Exploring Knowledge Translation Models for Clinical Nurse Educators with a focus on the Ottawa Model for Research Use

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Abstract

Clinical nurse educators and clinical nurse specialists are responsible for keeping themselves and their nursing staff up to date on new evidence and research. This knowledge translation occurs in a complex environment that includes many stakeholders, different cultures and beliefs, and budget restraints. This complex environment impacts how, when, and who will transfer new evidence into practice. This project explored whether using a knowledge translation framework can assist the advanced practice nurse to implement new evidence appropriately and successfully into practice. The use of new evidence should enable patients to receive the most up to date, evidence based care, improve the quality of care patients receive, and enhance patient safety. I explored different ways knowledge translation has been conceptualized, and then described and critiqued several knowledge translation frameworks that are available for use in practice. I also reflected on my recent experience with using a specific knowledge translation framework (Ottawa Model of Research Use) identifying the lessons I learned. Finally, I discussed the strengths and limitations of this selected model and the implications of using a knowledge translation model for clinical nurse educators, clinical nurse specialists, and other advanced practice nurses.

Exploring Knowledge Translation Models for Clinical Nurse Educators with a focus on the Ottawa Model for Research Use

The knowledge translation process occurs in a complex environment of stakeholder interactions, and all aspects of that environment must be considered when implementing new evidence into practice. Clinical nurse educators and advanced practice nurses are expected to keep themselves and nursing staff up to date with current evidence. In my experience, the workload of the clinical nurse educator is overwhelming and implementing new evidence into practice is a daunting task. It is difficult to keep up with the volume of new evidence along with all the other tasks that the clinical nurse educator is expected to perform. Over the last four years I have worked as a clinical nurse educator and I have had to disseminate new policies, procedures, and guidelines to the staff. High-quality guidelines based on research are necessary for health care workers to care for their patients using best practices. However, just having guidelines available is not sufficient to ensure practitioners are using current evidence in their decision-making (Harrison, Legare, Graham & Fervers, 2010). I have found that the uptake and use of new knowledge does not occur with simple dissemination and "usually requires a substantive, proactive effort to encourage use at the point of decision-making" (Harrison et al., 2010).

I am interested in Knowledge Translation (KT) frameworks because of my personal experience as a clinical nurse educator on a maternity unit. Shortly after I started my job as educator, I tried to change practice regarding epidural pump programming. I started having inservice education sessions for the nurses and taught them how to use the pump, expecting that they would embrace this new knowledge and begin programming the pumps when needed. There were concerns voiced about time constraints and unrealistic expectations from the nurses during

these professional development activities. Nurses were also frustrated because they felt that they were being asked to perform an activity that was part of the anesthetist's duties. Before the inservice education sessions for the nurses, I consulted with one of the anesthetists and a Clinical Nurse Specialist but I did not use a KT framework which might have identified barriers to this practice change. On reflection I wonder what difference it would have made if I had dealt with the barriers, potential adopters, and practice environment before I taught the nursing inservice education sessions, as many of the knowledge translation frameworks suggest.

Oxytocin (syntocinon) is a drug commonly used in the majority of births in Fraser health. It has recently been added by the Institute for Safe Medication Practices to a small list of medications "bearing a heightened risk of harm" (ISMP, 2012). Clark, Simpson, Knox, and Garite (2009) state that oxytocin is a drug most commonly associated with preventable adverse perinatal outcomes and evidence-based guidelines may reduce the likelihood of patient harm. An audit in Fraser health, where I work as a clinical nurse educator, showed that oxytocin was a factor in many adverse perinatal outcomes. As a result of this audit an oxytocin protocol was developed in an attempt to improve patient safety. Subsequently, I was asked to facilitate the regional implementation of the new evidence-based protocol using a KT framework.

Background Information

In the Fraser health region where I work, clinical nurse educators play a key role in transferring new evidence into practice. New evidence from research is necessary, but is not sufficient for a change in practice. Knowledge translation is one possible solution "for closing the knowledge-to-action gaps" (Straus, Tetroe & Graham, 2009). An understanding of the concept of knowledge translation (KT) is important when educators are putting knowledge into

action. Research findings need to be translated and sometimes adapted into information that is meaningful for the audience. Also, the perspective of the educator will influence what information is taught, how it is taught, and the context within which teaching and learning will take place (Pratt & Paterson, 2007).

Purpose of this project

The goal of this project was to learn more about how KT Frameworks can be used by clinical nurse educators and advance practice nurses. I also wanted to share my experiences with using a knowledge translation framework and reflect on how it has informed my practice as a clinical nurse educator. I explored the literature on KT and studied how KT frameworks have been used by clinical nurse educators and clinical nurse specialists. My ultimate intention was to demonstrate how using a KT framework has the potential to support and assist clinical nurse educators as they facilitate the transfer of research into practice, ensuring evidence is transferred appropriately into practice, and decreasing the knowledge to practice gap.

The project is organized as follows. I begin by reviewing the literature on the transfer of research to practice in health care and the importance of using best evidence in practice. Next, I explore how KT has been conceptualized and how KT frameworks have been used by clinical nurse educators and clinical nurse specialists. I then explore and critique selected KT models, and describe my experiences using the Ottawa Model of Research Use (OMRU) framework. I then describe how the OMRU can be used to guide the implementation of a new evidence-based nursing practice guideline, reflect on how learning theories informed the use of that framework, and identify lessons learned.

Literature Review

Literature reviews are performed to understand what is known or not known about a phenomenon. They are also useful for determining whether research findings are ready for use in practice, or whether more research is needed (Griffin-Soebel, 2003). For this project, the literature review is mainly focussed on four topics: 1) the gap that exists between current evidence and current nursing practice, reasons why that gap exists, and possible solutions for how to eliminate that gap; 2) knowledge translation frameworks; 3) learning theories and their impact on knowledge translation; and 4) recommendations for the use of knowledge translation frameworks.

To gain a better understanding of knowledge translation frameworks, I initially reviewed the Knowledge Transfer and Exchange strategies document from the Fraser Health Authority. This provided useful references and I created a chart of the different knowledge translation frameworks using those references. To find peer-reviewed articles and books I used Google Scholar, the Cumulative Index of Nursing and Allied Health Literature (CINAHL), and the University of Victoria search engine Summon. I used the key-words' knowledge translation, knowledge framework, and knowledge transfer. Useful information was also found through the Canadian Institutes of Health Research (CIHR) website. I followed references found through the articles and books from all of those sites and references which broadened my research and review. I decided to use the Ottawa Model for Research Use by Graham and Logan (2004) in my final masters nursing practicum and to document my experiences.

Research to Practice Gap

All nurses have a responsibility to participate in the research process, whether it is by critically appraising research studies, becoming involved in the study itself, or by applying

research to nursing practice (LoBiondo-Wood, Haber, Cameron, & Singh, 2009). The College of Registered Nurses in British Columbia (CRNBC) include in their standards of nursing care that it is a standard that every nurse "interprets and uses current evidence from research and other credible sources to make practice decisions" (CRNBC, 2011). Evidence-based nursing practice involves a conscious decision by the nurse to use the best evidence when caring for patients and delivering health care services (LoBiondo-Wood, Haber, Cameron, & Singh, 2009). Research-based practice informs nursing decisions and actions. Nurses and advanced practice nurses are increasingly challenged by patients and healthcare organizations to provide care of the highest quality (Holleman, Eliens, van Vliet, & van Achterberg, 2006; McSherry, Simmons, & Abbott, 2002).

Graham et al. (2006) suggest that "despite the considerable resources devoted to health sciences research, a consistent finding from the literature is that the transfer of research into practice is often a slow and haphazard process" (p. 13). The National Collaborating Centre for Methods and Tools promoting Evidence-Informed Public Health (NCCMT, 2011) state that it takes an estimated fifteen years to get research into recommended policy. It also takes practitioners an estimated fifteen years to achieve implementation of new evidence into practice (NCCMT, 2011). Thirty to forty percent of the time people do not receive treatments that have been proven to be effective for their care (NCCMT, 2011). These sobering statistics were from both public health and acute care and reflect the research to practice gap that currently exists in healthcare. A review of the literature on evidence-based nursing practice reveals many barriers that prevent nurses from caring for their patients using current evidence. Evidence reveals that a lack of time, support, knowledge, and the organisational culture all contribute to whether or not a nurse will use current evidence to inform her practice (Brown, Wickline, Ecoff, & Glaser, 2008;

Gerrish, Ashworth, Lacey & Bailey, 2007; Gerrish & Clayton, 2004; Valente, 2003). In order for advanced practice nurses to provide leadership for evidence-based practice, they need to be aware of how to introduce practice changes, develop tools to support needed change, and evaluate the effects or outcomes of evidence-based practice innovations.

Reimer-Kirkham et al. (2009) affirm that approaches to knowledge translation (KT) are still being developed and "the mechanisms whereby knowledge translation best occurs are not entirely clear" (p. 153). Effective KT requires long-term sustained relationships between all the partners (CIHR, 2006). Crucial to those relationships are trust and common goals, therefore, KT activities including face-to-face interactions may be more effective (CIHR, 2006). The educator's knowledge, skills, and attitudes will also influence how new knowledge is presented, what new knowledge is chosen, and the environment within which teaching and learning will take place (Pratt & Paterson, 2007). Strategies that build in interactive learning activities, and address contextual factors (including enablers, barriers, and environmental factors), instead of just the content of research knowledge, are being advocated for effective KT (Baumbusch et al., 2008). These activities focus as much on process as on product, and recognize how important the relationship of reciprocity and exchange is between the producers and users of knowledge (Jacobsen, Butterill & Goering, 2003; Baumbusch et al., 2008). Jacobsen, Butterill and Goering (2003) suggest that even when researchers are committed to KT, they express frustration with understanding how different groups take up evidence-based practice changes in different contexts.

Straus, Tetroe and Graham (2009) state that better management of knowledge is necessary, but not enough, to ensure effective KT. They suggest that "efforts must be made to improve health outcomes by using effective interventions to close the gaps in translating knowledge to

practice" (Straus, Tetroe, & Graham, 2009). Challenges related to financial constraints, lack of appropriate equipment, health care teams, individual health care professionals' beliefs/practices, and patient preferences all influence KT and must be considered (Strauss et al., 2009). There is increasing recognition that frameworks or conceptual models are needed to guide efforts aimed at changing practice, so that the process of change is better understood (Graham et al., 2007; Graham, Tetroe & KT Theories Research Group, 2008). Effective models for the transfer of new knowledge and research into nursing practice are needed to close the gap between what nurses know and how we practice (Baumbusch et al., 2008).

With the widespread agreement that transferring knowledge into practice is important, the problem remains that we lack information about what works in different settings (Ward, House & Hamer, 2009). Using a knowledge translation framework may serve to promote the uptake of complex continuity-of-care innovations (Graham & Logan, 2004). Unfortunately "there are remarkably few intervention studies testing these models or evaluating the relative impact of different interventions on either nursing or patient outcomes" (Davies, 2002, p. 561). Graham et al. (2007) suggest that those who use KT models should document their experiences so that others can better understand the model's usefulness in disseminating research into practice.

Knowledge Translation

Definition of Knowledge Translation

Research utilization, knowledge utilization, research transfer, implementation science, knowledge transfer, and knowledge translation are all terms used to describe the process of transferring research-based knowledge into practice. The Canadian Institutes of Health Research (CIHR) has adopted the term knowledge translation because translation of research is embedded

in their mandate (Straus, Tetroe & Graham, 2009). The Canadian Institutes of Health Research defines knowledge translation as "a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically sound application of knowledge to improve the health of Canadians, provide more effective health services and products and strengthen the health care system" (CIHR, 2009). The definition of knowledge translation has also been adopted by the World Health Organization (WHO) and the United States National Center for Dissemination of Disability Research (Straus et al., 2009). This term and definition of KT is applicable to my work as a clinical nurse educator because it moves beyond the simple dissemination of knowledge into the exchange and application of that knowledge. Therefore I have used this definition of KT for this project. The exchange and application of new knowledge is my responsibility as a Clinical Nurse Educator, and takes into consideration the complex health care environment which includes stakeholders such as nurses, physicians, and patients.

Importance of knowledge translation and evidence-based practice

The failure to use current evidence in practice is a problem that is seen across all groups of decision makers including patients, all levels of health care providers, in developed and developing countries, and in both primary and specialty care (Straus et al., 2009). Reimer-Kirkham et al. (2009) state that knowledge translation discourses operate in similar fields as evidence-based practice (EBP). Evidence-based practice is defined as "the conscious and judicious use of the current 'best' evidence in the care of clients and the delivery of health care services" (Lobiondo-Wood & Haber, 2009). However, despite years of using knowledge-driven, evidence-based models, which typically used a linear, passive, one directional flow of information from research to practice, a growing number of scholars have noted that these

models have not addressed the growing research to practice gap (Baumbusch et al., 2008; Straus et al., 2009).

In the 1990's, the evidence-based practice movement in nursing was derived from the evidence-based medicine movement (Baumbusch et al., 2008). Nursing's equivalent of EBP has been defined as "the integration of best research evidence with clinical expertise and patient values to facilitate clinical decision-making" (DiCensa, Giliska, & Gyatt, 2005). Several critiques of EBP reveal issues for nurses wanting to practice using current evidence. For example, theoretical and methodological approaches often used in nursing research, such as qualitative or participatory action research, often fall to the bottom of evidence-based practice hierarchies. Furthermore, nurses rely not only on research findings for practice, but also rely on aesthetic, personal, and practice knowledge, which are mostly excluded in evidence-based practice research (Baumbusch et al., 2008; Reimer-Kirkham, Baumbusch, Schultz, & Anderson, 2007).

Knowledge translation offers an opportunity to bring knowledge from multiple theoretical frameworks and methodologies into the practice environment (Baumbusch et al., 2008). Reimer-Kirkham et al. (2009) discusses a cultural shift in KT literature. The KT shift recognizes that knowledge is a process of inquiry and not just a product. One key acknowledgment is that there are many diverse ways of generating knowledge and that they all count as legitimate evidence. Another key acknowledgement is that knowledge translation is complex and does not happen in a linear, rational process (Reimer-Kirkham et al., 2009). Knowledge translation involves interactions between policy makers and decision makers and takes place within a complex social system, which needs to be taken into consideration during new initiatives (Baumbusch et al., 2008). Successful translation is a function of the relationship between the evidence, the context

of the change, and the ways in which the changes will be made (Davies, 2002). Using a knowledge translation framework can address all of those relationships and has the potential to bring together researchers and clinically based practitioners in a dynamic process which can begin to address the research to practice gap.

Knowledge Translation Frameworks

There are many theories and frameworks that have been proposed to achieve knowledge translation. KT frameworks can be used to understand the contextual factors that influence the success or failure of the knowledge translation effort and should be taken into consideration in all stages of the KT process (Sudsawad, 2007). Graham et al. (2007) suggest that one practical use of implementation models is to help plan and focus implementation efforts and to provide all stakeholders with a common understanding of the action plan. Ward, House, and Hamer (2009) submit that because of the sheer quantity and diversity of the many frameworks that are available, it can be difficult for the researcher or manager to choose which model to use. I have chosen to review five frameworks that seemed the most appropriate for my use as a clinical nurse educator. These frameworks are the Stetler Model of Research Utilization, the Knowledge-to-Action model, the Promoting Action on Research Implementation in Health Services (PARIHS) Framework, the Iowa Model, and the Ottawa Model for Research Use. I will then provide an example of how I used the Ottawa Model for Research Use in practice, reflect on my experiences and identify implications for nursing education and practice

The Stetler Model of Research Utilization

The Stetler Model of Research Utilization was first developed in 1976 and was called the Stetler/ Marram Model (Stetler, 2001). Stetler and Marram (1976) originally created the model

and refined it in 1994 and renamed it the Stetler Model of Research Utilization (Stetler, 1994, 2001). The model has been further refined on the basis of a "related utilization-focused integrative review methodology, targeted evidence concepts, and continuing experience through use of the model with clinical nurse specialists" (Stetler, 2001, p. 272). It was refined by articulating conceptual underpinnings and a set of assumptions which were based on research about the concept of research utilization (Stetler, 2001). The Stetler Model of Research Utilization is a practitioner oriented approach. The model is expected to be used by individual practitioners as a procedural and conceptual guide for the application of research in practice. The use of evidence by individual nurses is an important part of developing their critical thinking and reflective practice skills (Stetler, 2001). This model was originally developed for use with nurses; however, the principles could be applied to other disciplines (Sudsawad, 2007). The refined model is grounded in the assumption that "research on knowledge utilization and case examples provide evidence of informed use by individual clinicians and managers" (Stetler, 2001, p. 274). There are five phases in the model: preparation, validation, comparative evaluation and decision making, translation, and application and evaluation. This model is highly comprehensive and provides procedures that help guide practitioners through all steps of the research use process, while practitioners also consider the utilization aspects of clinical decisions. The model also includes a set of applicability criteria: substantiating evidence, current practice, fit, and feasibility (Stetler, 2001). The refined model directs individuals to be conscious of the types of research evidence chosen and suggests that, instead of using primary studies, they seek published systematic reviews (Sudsawad, 2007).

The individual practitioner focus of the model is a strength and the model provides direction both for individuals working alone and/or within a group. Staff development questions can be

answered using all the different steps of the model. Directions in the form of detailed steps are designed to buffer the potential barriers and enhanced facilitators to research utilization. The assumptions of the model take into consideration important aspects of knowledge translation such as: the types of evidence and/or non-research-related information that are likely to be combined with research findings to influence decision making, the internal and external factors that can influence an individual's or group's view and use of evidence, and that a lack of knowledge and skills pertaining to evidence-based practice can inhibit appropriate and effective use (Sudsawad, 2007). Another strength of the model is that the developers provide guidance for practitioners to be conscious of the types of research evidence selected and recommend that published systematic reviews should be used whenever possible instead of primary studies (Sudsawad, 2007). While I identified the detailed steps of the model as a strength, when I looked closer, I found the details overwhelming, therefore I viewed the complexity as a weakness of the model. I wanted to choose a model for use in practice that would take me less time to comprehend.

Promoting Action on Research Implementation in Health Services (PARIHS) Framework

The Promoting Action on Research Implementation in Health Services (PARIHS) Framework was conceived by Kitson, Harvey and McCormack (1998) and since that time the framework has been refined by a team led by Rycroft-Malone (2004). The PARIHS framework was developed in 1998 to create a framework that represents the “complexity of the process of change and implementation of research findings” (Kitson, Harvey & McCormack, 1998). This conceptual framework emerged from several years of team experience, working mostly with nurses, helping them to “improve the quality of their care by setting clinical standards, introducing audit and

quality improvement, and in changing patient services in several community hospitals in one health authority" (Kitson et al., 1998, p. 150). Since its conception in 1998, the framework has undergone development and research revision. Rycroft-Malone (2004) modified the framework to expand the evidence element to include local data and information, research, clinical experience, and patient experience. The framework places these elements on a continuum from low to high, so that when elements are placed higher on the continuum, implementation success is more likely (Rycroft-Malone, 2004).The PARIHS framework now focuses on implementing research for evidence-based practice, attending to the characteristics of the elements of evidence (research, clinical experience, and patient experience), context (culture, leadership, and evaluation) and facilitation (purpose, role, and skills/attributes) (Rycroft-Malone, 2004). If the implementation of evidence is to be successful, there needs to be understanding of the nature of the evidence being used, the context, and the type of facilitation needed to ensure a successful change process. With an emphasis on implementation, this framework is unique in that it identifies facilitation as one of the main elements of the research utilization process, and determines the potential of success based on the prediction structure of the model (Sudsawad, 2007). Research that is well conducted and conceived, resonates with clinical experiences, and considers patient preferences is more likely to be successfully implemented (Rycroft-Malone, 2004).

One strength of the PARIHS framework is the identification of important elements in the practice setting that need to be present in order for evidence to be used in practice. For example, if patient preferences are used as part of the decision making, successful implementation is more likely. Evaluation is an important component of the context for change and the model indicates that multiple methods of feedback should be incorporated into an organization's framework

(Doran & Sidani, 2007). However, the model does not specify which indicators are appropriate for evaluating systems and services or how to use measurement and feedback to evaluate practice change. While the model emphasizes evidence, context, and facilitation as key to successful implementation, if any one of the three elements are lacking, implementation will be less successful. The model lists sub elements but omits descriptions or explanations of how to move from low to high which would increase the probability of a successful implementation. The lack of explanation is a weakness and more detail is needed. For example, moving awareness of patient preferences and experiences from low to high is required for research implementation success, but there is no explanation of how to accomplish that transition.

The Iowa Model

The Iowa model is a collaborative, organizational model that incorporates clinical inquiry and use of research evidence along with a variety of types of evidence (Doody & Doody, 2011). Since it was created in 1994, the authors have received many requests to use the model in clinical research programmes and in publications and presentations (Titler & Cameron, 2009). A focus on knowledge and problem-focused triggers through the model lead staff members to question current nursing practices, and to consider whether client care can be improved through the use of research findings (Titler & Cameron, 2009). The Iowa model includes seven steps to follow and diagrammatically, they appear in a circle (Doody & Doody, 2011). The first step is choosing a topic. The second is forming a team and this team is responsible for the development, implementation, and evaluation of the evidence based practice. Evidence retrieval is the third step and evidence grading is the fourth step. The fifth step directs the team to organize recommendations for practice. The sixth step involves implementation of the evidence and the seventh step evaluates the value and contribution of moving the evidence into practice.

One strength of this model is the variety of evidence used and the three options provided if there is not enough research to guide practice (Titler et al., 2001). If, through the process of literature review and critique of studies, there is an insufficient number of scientifically sound studies with which to base practice on, consideration is given to conducting a study. If conducting a study is not feasible, other types of evidence such as expert opinion and case reports are used or combined with available research to guide practice (Lobiondo-Wood & Haber, 2009). Another strength of the model is the focus on implementation and evaluation. Conducting a pilot using the evidence-based practice in the setting where the new practice will occur permits evaluation of improvement in care (Titler, 2007). Piloting the change allows monitoring of the effects on a small group of patients which will minimize the possible adverse occurrences, and allow time for revisions to be completed if needed. The Iowa model approaches evidence-based practice from a systems or organization perspective rather than from the perspective of an individual provider. This could be considered a strength or weakness depending on which perspective is the priority. A weakness of the model is the lack of teaching and learning strategies on how new evidence can be implemented into practice.

The Knowledge to Action Model

The Knowledge to Action model is a conceptual model that was developed by Graham and colleagues (Graham et al., 2006). It has been adopted by the Canadian Institutes of Health Research as “the accepted model for promoting the application of research and for the process of knowledge translation” (Straus et al., 2009). The model was developed based on a review of planned action theories and has not been revised since it was created (Ward et al., 2009). The process of translating knowledge into practice is a dynamic and complex process. It includes the

creation and application of knowledge. The model is seen as a cyclical process where aspects of the research, knowledge transfer intervention, and evaluation lead to the identification of new problems. However, the phases can be used out of sequence if needed. The end-users of the knowledge have to be involved in the phases of the model to make sure the knowledge is relevant to their needs (Straus et al., 2009).

The knowledge to action process includes two components: knowledge creation and action (Graham, Logan, Harrison, Straus, Tetroe, Caswell, & Robinson, 2008). Knowledge creation includes three phases: knowledge inquiry, knowledge synthesis and knowledge tools and products. Knowledge Inquiry includes primary research. Knowledge synthesis brings together the findings from similar research studies so that common patterns can be identified. Knowledge products and tools are the result of the synthesis of the best studies and include practice guidelines and algorithms. The action cycle includes seven phases which focus deliberately on creating change in health care systems and groups (Straus et al., 2009). The seven phases are: identifying the problem, identifying, reviewing and selecting the knowledge to disseminate, customizing the knowledge to the local context, assessing the barriers to knowledge use, selecting , tailoring, and implementing interventions, evaluating outcomes of using the new knowledge, and determining strategies for making sure the knowledge is sustainable (Straus et al., 2009). Integral to the model is the need to make sure the end-users or stakeholders are considered in the process so that knowledge is adapted to the local context and changes are anticipated and adapted to accordingly.

One strength of the model is the need to consider all the stakeholders (patients, nurses, managers, physicians) who are the end-users of the knowledge (Straus et al., 2009). This consideration customizes the knowledge to the local context, making it more applicable and

therefore more relevant to their needs in practice. The process of translating knowledge into action is complex and this model recognizes there are no definite boundaries between knowledge creation and action. The phases of the action component may occur simultaneously or sequentially and the knowledge creation phase may influence the action phase. The knowledge to action process is more comprehensive in this model compared to the Ottawa Model of Research Use because it incorporates the knowledge creation phase (Sudsawad, 2007). However, when I was selecting an appropriate KT framework for use in practice, I needed one that focused on the implementation phase. The oxytocin protocol that I needed to incorporate into practice had already been developed, therefore the knowledge creation process was already complete. My focus was the implementation or knowledge translation phase. The knowledge to action model did not provide details about what knowledge translation activities would be most successful as I implemented the oxytocin protocol in several regional hospital maternity sites.

The Ottawa Model for Research Use

The Ottawa Model of Research Use (OMRU) offers a "comprehensive, interdisciplinary framework of elements that affect the process of health-care knowledge transfer, and is derived from theories of change, from the literature, and from a process of reflection" (Graham & Logan, 2004, p. 93). The OMRU was developed when the authors Logan and Graham became aware of the lack of practical models to promote research use (Logan & Graham, 1998). They created a framework that could be used by policymakers and researchers. Policymakers could use it to increase the use of research by practitioners and researchers could use it to study the process by which research is integrated into practice. The elements of the model are supported by evidence and are drawn from literature regarding research utilization, diffusion of innovations, changing physician behaviour, and practice guideline development and implementation (Logan & Graham,

1998). The model was refined through discussions with participants when Logan and Graham taught workshops for the Ontario Health Care Evaluation Network (Graham & Logan, 1996a), presented at Interdisciplinary Research Conferences (Graham & Logan,1996b; Harrison, Logan & Graham, 1997), and through clinical education rounds at the Children's Hospital of Eastern Ontario (Logan & Graham, 1997). The OMRU is an example of a planned change theory, which helps "administrators control factors that will influence the likelihood of changes occurring at the organizational level and how these changes occur" (Graham & Logan, 2004, p. 2).

The OMRU was originally developed using six key elements that are connected together through the process of evaluation. The key elements that were considered central to knowledge transfer are: 1) the practice environment, 2) potential adopters, 3) the evidence-based innovation, 4) transfer strategies, 5) adoption, and 6) outcomes (Logan & Graham, 1998).

The model has gone through revisions since it was created and the most recent model created in 2004 has re-arranged the six elements as follows: 1) evidence-based innovation, 2) potential adopters, 3) practice environment, 4) implementation intervention strategies, 5) adoption and 6) outcomes (Graham & Logan, 2004)(See figure 1).

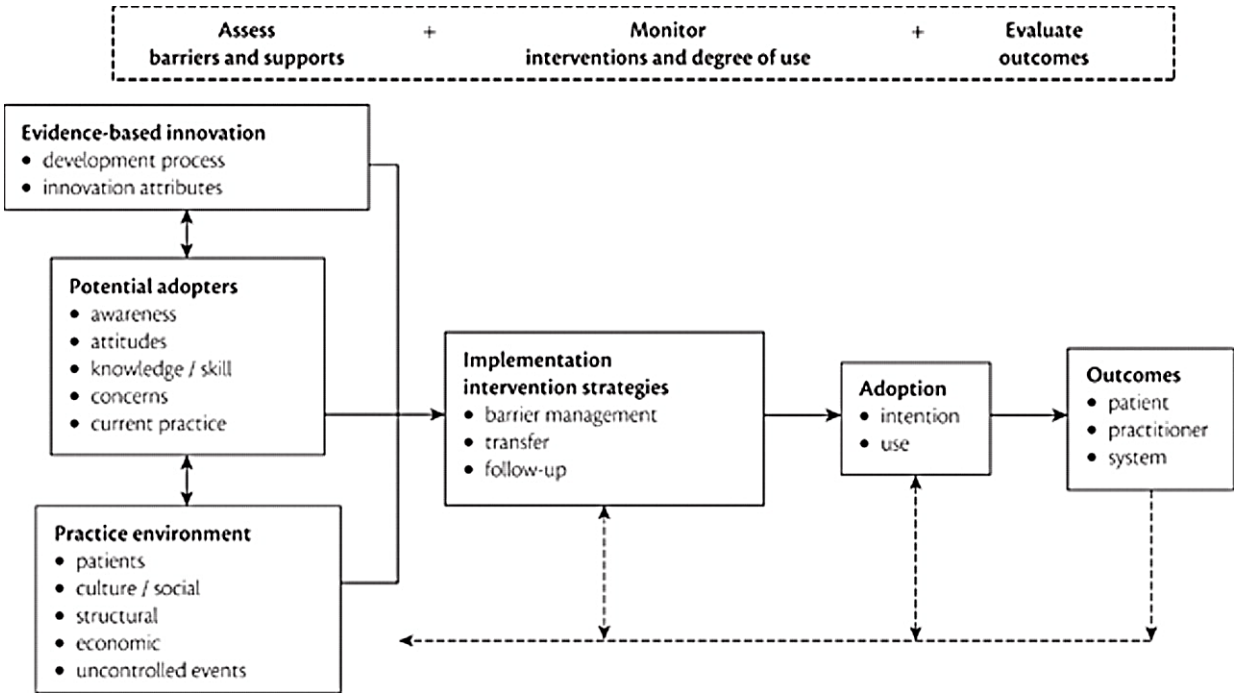

Figure 1 The Revised Ottawa Model of Research Use (Graham & Logan, 2004).

The revised model is a better representation of the interconnected, bilateral direction of the progress of research into practice by the addition of several arrows that point in both directions. This model represents the complexity of the knowledge transfer process more accurately. The wording has been changed under the title evidence-based innovation and focusses more on the development process and the attributes of the innovation. The attributes of potential adopters have been revised to include awareness, concerns, and current practice to the previously listed knowledge, attitudes, and skill. The practice environment has been changed and culture, economic, and uncontrolled events have been added to patients and social considerations. The title of the next box over has been changed to implementation and intervention strategies which now include barrier management, transfer, and follow-up. The adoption box includes both intention and use and the outcomes box includes patient, practitioner and system outcomes. I will

next explore in detail what each step entails when the model is used to implement new guidelines.

Assumptions

The OMRU model adopts a holistic approach that considers all aspects of the use of research and how it affects the patient's outcomes. There are several main assumptions that are implicit in the OMRU. The first assumption is that patients play a key role in every aspect of evidence-based practice and they need to be considered within each model element (Logan & Graham, 1998; Graham & Logan, 2004). Patients are often the source for the issues that are identified by policymakers and clinicians that in turn trigger the demand for evidence-based practice change (Logan & Graham, 1998). Patients can encourage or discourage a new evidence-based innovation depending on how they receive it. The patient and their influence or pressure on a new innovation can influence whether a practitioner will apply the evidence-based practice or not. A review of the practice of routine episiotomies reveals that the backlash from midwives and women's groups had a big influence on the use of this procedure (Graham, 1997). Therefore, the first assumption directs practitioners to consider the patient when the innovation is developed, implemented and evaluated. The second assumption is that KT is not a sequential stage model of change (Graham & Logan, 2004; Logan & Graham, 1998). It is a process that takes place over time, and the sequence progresses depending on the elements in different contexts. The third assumption is that the environment, which includes the health-care field and society, will affect all aspects of the process and must also be considered when moving research into practice.

Integral to the OMRU is the systematic assessment, monitoring, and evaluation (AME) of each element before, during and after the decision is made to introduce the innovation (Graham

& Logan, 2004; Logan & Graham, 1994). There are four goals of collecting AME data: 1) to perform a barrier and support assessment of the new practice or protocol related to the practice environment, the potential adopters and the evidence-based innovation; 2) to provide direction to overcome the identified barriers and encourage support using tailored transfer strategies; 3) to track the progress of the transfer activity; and 4) to evaluate the use of the new practice and protocol and the impact on the end users (Logan & Graham, 1998). The methods used to conduct the AME will depend on whether the focus is to assess, monitor, or evaluate. Methods used to assess, monitor, and assess may include observation, interviews, focus groups, surveys, and cost-benefit analysis.

Strengths of the OMRU include the holistic approach that considers all aspects of the process of research use and its impact on health outcomes. Patients and their health experiences and outcomes should be the focus of evidence-based practice and the OMRU directs practitioners to make sure the patient has a key role when the innovation is developed, implemented and evaluated. The OMRU is different from other frameworks because it challenges the assumption that moving research into practice is a linear, orderly, rational progression. It views research as a dynamic process involving different individuals and interconnected decisions, which takes place over time and in various progressions (Logan & Graham, 1998). The OMRU acknowledges that the internal and external health care environment will affect all aspects of the knowledge translation process and must be considered when planning implementation of new knowledge. The OMRU is meant to be used as a guide and not a recipe (Logan & Graham, 1998). It allows practitioners to identify unique barriers and facilitators which are considered when selecting and tailoring research translation activities. Logan and Graham (2004) suggest that learning theories

can be incorporated into the OMRU constructs however, detailed information about specific teaching and learning strategies to be used in certain circumstances is lacking.

Practice example using Ottawa Model of Research Use

To demonstrate how the OMRU can be used in practice, I will reflect on my own experience of using the model to explore how it can be used as a guide to implement an evidence-based protocol. When I started my last preceptorship for my Masters degree, I wanted to use a knowledge translation framework to implement a new oxytocin protocol across seven hospitals in the Fraser health region. The idea for a new protocol for oxytocin began when several nurses in leadership positions from the unit where I work went to an Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) conference in the United States. At that conference, the oxytocin checklist was presented and innovation attributes were presented. The development and implementation process of the new protocol started when the regional perinatal clinical nurse specialist wrote a 12 page protocol in 2011. The new protocol was based on research and was developed because of the occurrence of adverse events across the Fraser Health region related to oxytocin. The protocol was implemented as a pilot at one of the eight sites in Fraser health in 2011. It was at the end of this pilot when I became involved and took over the coordination of the implementation for the remaining seven hospital sites.

Evidence- based innovation.

Using the revised OMRU, I started by looking at the evidence-based innovation. Using the term innovation as Logan and Graham (1998) proposed, I reviewed the research evidence that supported the new protocol. The evidence showed that using an oxytocin checklist improved safety by standardizing practice in a systematic manner which would prevent potentially harmful

consequences if specific items were missed or ignored (Clark et al., 2007). Clark et al. (2007), the creator of the checklist, demonstrated that when the checklist was used, there was a reduced maximum infusion rate of oxytocin, no increase in the duration of labor, and no increase in operative delivery. Newborn outcomes also appeared to be improved, which was the main reason why a checklist was needed in our Fraser Health region. The innovation and new protocol included an oxytocin checklist created by Clark and colleagues in 2007 but it was new to me and to most of the RN's working on the perinatal units in Fraser Health.

Change agent.

Before I could begin the implementation at the remaining seven sites in Fraser Health, I had to wait for the protocol to come back from the stakeholders, which included the physicians from across the region at all eight sites. The process for stakeholder feedback in Fraser health was not clearly defined and could be considered a barrier for appropriate and timely feedback. While I waited for the physician group to approve the protocol for the remaining seven sites, I considered who would be change agents and potential adopters at each site. Graham and Logan (1998, 2004) state that assessing the potential adopters and the practice environment at the beginning of the innovation process is essential. Estabrooks (2003) echoes that statement and maintains that it is essential if the potential adopters are nurses. Estabrooks (2003) maintains that a nurse will draw upon several sources of knowledge to influence their practice. The most common knowledge sources are discussions with fellow nurses, discussions with physicians, personal experience in nursing, and individual patient information (Estabrooks, 2003). Therefore, it was essential to gain an understanding of how nurses make decisions in practice and who and what influences those decisions when introducing a practice change.

Logan and Graham (1998) identify potential adopters to include clinicians, patients, and any other policy makers in the system. They suggest that the potential adopters and target audience need to be defined and described in terms of their skill, current practice, attitudes, knowledge, and motivation for adopting or rejecting the new evidence. The OMRU "emphasizes the need to view the proposed change from the potential adopters' perspective" (Logan & Graham, 1998, p. 232). This perspective helps identify potential barriers and facilitators when introducing new innovations in practice.

When I considered who would be a change agent at each site, I also needed to identify who would have the authority to make the required changes (Graham & Logan, 2004). As Graham and Logan (2004) suggest, if the protocol crosses the boundaries of professions, strategic alliances need to be identified, developed or cultivated. Since the protocol was to be implemented as soon as possible, I chose a group of staff who had alliances with many different professions. The change agent I identified at each site was the clinical nurse educator. I am a member of a highly functioning group of perinatal clinical nurse educators in Fraser health. We meet monthly to discuss common issues, new protocols and guidelines, to provide support for each other, and to share resources.

I presented the protocol at a clinical nurse educator meeting in early 2012 and had the support of the clinical nurse educators from across the region; I confirmed them as strong change agents. I followed the recommendation of the OMRU and asked at that meeting about the attitudes, skills, and current practices of the front line staff related to oxytocin induction at each site. I suggested that the CNEs think about nurses as potential adopters and decide who could be a local champion at each of their sites. Local champions at each site could be considered early adopters and could help endorse the change through leadership and peer influence (Graham & Logan,

2004). I also suggested that they think about individuals or groups who would present a barrier to implementing the new protocol; I asked that we target those individuals or groups to make sure they were well informed and educated about the protocol.

Fortunately, one site in Fraser Health had already used the protocol in a pilot for several months; I asked the clinical nurse educator at that site about the barriers and facilitators they had encountered. The availability of resources to implement this protocol at seven sites was also discussed at this meeting; I offered to be the coordinator of the implementation. I left the meeting with a list of resources needed by the group, and a list of tasks I needed to complete before the first oxytocin protocol education in-service was taught. The clinical nurse educators were very supportive of my offer to be the coordinator of the implementation; they stated they were thankful that I would be providing support and trouble-shooting ideas.

Potential adopters.

Nursing staff, especially those with less than one year of acute nursing experience, often asked the clinical nurse educator group at each site about oxytocin titration. These nurses were identified as potential adopters because they had already been asking for more guidance related to oxytocin induction and augmentation, and this protocol would give that direction. The site who had completed the pilot confirmed that the nursing staff had been early adoptors. They had provided oxytocin protocol education inservices to one hundred percent of their nursing staff before it was implemented. The clinical nurse educator group identified that we wanted eighty percent of our nursing staff to receive the inservice education before the implementation of the new protocol.

Practice environment.

The practice environment at each site differed in acuity, culture and social practices, and in economic resources, structure and size. The seven hospitals were located over a large geographic area so the patient population varied dramatically. This meant that we needed to discuss specific issues related to the patient culture at each site. For example, at the site where I work, our patient population consists of forty percent Indo-Canadian women. At one of the smaller sites, the population includes many Aboriginal women. This difference has implications for how the women would be involved in their care and decision making, and interpreters were needed more often at those two sites. Therefore, during the education inservices, we discussed how and why to contact interpreters for those patients.

Before the oxytocin checklist was developed, an audit was done at one site in Fraser health to determine if we were following fetal health surveillance guidelines and acting appropriately when abnormal tracings were identified. Oxytocin was found to be a factor in many of the cases with abnormal fetal heart tracings and the conclusion was that oxytocin administration was contributing to poor outcomes for some women and their fetuses. The cultural belief at this site was that when the fetal heart tracing was abnormal there was an urgency to deliver the fetus by increasing the oxytocin infusion rate which further compromised the fetus. When the nurse identified concerns regarding the fetal heart tracing, the physician would often instruct her to continue with the oxytocin instead of stopping it. This chain of events also highlighted the cultural belief that the physician was correct and the nurse was wrong, even though when the cases were reviewed, the nurse was often correct in her initial assessment.

The new protocol was created to prevent the practice of inappropriately continuing to administer oxytocin in the presence of abnormal fetal rate rate patterns but the new protocol would also require a significant increase in physician and/or midwife attendance, charting, and

assessment of the patient. Typically, the nurses were the ones who titrated the oxytocin for the patients at each site, and there were varying degrees of attendance by the physician and/or midwife at each site using this oxytocin induction or augmentation. The clinical nurse educator group identified the expectation of increased attendance by physicians and midwives as a potential barrier to the success and implementation of the protocol.

Another significant addition to the new oxytocin protocol was that informed consent to initiate oxytocin needed to be acquired by the physician or midwife and charted in the patient progress notes. Obtaining informed consent was something that the nurses had often done in the past, even though it was the physicians' responsibility to obtain this consent initially when the order was written. When I started talking about the protocol to the physicians I work with, they were quite concerned about obtaining informed consent before the oxytocin could be started and felt it would be difficult to get that consent in the middle of the night or from a patient who could not speak English.

Even though the head of the obstetrical department at each site was supposed to promote the protocol to their colleagues, I advised the clinical nurse educators to make sure the new protocol was mentioned at their local obstetrical department meetings and directed them to e-mail and provide written copies of the protocol to all the physicians at their site. I communicated with the regional head of midwifery and made sure copies of the protocol were distributed to all the midwives in the region. Physicians and midwives were invited to come to all the education inservices we provided across the region but very few attended. When I taught the oxytocin education inservices at the different hospital sites, nurses always asked whether the physician group was aware of this protocol and whether they had approved it.

Evidence-based innovations are more likely to be used in practice if the health professionals are exposed to interventions that address barriers (Stacey et al., 2008). Consequently, I changed the education that the pilot site had used, and added points related to the barriers that had already been identified. For example, I provided an example in the case study where the physician and the nurse did not agree and allowed the nurses to work through how they would deal with this situation in practice. I recognized that communication between all the affected health care providers had not been adequate at the pilot site. I tried to make sure that all the health care providers had a copy of the protocol, and an opportunity to ask questions and come to an education inservice before the practice change was implemented. I also tried to ensure that change agents and local champions were identified and well informed. For example, I created an accessible online file that contained all of the oxytocin research articles, the protocol, the education inservice powerpoint, and a question and answer sheet that I updated regularly.

Implementation and intervention strategies.

The implementation and intervention strategies include barrier management, knowledge transfer interventions, and the follow-up activities. Barrier management at this stage included interventions directed at the system and organization level. Since the oxytocin protocol was being implemented at seven different hospital sites, I asked the clinical nurse educator at each site to consult with their manager to decide on the best way to educate their staff. As I was coordinating the implementation across the region, I used a train-the-trainer model and taught the first education inservice at six maternity sites to mentor the local clinical nurse educator. After I taught the first education inservice at each site, the clinical nurse educators were asked to teach the rest of their staff. I was also responsible for teaching all of the staff at my own local maternity unit where I am the clinical nurse educator.

Graham and Logan (2004) recommend that effective transfer strategies are required to ensure that each potential adopter knows about the new innovation, understands how their behaviour must change, and has the training and skills to make the change. Logan and Graham (1998) also advise that the translation process needs to include credible developers, involvement of potential adopters in the translation process, and transparent evidence gaining methods[1]. They propose that the innovation will be consistently adopted if it relates to current practice, is seen to be more advantageous than current practice, is not considered difficult to do, and can be easily tried out before adoption (Logan & Graham, 1998). Logan and Graham (1998) advise that successful knowledge uptake rests with adapting knowledge implementation strategies to salient barriers of the individual and their organisation, and identifying evidence-based innovations that are applicable to their clinical setting.

The OMRU does not specifically endorse any translation strategy and suggests that evidence of the effectiveness of one translation strategy over another is lacking (Logan & Graham, 1998). They do suggest that Roger's (2003) stages of the innovation decision process may be helpful in the selection of interventions that are tailored for each site. Roger's (2003) innovation decision process includes five stages. Knowledge is the first stage and allows the potential adopters to become aware of the innovation before it is implemented. The persuasion stage involves the development of positive attitudes towards the innovation. The decision stage is when potential adopters decide to use or not use the innovation. The fourth stage is implementation and this is when the innovation is actually used in practice. The final stage is the confirmation and this is when the innovation continues to be used in practice (Logan, Harrison, Graham, Dunn, & Bissonnette, 1999; Rogers, 2003).

[1] Logan and Graham (1998) explain transparent evidence-gaining methods to include a rigorous searching of the literature for evidence and objective methods incorporated when synthetizing the evidence.

Before I started the education inservices for the staff, the clinical nurse specialist and I spoke about the oxytocin protocol at several physician department meetings, our monthly professional practice council meeting, and at the monthly perinatal clinical nurse educator meeting so the educators knew when implementation would start. I spoke to staff members one-on-one to tell them about the protocol and emphasized the positive characteristics of the protocol. The decision stage for the nurses started during the education inservices and then once it was implemented. They had to make cognitive decisions whether they would use the new protocol in practice or not. When the protocol was being developed, feedback was requested from physicians at each site. However, increasing the involvement of physicians and midwives during the protocol development stage might have increased their acceptance of the protocol. Ray-Coquard et al. (2002) discovered that the active involvement of physicians in the development of a clinical practice guideline significantly facilitated the adoption and use of that guideline in practice. The implementation stage happened when the protocol was used in practice; we are currently in the confirmation stage. I did not intentionally follow Rogers's (2003) innovation-decision process but found on reflection after implementation, that it was my usual practice to follow many of the stages outlined. For example, I discussed the oxytocin protocol at several meetings for several weeks prior to the first education session so that staff were aware of it before it was implemented.

Systematic reviews suggest that all implementation strategies work "at least some of the time but that none work all of the time" (Logan & Graham, 1998, p. 236). Eccles and Grimshaw (2008) reviewed the literature in order to illustrate the effectiveness and impact of different knowledge translation strategies. They found that reminders provided verbally, on paper, or on a computer screen, are 14.1% effective. Interactive meetings, where health care providers are

participating in conference, lectures, or workshops, are 11-20% effective. Local opinion leaders are 10% effective. Graham and Logan (2004) advocate for two or more of audit, feedback, and reminders combined with interactive educational meetings to produce professional behaviour change.

I had already emphasized to the clinical nurse educators how important the champions were at each site. I created a question and answer sheet from staff at each site and added it to the file I created online for each clinical nurse educator to access. I used e-mail, posters, print copies, and online communication as resources to the staff. Follow-up interventions can be thought of as "booster shots" (Logan & Graham, 2004, p. 97) and can augment the initial transfer activities. I provided support to the clinical nurse educators on the day of implementation by e-mail and by phone. I provided continuous feedback and support for the clinical nurse educators and the nurses on my unit for several weeks following implementation. The clinical nurse educator group is currently starting to complete audits to assess compliance and outcomes.

Knowing how to develop interactive education sessions is an important competency for Clinical Nurse Educators. Knowing what and how to teach the protocol to the staff involved utilizing learning theories that would ensure the staff understood the new protocol and knew how to use it in practice. As a Masters prepared Clinical Nurse Educator, I had been learning about learning theories and educational strategies so was able to draw on this knowledge to address some of the gaps in the KT model.

Learning theories.

As a clinical nurse educator, I have based my nursing education practice upon specific learning theories. These learning theories direct how I teach, how I view the learner, what I think

my role as the educator is in their learning, and what encourages the transfer of learning in different situations. I will explain each theory and how I applied it to the oxytocin inservice education I provided.

Active learning.

When I reviewed the inservice education powerpoint that the pilot site had used, I wanted to make sure effective learning theories were represented in the education program. Active learning needed to be accomplished so the staff understood the new protocol and could apply it in practice. Oermann (2004) describes active learning for the student as a process where the student is not just listening to the teacher present information, but the student is doing something with the information and then reflecting on the process of learning. If the instruction is teacher-centered, the student listens to the formal instruction, but they are in a passive role, and do not have any opportunity to respond. The teacher decides what the content will be, how it will be taught, and provides the structure for the student. There are advantages and disadvantages to both approaches and Oermann (2004) suggests that an integrated approach is an effective strategy for teaching. Combining both lecture and active learning strategies allows the instructor the opportunity to present the information with the opportunity for the participants to respond and engage with the information in a practical way. When I revised the education inservice plan, I included information about why the oxytocin protocol was developed, what the research reported about oxytocin use, and allowed learners to review the actual protocol. I presented a case study which we worked through and problem-solved using the protocol as a group as an active learning strategy.

Constructivism.

I have always supported my nursing practice with the epistemology of constructivism. The constructivism model of learning recognizes that prior learning is a foundation for the learning process (Young & Maxwell, 2007). Young and Maxwell (2007) maintain that knowledge is socially constructed and that learning is a process of meaning making where learners integrate new knowledge into an established understanding. When I teach something new to a staff member, I try to shift the focus away from the new material and instead try to link the material to what the staff member already knows. For example, when I was teaching the oxytocin education inservice to a group of nurses, one of the nurses was complaining about how often she was going to have to call the physician with the new protocol. I asked her what she would have done in the past when she had an issue with the oxytocin. She thought for a moment and then realized that she would have called the physician about the same issue in the past and would not actually have to call him more often. It seems that this allowed her to link old practice to new practice and facilitated acceptance of the new protocol.

The oxytocin education inservice was a combination of research, facts about oxytocin, the oxytocin protocol, and a case study. The case study included the scenario of a woman who needed induction by oxytocin. The role of the nurse and the physician was reviewed, and a situation was included when the physician and nurse disagreed about the management of the patient. Staff worked through the problems found in the case study as a group through social interaction. There was much discussion during the inservices and I welcomed discussion related to their concerns and opinions. Often, there were staff members who liked the protocol and would answer the questions that their colleague raised. I considered those staff members to be unofficial oxytocin protocol champions and I encouraged them to continue to promote the protocol with their colleagues.

Problem-based learning.

Problem-based learning is consistent with constructivist principles. By presenting a case study with issues to work through, the staff can develop the capacity to solve problems rather than mastering solutions to issues (Young & Maxwell, 2007). Problem-based learning is "a small-group educational philosophy characterized by goal-oriented sessions that follow a systematic process to work through a problem situation as a means of accomplishing the learning objective" (Wolff, 2007). Using an authentic problem from clinical experience allows staff to acquire new knowledge and integrate it into practice. Problem-based learning typically involves a small group of five to ten people and the learning environment is learner-centered (Wolff, 2007). Problem-based learning is consistent with cognitive and social constructivist epistemology. Wolff (2007) describes the four principles or theoretical underpinnings of problem-based learning which include: first, prior knowledge is activated, elaborated upon, and restructured with the new knowledge; second, the learning environment mirrors clinical practice and allows the learner to gain a better understanding; third, creative intelligence is developed by meaningful learning experiences; and finally knowledgeable persons guide the activities and experiences of the learner (p. 247). The case study that was included in the oxytocin education inservice allowed the staff to practice using the new protocol. Many questions were raised, discussed, and answered during this portion of the inservice. I encouraged the nursing staff to voice their concerns and tried to problem solve issues that were raised that were not directly included in the case study, but were related to the protocol.

Adult learning principles.

Knowles (1980), who is referred to as the father of adult learning, proposed that educating adult learners was more a process of self-directed inquiry (Murrell, Russell, Hartig and Dean Care, 2007). Knowles (1980) proposed there was a difference in assumptions between pedagogy and androgogy. He states that adult learners benefit from collaborative, participatory education. According to Knowles (1980), adults want to decide for themselves what they want to learn and when they want to learn it. Adults have acquired more life experience than children and are able to apply that experience to a learning situation which enhances their ability to learn. Knowles (1980) suggested that these assumptions have learning implications for the teaching environment. The learning environment needs to be physically comfortable for the adult as well as psychologically safe. The learning environment for the learners needs to include acceptance, respect, and support and is established by the teacher.

I tried to facilitate this safe learning environment by getting to know the staff on a personal level outside of education inservices. During the education inservice I tried to actively listen and respect what the staff say by making sure only one person speaks at a time, by thanking them for their question, and by making sure their question is answered. I gathered common questions from the staff in the region, answered those questions, and sent the question and answer sheets out to the staff via e-mail and posters. Knowles (1980) also proposed that adults will be more motivated to learn if they perceive the new knowledge will affect their practice. For example, during the education inservice, I talked about the negative outcomes that had happened frequently in Fraser Health related to oxytocin. I often had to repeat the reasons for why the oxytocin protocol was being implemented and that patient safety was the motivating factor for the protocol. Staff understood this rationale and agreed that patient safety was a primary focus of nursing care. Finally, I see my role using adult learning principles as a facilitator. I cannot make anyone learn

anything, but I am an approachable, open resource to the staff as they learn about and use the new protocol.

Adoption.

The next step in the OMRU is adoption of the innovation, which includes intention and use. The OMRU states that decisions must be made regarding what constitutes adoption of the innovation, or in my example, the new protocol. Since adoption needs to be measured, the method for collecting the data needs to be established, and the time frame and people responsible need to be identified. Monitoring is essential to determine whether the new innovation has diffused through the potential adopter group and whether it has affected the process of care (Graham & Logan, 2004). If the degree of adoption is less than what was expected, then an assessment of barriers needs to be determined. Adoption of the oxytocin protocol in Fraser Health will be measured by audits. The clinical nurse educators at each site will be responsible for randomly reviewing charts when oxytocin has been used. The audit tool has been developed and monitoring targets identified (i.e. ten audits every month need to be completed at the larger sites; with five audits at the smaller sites). At the pilot site, auditing monthly and sharing the audit results has been effective in increasing uptake of the protocol. The goal is to reach at least an eighty percent compliance level with all parts of the protocol at all the Fraser Health sites. If the protocol is not being followed, we cannot evaluate whether or not it is effective in relation to maternal and newborn outcomes. One aspect of the auditing that the clinical nurse educator group is currently discussing is the importance of feedback to the nurses, physicians, and midwives following the audit. Decisions need to be made regarding who will provide the feedback to each group and the acceptable timeframe required for that feedback to occur.

Outcomes.

The last step of the model includes evaluation of the outcomes of this practice change (in this case following implementation of this new protocol). In this step, the outcomes that need to be evaluated are related to the patient, the practitioner, and the system. Decisions need to be made about what outcomes will be used to determine the impact on the patient, the practitioner, and the system. Since this practice change was implemented to improve patient safety, data was available about the need for change prior to implementation. Decisions also need to be made about how the innovation or practice change will be measured, who will collect data to provide that measurement, and the time frame needed for the evaluation. Evaluation of the innovation is the only way to determine whether the efforts to promote it were successful over time (Graham & Logan, 2004).

One of the key assumptions of the OMRU is that adoption of the research improves patient health outcomes therefore one of the key evaluation measures will need to include patient outcomes that are sensitive to the protocol. One of the main objectives of the new protocol is to respond appropriately to the woman and fetus when oxytocin administration is used during labour which will reduce the likelihood of harm to the fetus. Therefore, one outcome we will be measuring is whether nursing staff turn the oxytocin off when the fetal monitor tracing is abnormal. The plan for the implementation of the new oxytocin protocol is that we will carry out an interrupted time series evaluation of the outcomes and compare the outcomes from the thirteen fiscal periods prior to implementation to the thirteen periods following implementation. Evaluation will need to wait until we know by monitoring uptake (chart audits) that the protocol is being followed. The audits mentioned earlier need to be completed by the clinical nurse educators before the evaluation of the outcomes is started.

Lessons Learned

Using the OMRU provided me with a comprehensive KT framework for planning the implementation of a regional research based protocol. The transfer of new guidelines and protocols into practice is a complex process and this process is compounded by the need to simultaneously implement the same protocol across several hospitals, settings, cultures, and professions. Through the process of using the OMRU I gained insight into the usefulness of using a KT framework for implementing new protocols.

The OMRU was extremely suitable for keeping the implementation on track and making sure important gaps in the process were prevented. I was surprised by how much work and planning needed to be done before any actual teaching was done. When I initially started to assess the potential adopters and practice environments, I started with my own assumptions and concerns regarding both. I wanted to make sure I reflected upon and acknowledged my own attitudes and beliefs regarding the research that supported the protocol and the impact it would have on the staff and patients. Reflection “facilitates assessment of past experiences and underlying assumptions” (Ruth-Sahd, 2003, p. 488) which helps to identify what guides our practice. I also knew I was adding to the nurses’ workload so I had to work through that barrier and decide whether adding to the nurse’s workload was worth the effort (i.e. if the outcome for the patient and the baby was improved). I realized that patient safety is a common or shared objective and I often shared this insight when I was educating the staff. I embraced the assumption of the model where the patient has a key role in all aspects of the process and should be a primary focus of the evidence-based practice. I included that statement in every education inservice I taught, in every conversation I had with the staff, and in every e-mail I sent out.

Because I was directed to start thinking about and exploring barriers before we had even begun teaching the new oxytocin education inservices through the OMRU, I started speaking with individual physicians, asking them what they thought the barriers would be. This allowed me to target education to the physician group through flyers, e-mail, and posters. I was surprised by the barriers the physician group identified regarding patient informed consent. I know anecdotally that the physician does not always provide the initial informed consent and will often let the nurse explain the procedure and medication to the patient. This protocol supports the nurse to ensure that the informed consent is initially provided by the physician when the order is written but it was a large barrier when I spoke with both groups, because it meant a large culture change needed to happen.

The change agents were identified as the clinical nurse educator group. I targeted that group and made sure that I provided them with the resources that they needed. For example, I created posters and speaking notes for the education inservice and made them available for use. I viewed the clinical nurse educator group as a very important group to support and mentor. I provided timely communication and support so they would not become discouraged. The potential adopters or supporters were identified early as the nurses and the education was targeted to that group. I knew from clinical nurse educator experience that the nurses would primarily want to know how to use the checklist included in the protocol. They would also want to know what their responsibilities were regarding oxytocin administration, the paperwork needed, and when they needed to call for assistance. Therefore, I spent more than half of the education inservice practicing with the scenario of the patient who needed the oxytocin induction. Because we had identified one of the barriers as the physician group, I included a

disagreement between the nurse and physician in the scenario and we worked through how they would handle a similar situation in practice.

The model helped me to think about the culture and current practice before the new protocol was implemented. Logan and Graham (1998) suggest that the environment exerts a "powerful set of influences" (p. 231) on practitioners and can encourage or discourage research transfer and use. Assessing culture and current practice allowed the clinical nurse educators and I to problem solve and direct solutions to some of the issues even before we started teaching the education inservices. The current practice or habits can indicate the gap between current practice and what will be required if the innovation is adopted (Graham & Logan, 2004). When we assessed the current practice and culture, we identified barriers to the uptake of the protocol. One example of a barrier that needed more discussion is that before the protocol, the nurse was the one who titrated the oxytocin and made decisions about when to increase or decrease it, even when the fetal heart tracing was atypical. With the new protocol, the physician needed to be consulted regarding titration and needed to physically see the patient and chart their findings. This change presented a significant barrier with oxytocin administration as the physician is often not in the hospital or if they are, they are busy elsewhere. Therefore the nurse is not able to increase the oxytocin, and not able to titrate appropriately. I knew before we started the implementation of this protocol that changing physician practices would be a barrier, but I underestimated the magnitude of the barrier. Therefore, I had to go back to the beginning of the OMRU and re-assess this barrier and try to problem-solve with my colleagues. The attitudes of the staff, the culture on the unit, and uncontrolled circumstances have all affected the appropriate use of the protocol. For example, the responsibilities of the physician in the hospital environment had a bigger impact on the appropriate use of the oxytocin protocol than I had anticipated.

I also realized how important communication was for all the stakeholders and how fast that communication can be affected. Knowledge translation activities are enriched by face-to-face interactions, trust, and personal contact but I was unable to personally speak with all the stakeholders (CIHR, 2006). I had the responsibility to make sure all the nurses were informed about the protocol. The head obstetrician was responsible at each site to make sure their colleagues were aware of the new protocol. Even though it was not the clinical nurse educator's responsibility to inform the physician group about the protocol, we spent a large amount of time making sure they were included in all information sharing strategies and were invited to attend our education inservices. Otherwise, I was worried that they would impact the success of the implementation. We still heard from physicians after the implementation date that they were not aware of the protocol and that they did not like certain aspects of it.

Since most clinical nurse educators (CNEs) are not prepared at the graduate level, they do not develop protocols and guidelines. They are often given previously developed protocols and guidelines to implement. The OMRU emphasizes the assessment of the potential adopters, the practice environment, and implementation of the model or practice change. Using the model in my final practicum for my masters degree provided me with a comprehensive, practical framework which directed and organized my knowledge translation activities and educational strategies.

Project Limitations

One of the main limitations of the OMRU framework is the lack of detailed information regarding which strategies and interventions should be used in various circumstances to translate new knowledge. Graham and Logan (2004) suggest the model does not yet provide detailed

information because validation has not been achieved for potentially relevant theories for health care or organizational change. As a Masters prepared CNE I have knowledge about learning theories and skills related to developing appropriate learning activities. However, since the model may be used by nurses without graduate preparation in nursing and education, I would have liked more information within the model regarding the transfer of the new knowledge into practice. The model is useful for protocols and guidelines that have already been developed and are ready for dissemination into practice. However, if I had to generate a new protocol using current evidence, I would need to use a model that provided more guidance about evidence retrieval, grading of evidence, and synthesis of that evidence.

Conclusion

Using a knowledge translation framework can facilitate the uptake of research into practice which can improve health care outcomes for patients (CIHR, 2009; Hogan, 2004; Logan & Graham, 1998; Logan et al., 1999) In Canada, health care providers, managers, and governments are committed to improving the quality and safety of patient care (CRNBC, 2012; Health Canada, 2010; IOM, 2012). A knowledge translation framework provides a useful conceptual framework which can guide clinical nurse educators through the implementation of evidence-based clinical practice guidelines into practice, especially when organizational and practice changes are required. Clinical nurse educators and clinical nurse specialists need to have a good understanding of knowledge translation so the complex health care environment which includes stakeholders such as nurses, physicians, and patients are taken into consideration. My experience using the Ottawa Model for Research Use confirms that using a knowledge translation framework can assist a clinical nurse educator or another advance practice nurse (APN) to implement research findings into health care practice. Knowledge translation frameworks can

assist clinical nurse educators, clinical nurse specialists, and advanced practice nurses when transferring evidence into practice by providing a comprehensive, practical framework which identifies barriers and facilitators to change. Drawing on a KT model facilitates the successful implementation of new guidelines, new protocols, and new research into practice which decreases the knowledge to practice gap. My use of the OMRU facilitated the successful regional dissemination of new evidence related to oxytocin use for induction and augmentation of labour. The transfer of knowledge into practice is a complex process and more research is needed regarding the effectiveness of different teaching and learning strategies in different practice settings. Advance practice nurses can use knowledge translation models to promote the development, adaptation, and application of research-based knowledge to improve patient safety and enhance the quality of care received by patients and their families.

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