direct services and support clients in their self-care decisions and actions in situations of health, illness, injury and disability in all stages of life. RNs contribute to the health-care system through their work in direct practice,

education, administration, research and policy in a wide array of settings" (CNA, p.6, 2007).

- RN prescribing is a practice used in many countries in which RNs with extra education and training specific to prescribing, can prescribe medication. In the UK, whether they are supplementary, independent or group protocol prescribers, all RNs must complete the same training to gain competency in prescribing in order to prescribe (Courtenay, Carey & Burke, 2007a).
- Competence, as it relates to areas of RN competence, has been defined by the College of Nurses of Ontario as "The quality or ability of a registered nurse to integrate and apply the knowledge, skills, judgments, and personal attributes required to practice safely and ethically in a designated role and setting. Personal attributes include but are not limited to attitudes, values and beliefs" (College of Nurses of Ontario, p. 21, 2008).

CHAPTER TWO

Literature Review and Conceptual Framework of Readiness for RN Prescribing

Registered Nurse Prescribing

Registered Nurse (RN) prescribing has been in practice for many years in other countries. It is currently being practiced in the UK, Sweden, Ireland, Brazil, South Africa, Australia, and New Zealand (Courtenay & Carey, 2008a), and to some extent Canada and the United States where RNs with an advanced Nurse Practitioner degree are able to prescribe (Courtenay, et al., 2007a). RN prescribing has been implemented in countries other than Canada for various reasons. In Sweden, the practice of RN prescribing was initiated to reduce physician workload, improve services to health care consumers, and to provide care in the community using an appropriate mix of health care professionals (Courtenay & Carey, 2008c). RN prescribing was initiated in the UK in order to improve patients' access to care and medications, make effective use of healthcare human resources, and increase patients' choice in care (Department of Health, 2006). RNs in the UK, with additional training, began prescribing from a restricted range of medications in a small number of pilot sites in 1992. This practice grew to RNs prescribing independently in their area of expertise by 2006 (Courtenay, 2007). The scope of RN prescribing in the UK, however, varies according to the category of prescriber: Nurse Supplementary Prescriber (NSP) and Nurse Independent Prescriber (NIP).

The Nurse Supplementary Prescriber (NSP) prescribes from a specific list of medications for a specific patient under an independent prescriber and works mainly with patients with chronic conditions such as diabetes (Furlong & Smith, 2005). NSPs are part of a care team in which a physician makes a diagnosis and develops a clinical management plan (CMP). The patient, NSP and physician agree with the CMP prior to its initiation (Stenner & Courtenay, 2008a). The CMP includes all medications that the NSP may prescribe, including controlled

drugs and unlicensed medications, as long as they are within the NSP's area of expertise (Courtenay, Carey & Burke, 2007b). All drugs from the British National Formulary (BNF) related to the CMP, except narcotics and drugs of addiction, can be prescribed by NSPs (Latter, Maben, Myall & Young, 2007a). NSPs are intended to complement the existing care provided by physicians for patients with chronic conditions such as asthma, diabetes and hypertension, and co-morbidities. This practice enables physicians to concentrate on more complex cases (Cooper, et al., 2008).

Nurse Independent Prescribers (NIP) take responsibility for the assessment, diagnosis, and clinical management of the patient (Latter, et al., 2007a), and prescribe from the Extended Nurse Prescribers' Formulary (Bradley, Campbell & Nolan, 2005). In 2006, the NIP role was expanded to include prescribing any licensed medication for any condition within the nurse's area of expertise (Courtenay, 2008). The level of autonomy, responsibility and accountability puts the NIP on par with the Nurse Practitioner (NP) role in Canada (Furlong & Smith, 2005). NPs provide direct care, usually in health promotion, and the treatment and management of health conditions (CNA, 2008). NPs are RNs with an advanced degree and experience that are able to make diagnoses, order and interpret specific diagnostic tests, and prescribe procedures and medication autonomously within a clearly defined range of tests, procedures and medications (CNA, 2008). Of the 13 provinces and territories in Canada, only 10 have provisions for NPs to practice in acute care settings (Kilpatrick, et al., 2010). While historically NPs have primarily worked in primary care settings, the employment trends of NPs have changed over the past few years. Presently the numbers of NPs working in primary care and acute care settings areas is almost equal (CIHI, 2010).

The role of the NIP is most similar to the role of the NP in Canada, in that they can independently order and interpret tests and results, diagnose, and treat their patients. The focus

of this research is RN prescribing that is more in line with the role of the NSP in the UK. Currently, Manitoba is developing RN prescribing protocols based on the evidence of the careful and safe practices in the UK and Ireland, but is unclear if the new RN prescribing role will be based on the NSP or NIP (Wilson-Maté, 2010). Group protocol prescribers are specific to a particular group of patients and can only prescribe predetermined medications related to this group, similar to medical directives (Van Roth, Mistian & Francke, 2008).

Training in the UK is the same for both Nurse Supplementary Prescribers and Nurse Independent Prescribers (NMC, 2006), and the same prescribing qualification is given to each following successful completion of the course (Courtenay & Carey, 2008a; Courtenay, et al., 2007a). Training for RN prescribing is offered to RNs who have at least three years of experience, with at least one year of practice in the clinical specialty in which they wish to prescribe and who have the ability to study at the degree level (Courtenay & Carey, 2008a). RNs are expected to have specialist training, such as a diploma, degree, or master's level module in the particular clinical specialty where they will prescribe, for example, diabetes (Courtenay & Carey, 2008a). RNs must also be in a nursing position that requires them to prescribe and have the support of a medical prescriber willing to supervise their clinical practice (NMC, 2006). Training typically takes three to six months to complete. It includes 27 days of classroom content and 12 days of supervised clinical placement with a medical mentor, during which time theory is applied to practice, and competency is gained in prescribing (Courtenay, et al., 2007a).

The classroom portion of the training typically includes all aspects of prescribing including clinical pharmacology, decision-making, legal and ethical issues related to prescribing, professional accountability and responsibility, influences and psychology of prescribing, and evidence-based practice and clinical governance in relation to RN prescribing (Courtenay, et al., 2007a). Prior to prescribing, the RN must meet the new standards that were introduced by the

Nursing and Midwifery Council in 2006. These standards state that RN prescribers must have the necessary knowledge and competence in order to assess a patient's clinical condition, complete a thorough medical and medication history on a patient, prescribe a medication when necessary, and advise the patient on the effects and risks of the medication and monitor the response to the medication (NMC, 2006).

There are differences in the effectiveness of training for RN prescribing depending on the RN's previous knowledge and experience in his/her area of clinical expertise (Courtenay & Carey, 2008a). Courtenay and Carey (2008a) conducted a postal questionnaire to determine how prepared newly trained NSPs and NIPs felt in their new role. Although the training for RN prescribing is the same for all RNs in the UK, Courtenay and Carey found that the educational needs of RNs with specialist training, such as advanced degrees, were met more often during the RN prescribing training compared to the needs of nurses who did not have additional training in their area of expertise. RN prescribers felt that the education they received was adequate and that educational updates were available when required, although the frequency of the educational updates was not mentioned (Lewis-Evans & Jester, 2004). Unfortunately all respondents from this latter study were from the same nursing trust, resulting in a homogenous sample and homogeneity in the responses (Lewis-Evans & Jester, 2004).

Each Canadian province and territory follows the provincial or territorial guidelines, legislation or protocols regarding RN prescribing. In Manitoba, the Manitoba Registered Nurses Association (MRNA) has developed a regulatory framework to address requirements, related to RN prescribing, such as education, registration, continuing competence and practice (Wilson Maté, 2010). Alberta has created a draft of "Standards for Limited Registered Nurse (RN) Prescribing" that is similar to the UK model in terms of education, job requirements and prescribing authority (CARNA, date TBD). Respondents to the CNA RN prescribing assessment

proposed several requirements for RN prescribing, including additional education, CNA certification for RN prescribing, and permitting only the RNs who want to prescribe, to prescribe (MacKenzie, 2009).

Benefits of RN Prescribing for Patients and RNs

RN prescribing has been shown to have benefits for the health care consumer and the RN in other countries (Berry, Courtenay & Bersellini, 2006; Latter & Courtenay, 2004; Lewis-Evans & Jester, 2004). Patients in the UK, who participated in a semi-structured qualitative study, felt they received relaxed and accessible care from RN prescribers but also felt the RNs were more knowledgeable than physicians in certain areas, such as wound care (Luker, et al., 1998). Patients appreciated the RN's simple explanations of medication use and purpose, which made the instructions more understandable (Luker et al., 1998). This is important as poor communication contributes to decreased patient satisfaction, poorer adherence rates and poorer health outcomes (Berry, Bradlow & Courtenay, 2008). Patients' support for RN prescribing was based on the RN having appropriate knowledge of individual patients, medications and products in their area of clinical expertise, in addition to the stability and continuity of care (Courtenay, Stenner & Carey, 2010; Luker et. al, 1998). Courtenay (2007), in an article examining the benefits and disadvantages of RN prescribing, according to physicians, patients and nurses, reported that patients benefitted from greater accessibility to prescriptions, early intervention, a holistic approach, and the RN's knowledge of the patient's condition and treatment, as well as enhanced patient care and improved patient outcomes such as improved glycemic control and diabetes symptoms, cost-effectiveness and decreased length of hospitalizations. Lewis-Evans and Jester (2004) conducted minimally structured interviews in a qualitative study with seven RN prescribers. Improved patient centred-care, communication and continuity of care were the

perceived benefits for patients, while cost-effectiveness, role satisfaction and increased autonomy were viewed as benefits for RN prescribers.

Hallworth (2004), in a review of how supplementary nurse prescribing affected patients with diabetes in the UK, identified many benefits of the NSP role for both RNs and patients with diabetes. Improved accessibility and decreased wait times were realized outcomes for patients with diabetes, as it was easier for patients in this study to see an RN than a physician. The wait time was decreased since the nurse did not require the physician to approve the prescription.

Courtenay (2007) examined the available literature regarding the benefits and disadvantages of RN prescribing as determined by physicians, nurses and patients. Benefits for health care professionals included increased autonomy, networking and patient involvement in their plan of care. In a telephone interview, using a structured open-ended questionnaire with 12 physicians, respondents stated there was an improvement in the professional relationship between the RNs and the physicians, fewer interruptions to sign prescriptions, and a decreased workload (Avery, Savelyich & Wright, 2004). Bradley and Nolan (2007) used semi-structured interviews to determine the impact of RN prescribing training on 45 recently qualified NIPs and NSPs. Knowledge obtained from a prescribing program increased the confidence level of the RN prescribers, enabled them to challenge medication orders, earn greater respect from physicians, and enhance their opportunities for networking with medical prescribers. Respondents who took part in the CNA RN prescribing assessment identified many of the benefits identified in the UK studies as potential benefits for Canadian health care consumers and health care professionals, including better chronic disease management in the community as well as continuing care medications, and decreased wait times to receive care (MacKenzie, 2009).

Primary Care in Canada

There is much confusion between the terms primary care (PC) and primary health care (PHC). Both terms are used inter-changeably, with PC more widely used in health literature and associated more with physicians (Awofeso, 2004). PHC refers to an approach to healthcare and the services that play a role in health but fall outside the traditional health care system. These services include income, housing, education and environment (Health Canada, 2006). Primary care is the area within PHC that provides the health services including health promotion, illness and injury prevention, and the diagnosis and treatment of illness and injury (Health Canada, 2006).

While there is no universal job description for RNs who work in PC settings, the Canadian Family Practice Nurses Association, an Associate Member of the CNA, has created a sample role description for RNs in family practice. Key points from the role description resonate with key points of the primary health care approach to care: encouraging maximum independence and accountability for self-care from patients; involving patients in self-management discussions; discussing medication therapies, side effects and interactions with patients; and providing education and counseling for chronic disease management (Canadian Family Practice Nurses Association, 2011). The roles of RNs working in PC settings are similar in many ways to the NIP and NSP roles in the UK. In PC the focus is on the health care services related to treating illness (Health Canada, 2006), which in turn improve the access to care and management of chronic diseases, such as diabetes, for patients (Bradley & Nolan, 2007; Lewis-Evans & Jester, 2004).

One chronic disease requiring ongoing management is diabetes. Diabetes is a health concern for valid reasons. Individuals with diabetes are at greater risk for other health conditions as well as longer stays in hospitals. There are many diverse roles for RNs working with patients

with diabetes in a PC setting. These roles include education of newly diagnosed patients with all forms of diabetes, on-going education regarding diabetes self-management, ensuring follow-up for tests and appointments, prescribing oral hypoglycemic agents and insulin, and monitoring of complications and associated medications (Peters, et al., 2001). In a study conducted in the UK, to determine the prescribing practices of RN prescribers, it was found that diabetes was one of the conditions most frequently prescribed for (Courtenay, et al., 2007b).

Diabetes is a concern in Canada due to the increasing incidence of this disease (PHAC, 2008). The number of individuals with diabetes will increase from 2.5 million in 2010 to 3.7 million by 2020. This increase in prevalence is attributed to the increase in population, the aging demographics of Canada and the rising incidence rates of diabetes (Canadian Diabetes Association, 2011). Canadians are affected by the rising direct and indirect health care costs to both the health care system and the individual, yet many of these expenses can be reduced with self-management of diabetes and good healthcare (Carey, Stenner & Courtenay, 2010b).

Diabetes

Diabetes is a disease in which the body is unable to produce insulin, or has increased insulin resistance, resulting in high blood sugar (Green, et al., 2003). It is most commonly divided into type 1 or type 2 diabetes. Type 1 diabetes affects approximately 5% to 10% of individuals with diabetes, often before age 30 and with an acute onset. It is caused by an autoimmune process that prevents the pancreatic beta cells from producing insulin and is controlled by insulin injections (Smeltzer & Bare, 2000).

Type 2 diabetes is a result of decreased insulin production or decreased sensitivity to insulin. It affects 90% to 95% of individuals with diabetes and usually occurs after age 40 (Smeltzer & Bare, 2000). Type 2 diabetes is initially treated with diet and exercise, and if not

successfully managed, patients may require oral hypoglycemic agents or insulin to lower blood glucose levels (Smeltzer & Bare, 2000). Because the onset of type 2 diabetes is slow, it may go undetected for years, and is often diagnosed during routine blood work. The symptoms related to type 2 diabetes are fatigue, irritability, frequent urination, thirst, poorly healing skin wounds, vaginal irritation and occasionally blurred vision (Smeltzer & Bare, 2000). The number of individuals with type 2 diabetes is expected to increase to approximately 300 million people or 6.3% of the adult population worldwide by the year 2025 (Green, et al., 2003), and 366 million people by 2030 (Wild, Roglic, Green, Sicree & King, 2004).

Gestational diabetes mellitus (GDM) is impaired glucose tolerance that is detected during pregnancy (Kjos and Buchanan, 1999). Women with GDM are at greater risk of developing type 2 diabetes in later life, and their children are at increased risk of obesity as well as type 2 diabetes (Lindsay, 2009).

Complications

The treatment goal of diabetes is to normalize blood glucose levels and increase insulin sensitivity to prevent vascular and neuropathic complications. Nutritional management, exercise, blood sugar and blood pressure monitoring, pharmacologic therapy and education are used to achieve this goal (Diabetes in Canada, 2008).

High blood glucose levels prevent the body from functioning correctly, causing complications to manifest (Diabetes in Canada, 2008). The complications of diabetes can be classified as macrovasular, microvascular and/or neuropathy (Smeltzer & Bare, 2000). Macrovascular changes (changes in the medium to large blood vessels) or blockages in the vessels, result in hypertension, coronary artery disease, cerebrovascular disease and peripheral vascular disease. Examples of macrovasular changes are strokes, heart conditions, delayed wound healing and decreased circulation to lower limbs (Smeltzer & Bare, 2000).

Microvascular changes are changes in the smaller vessels, such as capillaries, possibly due to the increased blood glucose levels. The major complication of microvascular change is diabetic retinopathy (Smeltzer & Bare, 2000).

Neuropathy is a painful condition as it affects peripheral, autonomic and spinal nerves. It manifests as prickling, tingling or increased sensation that typically occurs at night. As it progresses, limbs lose feeling and may lead to an unsteady gait, foot infections that go unnoticed and possible amputations (Smeltzer & Bare, 2000).

Although almost 25% of people with diabetes have three or more complications or chronic conditions (Carey, et al., 2010b), the leading cause of death associated with diabetes is cardiovascular disease (Bhattaccharyya, Estey & Cheng, 2009). Type 2 diabetes is also associated with other metabolic abnormalities such as dyslipidemia (Green, et al., 2003). Kidney failure, blindness, heart disease and stroke, and peripheral nerve damage are common health problems related to type 2 diabetes.

Diabetes Management

According to the Canadian Diabetes Association 2008 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada, the management of diabetes involves many strategies. A self-management approach to care in diabetes is important in order to increase the involvement of an individual in his/her own care and decision-making, leading to increased confidence and motivation (Canadian Diabetes Association, 2008). Funnell, et al. (2008) define diabetes self-management education (DSME) as:

> The ongoing process of facilitating the knowledge, skill, and ability necessary for diabetes self-care. This process incorporates the needs, goals, and life experiences of the person with diabetes, and is guided by evidence-based standards. The overall objectives of DSME

> are to support informed decision-making, self-care behaviors, problem-solving and active collaboration with the health care team and to improve clinical outcomes, health status, and quality of life. (p.S97).

Self-management care is based on the individual's plan of treatment according to the diagnosis, medications involved, and the frequency of blood glucose monitoring. The main advantage of the increase in understanding of the treatment goals and increase in confidence, is a corresponding improvement in quality of life (Canadian Diabetes Association, 2008)

Most individuals who are diagnosed with type 2 diabetes are obese (Smeltzer & Bare, 2000). Obesity is associated with insulin resistance, therefore diet and exercise are the first course of action to decrease blood glucose levels (Smeltzer & Bare, 2000). The Canadian Diabetes Association (2008) has created a management plan for hyperglycemia with type 2 diabetes. If diet and exercise do not reduce the blood glucose levels an oral hypoglycemic agent (Metformin) is initiated. If this medication is not effective in decreasing hyperglycemia, more oral medications are added to the regime. If oral hypoglycemic agents are not effective, insulin is initiated (Canadian Diabetes Association, 2008).

Costs of Diabetes

The rising incidence of diabetes results in rising costs to the healthcare system. The treatment of diabetes requires 2.5% to 15% of direct healthcare budgets as a result of the complications of diabetes, such as blindness and end-stage renal disease (Lipscombe & Hux, 2007). The estimated cost to Canada's health care system to treat people with diabetes and their complications is approximately $5.6 billion dollars per annum. This does not include the cost of

rehabilitation following amputation or major surgery, nor does it include costs incurred by the individual (Canadian Diabetes Association, 2008). Direct health care budgets include costs related to hospitalizations, specialized treatment, physician costs and prescription medications. Indirect health care costs are the financial losses due to illness, disability or premature death (Ontario Chronic Disease and Prevention Alliance and the Ontario Public Health Association, 2007).

Diabetes may have a negative impact on the quality of life of individuals with the disease and their families due to the treatment, loss of health related to complications, financial loss due to disability from complications, and the costs of supplies (Conference Board of Canada, 2009). People with diabetes require equipment to check blood glucose levels several times per day and/or needles for insulin injections. This equipment may or may not be covered by a health plan, and the costs for medication and diabetes supplies can range from $1000 to $15000 per year per individual with diabetes (Canadian Diabetes Association, 2009). Individuals living with diabetes often require more appointments to a physician or treatments such as dialysis, resulting in parking fees and time off work. Automobile, health and life insurance may be more expensive (Canadian Diabetes Association, 2011).

RN Prescribing and Diabetes Management

RN prescribing has had positive outcomes in the UK for both nurses who provide care for patients with diabetes, and patients with diabetes (Carey & Courtenay, 2007; Courtenay & Carey, 2007). Nurses have been shown to effectively manage common complications of diabetes such as hypertension, hyperlipidemia, and cardiovascular disease (Denver, Barnard, Woolfson & Earl, 2003). RNs in the UK who can prescribe for their patients with diabetes have been shown to

have greater job satisfaction and feel there is improved use of their nursing skills as well as increased accessibility to medication for their patients and improved quality of care for patients with diabetes (Courtenay & Carey, 2008b). Patient outcomes can be improved with RN prescribing. A national survey conducted by Carey and Courtenay (2008) showed that one third of RN prescribers in the UK prescribe for patients with diabetes. The most commonly prescribed medications are oral hypoglycemics, insulin, antihypertensives and lipid regulating medications (Carey & Courtenay, 2008). In a study comparing nurse-led clinics and conventional primary care in the UK, improved access to monitoring and medication management in the nurse-led clinic was shown to improve hypertension for patients with diabetes, which is important for preventing the complication of coronary heart disease (Denver, et al., 2003).

RN Prescribing in Canada

RN prescribing in the UK offers greater accessibility to care, improved outcomes and more holistic care to healthcare consumers, as well as greater autonomy, increased job satisfaction and self-confidence for RN prescribers (Bradley & Nolan, 2007; Courtenay, 2007; Lewis-Evans & Jester, 2004). RN prescribing has been in practice in the UK since 1994 and training and regulations have been determined. In Canada, it is a new practice and no research on RN prescribing has been conducted as yet.

Although the majority of the respondents to the CNA RN prescribing assessment questionnaire thought there would be many positive outcomes of RN prescribing for both RNs and health care consumers, some barriers were also identified (MacKenzie, 2009). With the exception of NPs, RN prescribing is not a current practice in Canada, and the respondents stated they were at different stages of awareness and research on this topic. Respondents stated that

some provinces were still clarifying the NP role and in other provinces, there was little interest from the members of their provincial or territorial nursing organization (MacKenzie, 2009).

In Canada, each province and territory has specific regulations and scopes of practice for RNs to follow. Regulations are created after much research and discussion by members of the nursing college in each particular province or territory, and must be accepted by members before changes occur. Each new practice must have value for the individual RN, the nursing body, and members of the public. In terms of RN prescribing, the practice must be an additional skill that individual RNs of that province or territory would want to pursue.

RN prescribing will have an impact on health care professionals working with RNs; these health professionals include physicians, nurse practitioners, other RNs, and pharmacists. Physicians may express concerns that their role is changing, they are threatened, or they are unaware of the education the RNs have prior to prescribing (Cooper, et al., 2008). The role of the NP needs to be protected so that NPs will be the only RNs with the ability to diagnose, order and interpret tests and prescribe autonomously, while RN prescribers will only prescribe under an independent prescriber within their specialty area. Pharmacists may be affected as they may accept prescriptions from physicians only and may want the right to prescribe as well (MacKenzie, 2009).

When changes are made to current practices, or new practices are added to a specific role, other members of the healthcare team need to be aware of these changes and understand how these changes will affect their current role, practice and any additional responsibilities. In terms of RN prescribing, the role of the RN prescriber needs to be clearly defined, so the change in practice does not overlap other roles, such as other RNs, NPs or physicians, making the most effective use of health human resources. Before an individual RN accepts new responsibilities, he/she must have the clinical skills and abilities to understand and perform the new practice.

Healthcare facilities would need to determine if there is a need for RN prescribing in their institution. Policies, protocols and job descriptions would need to be adapted for the changes in the nursing role.

Another concern for RN prescribing is determining whether RNs are ready to prescribe medications. Readiness of RNs for RN prescribing must be determined prior to initiating further discussion. If RNs do not see value in RN prescribing, do not feel confident in their clinical skills and abilities, and are not willing to obtain further credentials, should they be required, RN prescribing will remain a concept, not a reality.

Concept of Readiness and RN Prescribing

Some words used in the definition of the concept of readiness include eagerness, preparation and willingness (Merriam-Webster Dictionary, 2011). Although there is no universally accepted definition of the concept, Armenakis, Harris and Mossholder's (1993) definition of readiness as "the cognitive precursor to the behaviours of either resistance to, or support for, a change effort" (p. 681) is a widely accepted definition used within the literature.

Recognition of the importance of individual readiness is evident in change theories at the organizational and individual level, where it is identified as an important initial step prior to the adoption of change (Lewin, 1951; Prochaska & DiClemente, 1983; Prochaska, DiClemente, & Norcross, 1992; Prochaska & Velicer, 1997) and critical for the success of change (Rowden, 2001; Weiner, Amick & Lee, 2008). For example, in Lewin's (1951) three-stage model of organizational change, readiness is akin to what he refers to as a state of "unfreezing" where members of the organization must change past knowledge, beliefs and intentions towards the current state of affairs prior to change (Weiner et al., 2008). Similarly, in individual behavioural change models such as the transtheoretical model, readiness is a precursor to behavioural change (Prochaska & DiClemente, 1983; Prochaska et al., 1992; Prochaska & Velicer, 1997).

Readiness within change theories has been widely applied to health care organizations (Weiner et al., 2008) and for health promotion (Spencer, Adams, Malone, Roy & Yost, 2006; Spencer, Pagell, Hallion & Adams, 2002). However, the concept has been applied infrequently to RNs' readiness for change and not specifically in terms of incorporating new nursing practices. Examples include, the readiness of military nurses for deployment (Austin, Stevenson, Scholes & Dremsa, 2007) and the readiness of nurses for technology (Caison, Bulman, Pai & Neville, 2008). In spite of this, the concept of the readiness that has been employed within individual level behavioural change theories is relevant and applicable to the current investigation. Specifically, Dalton and Gotlieb's (2003) analysis of the process of readiness is based on Rosenbaum's Theory of Learned Resourcefulness (1983) and the Transtheoretical Model (Prochaska & DiClemente, 1983; Prochaska et al., 1992; Prochaska & Velicer, 1997).

According to Dalton and Gotlieb (2003), there are three phases in the process of determining readiness prior to behavioural change. The first phase of the process is recognizing the value of what needs to change and the presence of a catalyst, such as a change in their circumstances, to make the change. The second phase of the process is determining whether to change by weighing the costs and the benefits of the proposed change. When it is decided that the benefits are greater than the costs of the change, the final phase of readiness begins. The final phase of an individual's readiness is determined by the desire or "willingness" to change and to take action towards that change (Figure 1).

In the context of a practice change, the three phases of readiness are similar to the phases of behavioural change in patients (Dalton & Gotlieb, 2003). The first phase is recognizing the value of what needs to change and a trigger to make the change. RNs must believe in the value of RN prescribing in terms of improved access to care and enhanced health services for patients, as well as the better use of health human resources (Courtenay & Carey, 2008c).

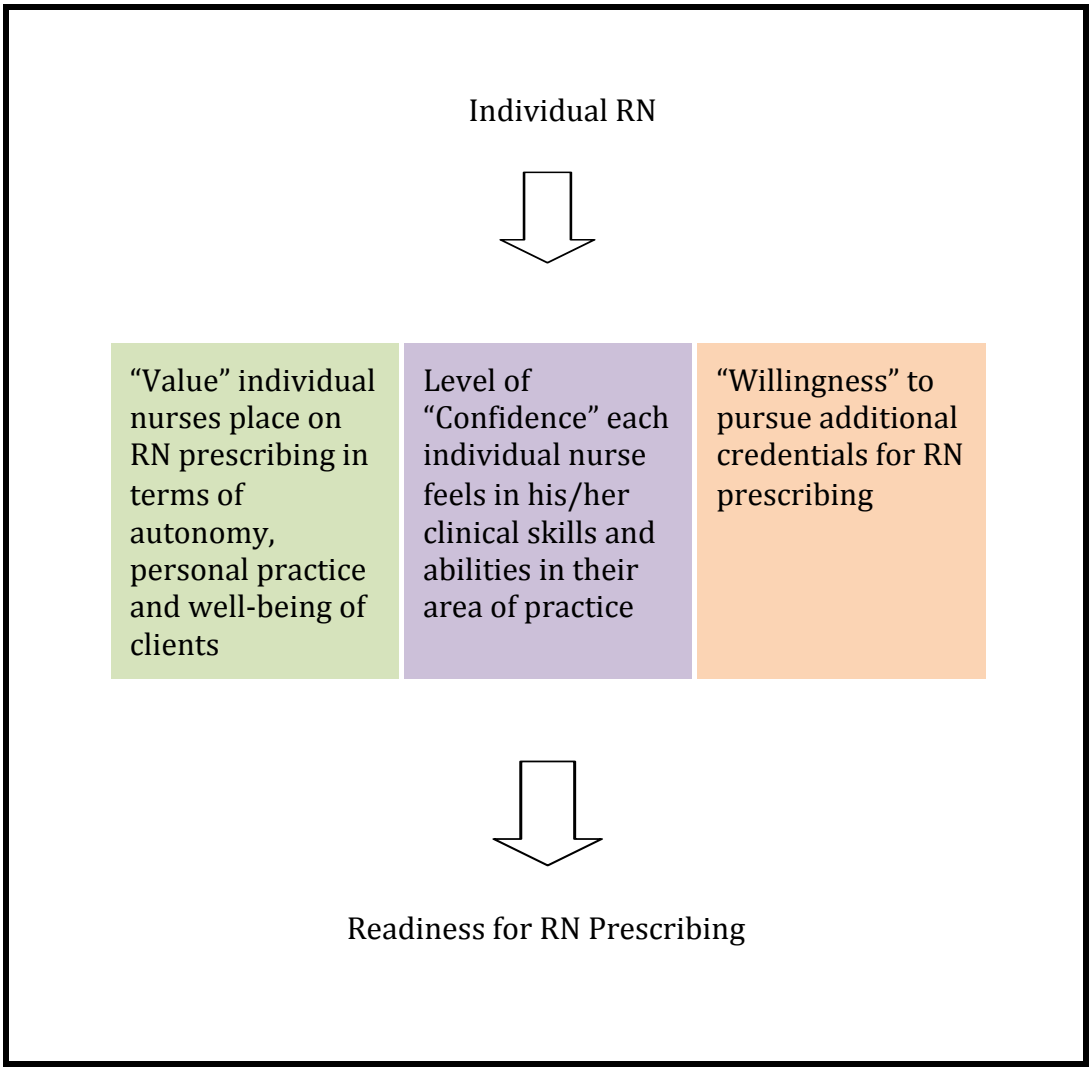

Figure 1. Conceptual framework for readiness of RNs for RN prescribing.

The second phase of readiness involves examining the costs and benefits of the change. The benefits of RN prescribing for patients and RNs, such as improved accessibility, decreased wait times, more holistic care and increased autonomy (Courtenay, 2007), need to be balanced against the costs of the added responsibility of RN prescribing for the individual RN and the potential liability issues. When analyzing the costs and benefits of RN prescribing, individual RNs must determine if the benefits of RN prescribing outweigh the costs. RNs need to have confidence in their clinical skills and abilities prior to pursuing RN prescribing. RNs in the UK

must have at least three years of experience and specialist training in the clinical specialty in which they will prescribe (Courtenay & Carey, 2008a). A study exploring the views of RNs and team members on the implementation of RN prescribing in the UK was conducted in 2007 and 2008. The acceptance of RN prescribing by nurses and other health care team members depended on the experience of the RN, the RN's insight into her limitations, and whether RNs were working within their defined areas of competence (Courtenay, Stenner & Carey, 2009; Stenner, Carey & Courtenay, 2010). Although there are benefits of RN prescribing for both RNs and patients, the costs for RNs includes additional responsibility, potential liability issues and additional education.

The final phase of readiness is the willingness to make the change. If RNs see value in the practice of RN prescribing and have confidence in their clinical skills and abilities, they may be more willing to prescribe and take the appropriate actions to enable them to prescribe, such as further education or training. RNs in the UK must be willing to pursue additional education prior to RN prescribing (Courtenay & Carey, 2008a). Willingness will also vary depending on what is required to adopt the practice. If there were educational requirements for RN prescribing in Canada, RNs would have to be willing to obtain this education.

The variables used to determine the readiness of RNs for RN prescribing will be the value or importance each individual nurse places on the practice of RN prescribing, his/her confidence in his/her clinical skills and abilities, and his/her willingness to obtain further credentials in order to prescribe. The greater the value each individual RN places on RN prescribing, the higher the level of self-confidence each RN has in his/her clinical practice skills and abilities and level of knowledge, and the higher the levels of willingness of each RN to obtain the necessary credentials for RN prescribing lead to increased levels of readiness of each individual nurse for RN prescribing.

Readiness for RN prescribing can therefore be determined through the assessment of the value the RN places on the new practice, the confidence the RN has in his/her clinical skills, and his/her willingness to obtain further credentials in order to prescribe. The three phases of readiness parallel the requirements for RN prescribing in the UK: holding a position in which RN prescribing is necessary (value), experience in a clinical specialty (confidence), and additional education for RN prescribing (willingness) (Courtenay & Carey, 2008a).

RNs who are older may have more clinical experience and more confidence in their practice, and therefore, may be more ready to prescribe. Patricia Benner is a nursing theorist who used education levels and years of experience to measure the level of skill acquisition for each nurse. Benner (1982) based her Novice to Expert theory on the Dreyfuss Model of Skill Acquisition. The Dreyfuss Model of Skill Acquisition describes five stages of proficiency an individual must experience before acquiring a skill: novice, advanced beginner, competent, proficient and expert. Benner applied the same theory to the acquisition of nursing skills using different years of experience and skill levels for each stage of the Novice to Expert theory. The theory assumes that RNs who are older have more experience and therefore, more confidence in their clinical skills and abilities. With more confidence in their clinical skills and abilities, they may be willing to obtain more education to enlarge their nursing skill set. Nurse independent prescribing was evaluated in a quantitative study conducted in the UK in 2004 and it was determined that older RN prescribers were more confident (Latter, et al., 2004). It was assumed, for the present study, that RNs with more education and experience would have higher levels of confidence in their clinical nursing skills and abilities.

Levels of education were obtained from respondents to determine if it made a difference in their levels of readiness for RN prescribing. One of the requirements for RN prescriber training in the UK is the ability to study at the degree level (Courtenay & Carey, 2008a). Almost half of

the RN prescribers in the UK have a degree (Bradley, et al., 2005; Courtenay, et al., 2007b), and almost half of the RN prescribers in Ireland have a master's degree (Drennan, et al., 2009).

Research Aims and Questions

- What is the readiness of RNs who provide care for patients with diabetes in a primary care setting for RN prescribing?
- What is the relationship between the value each individual RN sees in RN prescribing and the level of confidence each RN has in his/her clinical skills and abilities?
- What is the relationship between the level of confidence each RN has in his/her clinical skills and abilities and his/her willingness to pursue additional credentials for RN prescribing?
- Is there a difference in age between RNs who are ready to prescribe and those who are not?
- Is there a difference in education level and certification between RNs who are ready to prescribe and those who are not?

CHAPTER THREE

Methods

Design

A cross-sectional survey design was used to examine the readiness of RNs who provide care for patients with diabetes in a primary care setting for RN prescribing medications.

Setting and Participants

The population of interest was RNs who provide care to patients with diabetes in a primary care setting. RNs were considered eligible to participate in this study if they:

1.) Worked in a primary care setting such as a community health centre, specialized outpatient clinic or general practice clinic

2.) Worked more than 20 hours per week

3.) Provided care to patients with type 2 diabetes

4.) Understood English

Instruments

The survey (Appendix B) included questions on the demographics of participants including their age, education level and whether or not they had obtained certifications such as the CNA community health certification or the Certified Diabetes Educator designation and on the three variables of readiness. This data was used to describe the sample and to determine whether there were differences between RNs who were ready to prescribe compared to RNs who were not ready to prescribe.

Questions regarding the demographics of the respondents were originally part of a national questionnaire survey in the UK to determine the prescribing practices of independent extended/supplementary prescribers conducted by Dr. Molly Courtenay in 2005 (Courtenay, et al., 2007b). There are no specific measures of readiness for RN prescribing, however, the

National Independent Evaluation of the Nurse and Midwife Prescribing Initiative survey does include questions pertinent to readiness in this context. The purpose of the National Independent Evaluation of the Nurse and Midwife Prescribing Initiative was to measure the effectiveness of RN prescribing, and to determine whether the implementation of RN prescribing had resulted in the achievement of the initial goals relating to quality, patient safety, communication and patient benefits and satisfaction (Drennan, et al., 2009). The evaluation survey has been used in Ireland and was developed from previous national questionnaires measuring general practitioners perceptions of RN prescribing and RNs' perceptions of prescribing in the UK (Latter, Maben, Myall & Young, 2007b). For the purposes of this study, an adaptation of the National Independent Evaluation of the Nurses and Midwife Prescribing Initiative survey, including statements related to the variables (value, confidence, willingness) was used to measure readiness for RN prescribing.

The operationalization of the variables and the consequent development of the survey statements were based on the qualifications required by RNs in the UK prior to RN prescribing training. RNs require at least three years of nursing experience with at least one year in the clinical specialty in which they wish to prescribe, the ability to study at the degree level, a nursing position that requires RN prescribing and the willingness to obtain additional education in order to prescribe (Courtenay & Carey, 2008a). The variables comprising readiness have been adapted from these requirements: (1) the *value* the individual RN places on RN prescribing in terms of autonomy, personal practice and well-being of the patients; (2) the *confidence* the individual RN feels in his/her clinical skills and abilities in their area of practice: and (3) the *willingness* of the individual RN to pursue additional credentials for RN prescribing.

Value - Statements 1-9 in the survey were used to measure the "value" individual RNs place on RN prescribing in terms of autonomy, personal practice and the well-being of their

patients. Respondents were asked if they agree (5) or disagree (1) on a 5-point Likert scale, with statements such as *"Nurse prescribing would have a positive impact on patient/client care"*.

Confidence - To determine the level of confidence individual RNs have in their skills and abilities, respondents were asked to rate, on a 5-point Likert scale, the extent to which they agree (5) or disagree (1) with statements 10-17. An example is *"I am confident in my ability to provide patients/clients with education and preventative healthcare advice regarding medicinal products"*.

Willingness - The willingness to pursue additional credentials for RN prescribing was measured through statements 18, 19, 21 and 22. Statement 20 was not used, as it did not relate to willingness. Respondents rated the extent to which they agree (5) or disagree (1) on a 5-point Likert scale to statements such as *"If I were to prescribe, I would require further education in pharmacology"*.

To calculate the score for "readiness", each of the summary scores for "value", "confidence" and "willingness" were dichotomized into 0 (not ready) or 1 (ready). A score of 0 was given if the summary scores were less than or equal to three (strongly disagree, disagree or no opinion) and a score of 1 was given if the answers were greater than three (agree or strongly agree). Respondents were determined to be ready to prescribe if they "valued" RN prescribing, were "confident" in their clinical skills, and were "willing" to obtain possible further education; this was defined as having a score of 1 for each of "value", "confidence" and "willingness".

To date there is no psychometric data on the measures. Members of the thesis committee and colleagues assessed the face validity of the revised survey. The tool was reviewed and the feedback provided resulted in minor changes such as wording and clarification of statements.

Procedures

The study took place in 2010-2011. Two different survey approaches were used, as the response rate to the initial survey was very low. Initially, an email regarding the study was sent from the CNA to the presidents of the Community Health Nurses of Canada, Canadian Association of Rural and Remote Nursing and Canadian Family Practice Nurses Association, all Associate Members of the CNA. The presidents were asked to distribute the Letter of Information regarding the survey to their members. The cover email included background information regarding RN prescribing in other countries and the purpose of the study. The initial survey was completed through Fluid Surveys, an online password protected survey website whose link was provided on the cover email. A reminder email was sent two weeks later to the presidents of the above-mentioned groups to send to their members. In total, only 13 responses were received.

It is estimated that the letter of invitation was sent to over two thousand nurses, yielding a response rate of less than 0.7%. As a result of this poor response, the approach to the study and the tool were reviewed to identify reasons for the low response rate. The following were identified as possible reasons for the low response rate:

1) Length of questionnaire
2) Incorrect target population (target changed to nurses who provided care for patients with diabetes rather than nurses who worked in primary health care)
3) Incorrect recruitment method.

The survey was shortened from 60 to 22 questions and some statements were changed slightly to make them easier to understand. To increase the response rate, study packages were mailed directly to diabetes education centres across Canada using addresses from the Canadian Diabetes Association website. Study packages included a letter of consent (Appendix A) and the study questionnaire (Appendix B). In order to maintain confidentiality, completed questionnaires

did not contain any identifiers of study participants and were returned to the researcher through self-addressed stamped envelopes. Consent was implied with returned questionnaires.

Direct mailing of 120 study packages to Diabetes Education Centres across Canada resulted in 57 responses in four weeks, yielding a response rate of 48%. Data from the original survey were also entered in the database; responses for these participants were entered only for the statements that were substantially the same as those on the revised survey.

Data Analysis

All survey responses were entered into an Excel database and verified by a second person. Data were analyzed using a PASW Version 18 for Mac OS. Frequencies were calculated to describe respondent demographics.

Research Question #1: What is the readiness of RNs who provide care for patients with diabetes in a primary care setting for RN prescribing?

The readiness of RNs who provide care to patients with diabetes was determined by calculating the 95% confidence intervals around the proportions of RNs who exhibited the characteristics of "value", "confidence" and "willingness" to prescribe. The 95% confidence interval, about the proportion that was "ready" to prescribe, was also calculated.

Research Question #2:What is the relationship between the value each individual RN sees in RN prescribing and the level of confidence each RN has in his/her clinical skills and abilities?

The relationship between the value each individual RN placed on RN prescribing and the level of confidence each RN had in his/her clinical skills and abilities was determined by calculating the association between the independent variable "value" measured at the interval level with the dependent variable "confidence" measured at the interval level. Spearman's correlation coefficient was used, as the variable "confidence" was not normally distributed.

Research Question #3: What is the relationship between the level of confidence each RN has in his/her clinical skills and abilities and his/her willingness to pursue additional credentials for RN prescribing?

The relationship between the level of confidence each RN has in his/her clinical skills and abilities and their willingness to pursue additional credentials for RN prescribing was determined by calculating the association between the independent variable "confidence" measured at the interval level with the dependent variable "willingness" measured at the interval level. Spearman's correlation co-efficient was used as the variables "confidence" and "willingness" were not normally distributed.

Research Question #4: Is there a difference in age between nurses who are ready to prescribe and those who are not?

An independent t-test was used to analyze the mean differences in age between RNs who were "ready" for RN prescribing compared to those who were "not ready" for RN prescribing.

Question #5: Is there a difference in education level and certification between RNs who are ready to prescribe and those who are not?

The difference in education level between RNs who were "ready" to prescribe compared to those who were "not ready" was determined by comparing the independent variable of "level of education" measured at the ordinal level with the dependent variable "readiness" measured at the ordinal level using the Chi-square test. The difference in having obtained a certification between RNs who were "ready" to prescribe compared to those who were "not ready" was determined by comparing the independent variable of "certification" measured at the ordinal level with the dependent variable "readiness" measured at the ordinal level using the Chi-square test.

Sample Size

Sample size calculations were based on research questions 2 and 3. Assuming an alpha of 0.05 and a beta of 0.20, at least 60 participants would be required to detect a moderate correlation between each of the variables (value, confidence, willingness and readiness). Assuming an alpha of 0.05 and an equal number of nurses who are ready versus not ready, and a SD of 10, 60 participants would yield more than 80% power to detect a difference in age.

Ethics

Ethical approval for the study was obtained from the University of Ottawa Research Ethics Board. The initial study was completed through a password protected website online survey tool (Fluid Surveys) that ensures confidentiality and is consistent with Canadian privacy laws. Information regarding the purpose of the survey, the voluntary nature of participation and ethical issues such as risk and benefits, confidentiality, anonymity and contact information was included in the letter of introduction. Shelley MacKenzie, Kirsten Woodend, Christine McPherson and Lisa Ashley had access to the survey and data collected.

Due to poor participation to the initial survey, the recruitment process was changed. Study packages, which included a letter of consent and survey, were mailed to Diabetes Education Centres across Canada and addressed to the attention of "Diabetes Nurse". Confidentiality, anonymity and voluntary participation were maintained by having respondents return completed surveys to the researcher using a self-addressed stamped envelope. Amendments to the recruitment procedures were approved by the University of Ottawa Research Ethics Board. The information collected using recruitment strategies is kept in a locked cupboard in the Nursing Best Practice Research Unit at the University of Ottawa and will be destroyed five years after the completion of the study.

CHAPTER FOUR

Results

A total of 70 nurses completed the survey with a response rate of 47%. The mean age of the respondents was 46.5 years. Most respondents (79.7%) worked full-time in a community health centre, specialized outpatient clinic or a general practice office (Table 1). Thirty-four (49.3%) respondents worked in a community health centre, 39 (56.5%) respondents worked in a specialized outpatient clinic, and 11 (15.9%) respondents worked in a general practice clinic. Some respondents answered "yes" to more than one area of employment, therefore the summed percentages are greater than 100%. The majority of the respondents (61.4%) who completed the second survey consulted a physician at least once per shift regarding a patient and often at least three times per shift (21.4%). The results for this latter question, for the initial survey respondents, were not included due the changes in the wording. There were 67 responses for level of education. Some respondents indicated only that they had obtained a certification, such as Certified Diabetes Educator, but not whether they had a diploma or degree. Twenty-six (37.1%) respondents had diplomas, 39 (55.5%) respondents had degrees, nine (12.9%) had graduate degrees, and one (1.4%) respondent had a post-graduate degree.

Certifications included a Canadian Nurses Association Certification and Certified Diabetes Educator (CDE). The majority of the respondents had obtained the CDE designation (61.4%) while only 5.7% had obtained a CNA certification.

The majority of respondents (84.6%) saw "value" in RN prescribing for both themselves and their clients. An overwhelming proportion (93.8%) of the respondents were "confident" in their clinical skills and abilities. Again, the majority of the respondents were willing to obtain further credentials for RN prescribing if needed (83.3%).

Table 1

Respondent Characteristics.

Characteristics	**Number (%)**
Age	Mean 46.2 years (SD 9.1 years) Range 29 – 67 years
Education Level	
Diploma	26 (37.1%)
Degree	39 (55.5%)
Master's	9 (12.9%)
PhD	1 (1.4%)
CNA Certification	4 (5.7%)
CDE Certification	43 (61.4%)
Working full-time	55 (79.7%)
Type of service provided	
Community Health Centre	34 (49.3%)
Specialized Outpatient Clinic	39 (56.5%)
General Practice Clinic	11 (15.9%)
Frequency of consulting a physician each shift regarding a patient	
0 times	11 (15.7%)
1 time	17 (24.3%)
2 times	11 (15.7%)
≥ 3 times	15 (21.4%)

CNA: Canadian Nurses Association
CDE: Certified Diabetes Educator

Question #1:What is the readiness of RNs who provide care for patients with diabetes in a primary care setting for RN prescribing?

The nominal level variables of "value", "confidence" and "willingness" were characterized as "ready" if average scores were greater than 3 on the survey Likert scale (1) or "not ready" if average scores were less than or equal to 3 on the questionnaire (0). Readiness was determined by the proportion of respondents exhibiting all of the attributes of readiness by having a score of

1 for all three attributes. The majority of respondents (74.2%) had positive scores for all three variables related to readiness, suggesting that they were ready for RN prescribing.

Table 2

Attributes of Readiness Results

Attribute	**Proportion**	**95% CI**
Value	84.6%	73.8 – 91.6%
Confidence	93.8%	84.6 – 98.0%
Willingness	83.3%	72.4 – 90.6%
Readiness	74.2%	62 – 83.5%

Question #2:What is the relationship between the value each individual RN sees in RN prescribing and the level of confidence each RN has in his/her clinical skills and abilities?

The relationship between the value each individual RN sees in RN prescribing and the level of confidence each RN has in his or her clinical skills and abilities was measured using Spearman's correlation coefficient. The result was a high positive correlation (rho= 0.590, r^2=0.35) between "value" and "confidence", showing a strong relationship between the variables at the 0.01 level (2-tailed).

Spearman's correlation coefficient was also used to measure the relationship between value and willingness (DV) measured at the interval/ratio level. The result was a high positive correlation (rho = 0.760, r^2= 0.58) between "value" and "willingness", also showing a strong relationship between these variables at the 0.01 level (2-tailed).

Question #3: What is the relationship between the level of confidence each RN has in his/her clinical skills and abilities and his/her willingness to pursue additional credentials for RN prescribing?

The relationship between the level of confidence each RN has in his/her clinical skills and abilities and his/her willingness to pursue additional credentials for RN prescribing was measured using Spearman's correlation coefficient. The result was a high positive value (rho= 0.630, r^2=0.40) between confidence and willingness showing a strong relationship between the variables at the 0.01 level (2-tailed). Figure 2 shows the relationship between the attributes of readiness (value and confidence, value and willingness, and confidence and willingness). The r value for the relationship between value and willingness is higher than between the other variables suggesting that the relationship between value and willingness is not entirely mediated by confidence.

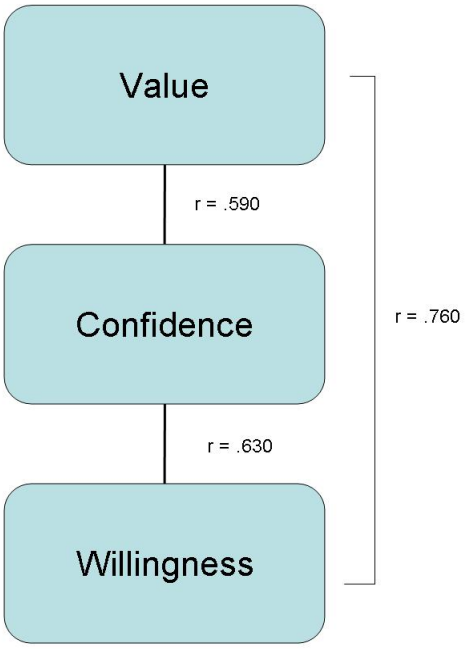

Figure 2. Relationships between attributes of readiness

Question #4: Is there a difference in age between RNs who are ready to prescribe and those who are not?

The age of respondents who were ready to prescribe and those who were not ready to prescribe was compared using an independent t-test with "age" (IV) measured at the interval/ratio level and "readiness" (DV) measured at the nominal level. There were no statistically significant differences in the ages of respondents who were not ready to prescribe and those who were ready to prescribe. Age was normally distributed.

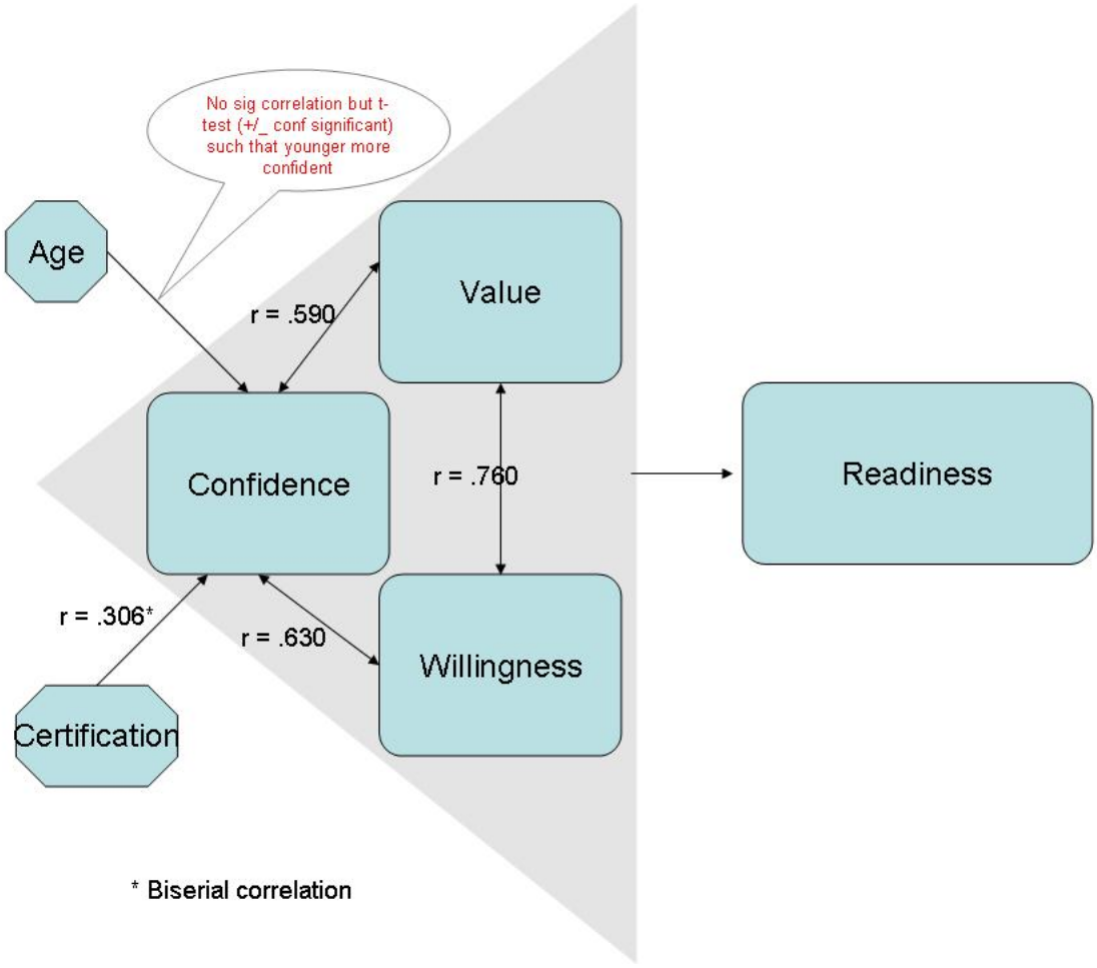

Figure 3. Correlations between attributes of readiness, age, and levels of education

Question #5: Is there a difference in education level and certification between RNs who are ready to prescribe and those who are not?

The difference in education level and certification between respondents who were ready to prescribe and those who are not ready to prescribe was measured using a chi-squared test. Although respondents who obtained additional certifications had higher levels of confidence, there was no statistically significant difference in the level of education or certifications in respondents who were ready to prescribe and those who were not ready to prescribe. Figure 3 shows relationships between the attributes of readiness and the effects of age and level of education on the attributes of readiness.

Respondent comments

While there were no open-ended questions on the survey, some respondents added comments to the survey that raised concerns not addressed in the survey such as liability related to prescribing or how they could provide better care for patients with diabetes. One respondent was concerned that only one third of patients with diabetes attended diabetes education centres while another respondent was concerned that many patients with diabetes did not have a family physician and were therefore not getting appropriate care.

> "I work with many clients who do not have a family physician. They require diabetes medications and I am unable to help them. I often refer them to a walk-in clinic, but often they don't want to work with the client as they have little experience with diabetes mellitus. I could be doing so much more to help these clients if I could prescribe".

Another respondent felt RN prescribing would be useful when providing care for patients with diabetes.

> "This is very important in diabetes. As educators we know the insulin as well as the MDs if not better. Waste of time trying to get the script signed"

The desire to continue the involvement of the physician with patient care was expressed.

"With chronic illness and aging population so many factors play into consideration of what to prescribe. I want the physician as part of the team guiding that".

Another respondent was concerned not only about the physician's involvement but the liability issues that may arise with RN prescribing.

"Need to remember it is still the physician's call. We recommend but they prescribe. Liability issues could be a large factor with this".

Liability and the compensation that goes with it, was also addressed.

"Although confident that I have the needed skills to prescribe, I don't feel RNs are adequately compensated to take on this added liability".

Knowledge regarding diabetes and the associated co-morbidities would be necessary prior to RN prescribing, according to one respondent.

"An excellent knowledge of diabetes and other related conditions would be needed as well as complete knowledge of the patient's history".

Many respondents felt that additional education or certification was imperative for nurses prior to RN prescribing or medication adjustment.

"I think medication adjustment by RN (after prescription by MD/NP is realistic and beneficial to patients (with proper education/certification)".

As in the UK, education programs need to be in place prior to RN prescribing.

"There needs to be education in nursing programs to ensure we are prepared and competent to do prescribing".

Concern was raised regarding risk to patient, liability and the training prior to RN prescribing.

"I am concerned about the risk to the client and the liability to the nurse. I would agree to this with intense education/training/certification only".

CHAPTER FIVE

Discussion

Main Findings

Over three-quarters of the respondents in this study perceived value in RN prescribing and indicated they would be willing to obtain further credentials if required. Additionally, an overwhelming majority of the respondents felt confident in their clinical skills and abilities. These factors translated into three-quarters of the respondents being "ready" for RN prescribing. Respondents were similar in age to the national RN average, however they had generally achieved higher levels of education than most other Canadian RNs.

Readiness for RN Prescribing

Prior to initiating discussion regarding a new practice, one must determine if those involved, and most affected by the proposed change, are ready to pursue the new practice. The readiness of respondents for RN prescribing was conceptualized in terms of the value or importance each individual RN places on the practice of RN prescribing, confidence in his/her clinical skills and abilities, and his/her willingness to obtain further credentials in order to prescribe. RNs must see "value" in prescribing in terms of their practice and the improved care they could give to their patients, they must have "confidence" in their clinical skills and abilities which generally comes with experience, and they must be "willing" to pursue additional education in order to prescribe. These attributes of readiness were chosen, as they were most similar to the UK requirements for RN prescribing where RNs are chosen or choose to be RN prescribers based on their ability to study at the degree level, possessing a minimum of three years nursing experience, whether they maintain a position that requires them to prescribe and having the sponsorship of an independent prescriber (NMC, 2006).

Although numerous studies on RN prescribing have been conducted in the UK over the past 15 years, there is currently no literature available examining RNs' readiness for RN prescribing. The outcomes of RN prescribing for patients, RNs and other members of the healthcare team have been described and the views of patients, physicians and RNs of RN prescribing ascertained (Avery, et al., 2004; Carey & Courtenay, 2008; Cooper, et al., 2008; Courtenay, 2008; Courtenay, et al., 2007b). The effectiveness of RN prescribing has also been discussed, often in relation to nursing specialties such as dermatology (Carey, Stenner & Courtenay, 2010a), diabetes (Courtenay, et al., 2010), rheumatology (Berry, et al., 2008) or pain management (Stenner & Courtenay, 2008b). While not specifically addressing readiness for RN prescribing, researchers in the UK have explored why RN prescribers decided to undertake RN prescribing training (Bradley, et al., 2005). Bradley, et al. (2005), in a qualitative study, found that the majority of the respondents completed the training because they felt it would advance their practice, allow them to work autonomously and improve patient care. Respondents to the present study saw value in RN prescribing in terms of benefits to themselves and patients with diabetes, similar to the reasons of the respondents in Bradley, et al's (2005) study. The effectiveness of RN prescribing for patients with diabetes may be duplicated in Canada, as almost three-quarters of the respondents to the present study were ready to prescribe.

Value

Value ascribed to the practice of RN prescribing by the individual RN is the potential positive outcome, related to RN prescribing, that each individual RN perceives for both her/himself and his/her patients. Respondents felt there would be an increase in patient satisfaction and compliance and a decrease in the number of visits to health care providers as a result of RN prescribing. An overwhelming number of respondents (84.6%) perceived value in

this practice and thought there would be a positive impact on patient care and an increased accessibility to care and medication prescriptions for patients.

The findings related to the anticipated value of RN prescribing are similar to those of previous studies conducted to determine the benefits of RN prescribing. Courtenay and Carey (2008b) conducted a study of RN prescribers in the UK, and found that the participants felt they were able to provide better care for their patients due to improved use of their nursing skills, increased access to medication and improved quality of care for patients with diabetes. The National Independent Evaluation of the Nurse and Midwife Prescribing Initiative studied RN prescribing from a service view, evaluated the outcomes of RN prescribing in terms of patient benefits, safety and satisfaction. It also examined the views of stakeholders involved with RN prescribing (Drennan, et al., 2011). Patients had increased levels of satisfaction and intended to be more compliant with medication as a result of the experience with a RN prescriber (Drennan, et. al., 2011). The results of the evaluation survey did not clarify how or why the patients would be more compliant. The results of previous studies indicate that increased compliance may be due to the non-medical interaction between the RN and the patient, and the patient's participation in the decision making process (Courtenay, Carey, Stenner, Lawton & Peters, 2011).

Confidence

For RNs to be ready for RN prescribing, they must be confident in their clinical skills and abilities in order to pursue this practice. Almost all respondents (94.8%) were confident in their clinical skills and abilities. These skills included history taking, physical examinations, interpreting laboratory and diagnostic test results, and having a strong understanding of diabetes as it relates to medications. The majority of respondents were confident in their understanding of pharmacology, and in their ability to provide patients with education and preventative healthcare advice regarding medical products. The average age of respondents was 46.2 years.

According to Benner's Novice to Expert theory, one might expect high levels of confidence in clinical skills and abilities in RNs who have been practicing nursing for many years.

There was a significant correlation between value and confidence in the present study. Respondents who perceived value in RN prescribing were also very confident in their clinical skills and abilities in their area of expertise. Unfortunately, the literature available regarding RN prescribing and confidence was restricted to the confidence RNs feel following the RN prescribing training. Based on current findings, it is possible to surmise that RNs who are confident in their area of practice and have gained extensive knowledge through their experience are likely to be more aware of the medications that are needed. One respondent in the present study stated that RNs know insulin as well as the MD's if not better and felt it was waste of time trying to get prescriptions signed by the physician.

Respondents who indicated that they were not confident in their knowledge, skills and abilities, also had less confidence in their understanding of pharmacology in their area of practice. Four respondents indicated that they were not confident taking a history from a patient, doing a physical exam, interpreting test results or integrating appropriate non-pharmacological interventions in to the plan of care. This is somewhat concerning as these are basic nursing skills.

Willingness

In this study, 83.3% of the respondents were willing to obtain the needed education/credentials to prescribe. There was a strong positive correlation between confidence and willingness in the present study. Respondents who had high levels of confidence also had high levels of willingness to pursue additional education for RN prescribing. Not only did respondents overall have high levels of confidence in their understanding of pharmacology and ability to provide education regarding medications, but over 80% indicated that they supported

RN prescribing, and felt that the practice would have positive benefits for the nursing profession. There is no literature indicating the percentage of RNs in the UK who choose to pursue RN prescribing versus those who do not choose to pursue it.

Confidence and willingness were also strongly correlated with value, suggesting that respondents who are confident in their clinical skills and abilities are willing to pursue additional qualifications in order to prescribe. Initially, it was thought that confidence mediated the relationship between value and willingness but results show the correlation between value and willingness was higher than the correlation between value and confidence and confidence and willingness. This indicates that confidence is only a partial mediator. The relationship between value and willingness suggests that RNs who see the value in the practice of RN prescribing are willing to pursue additional qualifications in order to provide additional care. Almost three-quarters (74.2%) of respondents possessed all three attributes of readiness suggesting they are "ready" for RN prescribing.

The concept of readiness is based on the three variables of value, confidence and willingness. Does this practice have value for the individual RN, the patient and the Canadian healthcare system? Respondents in this study see the potential value of RN prescribing for the individual RN, patients and the Canadian healthcare system as 84.6% of the respondents perceived value in this practice. Previous studies in the UK regarding the benefits of RN prescribing suggest RN prescribing may have the value to patients, RNs and the healthcare system in Canada.

The second variable of readiness is confidence. Do individual RNs have the confidence in their clinical skills and abilities to become RN prescribers? For RN prescribing to be undertaken, RNs must be confident in their skills and abilities in order to pursue this practice. Almost all

respondents (94.8%) were confident in their clinical skills and abilities, suggesting the practice of RN prescribing can be initiated effectively.

The final variable in the concept of readiness is willingness. Are individual RNs willing to obtain further credentials to become RN prescribers? Over 83% of the respondents in this study were willing to obtain the necessary credentials in order to prescribe. In the conceptual model, each individual respondent (RN) must possess all three attributes of readiness (value, confidence, and willingness) to be "ready" for RN prescribing. Almost three-quarters (74.2%) of the respondents possessed all three attributes of readiness, suggesting they are "ready" for RN prescribing.

Age of Respondents

Based on the literature, it was hypothesized that older, and therefore more experienced nurses, would have higher levels of confidence. Benner's Novice to Expert theory (1982) is based on the Dreyfuss Model of Skill Acquisition, in which there are five levels of proficiency in the development of a skill. In nursing, the first level is the "beginner" and the final level is the "expert". Beginner nurses know the basics of nursing and learn skills through experience. The expert nurse uses past experience and intuition, and has the ability to focus on the problem without wasting time on other possibilities (Benner, 1982). In an empirical, descriptive study in Australia, the cues that novice and expert nurses observed during their care were compared. Although both groups picked up cues, expert nurses picked up more cues, clustered them and were able to discern what was important (Hoffman, Aiken & Duffield, 2009). In the present study, we found that there was no difference in the ages of RNs who are ready to prescribe compared to those who are not ready to prescribe. In retrospect, it would have been more appropriate to compare the number of years each respondent had in providing care for patients with diabetes and the level of confidence to determine if there was a relationship.

In December 2010, the Canadian Institute for Health Information (CIHI) published "Regulated Nurses: Canadian Trends 2005 to 2009" (CIHI, 2010). The document followed the trends of Registered Nurses (includes RNs and NPs) in the previous five years. According to CIHI, the average age of RNs working across Canada is 46.5 years of age and the average age of RNs working in community health is 47.1 years of age. The average age of the respondents was 46.2 years of age, which is similar to the national average, therefore the results of the survey are representative of the general nursing population in terms of age. Interestingly, Bradley, et al. (2005) found the average age of RNs entering RN prescribing training was 41 years, with a range of 29-59 years. This is similar to the age and range of respondents in this study.

Education of Respondents

Education levels were obtained to describe the sample and determine if there was a relationship between the respondent's education levels and whether she/he valued RN prescribing, was confident about RN prescribing, and was willing to pursue necessary credentials to prescribe. No relationship was found between either of the education variables and the factors comprising readiness. The average age of respondents was 46.2 years of age, and assuming each respondent had numerous years of experience, the respondents to the questionnaire would all be expert nurses according to Benner's (1982) Novice to Expert theory. The percentage of respondents with a diploma was 37.1% compared to the national proportion of 60.1% of RNs with a diploma (CIHI, 2010). The percentage of RNs in Canada with a degree is 36.9% while the percentage of respondents with a degree was 55.5% (CIHI, 2010). The percentage of RNs, including NPs, across Canada with a graduate or post-graduate degree is 3.2% (CIHI, 2010). Of the 70 respondents in this study, 14.3% had a graduate (12.9%) or post-graduate degree (1.4%). The respondents in this study were not representative of the general nursing population in Canada in that they were more highly educated. It should be noted that all respondents worked in a

specific nursing area, whereas the CIHI statistics are from all nurses across Canada, regardless of the area of employment.

In a study by Bradley et al. (2005), 44% of the RNs entering RN prescribing training in the UK had at least a degree, which is a higher proportion than in the national average of RNs with a degree in Canada (36.9%)(CIHI, 2010) and lower proportion than in the respondents of the readiness study (55.5%). Courtenay et al. (2007b) found that over half the RNs in their study had obtained a nursing degree (55.4%). This is similar to the respondents' education levels from the survey in the present study. The education levels of the RNs who participated in the National Independent Evaluation of the Nurse and Midwife Prescribing Initiative in Ireland, on which the survey was based, had higher levels of education compared to respondents' levels of education in the present study and in Bradley et al.'s study. Almost one quarter of participants in the National Independent Evaluation of the Nurse and Midwife Prescribing Initiative had obtained their bachelor's degree and almost half of participants had obtained their master's degree (55.5%) (Drennan et al., 2010). This is much different to the number of respondents who had obtained a master's degree in the present study (12.9%). These differences may be due to the educational requirements for RN prescribers in the UK and the time span between the two UK studies conducted by Bradley et al. and Drennan et al. The CIHI statistics are from all RNs across Canada, regardless of area of employment, therefore the levels of education of respondents in the present study are not a good representation of the general nursing population in Canada.

Practice Implications

In order to implement role changes or changes to practice, the individuals whose roles will be affected must be ready to make that change. Based on the results of this study, three-quarters of the RNs who provide care to patients with diabetes in a primary health care setting, are ready to take on the new role of RN prescribing. RN prescribing has the potential to improve

access to care and reduce wait times by allowing: RNs with prescribing training to monitor and prescribe for patients with chronic conditions and associated co-morbidities, NPs to diagnose, treat and prescribe for new patients, and physicians care for patients who require more complex care.

RN prescribing has been initiated in a number of countries to make effective use of healthcare human resources, improve patient access to care and medication (Department of Health, 2006), reduce physician workload, and provide improved services to patients (Courtenay & Carey, 2008c). RNs in Canada have many roles. An RN has a basic nursing education, whether a diploma or degree. The Nurse Practitioner (NP) or Advanced Practice Nurse (APN) requires a graduate degree in some provinces and territories in Canada. NPs in Ontario must have a graduate degree, complete an additional full year of seven courses and an integrative practicum or complete a Nurse Practitioner certificate program. NPs can autonomously diagnose, order and interpret tests and results, and prescribe procedures and medications within a clearly defined range of tests and medications (CNA, 2008). In Canada, there is a clear delineation between the two RN roles, and the same delimitation would need to continue between RN, RN prescribers and NPs to ensure the most effective use of healthcare human resources and prevent the overlapping of roles. This encourages health care consumers to seek care from the most appropriate individual in a timely manner. In the UK, Nurse Supplementary Prescribers (NSP) and Nurse Independent Prescribers (NIP) have the same training involving 27 days of classroom content and 12 days of supervised clinical placement (Courtenay et al., 2007a). NIPs are responsible for the assessment, diagnosis and management of their client (Latter, et al., 2007a), and can prescribe any licensed medication for any condition in their area of competence (Courtenay, 2008). NIPs and NPs are very similar in their roles as both can assess, diagnose and prescribe autonomously, but NIPs can only do so within their area of competence.

By basing the role of the RN prescriber in Canada on the role of the NSP in the UK, RN prescribers would work under an independent prescriber, such as an NP or physician. RN prescribers would prescribe specific medications for specific chronic conditions, such as diabetes, pain control or dermatological conditions, that have been agreed to by the RN, the patient and the independent prescriber. This allows the RN prescriber to concentrate on the management and prescribing of established patients, while the independent prescriber focuses on newly diagnosed or more complicated patients.

Participants in the CNA assessment of RN prescribing suggested that physicians might express concerns because of the RN role change, feel threatened by the RN role, and be unaware of the education RNs have received prior to prescribing (MacKenzie, 2009). Courtenay and Berry (2007) surveyed 30 physicians and 31 RN prescribers on what they perceived as the main advantages and disadvantages regarding RN prescribing. The main disadvantages of RN prescribing were decreased contact with the physician, a threat to the physician role and a blurring of the boundaries between physicians and RN prescribers. The RNs' limited skill set was a concern to the participants of this study. Courtenay and Carey (2009) conducted a qualitative study in the UK to explore physicians' views on RN prescribing in a children's hospital. The findings were divided into the themes of benefits and concerns. Increased continuity of care, increased access to medication and the ability to respond to patients more effectively were benefits of RN prescribing as seen by physicians. Participants of the study expressed concerns regarding the selection of RNs for RN prescribing training as the physicians needed to trust the RNs and have confidence in the ability of the RN wanting to be a prescriber. What is more, the participants felt the RN prescribing training program was unrealistic in the areas of physical assessment and diagnosis. Another concern was who was ultimately responsible for the patient, as the physicians felt they were (Courtenay & Carey, 2009).

Participants in the CNA assessment of RN prescribing suggested physicians may welcome RN prescribing to tend to patients who are not acutely ill. In a qualitative study in the UK, Avery et al. (2004) interviewed 12 physicians via telephone. Participants cited increased efficiency of care, decreased waiting time for patients, and improved information regarding medication for patients.

All members of the inter-professional health care team would need to be aware of the scopes of practice, clinical skills and abilities of all members, and who is ultimately responsible for the care of the patient. RN prescribing would allow physicians to concentrate on acutely ill patients and allow NPs to concentrate on less acutely ill patients. RN prescribers modeled after the NSP role in the UK, would work with an independent prescriber such as an NP or physician, and care for chronically ill patients in their area of competence. Pharmacists would accept prescriptions from all three prescribers. This would make the most efficient use of healthcare human resources and allow all patients to be seen in a timely manner, while having the ability to choose whom they would like to provide care.

While there are many potential benefits for RN prescribing in Canada, there are also many concerns regarding introducing the new practice. Information regarding the scope of the new role, responsibility for the patient, and education obtained by RN prescribers would need to be discussed and determined by all members of the healthcare system prior to initiating this practice.

Political Implications

RN prescribing does not currently exist in Canada in the same form as it does in the UK. The evolution of RN prescribing and the required training in the UK, has taken place over almost two decades and has grown from small pilot sites to RNs prescribing independently in their areas of practice. The initiation of RN prescribing in Canada would require changes in policies and legislation on many levels. Each province and territory would need to assess the interest of

members of the respective national and provincial bodies in RN prescribing. Is there a need for RN prescribing? How would RN prescribing benefit patients? What are the implications and scope of practice for RNs who prescribe? How would RN prescribing training programs be implemented and candidates competency determined? The readiness of healthcare providers must also be determined. How would RN prescribing fit the business plan? Would RN prescribing make more efficient use of healthcare human resources? These questions involve much discussion and research. Once a province or territory decides to implement RN prescribing, changes to existing policies and laws are required on many levels to accommodate this new practice. Changes to existing policies in each province or territory would include the scope of practice of RN prescribers, such as a list of conditions and medications an RN could prescribe for. These parameters may change with the evolution of RN prescribing as has occurred in the UK and other countries.

Research Implications

In this study, a small sample of RNs indicated that they are ready to prescribe medications for patients with diabetes but is the general population ready for RN prescribing? Each provincial and territorial nursing body would need to discuss with its members to determine if there is interest in RN prescribing. If there were interest from the members for RN prescribing, then more research would be necessary to determine the views of patients, other healthcare professionals and RNs themselves.

In Ireland, a needs analysis was completed which included the wait times of patients for medications and care from a physician, the delays for RNs waiting for prescriptions to be signed by a physician, the delays caused by physician emergencies, the support of patients for RN prescribing, and the possibility that RN prescribing would enhance patient compliance and outcomes. Based on the results of the needs assessment, legislation in Ireland was changed to

allow RNs to prescribe under specific conditions (Guiding Framework for the Implementation of Nurse and Midwife Prescribing in Ireland, 2008). If a needs assessment in Canada suggested that RN prescribing has a place in the healthcare system, changes to the scopes of practice and legislation would follow. The content of education and training programs in other countries would need to be studied as would expected outcomes for the successful participant and the qualification received to incorporate into nursing practice in Canada.

RN prescribing allows healthcare dollars to be used more effectively by maximizing the potential competencies of RNs (Department of Health, 2006). RNs can autonomously monitor disease processes and prescribe medication for chronic conditions using a Clinical Management Plan (CMP), freeing up time for NPs and physicians, and potentially saving healthcare dollars.

There are many costs that would be associated with the initiation of RN prescribing. The implementation of a training program would involve program planning, educators, equipment, replacement staff for those in RN prescribing training, and the number of potential candidates being trained. The payor for extra training in Canada would have to be determined, although most education at present is the responsibility of the RN. If the organization requiring RN prescribing decides to pay for training, the associated costs would have to be compared to the savings that occur with the new practice of RN prescribing. The number of patients receiving care from a RN prescriber would need to be compared to the cost of care received from a NP or physician, to determine the potential financial savings. Unfortunately, these savings may not be noticeable for a few years.

These studies would need to be conducted at a variety of healthcare facilities such as primary, tertiary and acute care settings. Studies in the UK suggest that RNs are happy with the increase in autonomy and responsibility (Courtenay, 2007). RN prescribers state they have increased confidence levels (Bradley & Nolan, 2007) as well as increased job satisfaction as a

result of increased autonomy, better use of clinical skills and providing complete care for patients (Stenner & Courtenay, 2008b). At present, there is no research related to cost-effectiveness of RN prescribing.

Research has been done on the benefits of RN prescribing for patients, RNs and other stakeholders; the satisfaction levels of patients, RN prescribers and other stakeholders regarding RN prescribing; and the effect of RN prescribing on chronic conditions such as rheumatology, diabetes, pain and dermatological conditions. No research to date has been conducted regarding the process of implementing RN prescribing. The Office of the Nursing Services Director in Ireland, created the "Guiding Framework for the Introduction of Nurse and Midwife Prescribing in Ireland" in order to assist patients, nurses and services as they review their needs and map out new ways of working in delivering healthcare (Guiding Framework for the Implementation of Nurse and Midwife Prescribing in Ireland, 2008).

Educational Implications

In order to implement RN prescribing in Canada, the role of an RN prescriber will need to be clearly defined. Only then can the educational requirements for RN prescribing be determined. In the UK, RNs must be able to study at the first-degree or baccalaureate level (NMC, 2006) but RN prescribing training is not included in the generic RN education. In Canada, the entry to practice in most provinces or territories is a baccalaureate. The exceptions are Manitoba, where the entry to practice will be a baccalaureate in 2013, and Quebec, where presently a nursing diploma is required (CIHI, 2010). Although each province has separate regulatory bodies, the Certified Diabetes Educator (CDE) and Canadian Nurses Association (CNA) certifications are at the national level.

The Canadian Diabetes Educator Certification Board developed and maintains the CDE certification in order for health professionals to be recognized as diabetes specialists and ensures

all candidates meet the same practice standards in diabetes care and education. Candidates obtain the certification when they have successfully completed an examination offered yearly and must renew the designation every five years (Canadian Diabetes Educator Certification Board (CDECB), 2011). CNA certifications are similar to the CDE; CNA certification examinations are voluntary, offered yearly across Canada, and must be maintained though educational endeavours or practice every five years. The certification ensures that all candidates meet the same practice standards in a nursing specialty (CNA, 2011). At present, the CNA does not offer a certification in diabetes management.

In order to write the CNA or CDE examination, candidates must meet eligibility criteria, similar to the RN prescribing training in the UK. Candidates are required to be registered as a health professional for the CDE and as an RN for the CNA certification, completion of a specified number of hours in a set time frame in the diabetes or the nursing specialty/area of nursing practice and a letter of verification from a supervisor or clinical specialist in the specialty/area of nursing practice for the CNA examination (CDECB, 2011; CNA, 2011).

Most provinces have or are moving towards a baccalaureate as the entry to practice in nursing. RN prescribers in the UK must have at least three years of experience in nursing prior to prescribing training therefore undergraduate nursing programs would not include prescribing training. This suggests that RN prescribing training would be at the graduate or post-baccalaureate level, similar to the NP and APN role, or at the certification level.

Administrative Implications

The practice of RN prescribing presents many new questions regarding liability and responsibility for individual RNs. At present, the scope of practice for RNs does not include RN prescribing in the same manner as it does in the UK or other countries. Prior to introducing RN

prescribing, the extent of RN prescribing would need to be determined. In what specialty areas would RNs prescribe? How much autonomy would they have?

Respondents in the present study identified liability as an issue for RN prescribing. In the UK, RN prescribers are expected to carry additional liability insurance due to changes such that the insurance of the independent prescriber no longer covers RN prescribing. The additional insurance is similar to that offered by the Registered Nurses Association of Ontario (RNAO). As the scope of practice changes for RNs, changes are required to laws and insurance coverage regarding liabilities.

Manitoba is progressing in making RN prescribing a reality. It is possible that all other provinces will follow suit as the practice proves to use health human resources more efficiently, patients receive access to care and medication more rapidly, and physicians are able to concentrate on more critically ill patients while RN prescribers care for patients with chronic conditions.

Limitations

There are several limitations to this study. The survey used in the present study was based on a survey, used by Drennan, et al. (2009), to evaluate patient and nurse prescriber satisfaction in Ireland two years after the practice of RN prescribing was initiated. As a result, respondents were asked to complete a questionnaire on a subject about which they had little or no previous knowledge since RN prescribing is not current practice in Canada and the clarity of the survey for the respondents is not known. The survey used concepts and a conceptual framework that were not validated, nor were the psychometric properties of the tool known. Although the inclusion criteria for the respondents were specific to RNs caring patients with diabetes, the questions were not specific to RNs caring for patients with diabetes. Many respondents commented that their answers were specific to their area of expertise.

Respondents were asked to self-report on the statements in the survey, therefore there is no way to confirm results. It is not known if the survey questions were understood by the participants, or if the questions were leading.

Respondents to this study were not representative of the general nursing population in Canada, as they were more highly educated. Despite these limitations, there was a fair response to the study across Canada. RNs are ready to expand their role to help individuals with diabetes access care, while lessening the demand on Canada's healthcare system. The study results suggest more research is necessary to advance RN prescribing in Canada.

General Conclusions

RNs who provide care for patients with diabetes in a primary health care setting are ready for prescribing, see value in prescribing medication and are confident in their ability to do so. The majority of respondents perceived value in RN prescribing in terms of more efficient care for their patients, were confident in their clinical skills and abilities to prescribe, and were willing to obtain further credentials in order to prescribe. Age and level of education were not factors in the level of readiness.

RN prescribing would allow physicians and NPs to concentrate on the care of newly diagnosed patients and more complex cases, while RN prescribers would provide management for patients with chronic conditions. Research on the new RN prescribing role includes the level of interest of RNs to incorporate this role into their practice, in the provincial and territorial nursing bodies across Canada. A needs assessment with key stakeholders in the healthcare system, such as RNs, physicians and patients, would determine if there was a potential role for RN prescribing. Educational programs for RN prescribing training would be initiated at the graduate level or certification level. Following these steps, is the change in policy and legislation to enable RNs to prescribe.

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Appendices

Appendix A: Letter of Consent

December 1, 2010

Title of the study: What is the readiness of RNs who provide care to patients with diabetes in a primary health care setting for RN prescribing?

Invitation to Participate: You are invited to participate in the above-mentioned research study conducted by Shelley MacKenzie, a Masters of Science (Nursing) student at the University of Ottawa, School of Nursing as part of her thesis. You are being asked to share your thoughts on the readiness of registered nurses, who provide care for patients with diabetes, in a primary health care setting, for RN prescribing.

Background: In the UK, registered nurse prescribing has been practiced since 1994. RN prescribers in the UK are able to monitor and prescribe for their patients in their area of expertise, providing continuity of care in a holistic manner.

Presently, only Nurse Practitioners prescribe in Canada. The purpose of this study is to collect information about whether nurses see value in RN prescribing, the confidence RNs have in their clinical practice and their willingness to obtain any additional required credentials to prescribe. From this research, we hope to learn the readiness of RNs who provide care for patients with diabetes in a primary health care setting for RN prescribing.

Participation: Participation is voluntary. If you wish to participate, please complete the attached survey and return it in the self-addressed stamped envelope. There are twenty-two questions about your thoughts regarding RN prescribing related to your practice. The survey should take you approximately 5-10 minutes to complete. You do not have to answer any questions you do not want to answer.

Benefits: There are no benefits to in participating in the study. The information you provide is important in understanding nurses' views on registered nurse prescribing in Canada.

Confidentiality and Anonymity: The information that you share will remain strictly confidential and will be used solely for the purposes of this research. The only people who will have access to the research data are Shelley MacKenzie, Lisa Ashley, Kirsten Woodend, and Christine McPherson. Results will be published in pooled (aggregate) format. Anonymity is guaranteed since you are not being asked to provide your name or any personal information.

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Conservation of data: The surveys collected will be the property of Shelley MacKenzie. The anonymous data will be kept for a period of 5 years in a locked cabinet in the Nursing Best Practice Unit, from December 1, 2010 until December 1, 2015, at which time it will be destroyed.

If you have any questions or require more information about the study itself, you may contact the researcher or her supervisors at the number mentioned herein.

If you have any questions with regards to ethical conduct of this study, you may contact the Protocol Office for Ethics in Research, University of Ottawa.
Please keep this form for your records.

Thank you for your time and consideration.

Appendix B: Study Questionnaire

1) Nurses should be allowed to prescribe medications.
1) Strongly Disagree
2) Disagree
3) No opinion
4) Agree
5) Strongly Agree

2) Nurse prescribing would have a positive impact on patient/client care.
1) Strongly Disagree
2) Disagree
3) No opinion
4) Agree
5) Strongly Agree

3) Nurse prescribing would result in financial savings
1) Strongly Disagree
2) Disagree
3) No opinion
4) Agree
5) Strongly Agree

4) Nurse prescribing would enhance patient/client compliance.
1) Strongly Disagree
2) Disagree
3) No opinion
4) Agree
5) Strongly Agree

5) There is a need for nurse prescribers who provide care for patients/clients with diabetes.
1) Strongly Disagree
2) Disagree
3) No opinion
4) Agree
5) Strongly Agree

6) The introduction of the nurse prescribing initiative would reduce the number of health care professionals a patient/client must interact with.
1) Strongly Disagree
2) Disagree
3) No opinion
4) Agree
5) Strongly Agree

7) The introduction of nurse prescribing would enable patients/clients to access medication quicker.
   1) Strongly Disagree
   2) Disagree
   3) No opinion
   4) Agree
   5) Strongly Agree

8) The introduction of the nurse prescribing initiative would increase patient/client satisfaction levels.
   1) Strongly Disagree
   2) Disagree
   3) No opinion
   4) Agree
   5) Strongly Agree

9) Nurse prescribing would reduce the need for patients/clients with long-term illnesses to return to see their doctor as frequently as previously.
   1) Strongly Disagree
   2) Disagree
   3) No opinion
   4) Agree
   5) Strongly Agree

10) I have a good understanding of the policies at my workplace in relation to medication error/near miss reporting.
   1) Strongly Disagree /Very poor
   2) Disagree / Poor
   3) No opinion
   4) Agree / Good
   5) Strongly Agree/Very good

11) I am confident in my ability to take a history from a patient/client.
   1) Strongly Disagree / Very poor
   2) Disagree / Poor
   3) No opinion
   4) Agree/ Good
   5) Strongly Agree / Very good

12) I am confident in my ability to undertake a physical exam from a patient/client.
   1) Strongly Disagree Very poor
   2) Disagree / Poor
   3) No opinion
   4) Agree /Good
   5) Strongly Agree /Very good

13) I am confident in my ability to interpret laboratory and diagnostic tests.

1) Strongly Disagree / Very poor
2) Disagree / Poor
3) No opinion
4) Agree / Good
5) Strongly Agree / Very good

14) I am confident in my ability to integrate appropriate non-pharmacological interventions with a plan of care.

1) Strongly Disagree / Very poor
2) Disagree / Poor
3) No opinion
4) Agree / Good
5) Strongly Agree / Very good

15) I am confident in my ability to provide patients/clients with education and preventative healthcare advice regarding medicinal products.

1) Strongly Disagree / Very poor
2) Disagree / Poor
3) No opinion
4) Agree / Good
5) Strongly Agree / Very good

16) I am confident in my ability to provide advice to patients/clients about the side effects of medication.

1) Strongly Disagree / Very poor
2) Disagree / Poor
3) No opinion
4) Agree / Good
5) Strongly Agree/ Very good

17) I have a strong understanding of pharmacology.

1) Strongly Disagree / Very poor
2) Disagree / Poor
3) No opinion
4) Agree / Good
5) Strongly Agree / Very good

18) I would welcome the responsibility that prescribing brings.

1) Strongly Disagree
2) Disagree
3) No opinion
4) Agree
5) Strongly Agree

19) I believe that the ability to prescribe would improve the quality of care I am able to give my patients/clients.

1) Strongly Disagree
2) Disagree
3) No opinion
4) Agree
5) Strongly Agree

20) If I were to prescribe, I would require further education in pharmacology.

1) Strongly Disagree
2) Disagree
3) No opinion
4) Agree
5) Strongly Agree

21) I support the nurse prescribing initiative.

1) Strongly Disagree
2) Disagree
3) No opinion
4) Agree
5) Strongly Agree

22) The introduction of nurse prescribing would have positive benefits for the nursing profession.

1) Strongly Disagree
2) Disagree
3) No opinion
4) Agree
5) Strongly Agree

23) The prescribing of medicinal products would enhance the nursing profession.

1) Strongly Disagree
2) Disagree
3) No opinion
4) Agree
5) Strongly Agree

24) Do you currently work,

Full time? ❑ Part time? ❑

If part time, what number of hours do you work per week?

Up to 10 hours ❑

Between 10 and 20 hours ❑ 21 or more hours ❑

25) How many hours per week do you spend providing care for patients with type 2 diabetes?

Up to 10 hours per week ❑
Between 10 and 20 hours ❑
21 or more hours ❑

26) Do you work in a primary health care setting? Yes ❑ No ❑

27) What is your age? _____years

28) Please indicate the highest level of educational/academic qualification you have obtained:

Diploma	Degree	CNA certification	CDE certification	Masters	PhD

29) What type of service do you provide for people with diabetes? (Please tick all that apply)

Community Health Centre ❑
Specialized Outpatient Clinic ❑
General Practice Clinic ❑

30) On average, how often during an 8-hour shift do you need to consult a physician regarding changes in orders for a client?

0 ❑ 2 ❑

1 ❑ ≥3 ❑