CONTEXT AND BEHAVIOURAL INTENTION

THE ROLE OF ATTITUDES, SUBJECTIVE NORMS, PERCEIVED BEHAVIOURAL CONTROL, AND CONTEXT IN NURSES' BEHAVIOURAL INTENTIONS

By

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ABSTRACT

Background: Hospitalization is stressful, and anxiety is a common experience among hospital inpatients. Nurses who use a standardized patient anxiety assessment tool can improve their recognition of patient anxiety and its management. Implementing evidence-informed practice changes among nurses is a challenge, and there is little compelling evidence on how best to proceed with such implementations. Two theoretical frameworks that have shown promise for designing effective interventions among nurses are the Theory of Planned Behaviour (TPB), which focuses on individual determinants of behaviour, and Promoting Action on Research in Health Services (PARiHS), which focuses on the nature of the evidence, the context in which change is to take place, and the type of facilitation used to induce change. The current study attempts to fill a gap in our understanding of the relationship between the context of practice and nurses' intention to adopt evidence-informed practices.

Objective: The purpose of this study was to investigate whether adding context among those variables derived from the TPB enhances prediction of nurses' behavioural intentions to adopt an evidence-informed practice change.

Methods: Following an educational intervention aimed at teaching nurses the use of a tool for assessing patient anxiety, 174 participants (70% of those attending the educational classes) completed a survey measuring (1) attitude, (2) subjective norm, (3) perceived behavioural control, (4) context, and (5) intention to perform anxiety assessments.

Results: Intention to perform anxiety assessments on patients was greater for nurses who (a) perceived that they had control over performing anxiety assessments, (b) had a positive attitude toward providing such assessments, and (c) perceived their work context to be positive.

Conclusion: This study adds to our understanding of the variables influencing nurses' adoption of evidence-informed practices. Context, defined in terms of leadership, culture, and evaluation, appears to influence individual adoption of evidence-based practices. These results suggest that the success of attempts to encourage health professionals to adopt evidence-based practices will be enhanced when contextual variables important to the success of the change intervention are put into place. Future research can build on the current study by seeking to replicate the findings reported here and expanding the list of contextual variables investigated.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

PREFACE

Context of the Thesis

Approximately 16 million Canadians live with chronic illnesses, and demographic trends show a rapidly growing elderly population, longer life expectancies, and an increased prevalence of chronic diseases and disabilities among baby boomers (Interprofessional Care Steering Committee, 2007). Acute care hospitals face increasing pressures to provide more timely services while at the same time working with finite human and financial resources. Efforts to improve the efficiency of service delivery must be balanced with efforts to maintain or improve the quality of services received by patients and their caregivers.

Health care organizations use patient satisfaction surveys, among other assessments, to evaluate the quality of the services they deliver (Brown, Sandoval, Murray, & Boissonnault, 2008). However, as is true for many hospitals across the health care system, achieving high patient satisfaction scores is quite challenging (Brown, Alikhan, et al., 2008). For example, one acute care teaching hospital in southern Ontario revealed that although 93% of their patients rated their overall care experience as "excellent" or "very good," satisfaction with the item "nurses discussed my anxieties/fears" was at the 53% level, suggesting an opportunity for quality improvement.

Changing health care providers' behaviour to increase their attention and effective response to patients' anxiety should decrease patient anxiety and increase patient satisfaction with the overall quality of the care provided. The research conducted for this thesis was part of a HealthForceOntario-funded initiative, the *Interprofessional*

Collaborative Assessment and Management of Illness-Related Anxiety (iCAMIRA) project. The iCAMIRA project was designed to develop, deliver, and evaluate an interprofessional educational initiative aimed at teaching health care providers to adopt a standard approach to assessing and managing hospitalized patients' anxiety. The iCAMIRA project consisted of four evaluation phases:

Phase 1: The Theory of Planned Behaviour (TPB) was used as a guide to assess nurses' attitudes, beliefs and knowledge about performing anxiety assessments on hospitalized patients and managing anxious patients. This information was used to design an educational intervention and to pilot test a survey measure of nurses' intentions to use a patient anxiety assessment tool in their daily practice.

Phase 2: As part of their yearly education plan, nurses on the seven study units were required to participate in an educational intervention to teach them to recognize the symptoms of patient anxiety using a standardized assessment tool. The educational intervention was designed to provide them with opportunities to practice managing anxious patients. This intervention consisted of completing a Web-based learning module and subsequently attending a standardized patient workshop. The effectiveness of the educational intervention was assessed through a survey that measured changes in nurses' attitudes, subjective norms, perceived behavioural control, and intention to use a patient anxiety assessment tool. The survey was administered before completion of the Web-based learning module and after the educational workshop.

Phase 3: To evaluate the effectiveness of the TPB-based intervention on nurses' practice, a medical record audit was undertaken to measure the frequency with which nurses performed patient anxiety assessments on patients one month before the start of the intervention and at a minimum of one and six months after all of the workshops were completed.

Phase 4: Following attendance at the standardized patient workshop and during the post-intervention survey an additional assessment was undertaken to measure nurses' perceptions of their work environment using a Context Assessment Index (CAI) (McCormack, McCarthy, Wright, Slater, & Coffey, 2009). This was done to explore the influence of context, beyond the TPB components of attitude, subjective norm, and perceived control, on nurses' behavioural intention to use anxiety assessment tools with their patients. The fourth phase of this initiative is the focus of this thesis.

Organization of the Thesis

The thesis is organized into five chapters. Chapter 1 provides information on the background and relevance of conducting this study, including a review of the literature. The theoretical framework for this research is then provided. The chapter concludes with an articulation of the study's aims and hypotheses. Chapter 2 presents the methods, including the study's design, setting, procedures, ethical considerations, and instrumentation associated with measurement of the independent and dependent variables. The data analysis strategies employed are presented in Chapter 3, the results are presented in Chapter 4, and a discussion of the results is presented in Chapter 5.

CHAPTER 1

INTRODUCTION

Purpose

The purpose of this study was to investigate whether the addition of context, as a variable, beyond those variables derived from the Theory of Planned Behaviour (TPB), enhances prediction of nurses' intentions to use an evidence-based practice tool for the assessment and monitoring of patient anxiety. To date, the literature related to the adoption of evidence-informed practice changes in nursing has consisted mainly of identifying barriers. Fewer studies have assessed strategies for breaking down these barriers or for guiding interventions to promote the implementation of evidence-informed practices. The lack of compelling evidence to help in choosing change intervention strategies is likely due, in large measure, to the absence of a strong theoretical base for much of this past research (Cohen, Tallia, Crabtree, & Young, 2005; Eccles, Grimshaw, Walker, Johnston, & Pitts, 2005; Foy et al., 2005; Shojania & Grimshaw, 2005; Stetler & Caramanica, 2007; Walker et al., 2003).

Researchers interested in understanding what happens when clinicians' try to use evidence in practice have looked to psychological and cognitive behavioural theories that explain the underlying factors associated with clinician behaviour (Eccles, et al., 2007; Eccles et al., 2005; Godin, Belanger-Gravel, Eccles, & Grimshaw, 2008). The TPB, rooted in behavioural psychology states that behaviour is best predicted by an individual's stated intention to act, which is determined by attitude, subjective norm, and perceived behavioral control (Ajzen, 1991). The TPB has been used to explain clinician

behaviour related to evidence-informed practices (Francis, et al., 2004; Perkins et al., 2007). While the TPB is a well-established and tested theory, generally (Ajzen, 2002; Armitage and Conner, 2001; Conner and Armitage, 1998), and more recently has gained much popularity among implementation researchers (Godin et al., 2008), at best the theory only accounts for 30% of the variation in intention to use evidence-informed practices (Eccles, Grimshaw et al., 2007; Eccles Johnston, et al., 2007). This suggests that improvement in the predictive value of the TPB for evidence-informed practice may be achieved through the identification and addition of one or more new factors to the theory.

Current debates within the literature on the implementation of evidence-informed practice have identified the environment or setting in which nurses practice as key to successful practice change among nurses (French, 2005; Cummings, Estabrooks, Midodzi, Wallin & Hayduck; 2007; Estabrooks, Midozi, Cummings & Wallin, 2007; McCormack, Kitson, Harvey, Rycroft-Malone, Titchen, & Seers, 2002; McCormack, et al., 2009; Meijers Janssen, Cummings, Wallin, Extabrooks, & Halfens, 2006; Pepler et al., 2005, 2006; Rycroft-Malone, 2008; Titler, 2007; Wallin, Estabrooks, Midodzi, & Cummings, 2006; Wallin, Ewald, Wikbald, Scott-Finlay& Arnetz, 2006). Context is one component of the environment that has been identified as impacting evidence-informed practice. However it is a concept that requires additional exploration and development to understand the mechanisms through which it may predict clinician behaviour and it is one factor that holds promise for significantly improving the predictive ability of TPB. The primary focus of this doctoral research is to explore if nurses' intention to use a newly introduced assessment tool for evaluating and monitoring patient anxiety can be enhanced

by considering the influence of context in addition to the variables derived from the TPB. The results of this study add to our understanding of the variables influencing nurses' adoption of evidence-informed practice changes. Such understanding will assist in developing, selecting, and optimizing targeted intervention strategies. Furthermore, testing theoretically derived relationships within implementation models advances the current state of implementation science and provides a foundation for further research.

The remainder of this chapter provides a background on the context of the current study, including a discussion of the evidence-informed practice change of focal interest here: performing anxiety assessments. A review of the literature on implementation of evidence-informed practice changes and the overall theoretical framework for the study is also provided. The chapter concludes with a presentation of the study's hypotheses.

Background

Assessing Illness-Related Anxiety

Experiencing illness and hospitalization is stressful on patients, and anxiety is a very typical occurrence among hospital inpatients (Sherbourne, Jackson, Meredith, Camp, & Wells, 1994). Anxiety as an emotion or a singular symptom is common and is distinguished from an anxiety disorder by its context, persistence, effect on function, and relationship to other psychiatric symptoms (American Psychiatric Association, 2000). It is assumed that when patients note that they are feeling anxious or comment on the response of health care providers to their anxiety, no clear distinction is being made between the symptom of anxiety as a normal response to the stress of hospitalization and the presence of an anxiety disorder. The scientific literature indicates that both are

common in inpatient settings. Prevalence reports for inpatients range from 20 to 80% depending on the setting, and instruments used and scoring cutoffs (Stoudemire, 1996). The prevalence of clinically diagnosed anxiety disorders, such as generalized anxiety disorder and panic disorder, in the medically ill is also high. They are estimated to occur in 15 to 66% of primary care patients depending on their medical diagnosis (Sherbourne et al., 1994).

Anxiety experienced by patients has been associated with their satisfaction with care (Bohachick, 1984) and increased postoperative pain (Lawlis, Selby, Hinnant, & McCoy, 1985) and may increase morbidity and mortality in vulnerable critical patients (Frazier et al., 2002). Early studies of anxiety among hospitalized patients measured the effect of anxiety on increased length of hospital stay (Devine & Cook, 1983; Mumford, Schlesinger, & Glass, 1982). With the increased pressure on hospital bed capacity, the impact of anxiety associated with increased length of stay has lessened; however, some studies have shown an increase in readmission rates (Saravay, Pollack, Steinberg, Weinschel, & Habert, 1996), persistence of anxiety post-discharge (Walker, Novack, Kaiser, Knight, & Oblinger, 1987), an increase in the costs of health care post-discharge (Creed et al., 2002; Simon, Showers, Blumenfield, Holden, & Wu, 1995), and significant impairment of health-related quality of life at follow-up (Creed et al., 2002). Anxiety has also been associated with the broader concepts of distress and emotional support (Institute of Medicine, 2004, 2007).

As patients and their caregivers respond to the practical demands of illness, the emotional needs of patients can be overlooked by the health care system, leading to

unfortunate immediate and long-term consequences (Weihs, Fisher, & Baird, 2002). Dealing with patients' suffering is a major cause of job stress for health care professionals (D'amour & Oandasan, 2005). Effective communication among providers, patients, and families is essential for reducing patient and family suffering and strain. However, both health professionals and patients have suggested that the communication skills of caregivers are underdeveloped (Zwarenstein, Reeves, & Perrier, 2005), especially with respect to communicating with anxious patients and the anxious families of patients (West, Rose, Verhoef, Spreng, & Bobey, 1998). The combination of patient anxiety and ineffective communication by health providers in trying to assuage this anxiety contributes to difficulties for patients' decision making (Deep, Griffith, & Wilson, 2008; Zupancic et al., 2002) and dissatisfaction among patients and their families (Campbell, Auerbach, & Kiesler, 2007). Fortunately, communication training enhances professionals' self-efficacy (Ammentorp, Sabroe, Kofoed, & Mainz, 2007) and may improve clinical outcomes (Zwarenstein et al., 2005).

We know that many interventions are available to non-psychiatric health professionals to help patients manage their anxiety. These range from simple enquiry and supportive discussion to providing information, teaching relaxation techniques, reducing anxiety-provoking influences (e.g., disturbed sleep, uncertainty, medication effects), enhancing family support, and referral to psychiatry (Gulanick & Myers, 2006). In acute care settings, there are many health professionals who can assist in managing patients with their anxiety (physicians, psychiatrists, social workers, chaplains); however, nurses,

as the largest group of health care providers, have a significant influence on patient outcomes and have access to patients 24 hours a day, 7 days per week.

Anxiety has been accepted as a nursing diagnosis since 1992 (Shuldham, Cunningham, Hiscock, & Luscombe, 1995). There is a large body of knowledge to guide nurses' assessment of and interventions for addressing patient anxiety (Bohachick, 1984; Devine & Cook, 1983; Lawlis et al., 1985; Manias, 2003; Moser, 2002; Motyka, Motyka, & Wsolek, 1997; Mumford et al., 1982; Sheldon, Swanson, Dolce, Marsh, & Summers, 2008; Teasdale, 1994). Regardless, the evidence suggests that the use of routine assessment for patient anxiety among nurses is low and that a lack of a standardized measurement instrument or common language for describing anxiety among patients may contribute to the current difficulties nurses face with the assessment of anxiety (Burman, McCabe, & Pepper, 2005; Frazier et al., 2002; Moser, 2002; Sheldon et al., 2008). Providing nurses with an evidence-informed standardized approach to assessing and managing patient anxiety is a first step to improving the quality of care experienced by patients.

In summary, anxiety experienced by patients as a result of their illness is common in acute care settings. The extent to which patients experience anxiety is effected by the type and quality of communication among and with team members and with patients and families. Nurses are well positioned to identify and effectively intervene to reduce patient anxiety; however, a lack of standardized assessment tools and knowledge about effective approaches to managing patient anxiety may hinder nurses' behaviours. I propose that developing a routine process of care for anxiety assessment and intervention for nurses is

a crucial first step in reducing patient anxiety and improving patient outcomes. Components of this process of care include a standardized anxiety assessment tool along with strategies to manage patient anxiety. However, we know from the broader knowledge translation literature that simply providing evidence-informed tools or guidelines to clinicians is insufficient to change behaviour.

Evidence-Informed Practice

The use of research evidence to guide practice has been a consistent theme in the nursing literature since the 1970s. Despite this long-standing interest, narrowing the gap between research evidence and clinical practice is viewed as one of the most persistent problems in delivering high-quality health care (Doran et al., 2007; Ploeg, Davies, Edwards, Gifford, & Miller, 2007). Initial studies measured the use of research evidence among individual nurses. For example, Brett (1987) surveyed 216 practicing nurses in small, medium and large hospitals to determine their adoption of fourteen nursing research findings that were formulated as part of the Conduct and Utilization of Research in Nursing (CURN) Project (1981-1982). The CURN project was commissioned by the Michigan Nurses Association as a 5 year project, based on Roger's theory of diffusion of innovations. It was designed to increase the utilization of research findings through (1) dissemination, (2) encouraging organizational implementation and (3) encouraging collaborative research that was directly transferable to clinical practice (Burns & Grove, 2001). Brett (1987) designed the Nursing Practice Questionnaire, based on Rogers' stages of adoption to measure nurses' awareness of, persuasion about, and use of the findings. Results showed that the majority of nurses were aware of the average innovation

(research finding) and were persuaded about it; however, less than one-third used the average innovation at least sometimes and only about 10% reported using it always. Coyle & Sokop, (1990) replicated Brett's study with 113 nurses in North Carolina and found that nurses reported slightly higher rates (22%) of use even though the evidence had been available in the literature for more than 10 years. While these were descriptive, self-report studies that relied on research related to very specific nursing practices, the results of both studies were similar lending strength to the findings and they led researchers to begin to question why nurses did not use evidence in practice.

Thus, second-generation studies focused on measuring factors that predicted, facilitated, or inhibited the use of research evidence by nurses (Campion & Leach, 1989; Estabrooks et al., 2003; Hutchinson & Johnston, 2006; Meijers et al., 2006; Stetler & Caramanica, 2007; Tornquist, Funk, & Champagne, 1995). A large number of studies have been conducted to determine factors that influence research utilization by nurses. Estabrooks, Scott-Findlay, O'Leary, & Gushta (2003) conducted a systematic review of nursing research studies published between 1993-2000 which included measures for one or more individual determinants of research utilization, measured the dependent variable (research utilization),indicated the direction of the relationship between independent and dependent variables, reported a P-value and statistic and indicated the magnitude of the relationship. They found 20 studies that met their inclusion criteria. Data extraction was conducted by all team members and each study was reviewed by at least two team members who evaluated each study on 13 criteria. They concluded that while most studies used prospective study designs, had large sample sizes from multiple sites and

used randomization procedures, they all had significant methodological weaknesses. Most studies (13/20) were rated as having only moderate methodological quality. All of the studies reported using data collected from self-reports of nurses' research use. Most had poor response rates (<60%) and the measurement scales used to assess research use had less than acceptable levels of reliability (≤ 0.70) which limits the validity and generalizability of the findings. Despite these methodological flaws, Estabrooks et al. (2003) noted that, among the included studies, there were no differences in the frequency or distribution of reported barriers or determinants to research use among the reported studies and that the major determinant of research use among nurses was their "attitude toward research".

Recently, studies have shifted to determining the effectiveness of specific interventions to promote the use of research evidence by nurses (Dobbins et al., 2002). In a recent systematic review of studies published between 1983-2006 and designed to identify evidence-based interventions for increasing research use in nursing only 4 high quality studies were identified by the research team (Thompson, Estabrooks, Scott-Findlay, Moore, & Wallin, 2007). The most common implementation interventions were (1) researcher-led educational meetings (ineffective); (2) educational meetings with the use of an opinion leader (effective), and (3) the use of a multi-disciplinary committee (effective). While three of these studies were randomized control trials and one was a controlled before and after study, all of the studies used self-report tools for measuring research use (3 studies) or practice guideline implementation (1 study). While researchers have begun to investigate the effectiveness of implementation interventions, the quality

of this literature is problematic and there is little evidence to guide choice in selection. With this shift has come the realization that implementation of evidence-informed practice is a complex phenomenon and that traditional research utilization models that depict implementation as a stepwise, linear process may be inadequate to guide practice and research (Estabrooks, 2007; Graham et al., 2006; Kitson, Harvey, & McCormack, 1998; Rycroft-Malone et al., 2002).

The evidence for implementation of evidence-informed practice is further complicated by the nomenclature used throughout the nursing literature. For example, the terms research utilization, knowledge translation, evidence-based practice and evidence-informed practice are often used interchangeably. This finding is not specific to nursing and is common across many disciplines interested in studying how best to move research into practice (Graham, et al., 2006). Nursing research utilization refers to the process by which research-based knowledge is implemented in practice (Estabrooks, 1999). Research utilization by nurses is a broad concept that includes the use of research to change practice (instrumental); to change thinking about a practice (conceptual) or to persuade or legitimate one's position about a practice (symbolic) (Estabrooks, 1999). While all types of research utilization are important, this study is concerned with instrumental research use; that is, understanding the underlying factors associated with the use of research to change nurse behaviour related to practice.

Nurses, similar to other health care professionals, base their clinical practice decisions on a number of distinct pieces of evidence, including experience, basic educational training, values and beliefs, skills, resources, protocols, patient preferences,

and research results (DiCenso, Guyatt, & Ciliska, 2005; Dobbins et al., 2002a; Estabrooks et al., 2003). This view of clinical decision making is broad and reflects the notion that research evidence alone is never sufficient to make a clinical decision. The evidence-based practice (EBP) movement began in the 1990s in Hamilton, Ontario and with the publication, in 1998, of the journal *Evidence-Based Nursing* the concept has become central to the nursing profession (Cullum, 1998). Early debates within the nursing literature made clear distinctions between research use and EBP with some authors arguing that EBP was a narrow concept that gave preference to some types of evidence (i.e. that derived from randomized control trials) over other types of evidence (i.e. clinical expertise and patient preference) (Estabrooks, 1999; Kitson, 1997; Rolfe, 1999). These views have shifted over time and notions of what constitutes evidence have become more inclusive. This has prompted the use of the term *evidence-informed practice* to reflect a process whereby the best research evidence is integrated with clinical expertise, patient values, and available resources to inform clinical decisions (Sackett et al., 2000). It has been suggested that evidence-informed practice will lead to improvements in patient and system outcomes and is an essential component of professional nursing practice (DiCenso et al., 2005; Krugman, 2003). The use of research evidence by nurses is effective in changing both the process and outcomes of care (Thomas et al., 1999). Regardless, a consistent finding from the literature is that the transfer of research evidence to practice is a slow and haphazard process (Burns & Grove, 2001; Walker et al., 2003).

Knowledge transfer is the process of closing the gap between what is known from research evidence and knowledge synthesis and the implementation of that knowledge by providers with the intention of improving health outcomes (Graham et al., 2006). Typically, this involves two separate but interlinked steps. The first is the process of understanding "what is known" and results in the development of knowledge products, such as primary studies, research syntheses, practice guidelines, decision aids, and care pathways. The second is the process of moving "what is known" into "what is done". This stage is generally known as implementation and it refers to all of the actions and events involved in putting knowledge or research evidence to use once the adoption decision has been made (Rogers, 2003). Literature evaluating effective implementation of evidence-informed practice change has shown that knowledge of research evidence alone does not change practice and that the use of research evidence in clinical practice remains minimal and inconsistent (Dobbins et al., 2002b; Graham & Logan, 2004; Grol, 2001).

Implementation research is the scientific study of methods to promote use of research findings to improve quality of care (Eccles, Grimshaw, et al., 2007). It includes the study of influences on health professionals' behaviour and interventions aimed at helping providers use evidence more effectively in their decisions (Walker et al., 2003). It is this focus on using evidence to change behavior that differentiates implementation research from the broader field of research utilization. Implementation researchers have focused largely on changing physician behaviour, and nursing has lagged behind medicine in conducting research designed to successfully implement evidence into routine practice (Dobbins et al., 2005; Leeman, Baernholdt, & Sandelowski, 2007; Stetler

& Caramanica, 2007; Thompson, Estabrooks, Scott-Findlay, Moore, & Wallin, 2007). In acute care settings, nurses work in hierarchical structures as salaried employees and physicians having hospital privileges, work more autonomously. Generalizing implementation research findings that focus on physician behaviour to nurse behaviour is problematic because of the differences in how each group uses research in practice, their professional social structures, their relationships within an organizational context, their differing scopes of practice, and their autonomy to individually change their practice. Thus, nurses' evidence-informed practice behaviours must be understood in the context of the setting where practice changes are being encouraged.

Implementation – Individual or Organizational Phenomena

The majority of studies on the use of evidence-informed practice in nursing have focused on the identification of barriers. In 1989, Champion and Leach investigated attributes of research utilization concluding that attitudes toward research, availability of research information, and administrative support were identified as key indicators of research utilization. The Barriers to Research Utilization Scale (BARRIERS Scale) was designed and tested by Funk, Champagne, Wiese, Tornquist (1991a, b,) to elicit the opinions of nurses on barriers to research in the practice setting. The scale is based on Roger's theory of diffusion of innovations and the items on the scale cover four areas: (1) characteristics of the nurse, research values, skills and awareness; (2) characteristics of the organization, setting barriers and limitations; (3) characteristics of the evidence, research quality; and, (4) characteristics of the communication, presentation and accessibility of the research. Subsequently, Funk et al., (1995) conducted an integrative review of the literature to

examine barriers and facilitators of research and identified the top four barriers as: lack of knowledge of research, difficulty interpreting findings and applying them to practice, lack of time, and lack of autonomy to implement change. A review of research studies conducted using the BARRIERS Scale, during 1991-2006, found over 30 published studies (Hutchinson & Johnston, 2006). These authors did not explain how they identified, abstracted and evaluated the articles included in their review; therefore, it is difficult to judge the thoroughness of their efforts or accuracy of their conclusions. Nevertheless, they provided an assessment of each study including the purpose, findings and methodological quality of the studies included in their report. They stated that among the included studies that reported rank ordering of barriers, there was a large degree of consistency between studies on the importance of certain perceived barriers. Similar to Estabrooks et al. (2003), they found that many studies suffered from poor response rates and sole reliance on self-report as a method of data collection; thereby, limiting the validity of each study's findings.

Estabrooks et al. (2003) identified 95 characteristics which they grouped into six core categories: beliefs and attitudes, involvement in research activities, information seeking, education, professional characteristics, and other socio-economic factors. The six categories were not predetermined but emerged from the data extraction. By using a vote-counting approach to synthesis, they concluded the most frequently studied individual characteristic and the only one with a consistently positive effect was "attitude towards research", which is part of the larger category "beliefs and attitudes". Vote-counting is not a rigorous method for summarizing data and thus may have impacted on

Estabrooks et al's. (2003) conclusions. However, the overall quality of the studies included in their review limited the methods available for synthesis. The results of this review, while needing to be interpreted with caution provide some insight into individual determinants of nurses' research use and provide direction for future research in the field.

Additionally, this finding is also somewhat reassuring for practitioners interested in implementing evidence-informed practice because characteristics such as age, gender, years of experience, and socioeconomic factors are not readily modifiable and thus are not helpful for designing implementation studies. Interventions aimed at changing the information-seeking behaviour of nurses, such as getting them to read professional journals or providing education on how to search, appraise, and use research evidence, have not been proven effective and are expensive and time consuming (Doran et al., 2007). Inconclusive support for modifiable individual-level variables has led authors to focus on organizational variables as potential modifiers for research utilization (Cummings et al., 2007; Estabrooks et al., 2007; Meijers et al., 2006). However, in a study designed to test predictors of research use at the individual, specialty, and hospital levels, variation in research use by nurses was explained mainly by differences in individual characteristics, accounting for 87% of the variation, and specialty- and organizational-level factors contributing 8% and 4% respectively (Estabrooks, et al., 2007). Among organizational-level factors only hospital size was positively associated with research use. Regardless of this finding, the researchers concluded that these positive associations warranted further investigation. This is an interesting conclusion,

given that hospital size or specialty associations are not modifiable factors and it is not understood how one would use this information to design implementation interventions.

Nurses' perceptions of organizational support for implementation of evidence have also been widely studied in the nursing literature. Results research conducted using the BARRIERS Scale has shown that among the five most commonly reported barriers to using evidence, four of these barriers relate to nurses' perceptions of organizational support: (1) a lack of time to implement new ideas; (2) a lack of awareness of new research findings; (3) inadequate organizational infrastructure for implementation; (4) a lack of cooperation from doctors, management or "other staff" (Hutchinson and Johnston, 2006). The second most commonly cited barrier was their inability to understand statistical analyses. While this may be perceived an individual-level barrier, it may also be reflective of the infrastructure support available for research within an organization. Organizations supportive of nurses using research evidence to inform their practice may provide nurses with mechanisms to either learn the skill themselves or provide access to knowledgeable individuals who could interpret statistical findings for them. Hutchinson and Johnston (2006) also found that while there is consistency in the overall literature that all of the factor analyses consistently load on time, support, and facilities for implementation, emphasis on specific contextual barriers also differed between countries and emphasis on specific contextual features differed between clinical sites and specialties. This finding indicates that while organizational barriers are important, the degree to which each barrier is significant in any particular context is not predictable.

In summary, over 20 years of research on barriers regarding the use of evidence by nurses has been extensive with most empirical support for barriers associated with (1) nurse-level characteristics and (2) organizational support for implementation of evidence. This would indicate that an approach to understanding of implementation of evidence-informed practice among nurses must include individual and organizational factors.

Implementing Evidence-Informed Practice Changes

Regardless of the extensive research on barriers to evidence use, there are only a few nursing studies that have assessed strategies for breaking down such barriers and these are mostly descriptive, or of poor methodological quality (Pepler et al., 2006; Rycroft-Malone et al., 2004; Stetler & Caramanica, 2007; Thompson et al., 2007). A previous review of the nursing literature aimed at identifying activities associated with implementation of evidence-informed practice changes among nurses, provided some of the background for this doctoral research (Beduz, 2008). The review focused on the implementation of clinical practice guidelines (a direct form of research use) among front-line nurses working in acute care settings. Selected electronic databases (ISI Web of Science, CINAHL, Medline, and PsychInfo) were searched from January 1998 to May 2008. January 1998 was selected based on reports of the historical evolution of the EBP movement in nursing and implementation science research (Cullum, 1998; Titler, Everett, & Adams, 2007). The search strategy was executed for all databases using the same keywords and mapped subject headings. The inclusion criteria were limited to studies of original research published in English; front-line nurses working in an acute care setting and an evidence-informed practice change were study variables. Exclusion criteria

consisted of any study that did not meet the inclusion criteria above, such as studies exploring general barriers to and facilitators of research use; EBP or clinical practice guidelines; studies evaluating guideline effectiveness; studies without sufficient description of implementation strategies used; evaluations of theoretical frameworks, practice models, or quality assurance programs with no research design or methodology; studies of practice changes aimed at nurses other than front-line nurses, such as advanced practice nurses; and studies aimed at changing patient behaviour.

Screening involved a three-stage process. First, titles were screened for relevance to the purpose of the review. All titles indicating that implementation of practice guidelines and nurses were not the primary focus of the article were excluded. Second, abstracts were reviewed using the inclusion and exclusion criteria. Abstracts were primarily excluded because they were opinion pieces or commentaries and did not focus on implementation or on front-line nurses. If uncertainty existed, articles were retained for a third stage of screening that involved full article review using the inclusion and exclusion criteria. Thirty-eight potential articles were reviewed, and only seven met the inclusion criteria. Of these seven articles, only one article reported a randomized controlled trial and six used a quasi-experimental design. Despite the poor methodological quality of the studies all seven studies were included in the analysis to gain a better understanding of the type and quality of existing evidence. Using studies that did not employ control groups is problematic with respect to the confidence we can place in the interpretation of the findings. However, when no controlled studies are available, one has to rely on what is available, while being cautious in reaching

conclusions (Petticrew & Roberts, 2006). Quality assessments were conducted using the *Effective Practices and Organization of Care (EPOC) Review Group Checklist* (Cochrane Collaboration, 2007) for the experimental study. The remaining studies were assessed using the technique for quasi-experimental designs found in Greenhalgh et al. (2005). Studies were categorized according to setting, purpose, intervention method, duration and frequency, variables measured, implementation outcome, and quality assessments (Appendix A).

Overall, the quality of the studies accessed was low as they consisted of quasi-experimental designs with no control. It was difficult to determine from the reports if the interventions were independent of other changes within the study environment. There was no information to support the selection of the intervention used, or description as how the authors maintained intervention fidelity. In the only experimental study, the results were mixed. The six quasi-experimental studies had many methodological weaknesses, and the information provided in the reported outcomes did not always support the authors' claims of implementation success. The lack of well-designed studies is problematic and consistent with the findings of other authors in this field (Estabrooks, 2007; Rycroft-Malone & Stetler, 2004; Thompson et al., 2007; Titler et al., 2007). These studies represent both diverse settings within acute care hospitals and reflect a variety of evidence-informed practices, such as pain management guidelines (four of seven studies), intermittent auscultation and labour support, management of peripheral vascular devices, and fall prevention guidelines. The implementation strategies used in these studies were classified according to the EPOC (2008) classification as follows: (1) educational

meetings were the most commonly used strategy (six of seven studies). They ranged from one to eight hours in length and were all targeted to increase nurses' knowledge of and skills in the clinical practice. In four of six studies, these meetings consisted of formal off-unit educational sessions. In the remaining two studies, the meetings consisted of presentations at staff meetings and rounds. Two of the studies using educational meetings indicated that they included some discussion about nurses' attitudes toward the practice issue as part of the session; (2) distribution of educational materials, such as guidelines, workbooks, and resource materials, was the most commonly used strategy (five of seven studies); however, they were not evaluated in any of the studies; (3) reminders, in the form of documentation tools and checklists, were used in four of seven studies; however, only one study evaluated the tool's use. In the remaining three studies, the documentation tools were considered add-ons to existing work and as barriers to implementation; (4) audit and feedback were used in three of seven studies. Individual performance feedback was used in two of three studies, and group feedback was used in the other study; and, (5) educational outreach, defined as a trained person who met with nurses with the intent to change behaviour, was used in two of seven studies. In both of these studies, these individuals were local opinion leaders who had received additional training and were reported as fostering a positive attitude toward change and minimizing confusion or negative attitudes about the change; however, there was no evaluation of these roles.

Individual-level factors were measured in all studies: (1) measurements of change in nurses' knowledge and skills to perform the practice change were reported in six of seven studies. In five of six studies, these were direct measures of knowledge change; in

the other study, reported self-efficacy to perform the practice change was measured. Only two studies reported significant improvement in knowledge and skills; (2) demographic data, such as age, sex, years of nursing experience, and years of experience in the clinical setting, were collected in four of seven studies. Only one study reported that years of nursing experience affected performance of practice changes, with younger nurses responding more effectively to performance feedback than more experienced nurses; (3) nurses' attitudes and beliefs about the practice change were measured in four of seven studies. Attitudes and beliefs were measured post-implementation in one study and measured but not reported in another study, and in the final two studies, there was no significant change in nurses' attitudes and beliefs. All of the studies, with the exception of the randomized control trial, were single site studies and did not include any measures of organizational-level factors.

These findings are not specific to nursing intervention studies and are recurrent themes in the implementation research literature. In studies evaluating the effectiveness of implementation interventions there is evidence to suggest that some strategies may be more effective than others. For example, strategies such as educational outreach visits interactive workshops, reminder systems, audit and feedback and opinion leaders have been shown to have greater impact on physician practice (Grol et al., 2005;Titler, 2007); however, these results must be interpreted with caution for nursing practice (Dobbins, Ciliska, Estabrooks, & Hayward, 2005). Reminders and checklists are generally low cost and easy to implement and may be useful as well; however, passive strategies such as continuing education and didactic workshops are generally not effective in changing

practice (Dobbins et al., 2005; Grol et al., 2005; Titler, 2007). Initially, there was some thought that using multiple strategies may be more effective than single strategies alone (Grimshaw, et al., 2001). In an updated systematic review of studies of interventions to promote use of clinical practice guidelines, Grimshaw et al. (2004) reviewed over 235 studies representing 309 interventions concluding that multiple strategies were not more effective than single strategies and may be more expensive and thus unwarranted. Contrary to the earlier findings, Grimshaw et al. (2004) were unable to recommend any one intervention strategy reporting that all interventions were effective some of the time, with a median absolute effect size of approximately 10% and there was no compelling evidence for selecting any one intervention over others. They attributed their findings to a lack of rigour in many studies, concluding that further research is needed to "develop and validate a coherent theoretical framework of health professional and organizational behaviour and behaviour change to better inform the choice of interventions (p. 6)."

In summary, there is little definitive information to guide the choice (or optimize the components) of interventions for enhancing the uptake of evidence-informed practices by health care professionals. Not surprisingly, then, many researchers have called for a stronger theoretical foundation for deriving and testing strategies for increasing the uptake of evidence-informed practices among health care providers (Cohen et al., 2005; Eccles et al., 2005; Foy et. al, 2005; Shojania & Grimshaw, 2005; Stetler & Caramanica, 2007; Walker et al., 2003).

Implementation Frameworks

One of the challenges for implementation research is deciding which theory, model or framework to select. Kitson, Rycroft-Malone, Harvey, McCormack, Seers and Titchen (2008) argue that although there has been an increased interest in the use of theory for implementation research the lack of clarity about the use of the terms theory, model and framework which are often used interchangeably. This confusion is increased when one considers the varied philosophical and multidisciplinary approaches which exist for the study of implementation adding to the challenges in theory use. In counterpoint to this argument, Kitson et al., (2008) have built on previous work done in the field of policy analysis which has offered a typology for distinguishing between theories, models and frameworks and also allows for their integration across multiple disciplinary languages and levels of analysis. Using this typology, a conceptual framework is understood as consisting of sets of concepts and propositions that provide a heuristic for organizing implementation efforts. When using frameworks, researchers are guided by broad concepts that need to be considered for assessing barriers, facilitators, developing and evaluating implementation interventions. A model is narrower in scope and offers more precision than a framework because it attempts to provide a specific representation of an event. Models are used to help researchers think about how an event; such as, the process of using research evidence may work. A theory is made up of concepts that describe a phenomenon and statements about how the concepts relate. Theories help to explain the relationships between concepts and are useful for developing

implementation interventions and identifying appropriate variables and measurement tools for the study of concepts.

This typology provides a useful guide to think about how frameworks and theories may be used together. For example, when attempting to understand what happens when nurses try to use evidence in practice, a framework can focus users in the direction of what they need to think about during implementation; that is, what are the major concepts that need to be considered? A theory provides the user with guidance to design an implementation intervention and also with some reasonable evidence to believe that the intervention might work. Theories are situated within conceptual frameworks, and it is through core characteristics and concepts that theoretical linkages occur. In this manner a conceptual framework is a container for considering different theories and theoretical perspectives.

Many theories, models and frameworks have been used to induce health care professionals to embrace evidence-informed practices (Graham et al. 2006; Grol, Wensing, Hulscher and Eccles, 2005; Rycroft-Malone, 2007). Theoretical approaches to implementation vary based on how various disciplines have conceived implementing changes from an individual, professional, organizational or system perspective (Grol et al., 2005). Within the nursing literature, there has been a shift from focusing on individual characteristics associated with evidence-informed practices to a greater focus on the organizational context and processes of change (French, 2005) This increased focus on understanding organizational level factors stems from a belief that the majority of healthcare professionals work within very complex organizational structures wherein

social influence and organizational factors contribute to describing and explaining effective changes in patient care (French, 2005; Grol et al., 2005; McCormack, et al., 2002, 2009; McNulty & Ferlie, 2002; Meijers, et al., 2006; Rycroft-Malone, 2008).

A select review of some commonly used nursing implementation models and frameworks reveals this shift from individual to organizational level focus. Early models focused on how individual nurse's use research evidence. For example, *The Stetler Model of Research Utilization* is a nurse-oriented model, expected to be used by individual nurses as a procedural and conceptual guide for the application of research in practice. The model was first developed as the Stetler/Marram Model of Research Utilization (Stetler & Marram, 1976) and later revised and renamed the Stetler Model of Research Utilization (Stetler, 1994, 2001). The Stetler model was developed as a prescriptive approach designed to facilitate safe and effective use of research findings (Stetler, 2001). The model is based on six basic assumptions: (1) the formal organization may or may not be involved in an individual's utilization of research; (2) utilization may be instrumental, conceptual, and/or symbolic; (3) other types of evidence and/or non-research-related information are likely to be combined with research findings to facilitate decision making or problem solving; (4) internal and external factors can influence an individual's or group's view and use of evidence (5) research and evaluation provide us with probabilistic information, not absolutes (6) lack of knowledge and skills pertaining to research utilization and evidence-based practice can inhibit appropriate and effective use. The updated model centers on the types of research evidence and suggests that users seek already published systematic reviews whenever possible instead of using primary studies.

It also includes a greater awareness of the influence of organizational factors such as, 'fit' with local context, availability of resources and the need for an updated evidence-based change plan. However, the model is static in its approach to implementation in that it describes implementation as a linear step-wise process. It does not offer the user any guide for addressing issues of fit or how best to develop an 'evidence-based' change plan. It is descriptive in nature and does not predict the conditions for 'implementation success'. Finally, it does not acknowledge the role of change agent within the process of implementation and how the attributes and skills of these individuals can contribute to implementation success.

The *Ottawa Model of Research Use (OMRU)* views research use as a process of interconnected decisions and actions by different individuals relating to each of the model elements (Logan & Graham, 1998). Findings from a number of studies have supported the utility of the OMRU in actual practice contexts (Hogan & Logan, 2004; Logan, Harrison, Graham, Dunn, & Bissonnette, 1999; Stacey, Pomey, O'Conner, & Graham, 2006). The most recent version of the OMRU (Graham & Logan, 2004) includes six key elements: (1) evidence-based innovation; (2) potential adopters; (3) the practice environment; (4) implementation of interventions; (5) adoption of the innovation; (6) outcomes resulting from implementation of the innovation. The OMRU relies on the process of assessing, monitoring, and evaluating each element before, during, and after the decision to implement an innovation. Barrier assessments must be conducted on the innovation, the potential adopters, and the practice environment to identify factors that could hinder or support the uptake of the innovation. The implementation plan is then

selected and tailored to overcome the barriers and enhance the supports identified. Introduction of the implementation plan is monitored to ensure that the potential adopters learn about the innovation and what is expected of them. The monitoring is ongoing to help determine whether any change in the current implementation or a new implementation plan is required. Finally, the implementation outcomes are evaluated to determine whether the innovation is producing the intended effect or any unintended consequences. The OMRU focuses on the process of implementation; it includes a broader understanding of both the social influences (adopter characteristics – attitudes and awareness, skills and knowledge, concerns and current practices) and organizational factors (practice environment – patient population, culture, structural, economic, uncontrolled events) that may impact on implementation success. It provides a good diagnostic model that supports the development of a change plan. However, while the authors describe the process as dynamic they fail to acknowledge the role of the change agent or individual responsible for the process of implementation.

The *PARiHS* framework was developed as an alternative to traditional one-dimensional and linear models describing implementation of research into practice (Kitson et al., 1998, 2008). Each element within the framework has been subjected to a concept analysis to establish theoretical rigour and concept clarity; however, the framework continues to be refined to identify which factors practitioners identify as the most important in enabling evidence to be put into practice (Harvey et al., 2002; McCormack et al., 2002; Rycroft-Malone et al., 2002; Rycroft-Malone, Seers, 2004; Rycroft-Malone, Harvey, et al., 2004). Kitson, et al. (2008) propose that PARiHS is best

used, first as a framework to diagnose and guide preliminary assessment of evidence and context and second, to guide development, selection, and assessment of facilitation strategies based on the existing evidence base and local context. In addition to the developmental work of its authors, interest in this framework has been growing as illustrated by its use in several studies (e.g., Brown & McCormack, 2005; Cummings et al., 2007; Doran et al., 2007; Ellis, Howard, Larson, & Robertson, 2005; Meijers et al., 2006; Wallin, Estabrooks, Midodzi, & Cummings, 2006; Wallin, Rudberg, & Gunningberg, 2005; Wright et al., 2007).

The PARiHS framework posits that successful implementation is a function of three elements: the quality of the evidence, the context in which practice occurs, and the type of facilitation used to bring about the practice change. The framework represents these elements as existing on a continuum from high to low in any given implementation situation. As such, instead of a hierarchy or linearity of cause and effect, each dimension is considered simultaneously so that when preparing to implement an evidence-informed practice change, the same level of detail is given to preparing the context and selecting the method of facilitation as is devoted to testing the evidence.

Evidence. Rycroft-Malone et al. (2002) describe evidence as a continuum from high to low and in three dimensions: research information, clinical experience, and patient choice. Consistent with proponents of evidence-based nursing practice (DiCenso et al., 2005; Dobbins et al., 2002a; Doran et al., 2007; Stetler, 2001), they acknowledge that different types of evidence are needed to answer different clinical questions and that successful implementation into practice is most likely when the evidence is scientifically

robust and aligned with professional consensus and patient needs. Evidence is rarely constant and is often subject to multiple interpretations; thus, it must be translated and consensus must be built among local providers in order to make sense of it in the context of caring for individual patients (Rycroft-Malone, Harvey, et al., 2002).

Context. Context refers to the environment or setting in which the proposed change will be implemented and is composed of three dimensions: culture, leadership, and evaluation. McCormack et al. (2002), in a concept analysis of the meaning of context, conceptualize these dimensions on a continuum from weak to strong. They argue that environments conducive to evidence-informed practice have clearly defined boundaries and structures; clarity about decision-making processes; clarity about patterns of power and authority; access to resources; access to information; and feedback systems and are receptive to change. The underlying assumption is that the more favourable the context, the better the conditions for successful implementation. Context has been identified by other authors as having an effect on successful implementation of research (Cummings et al., 2007; Dobbins et al., 2005; Dopson & Fitzgerald, 2005; Meijers et al., 2006; Pepler et al., 2005; Scott-Findlay & Golden-Biddle, 2005; Stetler, 2003).

Facilitation. Kitson et al. (1998) proposed that facilitators have a defined role that may be internal or external to the organization and is focused on helping and enabling individuals or teams to understand what they need to change and how to change it in order to achieve the desired outcome. Facilitation consists of three dimensions: (1) purpose, (2) role, and (3) skills and attributes. Harvey et al. (2002) further developed the concept of facilitation reviewing 95 articles and books published from1985-1998, with

the purpose of exploring the maturity of the concept of facilitation. They argue that the purpose of facilitation ranges from helping an individual achieve a task to enabling individuals and teams to review their habits, attitudes, skills, and ways of thinking and working. The role of facilitation ranges from episodic contact, focused on providing technical or practical help, to a sustained partnership with more of a developmental role. The skills and attributes of facilitators range from those focused on doing for others to more holistic enabling skills. They concluded that facilitators who provide face-to-face communication and use a range of enabling techniques have been shown to change clinical and organizational practice; however, there is insufficient evidence about which aspects of facilitation are more or less effective in influencing change.

The PARiHS framework is an example of a heuristic that focuses on improving patient outcomes through the implementation of evidence informed practices. It originated in nursing and has broad health care use. It offers an explicit guide for assessing evidence and context and how these findings may be used to plan facilitation strategies for implementation. It is unique in that it acknowledges the role of change agents or facilitation as an intervention to implementation success. The developers of the PARiHS framework inclusive definition of evidence is congruent with nursing values and they recognize that implementation is a complex and multi-faceted process that is dynamic and often unpredictable. Additionally, PARiHS does not specify what constitutes 'successful implementation' and thus has been used to describe how clinicians apply research knowledge in general (i.e., Estabrooks et al., 2007) and specifically the implementation of an evidence-informed practice change (i.e., Stetler et al., 2006).

Since its publication in 1998, the framework has become increasingly popular most often, because users find it makes intuitive sense. Nevertheless, the framework continues to evolve and one of the main issues related to its use is the need for greater conceptual clarity about the definitions of the elements and sub-elements and how they relate to each other. Initially it was derived inductively based on the authors' experience with practice improvement and guideline implementation. Kitson, et al. (1998) rejected the notion of evidence-informed practice as a "process of simply informing, monitoring and changing practice (p. 149)." Changing practice was (is) in their view, a complex process and required alternate approaches to practice change. They developed their three main elements of evidence, context and evaluation with little evidentiary support for their findings. They presented three case examples to illustrate its usefulness as an organizing framework, suggesting that others might use it to generate hypotheses to test the framework in more systematic ways. Subsequent concept analyses were conducted and based on theoretical insights from this work the framework was updated in 2002 and further refined in 2004. While these concept analyses were broad, they were not systematic and require further development for concept clarity. For example McCormack et al., (2002) concept analysis of context has included a fourth sub-element of "receptive context" defined as having clear physical, social, cultural and structural boundaries. However, the indicators within this sub-element overlap with the indicators within the sub-elements of leadership (clarity around roles, power and authority, transparent and inclusive decision-making) and evaluation (information and feedback). Thus, it is unclear how receptive context is different from leadership and evaluation. This lack of concept

clarity makes the operationalization of some of the elements and sub-elements difficult and the application of these concepts have been inconsistently applied across studies. For example, Wallin et al., (2006) operationalized context using single items from the Nursing Work Index – Revised (Aiken and Patrician, 2000) that best reflected the sub-elements of culture ("freedom to make important patient care and work decisions"); leadership ("a nurse manager or immediate supervisor who is a good leader or manager"); and, evaluation (praise and recognition for a job well done"). They then developed cut off points for the responses to these items to identify organizations that had high and low contexts, demonstrating that those with 'high contexts' had more self-reported research utilization scores. Doran and Sidani, (2007) used the PARiHS framework to explain a process for inducing nurses to use evidence to make decisions at the point of care. They operationalized context in terms of the sub-element evaluation using a single item, "receiving real-time feedback about patient outcomes". They did not test this definition of context, but rather used it to describe their model for implementing clinical practice guidelines at the point of care. Cummings et al., (2007) used individual responses to the Alberta Nurses Research Questionnaire, completed in 1998, to identify which of these items reflected contextual influences at individual, unit and organizational levels. They then used structural equation modeling techniques to establish which contextual influences and at what level were positively associated with nurses' research use. It is interesting to note that while Wallin, et al. (2006) and Cummings et al. (2007) used the same data set (Alberta Nurses Research Questionnaire) for their work they used different item responses to operationalize context. In the most recent work conducted by

McCormack et al., (2008) they have further refined the concept of context to include five factors related to the three original elements – culture, leadership and evaluation. They used the framework to guide the structure of the tool development using a combination of different methodologies (case study and focus groups) followed with a multi-site large sample validity study (n = 479 from 27 sites). While this most recent version of context will be discussed further, it is offered here as an example of how the concepts within the PARiHS framework continue to evolve. Since its initial publication, many studies have reported using PARiHS to guide or explain their research; however, to date only three studies have attempted to generate hypotheses related to this framework and systematically test them (e.g. Estabrooks, et al., 2007; Cummings et al., 2007; Wallin et al., 2006).

Kitson et al. (2008) readily acknowledge that PARiHS is not yet fully developed, specifically: (1) how the elements and sub-elements interrelate and interact; (2) relative weighting attributed to the elements and sub-elements in moving evidence into practice; (3) the comprehensiveness of the framework; and (4) how individual's behaviour fits into the framework. This lack of focus on the individual may stem from the framework developers' belief that the adoption of evidence-informed practice changes are dependent upon more than individual characteristics and motivational factors – a belief that is shared by others (e.g., Dopson & Fitzgerald, 2005; Ellis et al., 2005; Meijers et al., 2006; Scott-Findlay & Golden-Biddle, 2005). However, several argue that practice change cannot be achieved without concerted effort to change individual-level behaviour (Dibella, 2007; Eccles, Grimshaw, et al., 2005; Titler, 2007).

In summary, implementation of evidence-informed practice changes can be viewed both as product (the practice change) and process (the manner through which the change is brought about) involving individual nurses within a practice setting and is facilitated by a designated individual. Implicit in this view is the notion that the change process involves an understanding of what is being changed (evidence); where the change is occurring (context); who will help bring about the change (facilitation); and who needs to change (individual).

I have argued that the success of implementing evidence informed practice changes requires individual nurses to change some aspect of their behaviour. Practice changes occur as each nurse screens, interprets, and applies new evidence to practice within the context of a unit or organization. Each nurse is an active participant in the dynamic interplay between a proposed evidence-informed practice and the context in which she/he practices. Nurses are not just the passive recipients of implementation interventions. In this thesis, I propose that developing an understanding of the relationship between the individual and the context in which they work will provide a more robust framework from which to design and study implementation interventions.

PARiHS is an implementation framework that explains what is being changed, where the change is occurring, and who can help bring about the change. Attempts to find modifiable individual determinants of evidence-informed practices have been inconclusive, with the exception of nurses' attitudes and beliefs which account for the greatest variation in use of evidence informed practices. While comprehensive the PARiHS framework provides no explanation for how individual-level characteristics

influence implementation outcomes, thus, consideration must be given to other theories or alternate explanations to account for these findings.

Implementation – Individual Perceptions of Change

A key goal of implementation research is to identify measures of change that can describe and predict which strategies will be best suited to bring about the behaviour change. The process of implementation concerns understanding the events, actions, and decisions involved in putting the practice change to use; that is, changing provider behaviour. Traditional approaches to the study of change view individuals as receivers of change interventions developed by change agents, who plan and manage the change apart from the individuals affected by the change (Weick & Quinn, 1999). In the real world, implementation is situated within an organizational context and unfolds dynamically over time as a social process that occurs through an interaction between the facilitator of change and the individual expected to adopt the change. The PARiHS framework includes the social aspect of change and describes the role of facilitation as enabling individuals and/or groups to make changes. Facilitators do not exert pressure over individual participants; rather, their role spans from providing help and support for achieving a specific goal to enabling participants and teams to reflect and change their own attitudes, behaviour, and ways of working (Harvey et al., 2002; McCormack & Slater, 2006). Facilitators may be external to the practice setting, but they work with internal facilitators to enable the development of the internal facilitator's skills and knowledge in managing change.

Understanding how individuals view or perceive change is fundamental to understanding the social realities of change that shape the relative success of the change process (Dibella, 2007). Individuals filter, appreciate, and accept or resist change according to their assessment of the change as either desirable or undesirable; this perception determines whether an individual will comply with or resist change (Dibella, 2007). For example, change that is congruent with an individual's existing values requires minimal adaptation, is relatively easy to use, or can be tried in advance has been associated with implementation success (Dobbins, 2002; Rogers, 2003).

Individual preferences are a function of social cognition or sense making (Weick & Quinn, 1999). Any given change is neither all bad (undesirable) nor all good (desirable); however, the more perceptions move toward the desirable view, the more individuals will be engaged, and the greater the chance for successful change implementation (Dibella, 2007). One method for increasing the appeal of change is to increase the number of participants in the change process, thereby moving change from a solitary to a group-influenced process (Baker et al., 1999). For example, in a tailored intervention to promote continuous labour support by nurses and decrease the use of electronic fetal monitoring, the hospitals in which desirable practice changes occurred were described as having good participant involvement in implementation (Davies et al., 2002). Change unfolds based on how participants communicate and converse about the transition they are experiencing (Smollan, 2006). Perceptions and reality can shift over time and changes initially considered impossible can become viewed as improbable, then

plausible, and, finally, inevitable (Dibella, 2007). The role of facilitation is to support individuals and groups through the process of change (Harvey et al., 2002).

This notion of change is developmental, continuous, and evolutionary; movement consists of sense making or understanding how the change may be incorporated into the current day-to-day work environment (Weick & Quinn, 1999). While attributes of individual nurses, such as age, gender, levels of education may not be significant or modifiable factors related to implementation of evidence informed practice changes; individual perceptions of change are constructed within a social setting which overtime become the group's normative views of the change (Tregunno, 2005). It is this recursive interaction between the individual and the system that gives rise to the creation of an evolved context in which practice is embedded (Tregunno, 2005). Further exploration of the relationship between the individual and the context of practice may illuminate our understanding of the influences on implementation of evidence-informed practice changes.

In summary, PARiHS provides a framework for understanding implementation efforts. It includes the importance of contextual elements but does not account for how these elements interact at an individual level. The argument has been made that viewing an evidence informed practice change from the perspective of the individual allows for an understanding of how attitudes and beliefs, individual perceptions of skill in performing the practice change and the involvement with and the views of other relevant group members can influence implementation success. In this way, the individual influences the perception of change and is influenced by the group's perception of change.

Additionally, the context in which the individual-group interaction occurs can influence implementation through its influence on individual attitudes and group behavioural norms – to move toward or away from action (Scott-Findlay and Golden-Biddle, 2005).

Theoretical Framework for the Study Design

The theoretical framework for this study provides an understanding of how individual behaviour is related to implementing an evidence-informed practice change and what factors may be influenced to effect changes in behaviour. Grol et al. (2005) provide an overview of theoretical approaches that have been used to study implementation of evidence-informed practice. The most common theory used to study the influence of attitudes and beliefs on individual behaviour related to implementation of evidence informed-practice is the TPB. Given the previous discussion about the differences between frameworks and theories, in this thesis while PARiHS provides a heuristic to aid in thinking about implementation in general, the TPB provides a theoretical explanation of individual behaviour in relation to implementation of evidence-informed-practice change.

The TPB was first proposed by Ajzen in 1985 as an extension to the theory of reasoned action (TRA), which included attitudes and social norms as variables influencing intentions and behaviour thought to be under volitional control. The TPB expanded on this research to include the concept of perceived behavioral control to include an explanation for influences on intention and behaviour that are more complex, goal oriented and dependent on the performance of other behaviours. The TPB, as illustrated in Figure 1, has been extensively used and tested in the health care field to help

understand and predict behaviour among patients (Perkins et al., 2007) and, more recently, to predict clinician behaviour in adopting practice changes (Eccles, Johnston, et al., 2007). This theory proposes that an individual's intention to behave in a certain way is a good predictor of that individual's actual behaviour. The strength of these behavioural intentions (in this case, the intention to use an evidence-informed tool to routinely assess patient anxiety) is influenced by three variables: attitude toward performing a certain behaviour (e.g., attitude toward assessing patients' anxiety with respect to patient benefits); subjective norm concerning the target behaviour (e.g., perceived expectation of one's work colleagues regarding measuring and monitoring patient anxiety); and perceived behavioural control (e.g., the degree to which a nurse believes she/he has the resources to effectively assess patients' anxiety levels) (Ajzen, 1991; Francis et al., 2004).

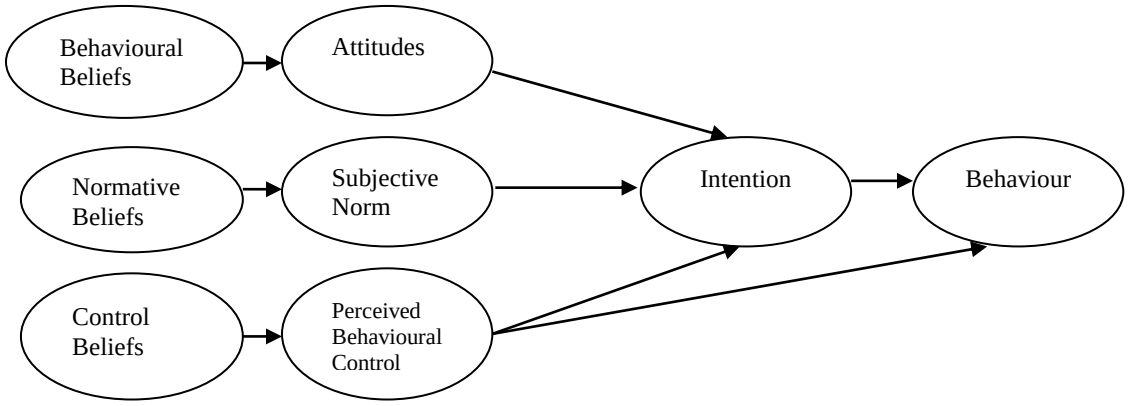

Figure 1. The Theory of Planned Behaviour (Ajzen, 1991)

The variables measured using the TPB have logical consistency with what we know about nurses' use of evidence-informed practices. The variable of attitude (ATT)

refers to an individual's perceptions about the advantages and disadvantages of performing a particular behaviour. This consists of two factors: the belief about the outcome of the behaviour (behavioural belief) and the corresponding positive or negative judgment about these outcomes (outcome evaluation) (Ajzen, 1991). For example, a nurse may want to better assess a patient's anxiety because she/he believes that this will guide the selection of interventions to better manage patient anxiety. Alternatively, the nurse may not want to use an anxiety assessment tool because she/he believes that asking patients about their anxiety may make them more anxious and upset. In a systematic review of the literature examining individual nurse characteristics related to their use of research in their work, attitude toward research was the only variable showing a consistent pattern of positive effects (Estabrooks, et al., 2003).

As stated previously, a review of the nursing literature attempted to provide a theoretical link between the types of implementation strategies used for evidence-informed practice changes among nurses and the success of these strategies in garnering nurses' support for change (Beduz, 2008). Shifting nurses' perceptions about a proposed practice change is likely to be critical in the eventual successful implementation of a change intervention. In studies of evidence-informed interventions for changing the practices of nurses, assessing nurses' attitudes toward the intended practice change was done in about 50% of the cases (Beduz, 2008). Surprisingly, however, strategies used to effect attitude change were not well articulated in the studies reviewed, and for those researchers who provided pre- versus post-intervention comparisons in attitudes, no statistically significant effects were found (Beduz, 2008).

The variable of subjective norm (SN) refers to a person's estimate of the social pressure to either perform or not perform a particular behaviour. Subjective norm has two components: beliefs about how people who are important to the individual would like them to behave (normative beliefs) and the positive or negative judgments about each belief (outcome evaluation). For example, a nurse may believe that her colleagues expect her to perform patient anxiety assessments because it is part of a nurse's role to provide emotional support to patients. On the other hand, that same nurse may believe that her colleagues would not expect her to perform anxiety assessments because the task is a diagnostic procedure and not part of a nurse's role.

The role of important people in the nurse's work environment has some support in the literature. For example, leadership and collaboration are critical to work unit effectiveness (Davies and Hodnett, 2002; Gifford, Davies, Edwards, & Graham, 2006; Gifford, Davies, Edwards, Griffin, & Lybanon, 2007). Gifford et al. (2007) conducted a secondary analysis of qualitative data to investigate factors that contributed to sustaining (or not) the use of clinical guidelines two and three years after implementation as part of the Registered Nurses Association of Ontario Best Practice Guidelines project. Their findings indicated a different pattern of leadership in organizations that sustained guidelines, when compared to those that did not. Leadership strategies identified as successful in implementing and sustaining guideline use were: (1) facilitating staff to use the guidelines; (2) creating a positive milieu of best practices; (3) influencing organizational structures and processes; and (4) leadership behaviours as support, role-modeling commitment and reinforcing organizational policies and goals consistent with

evidence-informed practices. Ploeg, Davies, Edwards, Gifford, and Miller (2007) conducted a qualitative study, using thematic analysis to identify factors associated with sustained use of clinical practice guidelines. They conducted a post-implementation semi-structured telephone interview with 59 administrators, 58 staff and 8 project leaders from 22 sites. They found that nursing leadership (through "champions," advanced practice nurses, managers, and executives) was identified as key to inducing nurses to follow clinical practice guidelines in a sustained way. While these studies do not prove a cause and effect relationship, they do suggest that leadership is influential in the implementation of evidence-informed practice. Among studies wherein attempts to get nurses to use new clinical practice guidelines failed, a lack of support from physicians, colleagues, and other team members was responsible in a third of the cases (Beduz, 2008).

Perceived behavioural control (PBC) refers to the extent to which someone believes they are able to enact the intended behaviour. Perceived behavioural control also has a direct influence on behaviour and it consists of two aspects: (1) self-efficacy or the perceived ability to engage in a particular behaviour (e.g., "I cannot perform an anxiety assessment without being provided with an assessment tool") and (2) degree of confidence to enact the behaviour successfully (e.g., "although I have a patient anxiety tool, I'm not confident in being able to effectively use it"). Accordingly, the level of PBC should increase as the individual has both access to required tools and the knowledge, skills, and opportunities to effectively employ them. The TPB attempts to explain aspects of behaviour that are under volitional control, that is, situations wherein the person can

decide to perform or not perform the behaviour. Although some behaviour may meet this requirement, the performance of most behaviour is dependent to some degree on non-motivational factors, such as availability of resources, skills, or the cooperation of others. Collectively, these factors represent the person's actual control over the behaviour (Ajzen, 1991). Thus, according to the TPB, behavioural achievement depends jointly on motivation (intention) and ability (behavioural control), which, by definition, occur within a specific behavioural context (Ajzen). Interventions designed to change behaviour can be directed at one or more of its determinants: attitudes, subjective norms, or perceptions of behavioural control. Changes in these factors should produce changes in behavioural intentions, and if the behavioural context is sufficiently adequate to support the behaviour, the new intentions will be expressed in desired behaviours. Ajzen argues that the degree to which a person can realistically assess contextual elements will determine the degree of correspondence between perceived and actual behavioural control.

To date over 1200 studies have been conducted using the TPB (Ajzen, 2010). The theory is found to be well supported by empirical evidence (Perkins, et al., 2007) and intentions to perform behaviours of different kinds can be predicted with high accuracy from attitudes toward the behaviour, subjective norms, and perceived behavioural control. These three core concepts together with behavioural intentions, account for considerable variance in actual behaviour. The TPB is flexible in its use and can explain easily executed behaviour through to complex behavioural change including …goals which demand resources, opportunity and specialized skills. Studies using the TPB's three core

concepts have been able to explain large variances in intention and behaviour and it provides a parsimonious account of behavioural determinants.

The TPB was chosen for the current research because the results of recent meta-analyses suggest that this theory may be useful in predicting clinician's evidence-informed behaviours. Correlational studies show that intentions are reliably associated with behaviour. Armitage & Connor (2001) conducted a meta-analysis of 185 studies using the TPB finding that intention was a moderate predictor of behaviour (r = 0.47). Sheeran (2002) conducted a meta-analyses of 10 meta-analyses representing findings from 422 studies involving 82,107 participants reporting that intentions accounted for 28% of the variation in behaviour. Thus, meta-analyses of correlational studies have suggested that intentions are moderately to highly associated with behaviour, according to standard estimates of effect size (Cohen, Cohen, West, & Aiken, 2003). Webb & Sheeran (2006) conducted a meta-analysis of 47 (n=221) experimental studies where participants were randomly assigned to a treatment group. The findings illustrated significant increases in intention among those in the intervention group compared with the control group. The review showed that a medium-to-large change in intention (*d*= 0.66) led to a small-to-medium (*d* = 0.36) change in behaviour. Thus, even though the overall effect size is modest it is equivalent to r = 18. While these findings lend support for a causative relationship between intention and behaviour, the studies included in this review explored changes related to health promotion behaviours (e.g. condom use, smoking cessation, self-breast and testicular examination, etc.). These reviews, while

supportive of the intention-behaviour relationship did not identify studies of clinicians and their clinical practice behaviours.

Eccles et al. (2006) argued that clinical practice is a form of behaviour and thus theories that explain human behaviour may help to explain professional behavior. They undertook a systematic review to explore the relationship between intention and behaviour in clinicians and how it compared with the intention-behaviour relationship for health behaviours. They found only a small number of studies that assessed the relationship between clinician intention to perform a behaviour and actual behaviour, thus their review was limited to correlational studies only. They reviewed 10 (n=82) studies representing 3777 health professionals (nurses – five studies; physicians – 3 studies, nurses and physicians – one study; and, pharmacists – one study). They reported that the proportion of variance in clinicians' behaviour explained by intention was similar in magnitude to that found in the literature relating to health behaviours (R^2 ranged from 0.15 to 0.40). While they did not report their findings separately for each clinician group, nurses accounted for 50 % of participants included in studies for their review. All of the studies, with the exception of one conducted with pharmacists, used the TRA/TPB. These studies lend support for using theories of human behaviour to predict clinician behaviour, however, there are many theories from which to select. In a prospective study, comparing the effectiveness of six psychological theories in predicting the uptake of a clinical practice guideline by physicians, the TPB prevailed, explaining 30% of the variation in intentions and in simulated behaviour (Eccles, Grimshaw, et al., 2007). The methodological qualities of these studies imply that these findings must be interpreted

with caution; however, the similarity in findings among reviews of experimental designs (e.g., Webb & Sheeran, 2006) and the consistency of findings in terms of the theories used to predict behaviour strengthen the argument for using theories of human behaviour for predicting clinician behaviours in clinical practice.

The TPB has been used to study clinician behaviour among physicians and nurses working in acute care hospitals, nurses working in primary care, and other members of the health care team (Eccles et al., 2006). Godin, Belanger-Gravel, Eccles, and Grimshaw (2008), in a systematic review of studies based on social cognitive theories, concluded that the Theory of Reasoned Action (TRA), and its extension, the TPB, was the most frequently used model to study clinician behaviour, and these theories were better at predicting health professionals' behaviours than were studies employing other theories ($p < 0.01$). A manual to support health care researchers wanting to construct measures based on the TPB for use in predicting clinician behaviour is now available (Francis et al., 2004).

Some of the challenges associated with using the TPB are related to understanding the underlying mechanisms through which the three core concepts influence behaviour. All influences on behaviour are assumed to work through attitude, subjective norms and/or perceived behavioural control (Ajzen, 2002). Others have argued (e.g., Connor and Armitage, 1998; Godin et al., 2008; Godin & Kok, 1996; Hagger & Chatzirantis, 2005) for the inclusion of other concepts that have some empirical support that influence intention and/or behaviour above and beyond that explained by attitudes, subjective norms and perceived behavioural control; such as, past behaviour or habit,

moral norms, self-identity or affective beliefs. While the addition of other components has received support in the general TPB literature, they have not been tested in predicting clinician behaviour related to practice changes (Perkins et al., 2007). A second challenge with using the TPB is that it assumes that individuals view behaviour as rational beings where they assess the outcome of a particular behaviour and determine their positive or negative belief about the outcome which in turn determines their attitude toward the behaviour. This view overlooks the effect of emotion, threats, fears, mood or personality that may influence behaviour (Perkins, et al., 2007). This lack of an affective component may be problematic in situations that are emotionally laden, and has been offered as one explanation as to why everyone does not behave in accordance with their intention (Armitage and Conner, 2001).Attitudes, subjective norms, and perceived behavioural control account for 30% of clinicians' behavioural intention (Eccles, Grimshaw, et al., 2007; Eccles, Johnston, et al., 2007), leaving 70% of behavioural intention unexplained. Researchers interested in shifting nurses' behaviour must look to other potential influences on behavioural intention. The consistent positive association between nurses' attitudes and beliefs and implementation of evidence informed practice, provides a basis from which to explore this mechanism. Connor and Armitage (1998) provide two possible explanations for how attitudes shape behaviour. The first relates to motivation and opportunity – highly motivated individuals think in a deliberate fashion and generally plan their behaviour based on their attitudes. Individuals who have a positive attitude toward performing anxiety assessments will reflect on the behaviour and in conjunction with other influences such as subjective norms and perceptions of control will form an

intention about how to behave. Implementing the behaviour relies on volition or effort which is influenced by a continued commitment to a goal or persistence in the face of obstacles. In this manner implementation is more a function of how hard individuals are willing to try to perform the behaviour. Connor and Armitage refer to this *as implementation* intentions which speak specifically to how hard people are willing to try to perform a behaviour. For example, responding to the statement "I will perform anxiety assessments" in contrast with the statement "I intend to assess and document my patient's anxiety using an anxiety assessment tool every shift" takes the intention beyond a general commitment to a specific implementation action. Making *implementation* intention is one way in which the individual passes control to the environment in terms of accepting environmental cues for action. This may explain why linking implementation plans to opportunities, through either provision of resources or support leads to positive intentions and behaviour.

The second explanation provided for the effect of attitudes on behaviour relates to conditions where no motivation or opportunity exist and it is believed that attitudes impact behaviour in a more spontaneous process (Conner and Armitage, 1998). In this scenario attitudes are automatically activated in the presence of an attitude object; that is, previous memories once activated will shape the perception of a situation as either positive or negative and result in behaviour that is congruent with the attitude. Thus in conditions where nurses lack motivation or have little support in their environment for performing evidence informed practice change, implementation is unsuccessful. This helps to explain the finding that nurses' attitudes and beliefs are the strongest predictors

of implementation of evidenced-informed practices. In summary, these mechanisms offer an understanding of how the practice environment or setting where nurses work not only shapes attitudes and social norms as previously argued, but can also independently influence intention through environmental cues to support behaviour or through a lack of opportunities for practice changes to occur.

As argued previously, a broader examination of the practice environment or setting has led some researchers to assert a significant impact of context on practice (Graham & Logan, 2004; Lee, Back, Block, & Stewart, 2002; Saliba et al., 2003; Vaughn, Sarrazin, Saleh, Huber, & Hall, 2002). Building on Azjen's (1991) assertion regarding the importance of contextual elements of behaviour, and having a deeper understanding of the potential mechanisms by which environmental influences can impact on implementation, I propose that adding context as a fourth component of the TPB may enhance the predictive validity of the TPB model.

Context and Behaviour

Context as it relates to implementation of evidence informed practice changes is a complex, multidimensional concept (Greenhalgh, Robert, Bate, Kyriakidou, McFarlane, & Peacock, 2004; McCormack et al., 2002; Meijers et al., 2006; Thompson et al., 2008; Wallin, Ewald, Wikblad, Scott-Findlay, & Arnetz, 2006). As argued previously, researchers interested in understanding implementation have begun to view context as influencing the adoption of practice changes, although how this is conceived is not well understood (Dobbins, Ciliska, & DiCenso, 1998; Estabrooks, Wallin, & Milner, 2003;

Estabrooks, Floyd, Scott-Findlay, O'Leary, & Gushta, 2003; Rycroft-Malone & Stetler, 2004). McNulty and Ferlie (2002) argue that context consists of three levels: the macro-level context of the public sector, the meso-level context of the organizational level, and the micro-level context of the unit, where emphasis is on the history and dynamics of activity within particular settings within the hospital. This finding is supported by Dopson et al., (2002) who suggest that while context influences the use of evidence-informed practices it is poorly understood and operates on many levels, local, organizational and government policy levels.

Greenhalgh, Robert, Bate, Macfarlane, and Kyriakidou (2005) conducted an extensive review of the empirical literature to determine whether there was support for macro-, meso-, and micro-level influences on adopting an evidence-based approach to adopting innovations into health care organizations. They grouped macro-level influences into "outer context" and combined meso- and micro-level influences into "inner context." They found limited evidence within the health care sector for the influence of macro-level variables, such as incentives, interorganizational competition, and networks (i.e., effects, although positive, were of small magnitude). They found support for the impact of policy making on decisions to adopt an innovation and on its successful implementation. At the meso-level, these researchers examined the impact of visible organizational structure and culture on adoption of innovations, citing the work of Pettigrew and Whipp (1992), who found that a "receptive context" for change was positively and consistently associated with organizations that often adopted innovations, organizational structural complexity, organizational size, and leadership support. Pettigrew and Whipp identified eight distinct

but interrelated attributes of such "receptive contexts," including (1) high-quality and coherent local policy; (2) key people leading change at all levels of the organization; (3) a supportive organizational culture; (4) managerial-clinical relations; (5) simplicity and clarity of goals for change; (6) cooperative interorganizational networks; (7) a clearly and widely communicated change agenda; and (8) external pressures for change.

At the micro-level, the notion of a receptive context refers to the willingness of persons and the groups of which they are members to accept the change agenda. This notion is similar to Tregunno's (2005) description of recursive interaction and speaks to how context shapes, and is shaped by, the ongoing activities of organizational members. Accordingly, an individual contributes to context in showing a willingness to change, and they are influenced by it, through encouragement and support to embrace the change. This notion of receptive context is essential to understanding how individual-group interactions work together to influence adoption of practice changes. While context operates at multiple levels, it is at the micro-level of context that individuals experience its effects; thus, this thesis is focused on understanding the effects of the micro-level context of practice on individuals' use of evidence-informed practices.

Dopson et al. (2002) conducted a secondary analysis of a group of seven comparative case studies involving 1,400 interviews across 49 cases to explore reasons clinicians used or did not use research evidence in the practices they adopted. They identified a number of characteristics of a receptive context, including a history of good relationships between professional groups and between professional and managerial groups; sustained managerial support for a clearly defined change at a local level; a

supportive local organizational culture, along with clear goals for change and appropriate resources; effective and good-quality relationships within and among local groups; opportunities to share information and ideas within the local context; and a history of changes that foster improved and effective interchanges among groups. Receptive context for practice change has some support within the nursing literature. Early studies on barriers to adopting evidence-informed practices among nurses have identified a lack of organizational support for applying evidence-informed practices, including lack of time, resources, authority, and cooperation (French, 2005). At the individual level, studies have examined nurses' perceptions of support (i.e., from colleagues, physicians, and unit managers) and their reported use of evidence-informed practices (Champion and Leach, 1989; Hatcher and Tranmer, 1997; Lacey, 1994). However, these studies did not consider the influence of contextual factors (e.g., peer support, interprofessional relationships, or supportive leadership). More recently, research has confirmed the importance of organizational context in nurses responding favourably to organizational efforts to induce them to adopt evidence-informed practices (Cummings, Estabrooks, Midodzi, Wallin, & Hayduk, 2007; Dobbins et al., 2005; Meijers, et al., 2006; Pepler et al., 2005; Scott-Findlay & Golden-Biddle, 2005; Stetler, 2003). Nevertheless, this research has fallen short with respect to identifying the most influential elements of context or explaining how context may influence behaviour related to evidence-informed practice.

One of the challenges to date in understanding the contextual influences on implementation is how context has been operationalized and studied. Within the nursing literature, the setting in which a proposed change is to occur has been described and

studied from various perspectives. Early work using Roger's diffusion of innovations theory (Rogers, 2003), focused on describing organizational characteristics associated with nurses' use of research evidence. Organizational characteristics found to be positively associated with adoption of innovations include organizational size, location (urban versus rural), complexity (number of services offered), functional differentiation (number of divisions), culture, internal communication channels and decision-making processes (Dobbins, Ciliska, Cockerill, Barnsley, & DiCenso, 2002). Cummings et al. (2007) found that hospital size was the factor positively associated with nurses' use of evidence accounting for 4% of the explained variance. While organizational structural characteristics may be associated with evidence-informed practice, many of these characteristics are not modifiable and thus while providing description do not provide guidance for designing implementation strategies.

Nurses' work environments have been a focus of research since the 1980's when the American Nurses Association commissioned a study of hospitals known to attract and retain qualified nurses (McClure, Poulin, Sovie, & Wandelt, 1983). Practice environments associated with these "magnet hospitals" have factors that emphasized decentralization in decision making, promoted autonomy and control over the practice setting, fostered good nurse-physician relations, and provided flexible scheduling and adequate staffing. Quality practice environments have consistently been associated with higher job satisfaction among nurses (Brady-Shwartz, 2005); lower rates of burnout or emotional exhaustion (Laschinger, Shamian, & Thompson, 2001); higher perceptions of quality care (Laschinger, Almost, & Tuer-Hodes, 2003); and lower rates of absenteeism

and turnover (McGillis-Hall, 2005); improved team collaboration, specifically related to nurse-physician communication (Doran, 2005); and higher rates of nurse autonomy and decision-making (Tranmer, 2005).

Kramer and Hafner (1989) designed the Nursing Work Index (NWI) as a 65-item instrument designed to capture all of the elements associated with magnet hospitals and found it to be predictive of nurses' job satisfaction and productivity. Aiken and Patrician (2000) revised the NWI (NWI-R) selecting 56 of the 65 NWI items and developing three subscales derived to measure nurse-physician relationships, control over practice setting and autonomy deemed to best reflect nurses' professional practice environments and found it to discriminate between magnet and non-magnet hospitals. Estabrooks et al. (2002) used exploratory factor analysis to analyse the results of NWI-R data on a subset of Canadian nurses and devised a single-factor Professional Environment Scale (PES). Recently, researchers have begun to link factors associated with quality practice settings derived from items on the PES-NWR and have linked them to elements within the PARiHS framework to represent contextual variables that may influence nurses' evidence-informed practices (Cummings, et al., 2007; Wallin et al., 2006). One of the main challenges in using this approach is that not all sub-elements of context as described in PARiHS are captured by the PES-NWR items. Additionally, the researchers who used this method did not explain how they made the theoretical links between the items in the PES-NWI and PARiHS elements.

As argued previously, PARiHS is a relatively comprehensive framework from which to study implementation of evidence-informed practice changes. Drawing from the

PARiHS framework, McCormack et al. (2002) refer to context as the environment or setting in which the proposed change is to be implemented. Following an extensive review of the literature on context, they concluded that context is composed of three interrelated elements, ranging from weak to strong: *leadership*, *culture*, and *evaluation* (i.e., methods for evaluating effectiveness). They argue that all three of these contextual elements must be strong for success to be achieved in change efforts to implement evidence-informed practices (McCormack et al., 2002). Contexts with strong leadership have clear role boundaries, effective teamwork, and effective organizational structures; they also have members of staff involved in decision making who are open to learning (McCormack et al., 2002). Strong leadership is instrumental in successful change and overall organizational performance (Tourangeau, 2003). Leadership is critical to nurses' decision-making processes (Angus, Hodnett, & O'Brien-Pallas, 2003) and to creating a culture of evidence-informed practice (Stetler et al., 1998). Leadership and collaboration are associated with the implementation of clinical practice guidelines (Gifford, et al., 2006; 2007) and with sustaining their use (Davies et al., 2002).

Culture consists of the beliefs, values, consistency in values, and receptivity to change among members of a group (McCormack et al., 2002). An organizational culture that encompasses interprofessional collaboration, communication, teamwork, conflict resolution, and shared beliefs about the utility of evidence and guidelines have been shown to influence adherence to evidence-informed practice changes (Kitson et al., 1998; Pepler et al., 2005; Rycroft-Malone et al., 2002; Scott-Findlay & Golden-Biddle, 2005; Varacoe & Hilton, 1995).

Evaluation refers to feedback mechanisms at the individual and the organizational level, sources of measurement, such as using financial and operational data, and data related to the patient's experience of practice (McCormack et al., 2002). An auditing of practices coupled with a feedback mechanism is one of the most common aspects of interventions aimed at getting health service providers to adopt evidence-based clinical practices (Grimshaw et al., 2004). Although they seem to have modest effects with physicians (Jamtvedt, Young, Kristofferson, O'Brien, & Oxman, 2006), they are less studied among nurses. Nevertheless, audit and feedback alone (Duncan & Pozehl, 2001), or together with other implementation strategies (Cheater et al., 2006), can have a positive effect on nursing practice.

Generally, environments associated with the adoption of evidence-informed practices have (a) clearly defined boundaries and structures; (b) clear decision-making processes; (c) clear patterns of power and authority; (d) access to resources; and (e) access to information and feedback systems and are receptive to change (McCormack et al., 2002). Meijers et al. (2006), in an integrative review of studies on implementation of research use among nurses, found that contextual factors, including culture and leadership, showed positive associations with use of research findings, but the particular set of context factors so identified varied across studies. Cummings et al. (2007) found a positive but weak association between context (i.e., culture, leadership, and evaluation) and adoption of research-based practices among nurses. Estabrooks et al. (2008) examined patterns of research use in patient care units, identifying units that demonstrated either high or low levels of research use, concluding that units with high

levels of research use had, on aggregate, nurses with more positive attitudes about research use, perceived authority to use research, and highest mean unit context scores (as measured by importance of access to continuing education, work values of creativity and efficiency, questioning behaviours, and coworker support). Taken together, these findings suggest a positive relationship between context and use of research/evidence-based clinical practices.

In summary, there is beginning evidence to support that contextual factors as described by PARiHS may influence nurses' use of evidence-informed practices. Operationalizing the concept of context has been challenging due to variation in the manner in which it has been defined and the tools used to measure it. McCormack et al. (2009) have developed and tested the CAI, which measures culture, leadership and evaluation. The five factors associated with these three elements of context are: culture (collaborative practice, evidence-informed practice), leadership (respect for persons, practice boundaries), and evaluation (evidence-informed practice and evaluation). While this survey has been subjected to initial validity testing, there is a need to test it more broadly in nursing. Nevertheless, the CAI, to date represents the most comprehensive attempt to operationalize context and has been selected for use in this study.

Behavioural Intention or Behaviour

Implementation research is concerned with the factors that influence the use of evidence to inform practice. Researchers who use the TPB are interested in the link between attitude, subjective norm, perceived behavioural control, behavioural intention, and actual behaviour. Measuring clinician behaviour is often not feasible through direct

observation, and establishing rigorous behavioural measures is difficult and costly (Eccles et al., 2006). Proxies such as clinician self-report, medical record audit, and patient report are commonly used measures of clinician behaviour. However, a recent systematic review of the evidence relating to the relationships between direct measures and proxy measures of clinical behaviour found that the validity of these measures is inconclusive (Hrisos et al., 2009). Two reviews that have evaluated the efficacy of the TPB in explaining clinical performance have found a positive relationship between clinicians' self-reported intention and behaviour (the maximum R^2 reported was 0.44). They also reported that the strength of this relationship varied with how behaviour was measured (Eccles et al., 2006; Godin, Naccache, Morel, & Ébacher, 2000). Hrisos et al. (2009) argue that at least some of the discrepancy between intentions and behaviour can be explained by error attributable to unreliable measures of behaviour. Given these challenges, Eccles et al. (2006) argue that intention is a valid proxy measure for behaviour in the development of implementation interventions. Thus, measuring nurses' behavioural intention has been selected as the final outcome measure for the current study because of the difficulty in establishing a direct measure of nurses' behaviour in clinical settings and the lack of validated proxy measures of clinical behaviour.

Study Hypotheses

Connor and Armitage (1998) argue that the TPB can be expanded provided there is empirical support for a variable influencing intention and/or behaviour beyond that explained by the three core components. Cognitive perceptions of context may influence behavioural intention; thus, the purpose of this research was to determine whether the

addition of context as a fourth component of the TPB contributes positively to predicting behavioural intention (see Figure 2).

The following hypotheses were tested:

H1: There is a positive association between organizational context (i.e., culture, leadership, and evaluation) and nurses' behavioural intentions to use anxiety assessment tools with their patients.

H2: Organizational context provides incremental prediction of nurses' behavioural intentions to use anxiety assessment tools with their patients beyond the three TPB components of attitude, subjective norm, and perceived behavioural control.

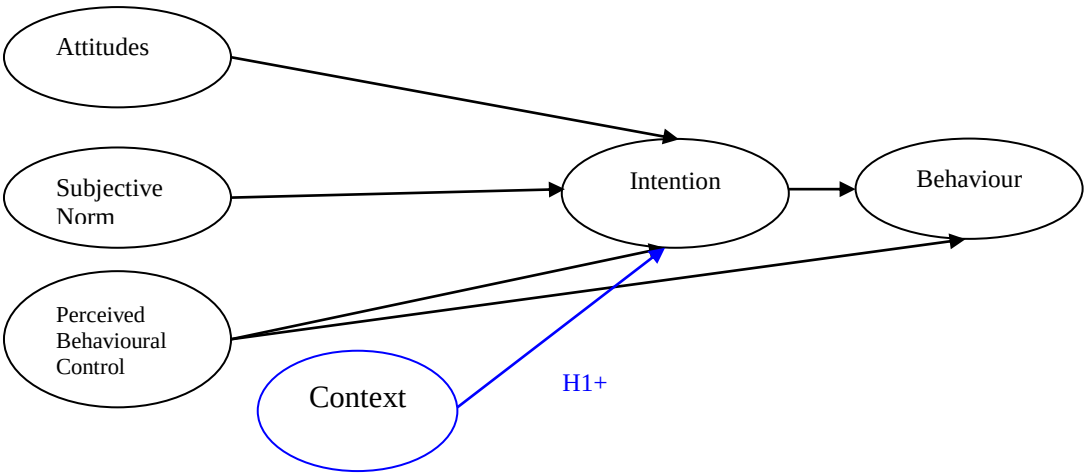

Figure 2. Modified Theory of Planned Behaviour (Adapted from Ajzen, 1991)

Summary

Nurses who use a standardized patient anxiety assessment tool can improve their recognition of illness-related patient anxiety and its management. However, there exists a lack of knowledge about how best to assess and manage anxious patients among nurses

working in non-psychiatric acute care settings. The identification of evidence-informed practices to assess and manage illness-related patient anxiety is insufficient to change nurses' practice and improve patient outcomes. An exploration of the literature related to implementation of evidence-informed practice reveals that changing nurses' practice behaviours is a challenge, and there is little compelling evidence on how best to proceed with implementing practice changes. This has prompted the call for theory to guide the design and study of implementation efforts.

A critical review of the literature about reported barriers to evidence-informed practices reveals empirical support for including individual and organizational factors in the study of implementation efforts. Currently there is no implementation framework or theory that provides a comprehensive understanding of how individual and organizational level factors combine to shape nurses' intentions to use evidence-informed practices. Two theoretical frameworks that have shown promise are the TPB, which focuses on individual determinants of behaviour, and PARiHS, which focuses on the nature of the evidence, the context in which the change is to take place, and the type of facilitation used to induce change. Critical examination of the PARiHS framework and the TPB reveal that the framework and theory can be used as heuristics to guide implementation efforts from different perspectives. Additionally, these heuristics intersect around the concept of context.

Evidence suggests that context is influential in nurses' evidence-informed practices; however, current understanding of the factors associated with context reveal it to be a multi-level complex concept that is poorly understood. An argument has been

made that nurses experience context at the micro-level where they interact with their clinical practice setting. To date, the best representation of this view of context is provided by the CAI, which has been developed using the PARiHS framework.

The addition of context as a concept to the TPB holds promise for significantly improving the predictive ability of this theory and to the empirical support for its inclusion within the PARiHS framework. The current study attempts to address a gap in our understanding of the relationship between context, attitudes, subjective norms, perceived behavioral control and nurses' intention to adopt evidence-informed practices.

CHAPTER 2

RESEARCH DESIGN

This chapter describes the methods used to conduct the study. The first part of the chapter reviews the context of the study and its design, including sample size. The second part provides a definition of the study variables and instrumentation. The chapter concludes with a discussion of ethical considerations in conducting this research, recruitment of participants, and data collection procedures.

iCAMIRA Project

As part of a larger ongoing project, all health care professionals working on one of seven medical and/or surgical units of an acute care hospital in southern Ontario were provided with an opportunity to be exposed to an educational intervention founded in TPB and aimed at improving the assessment and management of patients' illness-related anxiety (iCAMIRA project). The iCAMIRA project was conceived as a method to improve the organization's performance related to patient satisfaction with provider communication, specifically nurses' and physicians' abilities to address patient anxieties and fears. The project was led by a research team (a psychiatrist, a clinical nurse specialist in psychiatry and me as the principle investigator). The educational component of the project became part of the organization's nurses' annual educational plan. In keeping with the organization's existing human resource policies, nurses were paid for the time they spent completing the educational component. The project was supported by the executive team, specifically the Senior Vice President, Patient Services and Chief Nurse Executive who has oversight for all nursing and allied health professionals.

The iCAMIRA project was designed to develop, deliver and evaluate an interprofessional educational initiative aimed at teaching health care providers (HCP) to use a standard approach to assessing and managing hospitalized patient's anxiety. The details of the study are reported elsewhere and a facilitation guide describing the methods and associated learning materials used for the educational intervention has been developed and available for dissemination. The project consisted of conducting a literature review to identify and adapt a patient anxiety assessment tool for use with hospitalized non-psychiatric patients in an acute care setting (Maunder, 2009). The project lead worked with a group of interprofessional clinical experts to develop standards for using the anxiety assessment tool and to develop and deploy an electronic version of the tool which was embedded in the daily shift assessment form of the patient electronic record. The standard adopted by all professional groups was that nurses would routinely assess and document their patients' anxiety, and select interventions using the electronic tool. All HCPs (if they chose) had the ability to assess and document patient anxiety using the electronic tool; however, this became a standard for nursing staff working on medical and surgical units. The rationale for these decisions has been provided in the background of the research proposal. The iCAMIRA Project consisted of four phases as follows:

Phase 1: Design of Theory-guided Educational Intervention.

The Theory of Planned Behaviour (TPB) was used to design an educational intervention and pilot test a survey that was developed to measure HCP's behavioural intentions to use a patient anxiety assessment tool. The content for the TPB based educational intervention

was generated using an elicitation study. This consisted of using a subset of the target HCP population to collect information about their commonly held attitudes, normative beliefs and perceptions of control regarding their perceived responsibility for conducting patient anxiety assessments. This approach was used because it has been found to be effective in developing educational interventions targeted at heightening HCPs' intentions to use new medical techniques (Schoening, Greenwood, McNichols, Heermann, & Agrawal, 2004; Townsend et al., 2003; Valois, Turgeon, Godin, Blondeau, & Cote, 2001) and it is believed to be more effective in designing educational sessions aimed at inducing nurses to conduct anxiety assessments than traditional methods of instructional design (Casper, 2007). The results of the elicitation study were used to develop the specifics of the educational intervention.

The educational intervention consisted of a self-directed web-based learning module that included: a) content about the concepts of interprofessional collaborative practice and patient and family centred care; b) content about illness related anxiety; c) instructions about how to administer and score a patient anxiety assessment tool – the *Observer Rating Scale for Patient Anxiety (ORSPA: Appendix A*) as adapted by Maunder (2009); and d) how to interpret scores on this scale. The module was developed by the research team with the help of a curriculum designer and in consultation with a group of clinical experts. The web-based learning module was completed through the hospital's Learning Management System in an average of approximately 2.0 hours. A quiz was attached to end of the module, designed to ensure that participants were familiar with key concepts. A score of 80% or greater was needed for the successful completion of the

module. Individuals who did not attain a score of 80% were required to 'review' the content and re-take the quiz.

The module was made available to participants in late October, 2009 with the stipulation that participants complete the module prior to attending a 4-hour workshop. Completion of the Web-based module was verified prior to registration for the 4-hour workshop. The workshop used a standardized patient (SP) protocol; wherein, an individual who had been trained to act as a "typical" patient presented with a specific group of symptoms throughout their interaction with a healthcare professional (Adamo, 2003). These workshops, consisting of 3 stations, were offered over 14 weeks from November 2009 through February 2010. At each station participants assigned to pairs each took turns each interacting with or observing their partner interact with a "standard patient" who exhibited symptoms of mild, moderate or severe anxiety. Thus each individual had 6 interaction/observation opportunities to practice and receive feedback on the skills taught in the web-based learning module. Participants attended a debriefing session following the workshop where they had further opportunity to reflect on their experiences, seek clarifications or express concerns.

A total of 389 HCP's were working across seven inpatient medical and surgical units. Of this number 250 nurses, 8 occupational therapists, 13 physiotherapists, 11 social workers and 14 pharmacists completed both the Web-based module and SP workshop education. Thus we had a training participation rate of 89.5% meaning that 89.5% of staff working on the study units had completed the training and attained a minimum test score of 80% on the Web-based module.

Phase 2: Evaluating the effectiveness of the educational intervention.

The effect of the educational intervention (i.e., completion of the Web-based module and the SP workshop) was evaluated based on changes in nurses' attitudes, subjective norms, perceived behavioural control and their behavioural intentions to use a patient anxiety assessment tool. The standard nursing practice for patients admitted to a medical or surgical unit consists of a daily physical 'head-to-toe' assessment. Patient anxiety may be assessed and documented, but there was no standardized approach for doing this or accepted standard for documentation in the health care record. To measure the effectiveness of the intervention on nurses' intention to perform anxiety assessments, a survey was administered to participants at baseline (T1) prior to the educational intervention and immediately following the educational intervention (T2). All staff members were offered the opportunity to attend the educational sessions; however, they were invited to participate in this study by agreeing to complete the surveys.

Phase 3: Medical Record Audit

The ultimate goal of the iCAMIRA project was to improve the assessment of illness-related anxiety performed on patients admitted to medical or surgical units at an acute care hospital in southern Ontario. The number of patients who had anxiety assessments documented in their medical records was used as an additional measure of effectiveness. A medical record audit was conducted of all admitted patients at three separate times at 1 week intervals, in the month prior to advertising the educational intervention. The medical record audit, using the same method, was repeated 1 month following the

completion of the intervention and at 6 months following the intervention to assess the sustainability of the change. The percentage of completed patient assessments was calculated as the number of completed assessments divided by the number of patients eligible for assessment. Before and after intervention percentages were compared to detect a change.

Phase 4: Predicting Behavioural Intention

In Phase 4, an assessment of the influence of context, beyond the TPB components of attitudes, norms, and perceived control to predicting nurses' intentions to use anxiety assessment tools was conducted. In Phase 2, a tool for assessing context was added to the post-intervention surveys, which were completed by participants after they had attended the standardized patient workshop. Only responses to the post-intervention surveys completed by registered nurses were analyzed in hypothesis testing.

Sample Size

The proposed study design included eight independent variables: (1) age; (2) gender; (3) years of experience; (4) unit of hire; (5) attitude (ATT); (6) subjective norm (SN); (7) perceived behavioural control (PBC); and (8) context (CAI). Streiner and Norman (2008a) recommend 10 to 15 participants for each independent variable included in a regression model; thus, the minimum sample size was calculated as 80 participants to ensure an adequate case to variable ratio. A total of 341 nurses were available to participate in the educational intervention, and given that there were no data available on participation rates for nurses in this organization, a 50% participation (i.e., N = 171) rate was assumed based on Streiner and Norman's (2008b) recommendations.

Definition of Variables

This section provides an overview of the variables studied and their definitions. This is followed by a discussion of the measurement instruments.

Independent Variables

Attitude. Attitude (ATT), as measured here, reflected nurses' beliefs about the importance of conducting patient anxiety assessments and their evaluation of the positive or negative consequences of conducting these assessments. Attitude was measured using a four-item, 7-point response scale. The potential score ranged from 4 to 28, reflecting a global attitude score. Questions in this scale were as follows:

2-Q1: I think assessing a patient's anxiety is harmful (reverse scored).

2-Q2: Assessing a patient's anxiety is a pleasant task to complete.

2-Q3: I think assessing a patient's anxiety is the right thing to do.

2-Q4: I think assessing a patient's anxiety is good practice.

Subjective norm. Subjective norm (SN) is defined as a person's estimate of the social pressure to assess a patient's anxiety using a standardized assessment tool. Subjective norm was measured using a three-item, 7-point scale with possible scores ranging from 3 to 21. Questions included the following:

2-Q5: Most people who are important to me think that I should NOT assess patients' anxiety (reverse scored).

2-Q12: It is expected of me that I assess patients' anxiety.

2-Q7: I feel under social pressure to assess patients' anxiety.

Perceived behavioural control. Perceived behavioural control (PBC) is defined as the extent to which a person feels capable of performing the anxiety assessment using the standardized tool. This is achieved by assessing nurses' self-efficacy (i.e., perceived degree of difficulty and confidence in performing a task) and beliefs about control over the behaviour (i.e., perception that performing the behaviour is under personal control). Perceived behavioural control was measured using a three-item, 7-point scale with possible scores ranging from 3 to 21. Questions in this scale included the following:

2-Q8: I am confident that I can assess my patients' anxiety.

2-Q10: For me to assess my patients' anxiety is easy.

2-Q9: Whether I assess my patients' anxiety or NOT is entirely up to me.

Context. Context is defined as consisting of culture, leadership, and degree of support for evaluating nurses' effectiveness. It was measured using the Context Assessment Inventory (CAI), which consists of 37 items, each assessed on a 4-point scale (with possible scores ranging from 37 to 148). Examples of some of the items in this scale include the following (all positively keyed):

3-Q1: Personal and professional boundaries between health care providers are maintained.

3-Q8: There are good working relations between health care team members.

3-Q21: Challenges to practice are supported and encouraged by nurse leaders and nurse managers.

3-Q32: Guidelines and protocols based on evidence of best practice are available.

3-Q33: Patients are encouraged to participate in feedback on care, culture, and systems.

Dependent Variable

Behavioural intention. Behavioural intention (BI) is defined as the nurse's intention to assess and document patients' anxiety using the standard anxiety assessment tool. This variable was measured using a three-item, 7-point scale of nurses' general intention to perform the behaviour. It produces a single score, ranging from 3 to 21, which represents the nurse's agreement or disagreement with the intention to complete anxiety assessments on their patients. Examples of the items in this scale include the following (all positively keyed):

2-Q6: I expect to assess and document my patient's anxiety every time I do a "head-to-toe" assessment.

2-Q11: I want to assess and document my patient's anxiety every time I do a "head-to-toe" assessment.

2-QI3: I intend to assess and document my patient's anxiety every time I do a "head-to-toe" assessment.

Demographic Variables

Basic demographic information, and information related to employment and experience characteristics such as age, sex, length of professional designation, and unit of hire was collected.

Instrumentation

The iCAMIRA Survey (see Appendix B) used in this study consisted of three sections. Section one included questions about demographic variables; Section 2 consisted of a tool to measure nurses' attitudes, subjective norms, perceived behavioural control, and behavioural intention; and Section 3 comprised of the CAI (McCormack, McCarthy, Wright, Slater, & Coffey, 2009).

Theory of Planned Behaviour Survey

As there was no pre-existing tool to measure nurses' motivational factors and intentions to perform anxiety assessments using an anxiety assessment tool, items measuring variables from the TPB were derived from previously recommended scales and items. Table 1 provides a summary of the tools used for the development of TPB items in the iCAMIRA Survey. Items were adapted from those used in previous studies and according to Francis et al.'s (2007) guidelines for developing a survey based on the TPB. There is no direct measure of this instrument's psychometric properties; however, as part of Phase 1 of the iCAMIRA project, face and content validity were established using feedback from clinical experts who provided content expertise for the development of the practice standard and the educational intervention. Eight advanced practice nurses reviewed and completed the survey and provided feedback on the style, clarity of content, and length of time for completion. Their feedback guided the development of the survey instruments.

Table 1. Summary of Study Characteristics and Properties of Instruments Used

Study	*1. Types of Participants 2. Country 3. Sampling Strategy*	*Participants Approached and Analyzed* *N*	*n*	*%*	*Target Behaviour*	*Measure of Intention 1. Description 2. Reliability*	*Measure of Behaviour*
Godin et al. (2000)	1. Nurses 2. Canada 3. All approached	238	105	44	Adherence to Universal Precautions (UP) for venipuncture (VP)	1. 4-item, 7-point scale 2. 0.82*	Frequency of adherence to UP for last 10 VPs performed self-report
O'Boyle et al. (2001)	1. Nurses 2. USA 3. All approached	474	120	25	Adherence to hand hygiene (HH)	1. 5-item, 7-point scale 2. 0.74*	% times practiced HH self-report observation
Bernaix (2000)	1. Nurses 2. USA 3. not reported	52	49	94	Provision of maternal support for breastfeeding	1. 3-item, 7-point scale 2. 0.93*	46-item checklist self-report patient report
Renfroe (1990)	1. Nurses 2. USA 3. All approached	130	108	78%	Documentation of patient education	1. 2-item, 7-point scale 2. 0.66**	20-item checklist, no. of items documented

*Cronbach's alpha. **Correlation coefficient.

The Context Assessment Inventory (CAI) Survey

The CAI was developed and tested using a five-stage design by McCormack et al. (2009). The CAI operationalizes the elements of context in terms of five factors: collaborative practice, evidence-informed practice, respect for persons, practice boundaries, and measures of effectiveness. These have been theoretically linked to the elements of context—culture, leadership, and evaluation—defined within the PARiHS framework

(McCormack et al., 2009). Culture includes collaborative practice and practice boundaries. Leadership includes respect for persons. Evaluation incorporates the evidence-informed practice and evaluation factors.

McCormack et al. (2009) used a test–retest approach to assess reliability at the item level. Consistency in item response between T1 and T2 (separated by 2 weeks) exceeded the 25% level expected on chance alone (given the 4-point Likert-scale format). Specifically, two-thirds of the items showed an agreement of 64%, with 30% having agreement levels of 70% or higher. Items with levels of less than 55% were removed from the final list. The Cronbach's alpha score for the survey was estimated at 0.93, and all five CAI factors achieved an estimated level of internal consistency ranging from 0.78 to 0.91. These survey items were reviewed by clinical experts involved in the iCAMIRA project, who found the survey questions to be descriptive of the adult acute care setting. Slight wording changes were recommended to adapt the items to an organizational context. For example, references to unregulated health care workers were removed as they do not exist in the organization studied.

Participating nurses worked on one of seven units within the same organization. Researchers have defined context as occurring at both unit and organizational levels, with the potential for context being expressed differently at each level (Cummings et al., 2007; Dobbins et al., 2005; Estabrooks et al., 2008; McCormack et al., 2002; Meijers et al., 2006). The CAI is a global measure of context and has not been demonstrated to discriminate between unit and organizational levels (McCormack et al., 2009). Although there is no compelling theoretical basis to support or guide decisions about the unit of

analysis for which the CAI is best suited, McCormack et al. (2009) considered the CAI appropriate for use at the unit level. Accordingly, context, as measured by the CAI, was defined as a unit-level phenomenon. Evaluating between-unit differences for each variable helps determine the effects of unit membership on the study variables. Thus, between-unit differences for all study variables were assessed to determine the necessity of post hoc analyses.

Ethical Considerations

The iCAMIRA study protocol received approval from the ethics review board of the study organization. Ethics approval for Phase 4 of the iCAMIRA project (the current study) was received from McMaster University. As part of the iCAMIRA project, all nurses and members of the allied health team were required to participate in the educational intervention (Web-based module and SP workshop). Consistent with hospital policy, members of staff were paid for completing the web-based module and their attendance at the workshop.

Recruitment and Data Collection Procedures

All staff members attending the educational session were invited to participate in the study. Information about the required educational session was provided to staff by their managers at staff meetings, and staff registered for the educational sessions. Once registration was confirmed, staff members were sent an e-mail letter/text describing the study and requesting participation in Phase 2 of the iCAMIRA study (Appendix C). This message was sent to participants at least 1 week prior to the release of the Web-based module. Immediately before the release of the Web-based module, participants were sent

a survey package that included a second copy of the letter requesting participation (see Appendix C), a consent form (Appendix D), and a copy of the iCAMIRA Survey (see Appendix B).

Registration into one of the SP workshops was contingent on participants completing the Web-based module. Following registration in the workshop, the participants were again sent an e-mail confirmation and an e-mail letter/text inviting them to participate in the study. On the day of the SP workshop, the study's research coordinator met with the participants prior to the workshop to deliver the second survey package (letter requesting participation – Appendix C; consent form – Appendix D; and the iCAMIRA Survey – Appendix B). Participants were given at least 25 minutes to review the materials before the beginning of the workshop. Participants were provided time following the completion of the workshop for participants to complete the iCAMIRA Survey. They were asked to place the surveys in an envelope which were collected at the end of the workshop by the research study coordinator.

For the purpose of linking pre- and post-survey results, participants were assigned a numerical code. A master list of numerical codes was created for this study. This list was accessible only to the research study coordinator and was destroyed once the data were linked. Only data collected from the nurses who agreed to participate in the study following the SP workshop were analyzed for the purpose of this doctoral thesis.

All data have been reported in aggregate form. Unit identifiers were collected to allow description of the distribution of study participants and for assessing the impact of unit membership on the study variables. All original survey data are stored in a locked

file in the researcher's office. The results from the completed surveys were transcribed into password-protected electronic files available only to the research team.

Summary

An educational intervention designed to teach participants to use an anxiety assessment tool was offered to staff working on one of seven nursing units in an acute care hospital. Participants were invited to complete a survey following the educational intervention. In addition to basic demographic data, the survey was designed to measure participants' attitudes, subjective norms, perceived behavioural control, and intentions to perform anxiety assessments. Additionally, a context assessment index was included in the survey to measure participant's assessment of the work settings.

CHAPTER 3

DATA ANALYSIS PLAN

The first part of this chapter reviews data management procedures including data entry, verification, scale standardization, and treatment of missing data. The second part describes procedures used to test the data assumptions underlying the multivariate analyses. The third part describes the study participants and scale reliability assessments. The chapter concludes with a discussion of the statistical analyses used in testing the study hypotheses.

Data Entry, Verification, and Standardizing Scales

The survey results were entered on an Excel spreadsheet by the research study coordinator, and approximately 10% (18) of the surveys were randomly selected for data verification. No data entry errors were found. The data were entered into Predictive Analytic Software (PASW) version 18.0 (Chicago, IL, 2010). A data verification protocol was conducted consisting of performing frequency reports on each data element to determine any obvious outliers (Pallant, 2005; Tabachnick & Fidell, 2007). The individual item scores in the TPB and context surveys were recoded, with high scores representing agreement with the question. As there was a scaling difference between the items in the TPB survey (7-point scales) and the items in the CAI (4-point scales), the scores on the scale variables were converted to a standardized distribution (z-scores) (Harwell & Gatti, 2001).

Missing Values Analysis

The data set was screened for missing data. Missing data may increase the risk of bias

and minimize the generalizability of the results (Cohen, Cohen, West, & Aiken, 2003). The amount of missing data dictates which statistical procedures can be used to replace the missing data (Tabachnick & Fidell, 2007).

Missing values analysis (MVA) was used to assess the impact of missing data on the study results and to replace them. The MVA consists of calculating the percentage of data missing for each variable, and then t-tests are performed for the variables with missing data to test if "missingness" is related to any other variables at alpha = 0.05 (Leech, Barrett, & Morgan, 2008; Tabachnick & Fidell, 2007). According to Tabachnick and Fidell (2007), when less than 5% of the data is missing randomly from a large data set (greater than 30 cases), almost any procedure for handling missing values yields a similar result (p. 63). Mean substitution was used to replace missing data because it does not change the mean for the distribution of the whole variable (Cohen et al., 2003; Tabachnick & Fidell, 2007). Following imputation, the frequencies for each item were re-examined to verify that there were no errors in the final data set.

Outliers

The data were also assessed for the impact of outliers (Tabachnick & Fidell, 2007). Outliers were evaluated using the Mahalanobis distance value, defined as "the distance of a case from the centroid of the remaining cases where the centroid is the point created at the intersection of the means of all of the variables" (Tabachnick & Fidell, 2007, p. 74). To test for the impact of outliers, PASW regression analysis was completed, which calculates the Mahalanobis distance value for each data point. Cases identified as outliers, were assessed individually to determine their impact on the total data set.

Testing Assumptions of Multivariate Analyses

Underlying the multivariate analyses and statistical tests is the assumption that all of the variables are normally distributed. The following section describes the procedures undertaken to assess multivariate normality, linearity, homoscedasticity, and collinearity.

Statistical assumptions of normality were undertaken to ensure that all of the variables were normally distributed. This was done using both graphical and mathematical methods (Tabachnick & Fidell, 2007). Using mathematical methods, the degree of skewness and kurtosis of the independent variables, ATT, SN, PBC, and CAI, and the dependent variable, BI, were examined. Estimates of skewness and kurtosis for each scale variable were computed; the obtained value of skewness was tested against the null hypothesis of zero using the z distribution, and the obtained kurtosis value was compared to zero using the z distribution.

Non-normal variables were transformed using a logarithmic transformation. A logarithmic transformation was selected because it has been shown mathematically to improve the skewness of a distribution without affecting the mean, median, range, variance, standard deviation, or measures of association (Hardy, 2004). The results were reassessed to determine whether skewness and kurtosis had improved. Following transformation, the variables were further assessed for linearity and homoscedasticity through graphical methods (Leech et al., 2008; Pallant, 2005; Tabachnick & Fidell, 2007). The normal probability plot of the standardized residuals was visually inspected to see whether linearity existed initially and whether it was affected by the transformations. The scatterplot of the standardized residuals was also visually inspected to assess the

relationship between the continuous variables. A scatterplot that shows a roughly rectangular shape with most scores concentrated in the centre is homoscedastic (Pallant, 2005). Multicollinearity was assessed using the Tolerance and Variance Inflation Factor (VIF) values, where Tolerance must be greater than 0.1 and the VIF less than 10 to rule out the existence of multicollinearity (Leech et al., 2008).

Description of the Participants and Study Units

Response rate and participant demographic frequencies, including unit of employment, age of participants, and years of experience of participants, were calculated. To determine whether there was a relationship between unit of employment and participation rate and participants' age and experience categories, chi-square tests of independence were conducted (Pallant, 2005). The following questions were answered using the chi-square tests of independence:

- Were nurses in one unit more likely to have participated in the study than nurses on another unit?
- Was there a difference in the the age categories of the nurses across units?
- Was there a difference in the the years of experience categories across the units?

To determine whether there were differences in the means of ATT, SN, PBC, CAI, and BI by unit of employment, age, and experience categories, a series of one-way analysis of variance (ANOVA) were conducted (Pallant, 2005). The following questions were answered using ANOVA:

- Were the mean scores on ATT, SN, PBC, CAI, or BI for nurses on one unit different from those of nurses on another unit?

- Did the mean scores on ATT, SN, PBC, CAI, or BI vary for nurses across age and experience categories?

Reliability Testing

The instruments used to measure the continuous variables in this study consist of five scales that represent the following variables: the Total Attitude Scale (ATT); Total Subjective Norm Scale (SN); Total Perceived Behavioural Control Scale (PBC); Total Context Assessment Index (CAI); and Total Behavioural Intention Scale (BI). The individual item responses that make up these scales are as follows:

Independent Variables

- Total Attitude Scale: Section 2; Q1, Q2, Q3, Q4
- Total Subjective Norm Scale: Section 2; Q5, Q7, Q12
- Total Perceived Behavioural Control Scale: Section 2; Q8, Q9, Q10
- Total Context Assessment Index: Section 3; Q1–Q37

Dependent Variable

- Total Behavioural Intention Scale: Q6, Q11, Q13

Prior to calculating the reliability of each scale, composite scores were calculated to provide one overall score for each variable. A standard unit weighting procedure to calculate composite scores was used as suggested by Francis et al. (2007). Using this method, scale items were added and the sum was divided by the total number of items in the scale to produce a final score ranging from 1 to 7 for the variables associated with the TPB and a final score ranging from 1 to 4 for the variable associated with context (Pallant, 2005).

Internal consistency reliabilities were then calculated using Cronbach's coefficient alpha (Cohen et al., 2003). Nunnally (1978) recommends a Cronbach's alpha of at least 0.7 for individual scales. Items correlating less than 0.30 with their own scale are considered to be measuring something other than what is being measured by that scale. However, Francis et al. (2004) consider a Cronbach's coefficient alpha of "roughly 0.6 or greater" as acceptable. In the current study, the scales associated with the TPB were accepted as reliable if they had an alpha coefficient greater than 0.6; scales with an alpha less than 0.6 were further examined to improve reliability. Alpha is influenced by the length of the scale and the sample size (Nunnally, 1978). The larger the number of items (greater than 14) in a scale, the tendency is for alpha to be large, even if the individual item correlations are modest (Streiner & Norman, 2008a). The CAI scale was accepted as reliable where alpha was 0.8 or greater. The higher cutoff point for the CAI is set due to the larger number of items comprising this scale.

Improving Reliability of the TPB Subscales

A scale's reliability may be improved by removing items that have a low correlation with other items in the scale (Leech et al., 2008). However, given that some scales consist of only three items, removing one item from a three-item scale may be problematic. In developing TPB questionnaires, Ajzen (2010) cautions against using scales with less than three items largely due to issues with reliability. Cohen et al. (2003) also state that Cronbach's alpha levels may be quite small among scales with fewer than 10 items. However, Tabachnick and Fidell (2007) argue in favour of parsimonious scales with the lowest number of items possible. Thus, a factor analysis was used because it is an

accepted method for deciding which minimum number of items best represents the constructs being measured (Tabachnick & Fidell, 2007).

Factor Analyses

An exploratory factor analysis was conducted on all of the items used to measure the independent variables, ATT, SN, and PBC, to determine which individual item variables form coherent subsets that are relatively independent of one another (Tabachnick & Fidell, 2007). An exploratory factor analysis was conducted using the method described by Tabachnick and Fidell (2007) and Leech et al. (2008). In order for items to be retained, they had to meet the following two criteria: they had to be consistent with the theoretical labels, and they had to have factor loadings greater than or equal to 0.3. The factors were then "rotated" to present the pattern of loadings in a manner that was easiest to interpret (Tabachnick & Fidell, 2007). A Varimax rotation was used first because it is the most commonly used orthogonal rotation (Tabachnick & Fidell, 2007). An orthogonal rotation assumes that the underlying factors are uncorrelated. If the result of an orthogonal rotation shows individual items loading on more than one factor, then an oblique rotation is recommended because it allows for the condition that the underlying factors may be correlated. This two-step procedure was therefore employed. The result of the exploratory factor analysis is called the modified model (MM) to distinguish it from the original (TPB) model (OM).

To confirm the factor structure, a confirmatory factor analysis (CFA) was conducted. A CFA is a more complex statistical procedure used to determine whether the study variables, as measured, are empirically distinguishable from one another and

whether the items of each measurement scale align with the factor that they are intended to represent (Hurley et al., 1997; Schrieber, Stage, King, Nora, & Barlow, 2006; Ullman, 2007). In Figure 3 below, the measured item scores are called the observed variables and are represented by rectangles (Schrieber et al., 2006). The factors, called latent variables or unobserved variables, are represented by circles (Schrieber et al., 2006). Together these variables constitute the OM.

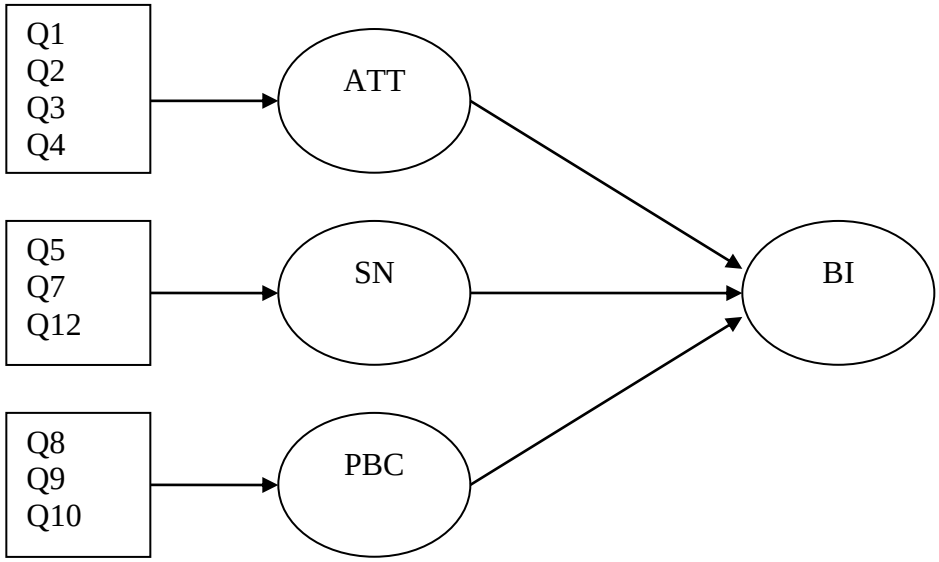

Figure 3. Original Model (OM)

Sample Size and Model Identification for CFA

CFA combines factor analysis with multiple regression analyses using the regression coefficients and the variances and covariances between the observed and latent variables (Ullman, 2007). In addition to the assumptions of multivariate normality, data used to conduct a CFA must meet minimal sample size requirements of a ratio of cases to parameters of at least 3:1 (Ullman, 2007). Only models that can be identified can be estimated; a model is said to be identified if there is a unique numerical solution for each of the parameters in the model (Ullman, 2007). Model identification was conducted by calculating the number of data points and the number of parameters that are to be estimated. The number of data points was calculated as follows, where p equals the number of measured variables (Ullman, 2007, p. 695):

$$\text{number of data points} = \frac{p(p+1)}{2}$$

In this study, for the OM, there are 10 measured variables; thus, there are 55 data points. The number of parameters equals the number of regression coefficients, variances, and covariances in the sample. For the OM, there are 23 parameters (10 regression coefficients, 3 covariates, and 10 variables). If there are more data points than parameters, a model is said to be overidentified, or if a model has the same number of data points than parameters, it is identified; either of these conditions is considered adequate for proceeding with a CFA (Ullman, 2007).

Confirmatory Factor Analysis

A CFA, using maximum likelihood estimation, was performed using LISREL 8.0 software (Scientific Software International Inc., Lincolnwood, IL, 2010). Maximum

likelihood estimation is a statistical method used for fitting a statistical model to data and providing estimates from the model's parameters; it is recommended when the underlying assumptions are met and the sample size is adequate for model identification (Schrieber et al., 2006; Ullman, 2007). Maximum likelihood estimation was employed to estimate all models, and chi-square difference tests and fit indices were used to assess how the OM and the MM performed in relation to their respective null models (wherein all variables are considered uncorrelated) and then to each other (Schrieber et al., 2006; Ullman, 2007).

To determine which model best fit the data, two steps were used. First, both the OM and the MM were tested against their respective null models to determine whether there was a significant difference between each model and its null model. In the second step, the models were compared to each other to determine whether the MM was a better fit with the data than the OM.

Confirming model fit. Ullman (2007) describes the process for a CFA as follows: parameters, in this case, covariances of the latent or unobserved variables, are calculated to create an estimated population covariance matrix. If a model is a good fit, the parameter estimates will produce an estimated matrix that is close to the sample's covariance matrix. In this way, models are nested within each other and range from a completely saturated model, where all variables are perfectly correlated, to the null model, where all variables are not correlated. Each model generates its own estimated population covariance matrix, and because one model is a subset of another (nested model), the chi-square difference test is calculated as follows: the χ^2 value for the larger

model is subtracted from the smaller nested model, and the difference is evaluated to decide which model best fits the data. In addition to the chi-square difference test, fit indices are calculated and used to determine which model is better fitting and most parsimonious.

Testing model fit. Three different categories of fit indices, absolute, relative, and parsimonious, are generated as a result of a CFA (Schrieber et al., 2006). Absolute fit measures indicate how similar the MM is to the observed covariance data (Schrieber et al., 2006). The relative fit measures indicate where the MM is on the fit continuum—in other words, where in terms of fit the MM is placed between the null model and the saturated model (Schrieber et al., 2006). The parsimonious fit measures adjust for the inclusion of estimated parameters by penalizing the fit statistics, where the penalty increases as the number of parameters estimated increases; thus, the parsimonious fit statistics can be used to compare models, noting that larger models with added complexity will not necessarily lead to increasingly acceptable models (Ullman, 2007).

Although there are no hard rules about which fit indices to use and how to interpret them, authors recommend the following as the most common indices, where the values in parentheses are accepted rules of thumb (Schrieber et al., 2006; Ullman, 2007). Absolute fit measures include the chi-square test ($p > .05$), Root Mean Square Error of Approximation (RMSEA < .10), and Goodness of Fit Index (GFI > .90). The relative fit measures that are commonly used include the Normed Fit Index (NFI > .90) and the Comparative Fit Index (CFI > .95). Finally, a commonly used parsimonious fit measure is the Parsimony Goodness of Fit Index (PGFI > .50).

The Akaike Information Criterion (AIC) and the Consistent Akaike Information Criterion (CAIC) are two additional fit indices that include a parsimony adjustment where small values indicate a good-fitting model (Ullman, 2007). These indices are applicable to models estimated with maximum likelihood methods; they are not normed to a 0 to 1 scale, and comparisons are qualitative as there is no accepted rule of thumb for what is considered "small enough." These indices are, however, useful for cross-validation purposes because they are not dependent on sample data; rather, they are a function of the χ^2 and degrees of freedom (Ullman, 2007, p. 720). The AIC and CAIC were used as a final validation of model fit.

Testing Study Hypotheses

The primary analyses for this study proceeded using multivariate analysis techniques for continuous data. These techniques were chosen as the most appropriate and robust methods to determine the extent to which ATT, SN, PBC, and CAI would be positively associated with BI. The following hypotheses were tested:

H1: There is a positive association between organizational context (i.e., culture, leadership, and evaluation) and nurses' behavioural intentions to use anxiety assessment tools on their patients.

A bivariate correlation analysis between all of the independent variables (gender, unit of employment, age, years of experience, ATT, SN, PBC, CAI) and the dependent variable (BI) was conducted (Cohen et al., 2003; Leech et al., 2008; Pallant, 2005). Once the zero-order correlations showed positive relationships between the independent and dependent variables, the next step was to determine whether the dependent variable could

be predicted from the independent variables.

H2: Organizational context provides incremental prediction of nurses' behavioural intentions to use anxiety assessment tools on their patients beyond the three TPB components of attitude, subjective norms, and perceived behavioural control.

The purpose of the current study was to test for unique incremental variance in BI explained by the CAI, over and above the variance explained by the three TPB variables. To evaluate whether including a measure of context (CAI) to the measures of ATT, SN, and PBC adds predictive value to BI, a hierarchical multivariate regression analysis was conducted. A hierarchical multivariate regression analysis was used because there is logical or theoretical support to predetermine the order of importance of the independent variables in the regression equation (Stolzenberg, 2004; Tabachnick & Fidell, 2007). Additionally, demographic variables such as gender, unit of employment, age, and years of experience that were significantly related to BI in the correlation analysis were also entered into the regression model as control variables. As stated previously, there is empirical support demonstrating that ATT, SN, and PBC are predictors of BI; hence, using hierarchical multivariate regression analysis, ATT, SN, and PBC were entered as a block into the regression equation followed by the CAI. Using this method, the variance contributed to BI by ATT, SN, and PBC was held constant, allowing for an estimation of contribution of the CAI to the total BI variance (Tabachnick & Fidell, 2007).

Finally, it is possible that some variables can affect the relationship between an independent variable and a dependent variable. A moderator is an independent variable

that affects the strength and/or direction of the association between two other variables (Baron & Kenny, 1986; Bennett, 2000). To test if context is a moderator for the relationship between the predictor set (ATT, SN, PBC) and BI, the method described by Baron and Kenny (1986) was used. Interaction terms were calculated by multiplying the scores on the CAI with each independent variable to create a third variable as follows:

ATT × CAI = MODATT

SN × CAI = MODSN

PBC × CAI = MODPBC

The interaction terms, MODATT, MODSN, and MODPBC, were added as a third step in the hierarchical multivariate regression analysis to calculate whether the addition of these interaction terms increased the predictive ability of the model.

Summary

This study was designed to determine whether there was a relationship between nurses' work context and behavioural intention and whether the addition of CAI to the TPB variables (ATT, SN, and PBC) could account for a significant proportion of the variance in behavioural intention in a sample of 174 nurses who had attended an educational workshop. The instruments used to measure the variables were tested for reliability. A factor analysis was completed on the scales used to measure the TPB variables. The modified scales were tested by conducting a CFA using LISREL 8.0 software. The analysis plan was guided by the study questions and hypotheses discussed in Chapter 1. The remaining analyses, including descriptive, univariate, and hierarchical multivariate analyses, were completed using PASW version 18.0.

CHAPTER 4

RESULTS

The following chapter describes the findings from the data analysis. The first part presents an overview of the data screening process and methods used to evaluate the statistical assumptions underlying multivariate analyses. The second describes the study population and setting characteristics and the third provides descriptive statistics on the independent and dependent variables. The fourth part presents the scale reliability analyses and describes the process and results of final item selection. The chapter concludes with the results of the hypotheses testing.

Overview

Participants for this study were recruited consecutively during the period from November 2009 to February 2010 from one organization. Participants were invited to complete the iCAMIRA Survey immediately following their attendance at a standardized patient workshop designed to teach them to use an anxiety assessment tool. There were 341 registered nurses working on one of the seven study units, of whom 250 completed both the Web-based module and standardized patient workshops and 174 completed the post-implementation survey, representing a 70% response rate.

Data Screening

Data screening included assessment for (1) accuracy, (2) missing data, and (3) confirmation of sample size and model identification.

Data entry and verification and missing values assessment. An audit of 10% of the complete data set was manually compared to the raw data scores for accuracy. No

data entry errors were found. Of the 174 post-implementation surveys, 152 surveys had all items completed, with 23 records having some missing responses. The results of the missing values analysis showed no consistent pattern among the missing responses, and there was less than 5% data missing for each item. Accordingly, the items were replaced with the mean values for that item. When frequencies were reassessed after replacing missing values with mean values, no obvious data entry errors were found.

Sample size and model identification. Based on sample size calculations conducted a priori, 174 participants was an adequate sample size for a case to variable ratio required for a multiple regression analysis. Additionally, the ratio of cases to parameters is 174:23 or about 8:1. Since the number of data points is greater than the number of parameters, this model is overidentified (tested with 32 [i.e., 55 − 23] degrees of freedom). Thus, the OM meets the sample size requirements for a CFA.

Testing Underlying Assumptions for Multivariate Analyses

This section describes the results of the assessment of normality, linearity, and homoscedasticity. The data set was also assessed for the presence of outliers and collinearity.

Table 2 shows that the distribution of data for ATT, SN, PBC, and BI is negatively skewed and for CAI is positively skewed, resulting in a pattern of variables that is non-normal in different ways. Visual inspection of the frequency histograms for ATT, SN, PBC, CAI, and BI shows that ATT is more peaked (lepto-kurtotic) and the remaining variables have a more flattened appearance (platy-kurtotic). As a result, it was necessary to transform the data. When the obtained skewness value for each continuous

variable was divided by its standard error, the following results were observed: ATT, −6.2; SN, −5.35; PBC, −1.8; BI, −4.07; and CAI, 3.28, suggesting that ATT, SN, and BI were significantly skewed. Kurtosis was also evaluated for each continuous variable with the following results: ATT, 1.2; SN, −0.377; PBC, −1.67; BI, −0.02; and CAI, −0.13, suggesting that the variables were not significantly kurtotic. Following logarithmic transformation of the ATT, SN, and BI scales, skewness and kurtosis improved significantly (Table 2).

Following transformation, visual inspection of the normal probability plots for ATT, SN, PBC, CAI, and BI revealed no major deviations from normality. Additionally, visual inspection of the scatterplots for ATT, SN, PBC, CAI, and BI did not show any systematic pattern that would indicate a violation of the assumption of homoscedasticity. No outliers were found. Thus, the transformed continuous variables met all of the assumptions required for multivariate statistical analyses. Additional tests for multicollinearity were completed as part of the hierarchical multivariate regression analysis and are discussed with those results.

Table 2. Assessment of Normality of Distributions for Scale Scores

Variable	*Before Transformation*		*After Transformation*	
	Skewness (SE)	*Kurtosis (SE)*	*Skewness (SE)*	*Kurtosis (SE)*
ATT	−1.144 (0.184)	0.445 (0.366)	0.560 (0.184)	−1.082 (0.366)
SN	−0.985 (0.184)	−0.138 (0.366)	0.435 (0.184)	−1.205 (0.366)
PBC	−0.342 (0.184)	−0.613 (0.366)	−0.342 (0.184)	−0.613 (0.366)
CAI	−0.750 (0.184)	−0.008 (0.366)	−0.750 (0.184)	−0.008 (0.366)
BI	0.604 (0.184)	−0.050 (0.366)	-0.033 (0.184)	−0.967 (0.366)

Note. ATT = attitude; BI = behavioural norm; CAI = Context Assessment Index; PBC = perceived behavioural control; SN = subjective norms.

Characteristics of the Participants

A summary of the characteristics of the final sample is presented in Table 3. Participants were evenly distributed among the nursing units, with participation ranging between 21 and 31 nurses per unit. The nurses were predominantly female (93%), and participation rates among each of the age categories ranged between 27 and 30%, with one exception: there were fewer nurses over age 50 (12%) relative to the other age categories. Most of the participants had 5 years or less of experience (44%), whereas 20% had over 20 years of experience. These characteristics are reflective of the general characteristics of staff nurses at this acute care hospital. However, among nurses working in acute care settings in Ontario, 95% of nurses are female, but there are more nurses over the age of 50 (36%) than under the age of 30 (13%) (College of Nurses of Ontario, 2010).

Table 3. Demographic Characteristics of the Study Sample (N = 174)

Variable	*N*	*%*
Sex		
Female	162	93
Male	12	7
Age		
20–30	57	32.8
31–40	47	27.0
41–50	47	27.0
> 50	23	13.2
Years of experience		
1–5	77	44.3
6–10	30	17.2
11–15	21	12.1
16–20	11	6.3
> 20	35	20.1
Nursing unit participation		
A	26	14.9
B	21	12.1
C	21	12.1
D	24	13.8
E	24	13.8
F	31	17.8
G	27	15.5

Note. Values are expressed as a percentage of the complete sample.

Characteristics of the Study Units

There were no statistically significant differences across study units in the number of participant responses or in the number of females relative to males. There were statistically significant differences in age and experience between two of the study units: Unit G (medical unit), where the nurses were 30 years or younger (67%) and had less than 5 years of experience (26%), and Unit A (surgical unit), where the majority of the nurses were over the age of 50 (44%) and only 3% of the nurses had 5 years or less of experience.

Generally, unit of employment and age had no effect on mean scores of ATT, SN, PBC, BI, and the CAI. Only mean levels of PBC differed by experience category [F (4,169) = 2.5, p = 0.04] between nurses with 6 to 10 years of experience (mean PBC = 5.0) and those with more than 20 years of experience (mean PBC = 5.8).

Descriptive Statistics of the Independent and Dependent Variables

Table 4 summarizes the range, mean, and standard deviations for each study variable. Mean response scores for each variable were above the mid-point, indicating a tendency toward positive responses. For items of the CAI scale, the lowest rating was 2.51, indicating that all of the scores fell above the mid-point and the mean was 3.19. Meaning that, generally, participants viewed their context as being positive. Additionally, there was little variance (0.11) in the CAI scores.

Table 4. Descriptive Statistics of the Study Variables

Variable	*Mid-point*	*Minimum*	*Maximum*	*Mean (SD)*	*Variance*
ATT	4.00	3.50	7.00	5.84 (0.78)	0.61
SN	4.00	3.05	7.00	5.55 (0.86)	0.74
PBC	4.00	2.33	7.00	4.77 (0.92)	0.84
CAI	2.50	2.51	4.00	3.19 (0.33)	0.11
BI	4.00	2.67	7.00	5.81 (0.99)	0.98

Note. ATT = attitude; BI = behavioural norm; CAI = Context Assessment Index; PBC = perceived behavioural control; SN = subjective norms.

Theory of Planned Behaviour Subscales Reliability

Table 5 provides the zero-order correlations for the 13 items in the TPB survey. Generally, all of the TPB items had a statistically significant relationship with at least one other variable. Furthermore, all items, with the exception of *Up to Me* and *Social Pressure*, correlated with at least one other variable, ranging from 0.2 to 0.9. The low correlations involving the TPB *Up to Me* and *Social Pressure* suggest that they may be measuring something different from the other items of the scale and therefore adversely impact the reliability of the individual subscales of the TPB (Streiner & Norman, 2008b).

Internal consistency reliabilities were calculated for all four subscales of the TPB (Table 6). The SN and PBC scales did not meet the required cutoff for Cronbach's alpha of 0.6 (Francis et al., 2007). Given that these subscales consisted of three items each, removing items to improve the overall Cronbach's alpha score would result in a two-item scale, which is not recommended (Ajzen, 2010). Thus a factor analysis was conducted.

Table 5. Theory of Planned Behaviour Item Correlations (N = 174)

Item	*Q1*	*Q2*	*Q3*	*Q4*	*Q5*	*Q6*	*Q7*	*Q8*	*Q9*	*Q10*	*Q11*	*Q12*	*Q13*
Q1. Harmful	1	.238**	.425**	.486**	.516**	.138	.139	.394**	.127	.269**	.408**	.469**	.553**
Q2. Pleasant	.238**	1	.206**	.201**	.223**	.060	.064	.164*	.156*	.354**	.237**	.063	.068
Q3. Right Thing	.425**	.206**	1	.688**	.343**	.381**	.119	.561**	.094	.335**	.421**	.556**	.541**
Q4. Good Practice	.486**	.201**	.688**	1	.447**	.327**	.182*	.488**	.159*	.281**	.430**	.556**	.609**
Q5. Not Assess	.516**	.223**	.343**	.447**	1	.120	.162*	.333**	.107	.260**	.306**	.296**	.338**
Q6. Head to Toe	.138	.060	.381**	.327**	.120	1	.075	.349**	.011	.235**	.389**	.394**	.434**
Q7. Social Pressure	.139	.064	.119	.182*	.162*	.075	1	.182*	.161*	.037	.157*	.117	.139
Q8. I Can	.394**	.164*	.561**	.488**	.333**	.349**	.182*	1	.059	.430**	.470**	.488**	.548**
Q9. Up to Me	.127	.156*	.094	.159*	.107	.011	.161*	.059	1	.110	.065	.162*	.191*
Q10. Easy	.269**	.354**	.335**	.281**	.260**	.235**	.037	.430**	.110	1	.562**	.386**	.441**
Q11. Want To	.408**	.237**	.421**	.430**	.306**	.389**	.157*	.470**	.065	.562**	1	.575**	.620**
Q12. Expected	.469**	.063	.556**	.556**	.296**	.394**	.117	.488**	.162*	.386**	.575**	1	.810**
Q13. I Intend	.553**	.068	.541**	.609**	.338**	.434**	.139	.548**	.191*	.441**	.620**	.810**	1

*p < 0.01, two-tailed. **p < 0.05, two-tailed.

Table 6. Internal Consistency Reliability Scores for the Four Subscales Comprising the Theory of Planned Behaviour (N = 174)

Subscale	*Cronbach's Alpha*	*Number of Items*
ATT	0.670	4
SN	0.376	3
PBC	0.286	3
BI	0.709	3

Note. ATT = attitude; BI = behavioural norm; PBC = perceived behavioural control; SN = subjective norms.

Factor Analysis

The results of the principal components analysis PCA are reported in Table 7. With a cutoff of 0.3 for inclusion of a variable, seven factors were extracted.

Initially, the items were rotated using a Varimax (orthogonal) rotation; however, the resulting factor matrix showed many items cross-loaded; thus, an oblique rotation was performed.

Table 7. Results of Principal Axis Factoring for the Items in the Attitude (ATT), Subjective Norms (SN), and Perceived Behavioural Control (PBC) Subscales (N = 174)

Scale Item	*Initial*	*Extraction*
Q1. Harmful	.401	.537
Q3. Right Thing	.560	.717
Q4. Good Practice	.565	.708
Q5. Not Assess	.331	.512
Q12. Expected	.447	.500
Q8. I Can	.420	.516
Q10. Easy	.237	.451

Note. Legend for full questions is located in Appendix B.

Table 8 shows the findings from the oblique rotation. The scale items load on three separate factors. This finding is consistent with the three TPB subscales ATT, SN, and PBC. However, analysis of the individual scale items within each factor revealed that some scale items loaded on factors in an atheoretical way. For example, in the OM, *Harmful, Right Thing,* and *Good Practice* items were categorized as measures of ATT. However, the results of the factor analysis showed that the *Right Thing* and *Good Practice* loaded on one factor defining ATT, whereas *Harmful* loaded on a different factor. Therefore, *Harmful* was dropped from the ATT subscale. Additionally, *Expected* was categorized as measuring SN in the OM; however, in the factor analysis, it loaded onto the ATT factor instead. Therefore, it was also dropped from the SN subscale. Consistent with the findings of the zero-order correlations, *Up to Me* and *Social Pressure* did not load onto any factors at greater than 0.3 and were also dropped.

The results of the factor analysis are summarized in Table 9. On the left is the OM, consisting of the 10 items that were used in the survey to measure the variables ATT, SN, and PBC. On the right is the MM resulting from the PCA, consisting of the five items that loaded onto ATT, SN, and PBC.

Table 8. Results of Principal Axis Factoring with Oblique Rotation for the Items in the Attitude (ATT), Subjective Norm (SN), and Perceived Behavioural Control (PBC) Subscales (N = 174)

Scale Item	*Factor*		
	ATT	*SN*	*PBC*
Q1. Harmful	0.114	0.633	0.042
Q3. Right Thing	0.864	−0.073	0.048
Q4. Good Practice	0.773	0.195	−0.130
Q5. Not Assess	−0.048	0.741	0.009
Q12. Expected	0.484	.0080	0.245
Q8. I Can	0.385	0.044	0.398
Q10. Easy	−0.013	0.055	0.653

Note. Legend for full questions is located in Appendix B.
Harmful was not retained for factor 2 (SN) because it was not theoretically derived to reflect SN.

Table 9. Comparison of Scale Items in Original versus Modified Model

Scale	*Items of Original Model*	*Items of Modified Model*
ATT	I think assessing a patient's anxiety is harmful.	
	I think assessing a patient's anxiety is a pleasant task to complete.	
	I think assessing a patient's anxiety is the right thing to do.	I think assessing a patient's anxiety is the right thing to do.
	I think assessing a patient's anxiety is good practice.	I think assessing a patient's anxiety is good practice.
SN	People who are important to me think that I should NOT assess patients' anxiety.	People who are important to me think that I should NOT assess patients' anxiety.
	It is expected of me that I assess patient anxiety.	
	I feel under social pressure to assess patient anxiety.	
PBC	I am confident that I can assess and document my patients' anxiety.	I am confident that I can assess and document my patients' anxiety.
	For me to assess and document my patients' anxiety is easy.	For me to assess and document my patients' anxiety is easy.
	Whether I assess and document my patient's anxiety using an anxiety assessment tool is entirely up to me.	

Note. ATT = attitude; PBC = perceived behavioural control; SN = subjective norms.

Confirmatory Factor Analysis

A CFA was performed on the three subscales of the TPB survey to determine which model, OM or MM, best fit the data. The OM is presented in Figure 3 and shows the relationship between the 10 observed variables (scale items) and the 3 latent (independent) variables that were measured. As a result of the PCA, the OM was modified (MM) as shown in Figure 4. The MM specifies the relationship between the five observed variables (scale items) and the latent (independent) variables of ATT, SN, and PBC.

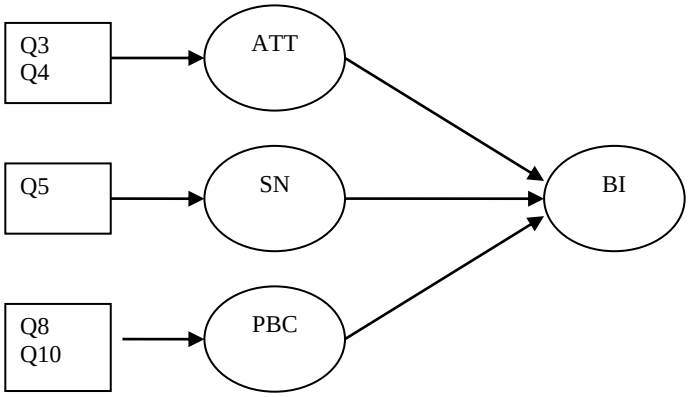

Figure 4. Modified Model (MM)

First, the OM and MM were each tested against their respective null models (i.e., wherein all variables are considered uncorrelated). The null model for the OM was easily rejected (χ^2 [45, N = 174] = 824.57, $p < 0.05$), meaning that the OM fit the data better than did its null model (χ^2_{diff} [13, N = 174] = 741.72, $p < 0.05$). The null model for the

MM was also easily rejected (χ^2 [10, N = 174] = 328.56, $p < 0.05$), and the chi-square difference test (χ^2_{diff} [8, N = 174] = 320.37, $p < 0.05$) confirmed that the MM fit the data better than its null model.

The OM was then compared directly to the MM. A chi-square difference test (χ^2_{diff} [30, N = 174] = 74.66, $p < 0.05$) suggests that the MM represents the best fit of the data. Additionally, the fit indices for both the OM and the MM were compared with each other. Table 10 presents the results of the comparison of fit indices across both models. The OM performed slightly better across the PGFI measure; however, the MM performed better across all the remaining fit indices. A cross-validation procedure comparing the AIC and the CAIC illustrated that the MM was optimal to the OM for both measures.

Context Assessment Index (CAI) Reliability

Table 11 presents the zero-order correlations for the 37 items of the CAI. All items related significantly to at least one other item comprising the CAI. The reliability score for the CAI was high at 0.95.

Table 12 reports the internal consistency reliability scores for the ATT, SN, PBC, and CAI scales.

Table 10. Fit Indices for Confirmatory Factor Analysis for Original Model (OM) and Modified Model (MM)

Model	χ^2	*df*	*RMSEA* (< 0.10)	*GFI* (> 0.90)	*CFI* (> 0.95)	*PGFI* (> 0.50)	χ^2_{diff}	*AIC*	*CAIC*
1. OM null model	824.57*	*45*						844.57	886.16
2. OM	82.85*	32	0.10	0.91	0.93	0.53		130.18	225.83
difference between OM and null model		13					741.71*		
3. MM null model	328.56*	10						338.56	359.36
4. MM	8.19*	2	0.13	0.98	0.98	0.13		33.96	88.03
difference between MM and null model							320.37*		
5. Difference between OM and MM		12					74.66*		

Note. AIC = Akaike Information Criterion; CAIC = Consistent Akaike Information Criterion; CFI = Comparative Fit Index; GFI = Goodness of Fit Index; PGFI = Parsimony Goodness of Fit Index; RMSEA = Root Mean Square Error of Approximation.
*$p < 0.05$.

Table 11. Correlation Matrix for the Context Assessment Index (CAI) (N = 174)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18
Q1	1	.410**	.383**	.332**	.290**	.297**	.266**	.226**	.245**	.109	.280**	.443**	.277**	.302**	.269**	.215**	.182*	.290**
Q2	.410**	1	.549**	.500**	.318**	.288**	.212**	.373**	.430**	.353**	.330**	.313**	.339**	.133	.301**	.350**	.247**	.323**
Q3	.383**	.549**	1	.515**	.379**	.362**	.342**	.342**	.517**	.303**	.237**	.324**	.387**	.234**	.210**	.404**	.270**	.207**
Q4	.332**	.500**	.515**	1	.411**	.377**	.321**	.315**	.371**	.229**	.397**	.364**	.364**	.222**	.290**	.332**	.210**	.219**
Q5	.290**	.318**	.379**	.411**	1	.469**	.201**	.255**	.346**	.224**	.234**	.390**	.294**	.244**	.262**	.198**	.263**	.137
Q6	.297**	.288**	.362**	.377**	.469**	1	.330**	.335**	.289**	.277**	.270**	.258**	.228**	.414**	.370**	.312**	.136	.218**
Q7	.266**	.212**	.342**	.321**	.201**	.330**	1	.263**	.260**	.201**	.321**	.276**	.235**	.278**	.284**	.220**	.085	.184*
Q8	.226**	.373**	.342**	.315**	.255**	.335**	.263**	1	.414**	.408**	.311**	.230**	.187*	.182*	.264**	.433**	.331**	.241**
Q9	.245**	.430**	.517**	.371**	.346**	.289**	.260**	.414**	1	.502**	.283**	.370**	.366**	.283**	.314**	.457**	.324**	.279**
Q10	.109	.353**	.303**	.229**	.224**	.277**	.201**	.408**	.502**	1	.413**	.279**	.308**	.270**	.236**	.436**	.375**	.368**
Q11	.280**	.330**	.237**	.397**	.234**	.270**	.321**	.311**	.283**	.413**	1	.394**	.392**	.306**	.391**	.358**	.276**	.342**
Q12	.443**	.313**	.324**	.364**	.390**	.258**	.276**	.230**	.370**	.279**	.394**	1	.556**	.314**	.357**	.318**	.257**	.336**
Q13	.277**	.339**	.387**	.364**	.294**	.228**	.235**	.187*	.366**	.308**	.392**	.556**	1	.366**	.288**	.349**	.317**	.282**
Q14	.302**	.133	.234**	.222**	.244**	.414**	.278**	.182*	.283**	.270**	.306**	.314**	.366**	1	.551**	.338**	.294**	.264**
Q15	.269**	.301**	.210**	.290**	.262**	.370**	.284**	.264**	.314**	.236**	.391**	.357**	.288**	.551**	1	.434**	.281**	.451**
Q16	.215**	.350**	.404**	.332**	.198**	.312**	.220**	.433**	.457**	.436**	.358**	.318**	.349**	.338**	.434**	1	.448**	.389**
Q17	.182*	.247**	.270**	.210**	.263**	.136	.085	.331**	.324**	.375**	.276**	.257**	.317**	.294**	.281**	.448**	1	.308**
Q18	.290**	.323**	.207**	.219**	.137	.218**	.184*	.241**	.279**	.368**	.342**	.336**	.282**	.264**	.451**	.389**	.308**	1
Q19	.220**	.377**	.366**	.328**	.247**	.332**	.302**	.364**	.354**	.506**	.474**	.297**	.296**	.415**	.447**	.445**	.368**	.476**
Q20	.274**	.325**	.322**	.345**	.208**	.304**	.299**	.258**	.265**	.396**	.447**	.356**	.383**	.392**	.419**	.306**	.268**	.432**
Q21	.245**	.229**	.307**	.260**	.377**	.299**	.182*	.335**	.276**	.339**	.339**	.287**	.304**	.275**	.224**	.282**	.323**	.222**
Q22	.211**	.288**	.240**	.275**	.134	.182*	.225**	.349**	.306**	.390**	.472**	.283**	.291**	.356**	.429**	.356**	.270**	.419**
Q23	.129	.192*	.203**	.192*	.278**	.207**	.235**	.316**	.218**	.341**	.310**	.386**	.282**	.299**	.327**	.296**	.263**	.372**
Q24	.243**	.328**	.286**	.392**	.283**	.290**	.277**	.232**	.307**	.382**	.414**	.324**	.427**	.457**	.341**	.368**	.230**	.374**
Q25	.146	.236**	.236**	.256**	.257**	.235**	.146	.382**	.414**	.556**	.381**	.324**	.276**	.293**	.324**	.405**	.508**	.375**
Q26	.293**	.235**	.244**	.400**	.286**	.386**	.319**	.315**	.279**	.283**	.402**	.381**	.355**	.356**	.522**	.383**	.268**	.331**
Q27	.272**	.393**	.320**	.493**	.307**	.306**	.408**	.352**	.293**	.312**	.434**	.405**	.421**	.383**	.425**	.420**	.301**	.373**
Q28	.195*	.285**	.195*	.281**	.183*	.244**	.223**	.324**	.271**	.429**	.386**	.281**	.341**	.382**	.433**	.239**	.283**	.278**
Q29	.191*	.344**	.335**	.244**	.200**	.242**	.220**	.465**	.397**	.499**	.324**	.309**	.276**	.273**	.326**	.348**	.382**	.388**
Q30	.181*	.339**	.365**	.222**	.298**	.243**	.161*	.426**	.446**	.538**	.329**	.306**	.314**	.345**	.299**	.332**	.421**	.312**
Q31	.216**	.274**	.312**	.285**	.223**	.200**	.237**	.524**	.357**	.477**	.362**	.276**	.282**	.212**	.257**	.334**	.337**	.252**
Q32	.281**	.291**	.271**	.378**	.324**	.300**	.296**	.360**	.281**	.280**	.447**	.486**	.404**	.371**	.469**	.381**	.252**	.375**
Q33	.349**	.340**	.360**	.347**	.281**	.239**	.321**	.310**	.433**	.416**	.370**	.451**	.406**	.430**	.437**	.407**	.392**	.485**
Q34	.246**	.223**	.206**	.388**	.140	.211**	.242**	.405**	.299**	.279**	.384**	.408**	.363**	.337**	.377**	.312**	.174*	.295**
Q35	.012	.194*	.125	.169*	.078	.098	.095	.297**	.277**	.420**	.252**	.096	.196**	.139	.150*	.298**	.494**	.202**
Q36	.386**	.319**	.383**	.332**	.409**	.281**	.322**	.316**	.423**	.386**	.457**	.452**	.481**	.433**	.456**	.369**	.345**	.268**
Q37	.245**	.159*	.200**	.203**	.319**	.363**	.245**	.293**	.364**	.255**	.383**	.365**	.266**	.379**	.437**	.309**	.216**	.385**

** p< 0.01 (two tailed); * p< 0.05 (two tailed)

Table 11. Continued from previous page.

Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34	Q35	Q36	Q37
.220**	.274**	.245**	.211**	.129	.243**	.146	.293**	.272**	.195**	.191*	.181*	.216**	.281**	.349**	.246**	.012	.386**	.245**
.377**	.325**	.229**	.288**	.192*	.328**	.236**	.235**	.393**	.285**	.344**	.339**	.274**	.291**	.340**	.223**	.194*	.319**	.159*
.366**	.322**	.307**	.240**	.203**	.286**	.236**	.244**	.320**	.195*	.335**	.365**	.312**	.271**	.360**	.206**	.125	.383**	.200**
.328**	.345**	.260**	.275**	.192*	.392**	.256**	.400**	.493**	.281**	.244**	.222**	.285**	.378**	.347**	.388**	.169*	.332**	.203**
.247**	.208**	.377**	.134	.278**	.283**	.257**	.286**	.307**	.183*	.200**	.298**	.223**	.324**	.281**	.140	.078	.409**	.319**
.332**	.304**	.299**	.182*	.207**	.290**	.235**	.386**	.306**	.244**	.242**	.243**	.200**	.300**	.239**	.211**	.098	.281**	.363**
.302**	.299**	.182*	.225**	.235**	.277**	.146	.319**	.408**	.223**	.220**	.161*	.237**	.296**	.321**	.242**	.095	.322**	.245**
.364**	.258**	.335**	.349**	.316**	.232**	.382**	.315**	.352**	.324**	.465**	.426**	.524**	.360**	.310**	.405**	.297**	.316**	.293**
.354**	.265**	.276**	.306**	.218**	.307**	.414**	.279**	.293**	.271**	.397**	.446**	.357**	.281**	.433**	.299**	.277**	.423**	.364**
.506**	.396**	.339**	.390**	.341**	.382**	.556**	.283**	.312**	.429**	.499**	.538**	.477**	.280**	.416**	.279**	.420**	.386**	.255**
.474**	.447**	.339**	.472**	.310**	.414**	.381**	.402**	.434**	.386**	.324**	.329**	.362**	.447**	.370**	.384**	.252**	.457**	.383**
.297**	.356**	.287**	.283**	.386**	.324**	.324**	.381**	.405**	.281**	.309**	.306**	.276**	.486**	.451**	.408**	.096	.452**	.365**
.296**	.383**	.304**	.291**	.282**	.427**	.276**	.355**	.421**	.341**	.276**	.314**	.282**	.404**	.406**	.363**	.196**	.481**	.266**
.415**	.392**	.275**	.356**	.299**	.457**	.293**	.356**	.383**	.382**	.273**	.345**	.212**	.371**	.430**	.337**	.139	.433**	.379**
.447**	.419**	.224**	.429**	.327**	.341**	.324**	.522**	.425**	.433**	.326**	.299**	.257**	.469**	.437**	.377**	.150*	.456**	.437**
.445**	.306**	.282**	.356**	.296**	.368**	.405**	.383**	.420**	.239**	.348**	.332**	.334**	.381**	.407**	.312**	.298**	.369**	.309**
.368**	.268**	.323**	.270**	.263**	.230**	.508**	.268**	.301**	.283**	.382**	.421**	.337**	.252**	.392**	.174*	.494**	.345**	.216**
.476**	.432**	.222**	.419**	.372**	.374**	.375**	.331**	.373**	.278**	.388**	.312**	.252**	.375**	.485**	.295**	.202**	.268**	.385**
1	.691**	.289**	.490**	.339**	.326**	.338**	.365**	.437**	.430**	.463**	.382**	.361**	.384**	.447**	.346**	.219**	.391**	.321**
.691**	1	.317**	.512**	.308**	.361**	.225**	.429**	.426**	.488**	.412**	.350**	.317**	.427**	.428**	.346**	.151*	.348**	.323**
.289**	.317**	1	.312**	.361**	.312**	.403**	.392**	.341**	.226**	.276**	.319**	.441**	.298**	.232**	.242**	.148	.360**	.296**
.490**	.512**	.312**	1	.547**	.364**	.486**	.331**	.335**	.442**	.490**	.418**	.456**	.396**	.391**	.366**	.358**	.426**	.389**
.339**	.308**	.361**	.547**	1	.467**	.516**	.292**	.329**	.267**	.356**	.305**	.417**	.366**	.321**	.330**	.226**	.414**	.378**
.326**	.361**	.312**	.364**	.467**	1	.383**	.254**	.429**	.256**	.258**	.337**	.299**	.429**	.418**	.385**	.294**	.441**	.287**
.338**	.225**	.403**	.486**	.516**	.383**	1	.436**	.324**	.314**	.450**	.489**	.496**	.294**	.357**	.337**	.414**	.386**	.333**
.365**	.429**	.392**	.331**	.292**	.254**	.436**	1	.596**	.411**	.317**	.357**	.511**	.425**	.403**	.368**	.207**	.425**	.451**
.437**	.426**	.341**	.335**	.329**	.429**	.324**	.596**	1	.472**	.438**	.411**	.446**	.591**	.488**	.491**	.278**	.428**	.402**
.430**	.488**	.226**	.442**	.267**	.256**	.314**	.411**	.472**	1	.471**	.457**	.414**	.359**	.361**	.418**	.380**	.328**	.325**
.463**	.412**	.276**	.490**	.356**	.258**	.450**	.317**	.438**	.471**	1	.651**	.531**	.392**	.444**	.378**	.308**	.399**	.379**
.382**	.350**	.319**	.418**	.305**	.337**	.489**	.357**	.411**	.457**	.651**	1	.618**	.366**	.398**	.325**	.393**	.361**	.320**
.361**	.317**	.441**	.456**	.417**	.299**	.496**	.511**	.446**	.414**	.531**	.618**	1	.352**	.372**	.336**	.371**	.444**	.364**
.384**	.427**	.298**	.396**	.366**	.429**	.294**	.425**	.591**	.359**	.392**	.366**	.352**	1	.571**	.701**	.292**	.555**	.572**
.447**	.428**	.232**	.391**	.321**	.418**	.357**	.403**	.488**	.361**	.444**	.398**	.372**	.571**	1	.514**	.347**	.511**	.488**
.346**	.346**	.242**	.366**	.330**	.385**	.337**	.368**	.491**	.418**	.378**	.325**	.336**	.701**	.514**	1	.318**	.493**	.420**
.219**	.151*	.148	.358**	.226**	.294**	.414**	.207**	.278**	.380**	.308**	.393**	.371**	.292**	.347**	.318**	1	.271**	.259**
.391**	.348**	.360**	.426**	.414**	.441**	.386**	.425**	.428**	.328**	.399**	.361**	.444**	.555**	.511**	.493**	.271**	1	.585**
.321**	.323**	.296**	.389**	.378**	.287**	.333**	.451**	.402**	.325**	.379**	.320**	.364**	.572**	.488**	.420**	.259**	.585**	1

Table 12. Final Internal Consistency Reliability Scores for the Scales Comprising the Theory of Planned Behaviour and Context Assessment Index (N = 174)

Scale	*Cronbach's Alpha*	*Number of Items*
ATT	0.82	2
SN	n/a	1
PBC	0.61	2
BI	0.74	3
CAI	0.95	37

Note. ATT = attitude; BI = behavioural norm; CAI = Context Assessment Index; PBC = perceived behavioural control; SN = subjective norms.

Testing Study Hypothesis

H1: There is a positive association between organizational context (i.e., culture, leadership, and evaluation) and nurses' behavioural intentions to use anxiety assessment tools on their patients.

Table 13 presents the results of the correlation analysis conducted among all of the study variables: gender, unit of employment, age, years of experience, ATT, SN, PBC, CAI, and BI. Consistent with the TPB, there was a positive correlation between ATT, SN, PBC, and BI. There was a positive association between CAI and ATT, SN, and PBC. Also, CAI was positively and significantly associated with BI ($r = .319$, $N = 174$, $p < 0.01$), meaning that more positive context scores were associated with higher levels of BI. Thus, the null hypothesis of no relationship between CAI and BI is rejected.

Table 13. Correlation Matrix for the Study Variables (N = 174)

Variable	*Unit*	*Experience*	*Age*	*Gender*	*ATT*	*SN*	*PBC*	*CAI*	*BI*
Unit	1	−.148	−.104	−.045	−.068	−.086	−.074	.119	−.145
Experience	−.148	1	.750**	−.046	.009	−.027	.181*	.007	−.046
Age	−.104	.750**	1	−.002	.040	.034	.156*	.072	−.074
Gender	−.045	−.046	−.002	1	.051	−.100	−.006	.034	.003
ATT	−.068	.009	.040	.051	1	.469**	.499**	.230**	.571**
SN	−.086	−.027	.034	−.100	.469**	1	.374**	.255**	.359**
PBC	−.074	.181*	.156*	−.006	.499**	.374**	1	.260**	.600**
CAI	.119	.007	.072	.034	.230**	.255**	.260**	1	.318**
BI	−.145	−.046	−.074	.003	.571**	.359**	.600**	.318**	1

Note. ATT = attitude; BI = behavioural norm; CAI = Context Assessment Index; Experience = years of experience; PBC = perceived behavioural control; SN = subjective norms; Unit = unit of employment.

*p < 0.05, two-tailed). **p < 0.01, two-tailed.

H2: Organizational context provides incremental prediction of nurses' behavioural intentions to use anxiety assessment tools on their patients beyond the three TPB components of attitude, subjective norms, and perceived behavioural control.

A hierarchical multivariate regression analysis was performed in two steps. In Step 1, ATT, SN, and PBC were entered as a block with BI as the dependent measure with the following results: $R^2 = .46$, $F(3, 170) = 48.30$, $p < 0.001$ (Table 14). When CAI

was added to the model in Step 2, the resulting R square change ($\triangle R^2$) was 0.02 ($p < .05$), meaning that context explained an additional 2.0% of the variance in BI above the TPB variables (Table 14). When interaction terms were included in the model to determine whether context had a moderating effect on explaining the relationship of the main predictor variables on BI, the resulting R square change was not statistically significant.

The overall predication model yielded $R^2 = .48$, $F(1, 169) = 5.225$, $p < 0.05$. The beta weights presented in Table 14 suggest that nurses' perception of control over performing anxiety assessments exerted the greatest impact ($\beta = 0.390$, $p < 0.001$), followed by nurses' attitude toward performing anxiety assessments ($\beta = 0.336$, $p < 0.001$), and, finally, the context in which nurses practice ($\beta = 0.134$, $p < 0.05$). In this sample, SN was not a statistically significant predictor of BI. The Tolerance (> 0.1) and VIF (<10) values for PBC, ATT, and CAI confirmed that there were no issues with multicollinearity among the variables remaining in the model.

Table 14. Hierarchical Multivariate Regression Analysis Summary for Context (CAI) Controlling for Attitude (ATT), Subjective Norm (SN), and Perceived Behavioural Control, Predicting Behavioural Intention (N = 174)

Variable	*B*	*SEB*	β	R^2	$\triangle R^2$
Step 1				0.46	0.46**
ATT	0.316	0.064	0.364**		
SN	0.039	0.059	0.043		
PBC	0.82	0.013	0.412**		
Constant	0.228	0.018			
Step 2				0.48	0.02**
ATT	0.307	0.063	0.336**		
SN	0.019	0.059	0.021		
PBC	-0.078	0.013	0.390**		
CAI	-0.027	0.012	0.134*		
Constant	0.233	0.018			

*p < 0.05. **p < 0.001.

Summary

Participants were recruited from one of seven medical/surgical units in one organization. The majority were female with 1 to 5 years of nursing experience. There were no between-unit differences in participation rates and gender, and although statistically significant differences in age and years of experience were observed between two units, age had no effect on the focal study variables (ATT, SN, PBC, CAI, and BI), whereas years of experience led to only a modest but statistically significant difference between two units for PBC. In this instance, nurses with 20 years of experience reported greater PBC than did those with 6 to 10 years of experience. Logarithmic transformations of ATT, SN, and BI were undertaken prior to conducting the multivariate analyses. A CFA was completed on the ATT, SN, and PBC scales; the instruments showed good reliability with the exception of SN, which retained one item.

Nurses' intentions to perform anxiety assessments on their patients were predicted by three variables, PBC, ATT, and CAI. These three variables accounted for 48% of the variance in BI. In this sample, SN was not a statistically significant predictor of BI, and context did not have a moderating effect on BI.

CHAPTER 5

DISCUSSION

This chapter contains five sections. The principal findings are discussed in the context of the study hypotheses posed in Chapter 1. The second section compares the results of the current study with those of other implementation studies. Next the study's strengths and limitations are discussed. Implications of the study's findings for practitioners and researchers are presented and future research directions are outlined. The chapter concludes with a summary.

Principal Findings

The findings from this study have provided the first evidence that CAI, when added to the TPB components ATT, SN, and PBC, contributes positively to predicting nurses' intentions to perform anxiety assessments on patients, in a sample of nurses working on medical/surgical units. The TPB hypothesizes that behaviour is best predicted by an individual's stated intention to act, which is determined by three variables, ATT, SN, and PBC. In this study, 46% of the variance in nurses' intentions to perform anxiety assessments was explained by nurses' perception of control over performing anxiety assessments and their positive attitudes toward providing such assessments. Subjective norm was not found to be predictive of nurses' intentions to perform anxiety assessments. This leaves unanswered questions about the role of subjective norms in predicting behavioural intention, which is discussed later in the chapter.

The workplace context for nurses accounted for an additional 2% of the explained variance in intentions to perform anxiety assessments of their patients. Although modest, the addition of context to the TPB enhanced the predictive ability of the model, thereby empirically supporting the theoretically derived association between workplace context and nurses' intentions to adopt (or not) an evidence-informed practice change.

Moreover, approximately 48% of the variance in nurses' intention to perform anxiety assessments was explained by three variables, suggesting that the adoption of a practice change is a function of the nurse's perception about the amount of control she/he has to perform the practice change, the nurse's attitude toward the practice change, and the context in which the practice change occurs. These findings are notable given that the results from previous meta-analyses of studies using the TPB, which does not include context, accounted for 33.7% (Conner & Sparks, 1996), 40% (Godin & Kok, 1996), and 39% (Armitage & Conner, 2001) of the explained variance in intentions. In a review of 16 studies aimed at predicting clinicians' adoption of a practice change, the TPB explained approximately 30% of the variance in intentions (Eccles et al., 2006).

This study contributes to our understanding of the variables influencing nurses' adoption of evidence-informed practice changes. Context, when measured as a variable that influences individual adoption, can have an impact on the implementation of practice changes. Identifying modifiable variables, such as nurses' perceptions of control, attitudes toward a practice change, and work context, assists in the development, selection, and optimization of intervention strategies to increase the uptake of evidence-

informed practice. As well, the findings support the study hypotheses and establish empirical support for the relationship between organizational context and individual behavioural intention to adopt an evidence-informed change in practice. This advances the current state of implementation science and provides a foundation for further research.

Perceived Behavioural Control

Perceived behavioural control is believed to allow for prediction of behaviours that occur under circumstances where there may be constraints on action and where simply forming an intention is insufficient to predict behaviour (Ajzen, 1991). This construct provides information, from the perspective of the individual, about what she/he may perceive as barriers to behaviour change. In this study, PBC was the strongest predictor of intention. This finding is consistent with that of Armitage and Conner (2001), who, in a meta-analysis of 185 independent studies using the TPB, found that the PBC-intention correlation was strong ($r = .43$), independently accounting for 6% of the variance, after controlling for ATT and SN. Additionally, controlling for intention, PBC accounted for an additional 2% of the explained variance in behaviour. In a meta-analysis of studies using social cognitive theories to examine clinician behaviour, Godin et al. (2008) found that in studies that measured the relationship between beliefs about capabilities and behaviour and intention, the latter was a significant ($p < 0.05$) predictor of behaviour (62.5% of the reported studies) and of intention (78.5% of the reported studies).

The current findings are also consistent with those of other studies that have examined the relationship between ATT, SN, and PBC and nurses' intentions to adopt an evidence-based practice change. For example, (Godin et al. (2000) found that 28% of the variance in nurses' adherence to using Universal Precautions for performing venipuncture was explained by intention ($\beta = 0.37$, $p < 0.001$) and PBC ($\beta = 0.23$, $p < 0.05$). Similarly, Nash, Edwards, and Nebauer (1993) found that PBC was the only variable to make a significant contribution to the prediction of nurses' intention to use a pain assessment tool, accounting for 21% ($R^2 = 0.21$, $p < 0.001$) of the overall variance. Puffer and Rashidian (2004) reported that 40% of the explained variance in nurses' intention to teach patients smoking cessation strategies was explained by two variables, PBC ($\beta = 0.48$, $p < 0.001$) and ATT ($\beta = 0.37$, $p < 0.001$); SN was not related to intention. Finally, O'Boyle, Henly, and Duckett (2001) found a positive association between PBC ($\beta = 0.08$, $p < 0.05$) and control beliefs ($\beta = 0.56$, $p < 0.05$) and nurses' intention to adhere to hand hygiene practices. In their study, control beliefs were treated as a precursor to PBC (discussed later in the chapter).

Ajzen (1991) argues that the magnitude of the PBC-intention relationship is dependent on the type of behaviour and the context in which it is to occur. He further argues that PBC is more useful in predicting behaviour as volitional control over behaviour decreases (p. 185). The construct of PBC includes both the concept of having the opportunity, including resources to perform a behaviour (external – control), and the concept of perceived capability to achieve a goal (internal-self – efficacy) (Ajzen, 2002).

Thus, PBC consists of both internal perceptions of capability and external opportunities to perform the behaviour.

The dual notions of control beliefs and beliefs about capabilities are embedded within the PBC construct and used in the construction of surveys using the TPB (Francis et al., 2007). In the current study, two items related to individual perceptions of capabilities in performing anxiety assessments were retained in the final PBC subscale (*I am confident that I can assess and document my patient's anxiety* and *For me to assess and document my patients' anxiety is easy*), whereas one item related to control over behaviour (*Whether I assess and document my patient's anxiety using an anxiety assessment tool is entirely up to me*) was eliminated from the final subscale. The poor performance of the control item suggests that it was a less important determinant of intention than perceptions of capability to perform anxiety assessments.

In the design of the iCAMIRA project, the decision to implement standardized anxiety assessments was not within the purview of the frontline nursing staff. Nurses were required and paid to attend the educational sessions for the purpose of learning to conduct anxiety assessments on their patients. The electronic health record was adapted to include the anxiety assessment tool. All of these were clear indicators that nurses were expected to perform anxiety assessments, and as such, they may have perceived that they had little choice in the matter. Alternately, their ability to comply with performing anxiety assessments required them to master their use. Considering the lack of their individual decision-making authority and their need to master a new skill, it is not

surprising that measures of nurses' perceived capabilities to perform anxiety assessments emerged as a more significant predictor of intention and, by association, behaviour than control over the behaviour.

Despite the lack of individual choice about the decision to perform anxiety assessments, nurses in this study had very positive views of their work contexts, as indicated by the high mean positive response scores in the CAI. Although the CAI did not moderate the relationship between PBC and intention, the high positive scores on the CAI and on intention suggest that nurses in this study viewed performing anxiety assessments and their work contexts favourably; thus, control over performing anxiety assessments was less important to nurses than their perceived capabilities. This finding is supported by O'Boyle et al. (2001), who found that when the work environment was chaotic, control beliefs were a stronger predictor of intention than perceived capabilities.

Research using the construct of self-efficacy has demonstrated that individuals are more likely to engage in behaviour that they believe is achievable (Bandura, 1997). In the current study, nurses who perceived that they were able to properly use the anxiety assessment tool and to effectively manage their patients' anxiety through the use of such tools had higher intentions to conduct these assessments. They felt both able and motivated.

Although many studies have established strong support for the influence of PBC on intention and behaviour, what is missing from the literature is evidence for the selection of effective strategies to improve specific aspects of PBC. Systematic reviews

of implementation strategies among health care providers have shown that all interventions are effective some of the time, with a median absolute effect size of 9% (Grimshaw et al., 2004). One reason for this may be that implementation strategies are not selected to target the underlying factors associated with changing practice. The concept of "readiness for change" includes notions of motivation, capability, and perceived need for change (Weiner, Amick, & Shou-Yih, 2008). The use of educational strategies has been found to be the most common intervention used to change practice among nurses, although the evidence to support its effectiveness is lacking (Thompson et al., 2007). Understandably, increasing individual knowledge and skill should increase perceived capability and in turn impact intention and behaviour. However, studies purported to use educational strategies to implement an evidence-informed practice change among nurses are generally of poor quality, with researchers rarely reporting the rationale for the selection of the strategies used or evidence suggesting that pre-implementation assessments informed the design of the intervention (Bernaix, 2000; Davies & Hodnett, 2002; de Rond, de Wit, & van Dam, 2001; Ellis et al., 2007; Lopez, Molassiotis, Chan, Ng, & Wong, 2004; Smith-Idell, Grant, & Kirk, 2007).

Attitude

Attitude toward performing a behaviour reflects an individual's global positive or negative evaluations of performing a particular behaviour; that is, attitude is determined by the individual's belief about the value of a given outcome of a behaviour (Ajzen, 1991). The key purpose of the TPB is to provide an explanation for the ATT-behaviour

relationship, which is mediated by intention (Hagger & Chatzirarantis, 2005). Ajzen (1991) claims that the TPB will be rejected if ATT does not predict intention. Studies measuring ATT, intention, and behaviour have consistently demonstrated that the more favourable an individual's attitude toward a particular behaviour, the stronger is that person's intention to express that behaviour (Ajzen, 1991; Armitage & Conner, 2001; Eccles, Grimshaw, et al., 2007; Francis et al., 2007; Godin et al., 2008). In 115 studies using the TPB in which the ATT-intention relationship was measured, ATT explained approximately 24% of the variance in intention (Armitage & Conner, 2001).

In this study, the relative contribution of PBC to the variance on intention was slightly larger than that of ATT. Nevertheless, both variables accounted for the majority of the explained variance in intention, and the association between PBC and ATT suggests that for every 1-point increase in PBC, there is a 0.5-point (95% CI –0.83, 0.99) increase in ATT. Interestingly, ATT has been linked to PBC because it is assumed that individuals who feel more capable in performing a behaviour tend to have a positive attitude toward the behaviour (Ajzen, 2002; Hagger & Chatzirarantis, 2005). This may explain why education is one of the most common interventions for changing practice among nurses. For example, Bernaix (2000) used a stepwise linear regression analysis to explore the predictors of nurses' intentions to offer breastfeeding support to women. She reported that 42% of the unique variance in nurses' intention to provide breastfeeding support to women was explained by their attitudes toward breastfeeding. However, when she used the amount of actual support (behaviour) provided by nurses as the outcome

variable, 29% of the unique variance was explained by nurses' breastfeeding knowledge but only 16% by their attitudes toward breastfeeding. Additionally, O'Boyle et al. (2001) found that control beliefs impacted intention directly and indirectly through PBC and through ATT.

The relationship between ATT and PBC is an important one that must be considered when designing implementation interventions. For example, Semin-Goossens, van der Helm, and Bossuyt (2003) evaluated various implementation strategies, including discussion at staff meetings, marketing materials, audit and feedback, reminders, and provision of patient care resources aimed at encouraging nurses to adopt a patient fall prevention guideline. At the end of a 2-year period, pre- and post-measures of nurses' knowledge and attitudes about fall prevention strategies showed no statistically significant improvement, with 82% of responding nurses indicating that they did not believe that patient falls were preventable and 80% stating that they did not change their practice (Semin-Goossens et al., 2003). Clearly, the attitudes of the nursing staff were inconsistent with the proposed change, and the interventions used by these researchers proved ineffective in shifting attitudes.

Ellis et al. (2007) evaluated the implementation of a pain assessment guideline among 528 nurses working in a pediatric hospital. They used a 4-hour educational workshop, coaches, and unit champions. They measured nurses' knowledge about assessment and management of pain and their beliefs and perceptions about pain before, after, and 6 months following attendance at the workshop. They also measured adherence

to completion of pain assessments. They found no change in knowledge, beliefs, or perceptions about pain. Although there was an increase in the use of pain scales, there was no increase in the use of the pain history tool or documentation of pain strategies (Ellis et al., 2007). The lack of change in knowledge and attitude may be one reason for the poor behavioural outcome.

de Rond et al. (2001) evaluated the implementation of a pain assessment guideline, including the use of an evidence-based pain assessment tool, by nurses across 11 medical/surgical units in 5 hospitals. All nurses were required to attend a 3-hour education workshop. Physicians were provided with information about the guideline during their business meetings. Nurses' knowledge scores increased from 69.1 to 75.8% ($p < 0.001$), and their attitude toward using the pain assessment tool changed from 33.1 to 48.5% ($p < 0.01$). Adherence to using the tool was high at 72 to 82%; however, this dropped to 59% at 6 months. The researchers attributed this drop largely to a change in nurses' attitude toward performing daily pain assessments, which changed from 87.4% of nurses initially agreeing that pain should be assessed on a daily basis to 77.1% ($p < 0.05$) 6 months later. Nurses implied that the main reason for this change in attitude toward daily pain assessments was that physicians did not make adequate use of them. This would suggest that although a positive attitude may motivate nurses to adopt a practice change, sustainability of the change is a function of other factors.

Regardless of the frequency with which educational interventions are used to change practice, none of the studies cited above related implementation success or failure

to nurses' knowledge levels or to changes in attitude. Among studies where baseline measures of nurses' knowledge and attitudes were obtained, there was no indication of whether or how this information was used to design the change interventions (Beduz, 2008). Additionally, all the studies, even those with reported positive outcomes did not report any significant change in nurses' attitudes, and few reported improvements in nurses' knowledge. The careful assessment of nurses' knowledge, skills and attitudes about a practice change may be key to changing practice.

Evidence-informed interventions aimed at modifying nurses' attitudes toward a practice change are lacking (Leeman et al., 2007). One reason for this may be a lack of recognition that when professionals adopt a new practice change, they must learn a new way of practicing by first unlearning an old practice (Soto-Crespo, 1999). While performing anxiety assessments was a "new practice" for nurses in the iCAMIRA study, nurses had to integrate performing these assessments into their daily routines and work practices.

Unlearning has been well described in the organizational change and educational literature; however, there are a limited number of references on unlearning in the health professions, and references to unlearning in the nursing literature are scarce and lack theoretical development (Macdonald, 2002). Encouraging nurses to stop doing things, as well as getting new practices started, is an important step toward an evidence-informed practice change (Nutely, Davies, & Tilley, 2000). The lack of reference to and awareness of the importance of supporting unlearning in the nursing literature may be a significant

barrier to personal and organizational change. Research is needed to identify and test interventions to help nurses change attitudes toward a practice—in other words, unlearn what they know and "give up" what they believe are the right ways to practice—before they can develop a new attitude and accept a new way of doing something.

Subjective Norm

Subjective norm refers to the individual's perceptions of social pressure to perform (or not) a behaviour; that is, if an individual believes that significant others approve (or disapprove) of the behaviour, he/she is more (or less) likely to perform the behaviour. SN was not predictive of intention in the current study, consistent with Armitage and Conner (2001), who, in their meta-analysis of 144 studies, found that the SN-BI relationship ($r = 0.34$, $p < 0.001$) was significantly weaker than the ATT-BI relationship ($r = 0.49$, $p < 0.001$) and the PBC-BI relationship ($r = 0.43$, $p < 0.001$). They attributed this finding to a function of how SN had been conceptualized and measured, suggesting that there is a need for a group-referenced conceptualization of SN. Drawing from social identity theory, Armitage and Conner (2001) distinguish between group norms and SN, suggesting that normative pressures from a group with which individuals closely identify are likely to be more influential than are more generalized normative pressures.

In the current study, the items associated with the SN subscale were problematic. That is, the two items on the SN scale that related most to a global perception of social pressure (*I feel under social pressure to assess patient anxiety* and *It is expected of me that I assess patients' anxiety*) performed poorly and were therefore not included in the

final version of the scale. The one item that related most to a socially relevant group (*Most people who are important to me think I should NOT assess patients' anxiety* [reverse scored]) showed a positive association with intention ($r = 0.36$, $p < 0.01$) and was retained as the only measure of SN.

The non-significant SN-intention relationship is consistent with Armitage and Conner (2001), who found that, generally, studies with the weakest SN-intention associations tended to use single-item measures. However, Godin et al.'s (2008) systematic review of social cognitive theories and health care professionals' intentions and behaviours demonstrated that 62.3% of studies that measured the effect of social influences on intention found a significant relationship. In light of these contradictory findings, more empirical attention needs to be given to this construct.

As discussed previously, the work environment of nurses in acute care settings differs significantly from that of other health care providers. One future direction for exploring the influence of nurses' socially relevant groups is to develop a better definition of these groups as a first step to operationalizing items within the SN subscale. For example, differentiating between the concepts "people who are important to me as a person" and "people who are important to me in my work environment" may improve this item. As has been suggested from previous research, the support of physicians and other colleagues is influential in determining nurses' adoption or sustained use of an evidence-informed practice change (Cummings et al., 2007; Estabrooks, Midodzi, Cummings, & Wallin, 2007; Semin-Goossens et al., 2003). Asking nurses to respond to

the statement "Nurses who work with me expect me to assess my patients' anxiety" may be a better measure of the perception of social influences from nurses' immediate work group. The inclusion of other items, such as "Physicians who work with me expect me to assess my patient's anxiety" and "Health care professionals who work with me expect me to assess my patient's anxiety," may be helpful in delineating the normative influences on behaviour that may be perceived as originating from different work groups within nurses' environments. Additionally, the hierarchical nature of the work environment could be captured by including statements such as "My manager expects me to assess my patient's anxiety" or "I feel pressure from my manager to assess my patient's anxiety."

Studies using the TPB to measure the factors influencing practice changes among health care providers have consistently found that different constructs of TPB components predict intentions and behaviour among different groups of clinicians and for different behaviours and guidelines (Hrisos et al., 2009; Kortteisto, Kaila, Komulainen, Mäntyranta, & Rissanen, 2010; Perkins et al., 2007). The influence of professional group membership highlights the importance of designing tools to measure group-specific influences and then tailoring interventions to specific group reference norms. This may explain why interventions that have been found to be effective with physician groups, such as the use of opinion leaders, educational outreach visits, and audit and feedback, have been less effective in changing nursing practice (DiCenso, Guyatt, & Ciliska, 2005).

Context

Within the PARiHS framework, context has been defined as "the environment or setting in which the proposed change is to be implemented" (Kitson et al., 1998, p. 150). Context was operationalized as a 37-item CAI scale (McCormack et al., 2009). The addition of CAI to ATT, SN, and PBC explained an additional 2% variance ($p < 0.05$) in BI. While modest, this did represent a significant direct effect of context on intention and interestingly, CAI did not emerge as a moderator of the relationship between ATT and BI or of the relationship between PBC and BI. One reason for the lack of interaction effects may be due to the lack of variability in the CAI across the nursing units, which may have led to an underestimation of its effects. An alternate explanation for this finding may be that linear models provide good accounts of psychological data even when interaction effects are known to be present (Ajzen, 1991, p. 188).

Current thinking suggests that context influences behaviour by shaping attitudes and beliefs, and opportunities. For example, in discussing influences on individual's health behaviours, Ajzen and Manstead (2007), argue against including broad environmental factors within the TPB. They believe that environmental factors are background variables which influence behaviour indirectly through their impact on more proximal factors (e.g. ATT, SN, PBC and BI) that are directly linked to the behaviour of interest. However, if their argument is valid, the lack of interaction effects between CAI and ATT and/or PBC is surprising and merits further investigation. This study

demonstrated a direct influence of context on intentions to use an evidence-informed practice.

Positive work contexts, characterized as needing a positive culture, collaborative relationships with physicians, good leadership, and a clear mechanism for feedback on performance, have been positively associated with the uptake by nurses of evidence-informed practice, although how these researchers have operationalized work context has varied across studies (Cummings et al., 2007; Dobbins et al., 2005; Dopson & Fitzgerald, 2005; Estabrooks et al., 2008; Meijers et al., 2006; Pepler et al., 2005; Scott-Findlay & Golden-Biddle, 2005; Stetler, 2003; Wallin, et al., 2006).

Positive associations between context as defined by PARiHS and nurses' use of evidence-based practices have been reported by Cummings et al. (2007), Estabrooks et al. (2008), and Wallin, Estabrooks et al., (2006). These three studies relied on secondary analyses of survey data collected in 1998, and the items used to operationalize the concepts of culture, leadership, and evaluation were limited by the types of questions posed in the original survey. Although these studies undoubtedly contribute to our understanding of the relationship between context and nurses' use of evidence-based practice, they have been criticized for how they have operationalized context and its theoretical alignment to the PARiHS framework (Rycroft-Malone, 2007; Titler, Everett, & Adams, 2007). In contrast, the CAI was designed to measure context according to PARiHS's three dimensions: (1) culture—collaborative practice, clear practice

boundaries; (2) leadership—respect for persons; and (3) evaluation—evidence-informed practice and evaluation.

Nurses in the current study reported having positive views of their work context, were positive about their capabilities to perform anxiety assessments, had positive attitudes toward performing anxiety assessments, and had high intentions to perform anxiety assessments. These findings are significant and theoretically aligned with the TPB. Ajzen (1991) asserts that in situations where attitudes toward the behaviour are positive and the contextual support for the behaviour is good, beliefs about individual capabilities to perform the behaviour may be a better predictor of behaviour than actual control over the behaviour. In contrast, if attitudes are negative or the contextual support for performing the behaviour is lacking, the effort required to perform the behaviour is greater than simply believing in one's capabilities (internal factors), and control over the behaviour (external factors) becomes more significant.

For example, in a multicentre randomized controlled trial of an educational intervention aimed at increasing nurses' use of labour support and intermittent auscultation behaviours, researchers found that despite high levels of nurses' reported self-efficacy to perform these behaviours, the successful implementation of the practice change was mixed across all sites (Davies et al., 2002). Although the researchers did not include a measure of contextual factors, a qualitative post hoc analysis of the findings revealed significant contextual differences among the study sites. Among sites where the adoption was successful, staff members were engaged in achieving group consensus

about the decision to adopt the practice changes, and unit policies were changed to reflect the new practice. Among sites where the adoption was not successful, the staff relied heavily on the use of central monitors, making it more convenient for nurses not to be in the patient rooms. Moreover, lower involvement of nursing leadership and a lack of physician support for the practice changes were cited as factors contributing to non-adoption.

As stated previously, O'Boyle et al. (2001) found that PBC and control beliefs were the strongest predictors of intention; however, they also reported a weak association between intention and behaviour ($\beta = 0.68$, $p < 0.05$), finding that unit intensity (a measure of workload) was a better predictor of actual behaviour than either PBC or control beliefs. Additionally, although de Rond et al. (2001) found a positive association between nurses' knowledge about and attitudes toward a pain assessment guideline and its use, this was not sustained over time due to a lack of physician support for the use of the pain guideline. Clearly, even when beliefs about individual capabilities and attitudes are high, but the context is not supportive of the change, the effect of PBC and ATT on behaviour may be lessened. This is consistent with the expectancy-value theory (Ajzen, 1991). Despite nurses' positive attitudes toward and knowledge about pain assessment guidelines, the lack of physician support for using pain assessments undermined the social reinforcement required to sustain their use. Social reinforcement for enacting newly learned behaviours and the lack of support and cooperation from physicians, other colleagues, and managers have been identified as the three most significant barriers to the

adoption of an evidence-informed practice change (Champion & Leach, 1989; Hutchinson & Johnston, 2006; Ploeg et al., 2007).

The CAI was designed to measure context according to PARiHS's three dimensions: culture, leadership, and evaluation. These dimensions include a value-oriented learning culture that is receptive to change, leadership that supports teamwork and staff involvement in decision making, and evaluation of various levels of performance with effective feedback mechanisms using multiple methods (McCormack et al., 2002). A context receptive to change is highly dependent on the quality of social interactions, where individuals both contribute to the receptivity of a context (by being willing to change) and may be influenced by a receptive context (by being encouraged to change) (Dopson et al., 2002; Estabrooks et al., 2003; Greenhalgh et al., 2004). This notion of receptive context is essential to understanding how individual–group interactions work together to influence the adoption of practice changes. Finally, linking context to intention and behavioural outcomes encourages clinicians and researchers to give greater attention to the elements of context when implementing programs aimed at increasing the adoption of evidence-informed practices.

Implications for Implementation Science

The results of the current study are congruent with the findings of other studies showing that the implementation of evidence-informed practice is a function of the interrelationships among a series of complex factors (Cummings et al., 2007; Dobbins et al., 2005; Estabrooks et al., 2008; French, 2005; Godin et al., 2008; Greenhalgh et al.,

2005; Kitson et al., 2008; Meijers et al., 2006; Ploeg et al., 2007). Researchers working in the field of knowledge translation have increasingly called for the use of theory in designing and studying implementation efforts asserting that it is only through theory that we will be better able to understand what happens when individuals try to use evidence in practice (Cohen et al., 2005; Eccles et al., 2005; Estabrooks et al., 2007; Shojania & Grimshaw, 2005; Stetler & Caramanica, 2007; Walker, et al., 2003). In this thesis I have argued that despite an array of frameworks, models and theories that have been used by implementation researchers, challenges exist in their use for two reasons: (1) because of a lack of a conceptual framework which adequately addresses the complexity of implementation efforts from the perspective of individuals and the contexts in which they use evidence-informed practices, and (2) the lack of available tested frameworks. In response to this challenge, the PARiHS framework has been proposed as an organizing heuristic for thinking about the concepts that influence evidence-informed practices. More specifically, with the development of the CAI, the PARiHS framework provides guidance for assessing the context in which implementation efforts occur. It does not provide guidance for understanding implementation efforts from the perspective of individuals. Alternately, the TPB has been proposed as an explanatory theory for understanding how motivational factors influence behavioral intentions to implement practice changes. Although, researchers using the TPB have recognized the influence of context and theorized that context acts on intention and/or behaviour through its effect on motivational factors or by providing opportunities, this relationship is not developed

within the theory. As well there are no studies, using TPB which examine the influence of organizational context factors on individual behaviour. Critical examination of the PARiHS framework and the TPB reveal that these heuristics intersect around the concept of context – how individual's contribute to and perceive the contexts in which they work.

The results of this study address a gap in our understanding of the relationship between context, attitudes, perceived behavioral control and nurses' intention to use evidence-informed practices. The study results add to our theoretical understanding of the individual-context relationship in the following ways: (1) it has provided empirical support for context as a separate concept in the TPB that has a direct effect on intention to use evidence-informed practices; (2) measuring context is a key concept that is currently lacking in the TPB; (3) it suggests that individuals' experience of context influences the use of evidence-informed practice and supports the measurement of context related to evidence-informed practice at the individual level; (4) adds to the growing empirical support for the inclusion of the concept of context as a significant predictor of evidence-informed practice within the PARiHS framework; and (5) confirms the centrality of the individual in using evidence-informed practice within a clinical setting and thus the need to include individual-level factors within a holistic approach to implementation.

This study did not test the relationship between PARiSH elements of evidence or facilitation on BI and therefore additional research is needed before suggested changes to PARIHS can be made. However, CAI, ATT and PBC were shown to be significant predictors of BI. This knowledge can be useful for (1) designing theory-based

interventions for implementation; (2) selecting modifiable variables (ATT, PBC, CAI and BI) for testing future interventions; and (3) guiding the evaluation of implementation interventions. This will be discussed further in relation to implications for practice and research.

Implications for Practice

The availability of resources, support for developing capability, cooperation of others, and a culture of expectation of evidence-based practice are examples of contextual elements that contribute to the formation of cognitions about both the desirability and the capability of performing a behaviour. These motivational factors are significant predictors of behavioural intention and, ultimately, performance. Clinicians and researchers can use this knowledge to design theory-based implementation interventions as a heuristic to provide direction as to what they need to think about and pay attention to while implementing an evidence-informed practice change. For example, the design of the iCAMIRA project is offered as an example of how concepts within the PARiHS framework and TPB were considered to increase the chances that the implementation intervention might work. The iCAMIRA project was designed using the elements from the PARiHS framework – evidence, context and facilitation. The educational intervention was designed using the TPB components: ATT, SN, and PBC. The study organization's overall culture values patient satisfaction with care and the use of evidence to improve quality (context); the study team assumed that an intervention that was targeted at improving patient care would be valued. The iCAMIRA research team developed an

assessment tool and process for assessing patient anxiety in acute care settings and then embedded the assessment tool and process within the organization's electronic health patient record and within the daily routine of nursing staff (PBC); the study team assumed that using evidence and adapting it to the context of care would increase the chance of success. External funding for the study, coupled with the track record of the research team, created the necessary conditions to gain senior leadership support for this project (context). Senior leadership support was required to allocate information technology resources to develop and deploy the anxiety assessment tool as part of the electronic patient record, making the documentation of anxiety assessments easy (context, PBC). Unit-level leadership support was also required to secure release time for staff to attend the workshops (context, PBC). Additionally, unit mangers, clinical nurse specialists, and interprofessional practice leaders attended the workshops (context). Attendance at the workshops was encouraged by managers, and nurses were paid for their participation (context).

An elicitation (pre-assessment) study conducted in Phase 1 of the project allowed for an assessment of nurses' attitudes and concerns about conducting anxiety assessments. The findings from the elicitation study were used to develop the TPB survey and the educational intervention. Messaging in the Web-based module was created to deliver knowledge about anxiety and using the anxiety assessment tool as well as to provide a rationale for the benefit of conducting anxiety assessments (ATT, PBC). As an innovation, using an anxiety assessment tool provided nurses with an evidence-informed

practice to routinely assess and manage patient anxiety, something that did not previously exist (ATT). The anxiety assessment tool consisted of only five items; it was automated and integrated into the electronic patient record as part of the daily shift assessment (PBC). The standardized patient workshops provided nurses with the opportunity to learn with their peer and other health professional colleagues. The workshops were facilitated by a clinical nurse specialist with expertise in anxiety (PBC). Nurses were given the opportunity to "try out" the anxiety assessment tool and management strategies on standardized patients; thereby, both experimenting and receiving immediate feedback on their performance (context, PBC, ATT).

A second way clinicians and researchers can use this knowledge to design theory-based interventions is to measure the variables as part of a formative assessment or diagnostic to identify areas of possible concern that may be mitigated prior to an implementation intervention. For example, if a practice change requires team collaboration, using the CAI as a diagnostic tool can provide an understanding of individual perceptions of the collaborative practices prior to implementing a practice change. The process used for designing a TPB survey recommends using a formative elicitation study to identify pre-existing attitudes and beliefs, normative influences and perception of capability issues that may exist prior to implementing a change intervention. The results of this doctoral research suggest that using theory to design an implementation intervention by paying attention to motivational and contextual factors will increase the chances of success.

Using modifiable variables such as ATT, PBC, CAI and BI also offer opportunities for clinicians and researchers to adapt interventions for their local contexts and populations. Attitudes, perceptions of skills and abilities and the context in which practice occurs will vary among persons, units, organizations and over time. We know from the synthesis of studies using the BARRIERS Scale (Hutchinson & Johnston, 2006) that while many consistencies existed in ranking of perceived barriers, the ranking of barriers varied between countries and professional groups indicating that the contexts of the practice may possess different barriers. One would expect to find that implementation strategies would also vary in success, depending on where and with whom they were used. For example, individual positive or negative attitudes will vary among individuals, about different practices and in different contexts. Therefore, we can design, measure and evaluate implementation strategies using the same concepts, ATT, PBC, CAI and BI with some degree of comparability across settings and studies.

Implications for Future Research

Building on the work of this thesis, recommendations for future research have been made in the following areas: (1) improving the psychometric properties of measurement tools used, (2) using ATT, PBC, CAI and BI to design and evaluate implementation studies, and (3) exploring the theoretical linkages between PARiHS and TPB.

Enhancing measurement tools. Context emerged as a significant (although modest) predictor of intention. However, the absence of CAI interaction effects precludes a more fine-tuned understanding of the conditions under which context is likely to exert

effects on intentions, thereby warranting additional research. Future research using the CAI should be undertaken as follows: (1) additional reliability testing should be completed on the CAI to provide psychometric data in a Canadian sample; (2) the CAI should be tested with nurses working in other organizations to investigate the influence of CAI among units that are much more heterogeneous with respect to context; (3) additional testing of the CAI should be conducted to determine how the subcomponents of context—culture, leadership, and evaluation—interrelate and interact; (4) the subcomponents of context should be tested to determine their relative weighting attributed to intention; and (5) the CAI and its subcomponents should be tested to determine their relationship to behaviour. Additionally, future studies using the TPB with nurses should include additional reliability testing with an expanded SN subscale that includes items that have group-referenced norms.

Designing and evaluating implementation studies. Given the strong positive association between PBC, ATT, and BI variables found in this study, future studies aimed at testing interventions designed to shift nurses' ATT and PBC should include pre-implementation assessment of nurses' perceived capabilities and attitudes toward the proposed change and articulate how those findings have been used to design the implementation intervention. For example, if a practice gap has been identified, how does that gap theoretically link with the chosen intervention? How has the intervention addressed the practice gap? Educational interventions are used most commonly to induce nurses' to use evidence-informed practices. Researchers using educational interventions

should explain how the intervention has been designed to change perceived capabilities and knowledge. Did a significant change occur? What was the impact on intention and behaviour? If a practice gap is a result of a lack of knowledge or skill, then an educational intervention, if it is effective, should be designed to increase knowledge and skill. An intervention study, which reports no change in knowledge, skill or attitude as a result of an intervention, simply means it was a poorly designed intervention. It does not mean that education is not an effective method of implementing a practice change.

Additionally, implementation studies which build on the findings of this doctoral research should measure changes in ATT and PBC over time relative to intention and behaviour to better understand how ATT and PBC relate to implementation interventions and to the sustained use of evidence-informed practices Using longitudinal study approach the implementation of a practice guideline, or a series of practice guidelines could be evaluated to measure: (1) the impact of varying implementation strategies of increasing/decreasing intensity on the adoption of specific practice changes; (2) how ATT, PBC and BI change relative to each implementation intervention; and, (3) if the perception of CAI changes relative to sustained use of a practice guideline.

Expanding on the theoretical linkages. The argument in this doctoral research has been for the integration of individual-level determinants – ATT, PBC and BI within the PARiHS framework. Building on this work includes exploring how the other elements within the PARiHS framework, specifically evidence and facilitation intersect at the individual level to influence nurses' intentions to use an evidence-informed practice

change. This would require additional theoretical and empirical justification for examining evidence and facilitation from an individual perspective and how this view relates to nurses' use of evidence-informed practice. The relationship between evidence and intention to adopt a practice change could be explored by assessing nurses' perceptions of the nature and quality of the evidence and their attitudes, perceived capabilities and stated intentions to use the evidence in practice. Alternately, nurses' could be asked questions about the role and purpose of facilitation, a facilitator's skills and methods or about different types of facilitation experiences and their attitudes, perceived capabilities and stated intentions to use an evidence-informed practice. Currently, there are no published scales to measure evidence and facilitation based on the PARiHS framework's conceptualization of these concepts. The development of such scales would include, (1) the development of an operational understanding (i.e., how have these concepts been measured) of evidence and facilitation from the theoretical and empirical literature; (2) psychometric testing of an evidence and facilitation assessment index; (3) using these indices to test the relationship between ATT, PBC, BI and evidence and facilitation.

Study Limitations

There are limitations inherent in the study design. Using data collected following the completion of the educational intervention, although useful in determining associations, does not permit inference regarding a causal relationship between independent and dependent variables. The variables measured in this study are dynamic and fluid but were measured once; thus, we have a static snapshot of these variables.

The survey response rate was quite high (70%) relative to the expected range reported in the literature for similar populations. Although some data were missing, this was considered to have had minimal impact on the findings, and there was no consistent pattern to the missing data. The sample was representative in terms of gender, age, and years of experience of the population of nurses within the organization. However, this sample of nurses was younger than most nurses in the province. The tendency toward a younger workforce among this sample may reflect recent provincial government policy incentives that have resulted in greater numbers of new graduate nurses being hired into this organization. Also, we do not have any information about the nurses who did not participate in the study. Nurses who did not participate may have had significantly different attitudes, perceptions of social norms, behavioural control, or intentions to perform anxiety assessments than those who did participate. This study was limited to medical and surgical units in one organization; therefore, the findings may not be representative of the contexts in other organizations. The lack of interaction effects found in this study may be due to the lack of variability in the CAI across the nursing units,

which may have led to an underestimation of its effects. For these reasons, these findings cannot be generalized to other organizations or nurses.

The data for this study were obtained through self-report using a single survey design. Although justification for the use of this design has been provided, this type of data is believed to be particularly susceptible to bias related to the use of a common method (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Study design procedures that were used to control for bias involved using a prospective design, having a research coordinator unrelated to the participants distribute the surveys to participants, leaving the participants unaccompanied in the room to complete the survey and collecting only sealed envelopes, using a paper-and-pencil format rather than a face-to-face procedure, varying the placement of the scale items on the survey, and varying the length and type of survey scale among the measured variables. These procedures have the effect of creating a psychological barrier between the measurement of the predictor and outcome variables, protecting respondent anonymity, reducing evaluation apprehension, counterbalancing question order, and using different end points and formats for the written items. These are all examples of proactive tactics for minimizing the effect of common method bias (Podsakoff et al., 2003; Streiner & Norman, 2008b). Post hoc analyses of common method bias using statistical procedures were not completed because whereas some researchers suggest using post hoc statistical controls to reduce method bias (Podsakoff et al., 2003), others have argued strongly against using

statistical post hoc analyses until additional research evaluates their relative effectiveness (Cohen et al., 2003; Spector, 2006).

Conclusion

Despite the prevalence of illness-related anxiety experienced by hospitalized patients, there has been little evidence to guide nurses' practices. As a first step toward assisting patients in reducing their anxiety, it has been suggested that using an anxiety assessment tool can improve the recognition of patient anxiety and, thus, its management. Challenges associated with successful implementation of evidence-informed practices among nurses have been well documented, with little conclusive evidence to guide the selection of effective implementation interventions. This lack of empirical evidence to guide practice has prompted the call for using theory to guide the design and study of implementation efforts.

A critical review of the literature about reported barriers to evidence-informed practices revealed empirical support for including individual and organizational factors when considering implementation efforts. A review of selected implementation theories, models and frameworks commonly used in nursing did not reveal any that provide a comprehensive understanding of how individual and contextual factors combine to shape nurses' intentions to use evidence-informed practices. In response to this call, the current study offered two promising theoretical frameworks that have shown promise. Specifically, the current study drew from the TPB, which focuses on individual determinants of behaviour, attitude, subjective norms, perceived behavioural control, and

behavioural intention, and the PARiHS framework, which focuses on the nature of the evidence, the context in which the change is to take place, and the type of facilitation used to induce change. A critical examination of the PARiHS framework and TPB revealed that both are heuristics that can be used to guide implementation efforst, albeit from different perspectives – organizational and individual. Additionally, these heuristics intersect around the concept of context. Specifically, that cognitive perception of context may influence nurses' intention to use and evidence-informed practice.

The CAI, which best represents the concept of context as defined by the PARiHS framework along with ATT, SN, PBC and BI was measured following nurses' participation in an educational intervention to teach them to recognize the symptoms of patient anxiety using a standardized assessment tool. The size and direction of the relationships among the variables suggest that intention to perform anxiety assessments with patients is greater among nurses who perceive that they have control over performing anxiety assessments, have a positive attitude toward performing anxiety assessments, and work in positive (supportive) contexts. This study has shown a direct, though modest, influence of context on nurses' intentions to use an evidence-informed practice. This research has added to our theoretical understanding of the relationship between contextual influences of nurses' work settings, their attitudes and perceived capabilities and their individual intentions to adopt an evidence-informed practice.

Implications for implementation science, practice and research have been discussed and suggestions have been offered for advancing our theoretical and empirical

understanding of the individual-context relationship. The addition of context to the TPB significantly improves the predictive ability of this theory and adds to the empirical support for its inclusion within the PARiHS framework. Moreover, it supports the initial working hypotheses that context matters to nurses, to evidence-informed practice change, and, ultimately, to patient outcomes.

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Appendices

A: Critical Appraisal of Nursing Evidence-Informed Practice Change Studies (Beduz, 2008)

Author/Country Study Conducted	Study Design Objective	Methods	Setting Sample	Intervention / Duration / Frequency	Individual level variables	Findings	Notes on Quality
Davies, Hodnett & Hannah et al (2002) Canada	RCT to evaluate the effectiveness of a tailored intervention in increasing labour support (LS) and decreasing EFM Practice change based on SOGC guidelines	Chart audit to establish pre and post levels of EFM Independent (2)observation of frequency of LS Surveyed nurse's self-efficacy to perform intermittent auscultation (IA) and LS.	2 tertiary hospitals 2 community hospitals one tertiary and one community hospital randomized into intervention group. Observers blinded to which groups had received intervention	All settings received standard dissemination practices Tailored intervention consisted of one 8-hour interactive workshop and 85-page workbook to 80% of frontline nurses. Study duration 9 months with follow-up at 6 months post intervention.	Self efficacy to perform LS and IA	Tertiary intervention = no significant decrease in EFM, Increase in LS Community intervention = large significant decrease in EFM, no increase in LS Tertiary control = small yet significant decreasing in EFM, no change in LS Community control = no change in EFM and decrease in LS. Self-efficacy was reported as high by nurses at all hospital sites and no statistical change over time	**Strengths** -Random sampling -objective outcome measures used **Limitations** - no measure of contextual factors that may have impacted on practice change. These were discussed post hoc, such as availability of central monitoring, policy changes, voting to adopt practice changes, lack of MD support for change -short time frame for measurement **Quality Assessment:** Some limitations

de Rond, de Wit & van Dam (2001) Netherlands	One group Pretest-post-test design to evaluate implementation of Pain Monitoring Program (PMP) Practice change based on American Pain Society Standards, used validated pain assessment tool	Chart audit for compliance to pain assessment and documentation standards. Pre and post survey of attitudes and knowledge about pain and pain management using Pain Knowledge Questionnaire Post surveyed nurses attitude toward practice of daily pain assessment	11 medical surgical wards across 5 hospitals 227 nurses and 115 MDs 85.2% participation rate for nurses in both pre-post measures Measured compliance to documentation standards for monthly for 6 months.	Introduced PMP over a two year period in all 11 wards. All nurses were given a 3-hour education program consisting of lecture and discussion. Following education program, daily pain assessment tool and documentation was introduced into practice.	Demographics, age, years experience and educational level Measured attitude toward daily pain assessments; ability to fit daily assessments into daily work; and, knowledge to complete scores.	Initial compliance was 72-82% stabilized for 5 months, dropped to 59% in 6th month. Positive attitudes toward PMP valued as important and wanting to continue ($p<0.05$) Differences found between hospitals and between medical and surgical units Nurses unhappy with how MDs used Pain Score, Nurses' mean knowledge scores improved after education program ($P<0.001$) Nurses' attitudes did not significantly change about quality of care patients received.	**Strengths** -used large diverse sample -used validated survey tool -objective outcome measure used **Limitations** -no randomization or control group -unable to determine if intervention was independent of other changes on units methods used for analysis not clear in all cases. **Quality Assessment:** Many limitations

Duncan & Pozehl (2001) United States	One group Pretest-post-test design to evaluate Implementation of guideline on assessment of acute pain management Guideline developed for Agency for Health Care Research and Quality	Measured documentation of 4 hour patient pain intensity ratings; reassessment of pain intensity following analgesia administration; follow-up action taken for pain intensity ratings that exceed the patient's acceptable level after analgesia	Orthopaedic unit in mid-size acute care hospital 34 staff nurses with at least 6 months of experience and working at least 20 hours per week. Total of 30 nurses received intervention and remained in study. Medical records of 244 patients admitted for total knee arthoplasty (TKA) were retrospectively reviewed, represented 98% of all TKA patients during study period. (122 charts reviewed pre intervention, 119 reviewed post intervention). Power analysis done to detect change (80% for .22 effect)	Data collected on individual nurse's performance on the three recommended pain practices during the previous 17 months preceding study. Individual private sessions held with each nurse. Nurse provided with her individual feedback data (graphs of percentage of time nurse complied with standards). Individual copies of guideline provided during feedback session an asked to review the guideline. One feedback session, no other education provided. Sessions conducted during a 2-week period. Post intervention audit at 15 weeks.	Mean years of experience 9.89 and years of experience on unit 5.08	Significant decrease in missed pain assessments ($P<0.0001$) Increase in pain reassessments ($P<0.0001$) Increase in mean number of follow-up actions ($P<0.01$)	**Strengths** -used pre and post measures, pre-measurements occurred over 17 month period indicating significant performance -number of chart audits significant to detect change -objective outcome measure used **Limitations** -no randomization or control group -unable to determine if intervention was independent of other changes on units -methods used for analysis not clear in all cases. **Quality Assessment:** Many limitations

Ellis, McCleary & Blouin, et al. (2007) Canada	One group Pretest-post-test design to evaluate Implementation of guideline on assessment of acute pain management Guideline developed based on RNAO BPG and adapted for Pediatric environment	3 questionnaires adminstered pre implementation and at 6 months post implementation. Q1 – Perception of current pain management practices Q2 – Nurses assessment and management of pain in hospitalized children Q3- Nurses beliefs and perceptions about children in pain Q4- demographics Chart audits 75 pre-implementation and 44 post implementation (10% of patient population on 5 units)	Paediatric hospital, employed 528 nurses, 366 attended pain workshops. Post-intervention response rate 35%. Only differences between nurses completing and not completing was unit of practice, critical care and medical units more likely to comply than surgical or emergency department.	One 4-hour workshop provided theory and introduced pain assessment scales and documentation tool. Unit based coaches designated as pain-resource nurses received additional training to enhance coaching and mentoring skills. Nurse advocate assigned to each shift to instill positive attitudes about change, averted confusion, or negative perceptions about change.	Demographics, age, gender, educational background years of work experience, years of pediatric experience and unit of employment. Nurse's perception of current practices Nurse's beliefs and perceptions about children in pain Nurse's assessment and management of pain in hospitalized children	Nurses' perceived improvement in own practice, but not in documentation. No change in knowledge about assessment and management of pain in hospitalized children No significant change in beliefs and perceptions about children in pain. Increase in use of pain scales and in narrative documentation of pain assessment. No differences in use of pain history tool or in documentation of pain management strategies. No statistical patient characteristic differences between groups.	**Strengths** -used pre and post measures, -used validated survey tools -objective outcome measure used **Limitations** -no randomization or control group -unable to determine if intervention was independent of other changes on units -selection of chart audits may have selection bias -no description of how much coaching or unit support was provided to nurses -use of self-report tool may create response bias **Quality Assessment:** Many limitations

Lopez, Molassiotis & Chan (2004) Hong Kong	Non-equivalent groups Pretest-post-test design to evaluate Implementation of guidelines for the management of peripheral vascular devices (PVD) Guideline developed based on CDC recommendations	Pre-and post-workshop 20 item multiple choice test to assess knowledge of guideline standards. IV Device Survey Tool developed and tested by Joanna Briggs Institute of EBN used to collect data about PVDs in situ. Measured 11 compliance points	786 patients recruited from medical, surgical, orthopedic and gynecology units. (393 patients per group) 200 out of 341 nurses working in these units also recruited. (pre-test completion 169, post-test completion 172)	2-hour workshop Guideline fact sheets distributed to each unit. Clinical support provided through IV Access nurse and nursing supervisors. Checklist tool used as documentation reminder. New dressings provided that allowed for documentation at site. Intervention occurred over 3 months. Post data collection occurred after a 3-month lapse without education or support.	Nurse's knowledge about guideline.	Significant increase in knowledge about PVD management following implementation. Significant increase in compliance on 3 out of 11 points post intervention, 3 related to documentation, 1 to compliance with type of dressing used	**Strengths** -used pre and post measures, -objective outcome measure used **Limitations** -no randomization or control group -unable to determine if intervention was independent of other changes on units - non-equivalent pre and post test groups make conclusion about knowledge change problematic. -no information provided about non-participant nurses **Quality Assessment:** Many limitations

Semin-Goosens, van der Helm & Bossuyt (2003) Netherlands	One group Pretest-post-test design to evaluate Implementation of falls prevention guideline Evidence-based nursing guideline locally developed Completion of fall risk scales, labeling patients at risk, introducing strategies to mitigate risk	Collection of falls incidents through Incident reporting tool (IRT) and chart audits (considered gold standard) Post implementation 8-item questionnaire to test nurse's knowledge about the guideline and self-reported guideline use. Post implementation 20-item survey to assess beliefs and attitudes about fall prevention.	2 wards medical and neurology 2670 patients hospitalized during 25 month period. Measured falls per 1000 patient days 67 nurses between two units, 78% response rate for questionnaire	Used Grol's 5-stage implementation model. Marketing strategies to increase awareness, flashlight with logo, pens pocket sized laminated guidelines distributed, posters displayed on nursing units. Article in hospital newsletter. Audit and feedback on fall incidences were provided at regular staff meetings. Alarm bells provided for patients at risk. Based on nurse feedback eliminated need for daily completion of risk assessment tools and elimination of patient labels.	8-item questionnaire to test nurse's knowledge about the guideline and self-reported guideline use. 20-item survey to assess beliefs and attitudes about fall prevention.	Number of falls per 1000 patients did not change during implementation year or follow-up year. Compliance to completing incident reporting tool did not improve to desired levels Poor knowledge gains about guideline 1 year following implementation 82% of nurses believed that falls are not preventable, and 80% stated that they had not changed their practice.	**Strengths** -used pre and post measures, -objective outcome measure used **Limitations** -no randomization or control group -unable to determine if intervention was independent of other changes on units -did not evaluate practice changes as guided by guideline, focused on compliance to completing IRF **Quality Assessment:** Many limitations

Smith-Idell, Grant & Kirk (2007) United States	One group Pretest-post-test design to have nursing staff consistently perform and document pain assessment within one hour of medication administration Guideline based on National Comprehensive Cancer Network Guidelines	Chart audits to collect data on compliance with pain reassessment guidelines (PRDT) Nurse's Knowledge and Attitudes Survey Regarding Pain (NKASRP)	42/55 oncology nurses from inpatient medical or surgical units working at least 24 hours per week completed study. No differences between two groups	Individual performance feedback provided to each nurse gathered from 5 separate charting episodes for each study participant.[Method described by Duncan & Pozehl (2001)] Conducted a series of unit based grand rounds using a case study approach. Results of grand rounds were communicated to remaining staff through a poster display.	Demographics, age, ethnicity, education, years in nursing, years as oncology nurse. Years on same unit. Measured knowledge and attitudes using NKASRP	Increase in knowledge gains, but not statistically significant. Improvement in compliance to documentation within one hour following administration (P=0.004). Did not provide data about change in attitudes toward pain management	**Strengths** -used pre and post measures -objective outcome measure used - used validated survey to assess knowledge and attitudes **Limitations** -no randomization or control group -unable to determine if intervention was independent of other changes on units -methods used for analysis not clear in all cases. -only used one measure of guideline compliance **Quality Assessment:** Many limitations

Appendix B: Observer Rating Scale for Patient Anxiety

Patient Name: _____ Today's Date: _____

The Observer Rating Scale for Patient Anxiety (Maunder, 2009) is an evidence-based tool designed to guide non-psychiatric health care providers. It consists of five items defined by symptoms. Each item is scored on a 5-point scale: *0* = not present; *1* = minimal but not present; *2* = obvious but not interfering with function; *3* = severe; appears to interfere with function; *4* = very severe.

ANXIOUS MOOD: Worries, anticipates the worst	☐
TENSION: Startles, cries easily, paces, restless	☐
FEARS: Fear of medical intervention(s), pain, or a poor outcome	☐
SLEEP PROBLEMS: Difficulty sleeping, nightmares	☐
TROUBLE THINKING: Trouble concentrating	☐

Total Score

Any item score of 1 or 2 AND total score < 6
See "low anxiety" on backside of sheet

Any item score of 3 OR (no item > 2 AND total score 6–10)
See "moderate anxiety" on backside of sheet

Any item score of 4 OR total score > 10)
See "strong anxiety" on backside of sheet

Low anxiety: Anxiety in the context of his or her hospitalization and well within the range that is common for people to experience during hospital treatment

Strategies

- Try to help the patient with problem solving around any specific issues that are identified.
- Reassure the patient that usually the worries and anxiety that occur during hospitalization improve within a few days.
- Reassure the patient that it is common and understandable to feel anxious or tense at times during a stay in hospital.

Moderate anxiety: Anxiety is moderate and is probably having some impact on this patient's ability to adapt to being in hospital and to focus constructively on the challenges of treatment and healing

Strategies

- Initiate low anxiety strategies as needed.
- Start specific relaxation skills; these include techniques of muscle relaxation, breathing exercises, and imagery. Individual patients may have a preference for one kind of relaxation. Print corresponding instruction sheet, "Relaxation Techniques" or "Slow Breathing."
- Increase their contact with others by reducing barriers to visitation from family (when the patient finds family contacts to be supportive), friends, and others. Consider the value of contact with a chaplain.
- If there is any indication of poor sleep, ask the medical team to consider if there is an indication for a hypnotic medication at bedtime.

Strong anxiety: Anxiety is quite strong and is having some impact on this patient's ability to adapt to being in hospital and to focus constructively on the challenges of treatment and healing

Strategies

- Initiate “low” and “moderate” anxiety strategies as needed.

- Additional considerations for strong anxiety:

    - Ask the medical team to consider consultation from psychiatry regarding the value of other specific anxiety reduction techniques and the possibility that other conditions are contributing to apparent anxiety (e.g., delirium, depression, medication interactions, and toxicity).

    - Consult with peers from nursing, with a clinical nurse specialist and with peers from other disciplines (e.g., social work) for strategies and support. When there are specific difficulties in patient-provider communication or in the circumstances related to the patient’s anxiety, the treatment team may benefit from a team meeting.

Appendix C: iCAMIRA Survey

Note: This survey has THREE sections. Section 1 asks about demographic information; Section 2 measures motivators and intentions; and Section 3 measures the context in which nurses work and patients receive care.

SECTION 1: **Participant Code_____**

About your BACKGROUND

1. How long have you been a registered health professional (years)?
   - □ 1–5 years
   - □ 6–10 years
   - □ 11–15 years
   - □ 16–20 years
   - □ > 20 years

2. What is your age (years)?
   - □ 20–30
   - □ 31–40
   - □ 41–50
   - □ > 50

3. Are you Male □ or Female □

4. Are you a
   - □ Nurse
   - □ Physician
   - □ Social worker
   - □ Nutritionist
   - □ Other
   - □ Physiotherapist
   - □ Occupational therapist
   - □ Speech-language pathologist
   - □ Registered respiratory therapist

5. Please check the unit that you primarily work on:

   □ 11N □ 11S □12S □14N □14S

   □17N □17S

Section 2

Each question in this section refers to assessing and documenting your patient's anxiety using an anxiety assessment tool.

1. I think that assessing a patient's anxiety is harmful	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
2. I think that assessing a patient's anxiety is a pleasant task to complete	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
3. I think that assessing a patient's anxiety is the right thing to do	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
4. I think that assessing a patient's anxiety is good practice	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
5. People who are important to me think that I should NOT assess my patient's anxiety	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
6. I expect to assess and document my patient's anxiety every time I do a "head-to-toe" assessment	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
7. I feel under social pressure to assess and document patients' anxiety	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
8. I am confident that I can assess and document my patient's anxiety	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
9. Whether I assess and document my patient's anxiety using an anxiety assessment tool is entirely up to me	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
10. I feel that assessing and documenting a patient's anxiety using an anxiety assessment tool is easy	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
11. I want to assess and document my patient's anxiety using an anxiety assessment tool	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
12. It is expected of me that I assess and document my patient's anxiety using an anxiety assessment tool	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
13. I intend to assess and document my patient's anxiety using an anxiety assessment tool	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree

Adapted from Francis, J., Eccles, M., Johnston, M., Walker, A., Grimshaw, J., Foy, R., . . . Bonetti, D. (2004). *Constructing questionnaires based on the Theory of Planned Behaviour: A manual for health services researchers*. Newcastle upon Tyne, UK: Centre for Health Services Research, University of Newcastle.

Section 3: Each question in this section measures the context (clinical area/team) within which care is provided to patients. HCPs = Health Care Providers

For each of the following statements, please put a check in one box only.

SA = STRONGLY AGREE; A = AGREE; D = DISAGREE; SD = STRONGLY DISAGREE

1. Personal and professional boundaries between HCPs are maintained	SA ☐	A ☐	D ☐	SD ☐
2. Decisions on care and management are clearly documented by all staff	SA ☐	A ☐	D ☐	SD ☐
3. A proactive approach to care is taken	SA ☐	A ☐	D ☐	SD ☐
4. All aspects of care/treatment are based on evidence of best practice	SA ☐	A ☐	D ☐	SD ☐
5. The nurse leader acts as a role model of good practice	SA ☐	A ☐	D ☐	SD ☐
6. HCPs provide opportunities for patients to participate in decisions about their own care	SA ☐	A ☐	D ☐	SD ☐
7. Education is a priority	SA ☐	A ☐	D ☐	SD ☐
8. There are good working relations between HCPs	SA ☐	A ☐	D ☐	SD ☐
9. Staff receive feedback on the outcomes of complaints	SA ☐	A ☐	D ☐	SD ☐
10. HCPs in the interprofessional team have equal authority in decision making	SA ☐	A ☐	D ☐	SD ☐
11. Audit and/or research findings are used to develop practice	SA ☐	A ☐	D ☐	SD ☐
12. A staff performance review process is in place that enables reflection on practice and goal setting and is regularly reviewed	SA ☐	A ☐	D ☐	SD ☐
13. Staff have explicit understanding of their own attitudes and beliefs toward the provision of care	SA ☐	A ☐	D ☐	SD ☐
14. Patients are encouraged to be active participants in their own care	SA ☐	A ☐	D ☐	SD ☐
15. There is high regard for patients' privacy and dignity	SA ☐	A ☐	D ☐	SD ☐
16. HCPs understand each other's role	SA ☐	A ☐	D ☐	SD ☐
17. The management structure is democratic and inclusive	SA ☐	A ☐	D ☐	SD ☐
18. Appropriate information is accessible to patients	SA ☐	A ☐	D ☐	SD ☐
19. HCPs and patients work as partners, providing individual patient care	SA ☐	A ☐	D ☐	SD ☐
20. Care is based on a comprehensive assessment	SA ☐	A ☐	D ☐	SD ☐
21. Challenges to practice are supported and encouraged by nurse leaders and nurse managers	SA ☐	A ☐	D ☐	SD ☐
22. Discussions are planned between HCPs and patients	SA ☐	A ☐	D ☐	SD ☐
23. The development of staff expertise is viewed as a priority by nurse leaders	SA ☐	A ☐	D ☐	SD ☐
24. Staff use reflective processes (e.g., action learning, clinical supervision, or reflective diaries) to evaluate and develop practice	SA ☐	A ☐	D ☐	SD ☐
25. Organizational management has high regard for staff autonomy	SA ☐	A ☐	D ☐	SD ☐
26. Staff welcome and accept cultural diversity	SA ☐	A ☐	D ☐	SD ☐

27. Evidence-based knowledge about care is available to staff	SA ☐	A ☐	D ☐	SD ☐
28. Patients have choice in assessing, planning, and evaluating their care and treatment	SA ☐	A ☐	D ☐	SD ☐
29. HCPs have the opportunity to consult with specialists	SA ☐	A ☐	D ☐	SD ☐
30. HCPs feel empowered to develop practice	SA ☐	A ☐	D ☐	SD ☐
31. Clinical nurse leaders create an environment conducive to the development and sharing of ideas	SA ☐	A ☐	D ☐	SD ☐
32. Guidelines and protocols based on evidence of best practice are available	SA ☐	A ☐	D ☐	SD ☐
33. Patients are encouraged to participate in feedback on care, culture, and systems	SA ☐	A ☐	D ☐	SD ☐
34. Resources are available to provide evidence-based care	SA ☐	A ☐	D ☐	SD ☐
35. The organization is non-hierarchical	SA ☐	A ☐	D ☐	SD ☐
36. HCPs share common goals and objectives about patient care	SA ☐	A ☐	D ☐	SD ☐
37. Structured programs of education are available to all HCPs	SA ☐	A ☐	D ☐	SD ☐

Adapted from McCormack, B., McCarthy, G., Wright, J., Slater, P., & Coffey, A. (2009). Development and Testing of the Context Assessment Index (CAI). *Worldviews on Evidence-Based Nursing, 6*(1), 27–35.

Appendix D: Recruitment Letter/E-mail Text

You are invited to participate in a study titled
Interprofessional Collaborative Assessment of Illness-Related Anxiety: A Theory-Guided Educational Intervention.

Principal Investigators: Mary-Agnes Beduz, RN, MN, PhD (student)
Co-Investigators: Dr. Maureen Dobbins, RN, PhD; Dr. Colleen McKey, RN, PhD; Dr. Rick Hackett, PhD; Dr. Robert Maunder, MD, FRCP; Nathalie Peladeau, RN, MScN
Study Sponsor: The Ministry of Health and Long-Term Care

XXXX, in collaboration with researchers from McMaster University, is seeking participants for a research project aimed at improving health care professionals' (HCPs) assessment and management of hospitalized patients' anxiety and to help HCPs use an anxiety assessment tool. The study will take place at XXXX.

The overall aim of each intervention is to improve your anxiety assessment skills and knowledge of common anxiety reduction strategies that can be used with patients by non-psychiatric HCPs. The study consists of three phases.

If you agree to participate in this study, you understand that the following things will happen. Standard demographics will be collected, including your age, sex, profession, years of experience, and unit where you work. At your discretion, you can refuse to answer any questions.

The intervention sessions in this study will take place at XXXX. The overall aim of each intervention is to improve your anxiety assessment skills and knowledge of common anxiety reduction strategies that can be used by non-psychiatric health professionals. The educational intervention consists of two components: (1) completing an e-Learning module and (2) attending a workshop using standardized patients (SPs). The e-Learning module is designed to (1) provide you with information about illness-related anxiety, (2) introduce you to an anxiety assessment tool, and (3) provide you with information about some common anxiety reduction strategies. At the beginning of the SP workshop, you will be briefed on the (a) organization of the workshop and (b) tools used for evaluation. After this 30-minute briefing, you will work in interprofessional small groups (4–5) to complete the workshop. At the end of the workshop, you will participate in a debriefing session.

Your participation in this research project is completely voluntary and does not in any way impact your employment standing. It does offer an opportunity for you to be part of an innovative study that could lead to changing clinical training curricula and as such contributes to enhancing the educational experience of future health care professionals.

Appendix D: Consent to Participate in a Research Study

Title	Interprofessional Collaborative Assessment of Illness-Related Anxiety: A Theory-Guided Educational Intervention
Investigator	Mary-Agnes Beduz, RN, MN, PhD (Student)
Co-Investigators	Dr. Maureen Dobbins, RN, PhD, Dr. Colleen McKey, RN, PhD, Dr. Rick Hackett, PhD, Dr. Robert Maunder, MD, FRCP Natalie Peladeau, RN, MScN
Sponsor	Health Human Resources Strategy Division, Ministry of Health and Long-Term Care's HealthForceOntario, Interprofessional Collaborative Education Fund

Introduction

You are being asked to take part in a research study. Please read this explanation about the study and its risks and benefits before you decide if you would like to take part. You should take as much time as you need to make your decision. You should ask the study staff to explain anything that you do not understand and make sure that all of your questions have been answered before signing this consent form. Before you make your decision, feel free to talk about this study with anyone you wish. Participation in this study is voluntary.

Background and Purpose

- You have been asked to take part in this research study because you are a health care professional and you are involved in direct patient care.
- Research indicates that anxiety experienced by hospitalized patients increases their length of hospital stay, readmission rates, morbidity and mortality in vulnerable patients.
- Although we know that there are many interventions available to non-psychiatric health professionals to help patients manage their anxiety, evidence suggests that routine assessment and management of hospitalized patients' anxiety are low.

- This intervention study aims to improve health care professionals' (HCPs) assessment and management of hospitalized patients' anxiety and to help HCPs use an anxiety assessment tool.
- The information obtained from this study will help us to evaluate the effectiveness of a theory-guided educational intervention using standardized patients aimed at improving HCPs' assessment and management of anxiety experienced by hospitalized patients. We will also better understand some of the motivational and context factors that influence HCPs' intention to assess patients' anxiety.

Study Design

This study is part of a theory-guided educational initiative designed to improve HCPs' assessment and management of hospitalized patients' anxiety. As part of this initiative, all staff working on a medical/surgical unit at Mount Sinai Hospital will participate in an educational intervention consisting of completing an online learning module, through the Learning Management System (LMS), and attending a 4-hour workshop using standardized patients. We are asking you to participate in the evaluation of this educational initiative.

If you agree to participate in this study, you understand that the following things will happen. Standard demographics will be collected, including your age, sex, profession, years of experience, and unit where you work. At your discretion, you can refuse to answer any questions.

The intervention sessions in this study will take place at Mount Sinai Hospital. The overall aim of each intervention is to improve your anxiety assessment skills and knowledge of common anxiety reduction strategies that can be used by non-psychiatric health professionals. The educational intervention consists of two components: (1) completing an e-Learning module and (2) attending a workshop using standardized patients (SPs). The e-Learning module is designed to (1) provide you with information about illness-related anxiety, (2) introduce you to an anxiety assessment tool, and (3) provide you with information about some common anxiety reduction strategies. At the beginning of the SP workshop, you will be briefed on the (a) organization of the workshop and (b) tools used for evaluation. After this 30-minute briefing, you will work in interprofessional small groups (4–5) to complete the workshop. At the end of the workshop, you will participate in a debriefing session.

Study Plan and Procedures

THE STANDARDIZED PATIENT (SP). In this simulation learning condition, you will work in small groups (5–6), with one SP and a trained expert facilitator. The SP in each group will be a trained actor from the Standardized Patient Program, University of Toronto. You will have an opportunity to engage with the actor in order to (a) conduct an anxiety assessment, (b) identify and address any anxiety-related concerns, and (c) address

and manage any illness-related anxiety and responses to the anxiety reduction strategies used. At the end of the session, you will be provided with written and verbal feedback about your participation in this workshop.

Assessment: There will be two occasions for assessment. Prior to the educational intervention, you will be asked to complete a survey designed to measure factors that may influence HCPs to assess and manage their patients' illness-related anxiety. After completing the SP workshop, a second survey will be administered to measure any changes. Additionally, we will be completing random chart audits before and after the educational intervention to determine if there has been any change in the frequency of the documentation of anxiety assessments in the patient's medical record.

Risks Related to Being in the Study

There are no known risks if you take part in this study. At no time during or after this study will your employment with Mount Sinai Hospital be affected because of your acceptance or refusal to participate in this study.

Benefits to Being in the Study

You will not receive any direct benefit from being in this study. Information learned from this study will help in the refinement of the research as well as support other health care professionals to assess, document, and manage hospitalized patients' anxiety.

Voluntary Participation

Your participation in this study is voluntary. You may decide not to be in this study or to be in the study now and then change your mind later. You may leave the study at any time, without stating a reason, without affecting your employment status. We will give you new information that is learned during the study that might affect your decision to stay in the study.

Confidentiality

The information that is collected for the study will be kept in a locked and secure area by the study coordinator for 7 years. Only the study team or the people or groups listed below will be allowed to look at your data.

The following people may come to the hospital to look at the study records to check that the information collected for the study is correct and to make sure the study followed proper laws and guidelines:

- The study sponsor or its representatives/partner companies

- Representatives of the Mount Sinai Hospital Research Ethics Board
- Representatives of the Hamilton Health Sciences/Faculty of Health Science Research Ethics Board

Study Information That Does Not Identify You

Some study information will be sent outside of the hospital to the sponsor. Any information about you that is sent out of the hospital will have a code and will not show your name or address or any information that directly identifies you. No personal-level information will be reported in any publication or reports resulting from this study.

The sponsor may use the study information and share it with its partner companies or with national and international regulatory agencies to help answer the study question or to develop future studies on a product or for research related to this study.

All information collected during this study will be kept confidential and will not be shared with anyone outside the study unless required by law. You will not be named in any reports, publications, or presentations that may come from this study.

In Case You Are Harmed in the Study

If you become ill, injured, or harmed as a result of taking part in this study, you will receive care. The reasonable costs of such care will be covered for any injury, illness, or harm that is directly a result of being in this study. In no way does signing this consent form waive your legal rights, nor does it relieve the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You do not give up any of your legal rights by signing this consent form.

Expenses Associated with Participating in the Study
There are no expenses associated with participating in this study. However, as an employee of Mount Sinai Hospital, you will receive your regular hourly rate for the time that you participate in this educational experience.

Conflict of Interest
The Ministry of Health and Long-Term Care's HealthForceOntario, the sponsor of this study, will pay the hospital and researcher for the costs of doing this study. All of these people have an interest in completing this study. Their interests should not influence your decision to participate in this study. You should not feel pressured to join this study.

Questions about the Study
If you have any questions or concerns or would like to speak to the study team for any reason, please call Mary-Agnes Beduz at XXXX or Nathalie Peladeau at XXXX.

If you have any questions about your rights as a research participant or have concerns about this study, call Ronald Heslegrave, PhD, Chair of the XXXX Research Ethics Board (REB), or the XXXX Research Ethics Office at XXX. You may also call Deborah Mazzetti, REB Coordinator of the Hamilton Health Sciences/Faculty of Health Sciences Research Ethics Board. A Research Ethics Board is a group of people who oversee the ethical conduct of research studies. These people are not part of the study team. Everything that you discuss will be kept confidential.

Consent

This study has been explained to me and any questions I had have been answered.
I know that I may leave the study at any time. I agree to take part in the Interprofessional Collaborative Assessment of Illness-Related Anxiety: A Theory-Guided Educational Intervention.

Print Study Participant's Name	Signature	Date

(You will be given a signed copy of this consent form.)

My signature means that I have explained the study to the participant named above. I have answered all questions.

Print Name of Person Obtaining Consent	Signature	Date