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Health Services Researcher Pathway for Registered Nurses: An Integrative Literature Review

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Abstract

Background: Research competencies across nurses' career stages have not been adequately explored. Yet, research skills to appraise, synthesize, and implement research findings are required for evidence-based practice.

Purpose: To explore the literature on registered nurse research competencies; to identify core competencies (i.e., knowledge, skills, and attitudes), research capacity-building activities, strategies and recommendations to strengthen nurses' research capacity; and to propose a conceptual developmental framework of nurse research competencies.

Methods: As part of a larger project titled "*Health Services Researcher Pathway*", with the consultation of a health sciences librarian, we conducted an integrative literature review drawing on relevant publications. The PubMed (Medline), CINAHL, Web of Science and ProQuest Dissertations and Theses databases were searched from 2000 to 2012. From the revealed publications (n=1012), only 22 articles were relevant to nurse research competencies.

Findings: The key themes cited in the literature reviewed include models and partnerships for building and developing competencies for research production (rather than utilization), and educational strategies and recommendations for interventions to provide confidence in evidence-based practice including research utilization and in clinical decision-making. According to the five-step evidence-based practice model (i.e., formation of answerable research questions, literature search and retrieval of the best available evidence, critical appraisal of the evidence, application of research findings into practice, and evaluation of performance based on the outcomes), we propose a framework for a nurse researcher pathway that may contribute to two research competency streams: for research users and research producers. The important area of research users is open for further research, since scarce literature exists.

Conclusions: The proposed conceptual developmental framework for a nurse researcher pathway includes essential steps toward evidence-based practice in healthcare that have implications at the micro-level (nurse), meso-level (organization), and macro-level (society). Our work continues to pilot and refine a nurse researcher pathway and its associated competencies.

Introduction

In 2001, the US Institute of Medicine [1] emphasized the need for health professionals to base their practice on the best available evidence that includes research findings, clinical experience, expertise, and patient or client preferences as described by Sackett and Haynes [2] in their seminal paper on the topic. While this seems obvious, its simplicity obscures the fact that implementation of evidence-based practice is a complex, dynamic and iterative process [3]. The contextual and changing nature of healthcare professional practice requires knowledge users to adapt, contextualize, and adjust knowledge for local use. At the same time, the contextual and changing nature of healthcare professional practice requires a cadre of experienced and able research scientists to advance knowledge to support the delivery of quality care.

Early in the 2000s, nursing organizations throughout Canada, the UK, and the USA, as well as Sigma Theta Tau International encouraged the development of evidence-based practice in nursing [4]. These organizations called for changes in nursing education and practice to fully develop advanced nursing as an evidence-based profession.

Nurses, like other health professionals, are expected to use evidence to inform the development of policies and practices to guide the provision of quality care. Thus, registered nurses need to achieve research competencies as they engage with evidence throughout their careers and as they generate new knowledge to guide practice. Equally, clinical nurses and nurse researchers need to learn to apply the best available evidence to their practice in order to influence patient, care provider, and system outcomes such as quality, cost-efficient, and cost-effective healthcare delivery [5,6].

Our team of nurse leaders from practice and academia began work on a project commissioned by the Michael Smith Foundation for Health Research (MSFHR) through its BC Nursing Research Initiative (BCNRI) in British Columbia, Canada to develop and disseminate an evidence-based, nurse researcher pathway with corresponding levelled competencies. The pathway we envision is one that would describe how nurses engage with research and the research process throughout their careers and was based on an assumption that nurses gain increasing levels of sophistication with research over a career trajectory. We adopted the definition put forth by Goudreau et al. [7] defining competency as "a complex know-how that is based on combining and mobilizing attitudes, knowledge, skills, and external resources and then applying them appropriately to specific types of situations" (p.1). Our first activity was to perform an integrative literature review of the published, peer-reviewed literature on nursing research competencies. This paper is a report of that review.

In approaching the literature, we acknowledged our interest in learning what was known and what was thought about the competencies that are required for nurses to develop a set of attitudes, knowledge, and skills to guide their research utilization and production. Our primary objectives were to identify any activities, strategies, and recommendations that build and improve registered nurses' research capacity and to describe a set of core competencies and their indicators for each step in developing a researcher pathway for nurses.

Materials and Methods

With the consultation of a professional health sciences librarian (L-AB), we conducted a series of exploratory searches using natural language terms depicting possible nodes reflective of nurse research competencies. Then, we focused on comprehensive searches (using controlled vocabulary, specialized fields, and limits) in PubMed (Medline), CINAHL, the Web of Science and ProQuest Dissertations and Theses databases, based on pre-determined inclusion and exclusion criteria. We included empirical studies published in English from 2000 to 2012 that referred to nurse (i.e., front-line, clinical) activities related to research use or research engagement (i.e., qualitative and quantitative methods). Publications that involved nurses in leadership positions, editorial or opinions were excluded, as were publications that involved teaching research in nursing educational programs. The keywords and search terms used for the literature search include: research (combined with basic methods, capacity building, capacity development, utilization/use, education, competency, research-based practice), nurse (combined with research, researcher, role in clinical trials research, advanced practice, research career ladder, researcher job description, researcher pathway, involvement in research activities, professional development, attitude/value on nursing research), evidence-based practice or evidence-informed practice, knowledge translation, magnet hospitals, and information and digital literacy.

Next, we constructed a data extraction table that two research

assistants used. The data extraction table includes general study characteristics (i.e., purpose/objectives, sample size, methods, target population, intervention, main results, and limitations) and specific components relevant to the literature review aims (the data extraction table is available from the authors). Also, to facilitate the laborious work of consistent data extraction, we defined core elements such as research competencies (i.e., attitudes, specific and complex theoretical knowledge, and skills that are related to the research process and evidence-based practice), attitudes (i.e., values and beliefs associated with and the ability to contribute to the research process), knowledge (i.e., tested theoretical knowledge about the research process with limited practical experience), and skills (i.e., ability to carry out the research process with sufficient practical experience).

Ethics approval does not apply to an integrative literature review. However, the larger HSRP project sought and obtained ethics approval from Health Research Ethics Board at both the University of British Columbia and the University of Victoria for continuation of the study, when it included recruiting nurses to participate in focus groups (University of British Columbia Protocol Number H13-01195 on 6 May 2013 and University of Victoria Protocol Number 13-122 on 11 April 2013).

Results

From the revealed publications (n=1012), 147 duplicates were removed and the remaining (n=865) were reviewed for inclusion. In total, 41 journal articles were included for data extraction, but only 22 publications were relevant to nurse research competencies. In these 22 publications, the most commonly cited themes referred to barriers to [8,9] and facilitators of [10,11] research utilization described as organizational factors and individual characteristics. To identify nurse competencies related to research utilization or engagement in research, we focused on (1) interventions (i.e., educational, practice, organizational) and activities related to the development of nurse researcher competencies; and (2) research capacity building for nurses.

Interventions and activities to develop nurse researcher competencies

In their systematic review, Boaz et al. [12] described a number of interventions to reduce the gap between research and practice and to implement research into clinical practice. Their conclusions include the need for multifaceted rather than single interventions to improve evidence-based practice. However, the most common intervention mentioned in the literature for improving research utilization is education. Several authors describe educational programs and activities to enhance research knowledge and skills of knowledge translation [6,13-17] as a form of organizational support for evidence-based practice [18,19]. These educational interventions are thought to strengthen research competencies [19,20] and provide research literacy, understanding of the literature, critical assessment of research findings and confidence in decision-making on the clinical usefulness of evidence [21]. Specific interventions noted in the literature were:

- Formal education

1. Assessment of the levels of education [22] that may lead toward high-quality postgraduate education [23] and graduation standards [21].

2. Implementation of an education model (i.e., the Partnership Education Model Competency) to train graduate students

to evaluate research evidence in clinical settings and to lead nursing teams to implement evidence-based findings [24].

- Informal education/on-the-job training

1. Implementation of a nurse researcher model [13], whose role, activities, and responsibilities would be to facilitate evidence-based practice and research-related staff development [18] such as employment of nurse research facilitators [25]. In this model, the nurse research facilitator acts as a consultant for 'hands-on' research practice and supports nurse attendance at research conferences and presentations [26].

2. Use of Regular Brown Bag Lunch seminars and Research Skills Workshop series [27] for nurses that focus on planning, implementation, and preliminary evaluation of a research capacity building initiative. The ultimate goal is to improve nurses' research utilization skills. The authors reported increased participant enthusiasm towards initiating their own research and knowledge translation activities, improving research capacity, and improving their ability to plan, manage and deliver healthcare services.

- Continuing education

1. Nursing research courses in academic institutions [6,21] resulted in nurse reports of improved knowledge and skills in evidence-based practice. Other evidence indicates that completing a research-related course is associated with positive attitudes towards research [28].

- Partnerships

1. Recent discussions about collaborative work between nurses in academia and clinical nurses suggested that shared knowledge, skills, and expertise from each area of practice can build models of evidence-based practice nursing [5]. One recommendation is to foster partnerships between healthcare organizations and academic institutions and to also develop joint research teams.

2. Use of the Iowa Model of Evidence-Based Practice to Promote Quality Care is another example of how nurses can form partnerships to assess existing evidence and translate it into practice or can conduct a study for developing the evidence [24,29].

Research capacity building for nurses

O'Byrne and Smith [30] identified three models to build research capacity in clinical nurses: the Evidence-Based Practice model, Facilitative model, and Experiential Learning model. Despite using various definitions of research competencies, all of these models focus on developing nurses' skills to conduct research and to appraise, synthesize, and implement research findings [31-33].Building research capacity for nurses [13] increases nurses' confidence [34] and quality in providing care [35].

Further, developing research competencies enhances the development of evidence-based practice champions, who may then change the organizational culture and improve nurses' research utilization activities [24]. Similarly, the UK Faculty of General Dental Practice identified research competencies for dentists and grouped them into four domains: practical skills, problem-solving attitudes, professional ethics, and dissemination of findings [36]. Recently,

Straus et al. [15] identified core competencies in the field of knowledge translation for professionals in various disciplines associated with the health sector (e.g., nursing), and developed and implemented an educational strategy to build capacity in the science and practice of knowledge translation. Their ultimate goal was to meet the capacity demand for knowledge translation researchers and practitioners in Canada and, in turn, improve care and strengthen the healthcare system. Finally, two interdisciplinary health research teams met in Sicily to identify and recommend research competencies for health professionals [37,38]. Their collaborative work produced the following recommendations:

1. An inclusive definition of evidence-based practice for both users and producers of research [37]

2. Description of the minimum skills required for health professionals and standard educational requirements for training health professionals in evidence-based practice [37]

3. Competencies organized by the five-step evidence-based practice model suggested by Cook et al. [39].

4. Use of the Classification Rubric for evidence-based practice Assessment Tools in Education (CREATE) framework as a common taxonomy [38] for competency tools.

Discussion

In this integrative literature review, which builds upon prior research and discussions related to nurses' capacity to use and produce research, our goals were to identify and describe research competencies required for nurses and to identify nurse research capacity-building activities, strategies and recommendations. With this background, we intended to take a first step to propose a conceptual framework for a nurse researcher pathway – a statement of how nurses engage with research throughout their careers and to identify what competencies nurses need at each step of the pathway. We found that there are no generally accepted research competencies in use for healthcare professionals and no career-based developmental researcher pathways have been described. The main findings of this review indicate that building nurses' research competencies assists those nurses to use evidence-based practice with confidence. We learned that most research capacity descriptions refer to skills to produce research, although there is acknowledgment that more inclusive competencies to use and apply research (i.e., knowledge translation) are needed [27] and that organizational support for nurses to regularly implement research is inadequate [40].

According to these findings and the five-step evidence-based practice model [39], our team suggests a nurse researcher pathway to be developed with two streams of research competencies: for research users (basic level) and for research producers (advanced level). Even though nurses in both streams need to have similar (positive) attitudes toward research, as attitudes are strong predictors of future behaviour [41], their knowledge and skills may differ in each stream. In particular:

- In the users (basic) stream of research capacity, where the majority function, nurses need to have certain knowledge and skills to read, understand, and use research findings. Competencies in this stream include the ability to understand research methods; locate, appraise, and synthesize evidence using basic computer literacy; form important research questions; engage in the data collection process; apply ethical

Competencies	Five-Step Evidence-Based Practice (EBP) Model [39]*				
	Step 1: Ask	Step 2: Search	Step 3: Appraise	Step 4: Integrate	Step 5: Evaluate
Attitudes (Do they value…?)	Forming (answerable) research questions	Conducting literature searches for knowledge synthesis	Critical appraisal of the literature and overall evidence	EBP & knowledge synthesis activities	Methods & process of evaluating EBP performance
Knowledge (Do they know the…?)	Structure of answerable research questions relevant to the study purpose	Appropriate databases for literature search strategies that distinguish types of knowledge synthesis	Suitable and justifiable critical appraisal methods and tools	Knowledge synthesis methods for feasible and appropriate application of EBP activities	Best methods to evaluate evidence and successfully translate knowledge into practice
Skills (Are nurses'…?)	PICO** research questions relevant, complete and answerable to the study purpose	Search strategies and research methods efficient, appropriate, valid and thorough for the study purpose	Chosen appraisal methods, tools, and processes complete, feasible and appropriate	Findings, interpretations, implications and recommendations reasonable and ready to be used in practice	Evaluations of their EBP skills feasible, reasonable and indicative of willingness to take action for improvement

*The five-step EBP model [39] includes:
1. Translation of uncertainty and literature information to formulate answerable research questions.
2. Systematic literature search and retrieval of the best available evidence with which to answer the research questions.
3. Critical appraisal of the evidence to assess its *validity* (closeness to the truth) and *usefulness* (clinical relevance & applicability).
4. Application/implementation of research findings into practice.
5. Evaluation of performance based on the outcomes

Patient/**p**opulation, **I**ntervention, **C**omparison/**c**omparator/**c**ontrol, **O**utcome [43]

Table 1: Suggested Nurse Research Competencies for Users (basic stream) & Producers (advanced stream).

processes in studies; manage studies during the research process; and interpret and use research findings to change clinical practice.

- In the producers (advanced) stream of research capacity, nurses need to enhance and build upon the basic stream of knowledge and skills, in order to not only read, understand and use research findings, but to design and conduct original studies. In this advanced stream, competencies include advanced computer literacy and the ability to conduct systematic literature reviews; apply valid research methods in studies by designing research protocols; conduct basic data analyses; interpret and translate research findings into concrete and practical actions to change behaviour, clinical practice, and policies; engage in dissemination activities to communicate research findings; and to mentor novice researchers.

Taking into consideration the five-step (domains) of the Evidence-Based Practice model [39], the Promoting Action on Research Implementation in Health Services (PARiHS) framework on two-stage process in improving research use [42], and the CREATE framework [38], we propose a framework to present a set of core competencies(i.e., attitudes, knowledge, skills) for each of the five-step evidence-based practice activities in each stream of research capacity (user and producer) (Table 1). Our intention is to use this framework to further articulate competencies specific to each level and category. This work can ultimately be used to develop a self-assessment tool as well as a tool for use of others such as supervisors, nurse research facilitators and educators. Once assessed, nurses can develop a learning plan related to research use and/or production depending on career goals. We emphasize that attainment of research competencies is neither an end nor an activity only for individual nurses. Essential elements to advance evidence-based practice are nurse managers' support and engagement as well as organizational facilitation for research-based practice [44].

Strengths and Limitations

Our integrative literature review is an overview of core competencies, activities, strategies, and recommendations that can build each step of a researcher pathway and improve registered nurses' research capacity. The strengths of this review include reference to the current literature on nurse research capacity, despite the limited number of relevant publications. Given that our review is not systematic but limited by the terms/keywords used for searching the relevant databases, it may be subject to publication bias if we missed some other publications. We are confident though that this review describes the most important approaches to nurse research capacity building.

Implications

To address the literature gap, we present a conceptual framework and method for a framework to assess nurses' research competencies in targeting critical areas for nurse advancement within the domain of research. A framework that includes an essential pathway toward evidence-based practice in healthcare should be leveraged to obtain educational and training opportunities to strengthen nurse research competencies. Nurse research competence has implications at the micro-level (nurse), meso-level (organization), and macro-level (society). At the micro-level, nurses need to confidently use research findings in practice for better patient and nurse outcomes. At the meso-level, organizations will benefit from research-competent nurses who use evidence-based approaches to improve system outcomes and contribute to ongoing research and knowledge development. At the macro-level, society will benefit by having research-competent nurses who actively contribute to the advancement of population health and well-being.

Strategies and Recommendations

According to the above findings, we recommend the following educational, practice, and organizational interventions:

- Enhancement of nurses' professional development through

formal, informal, and continuing education.

- Promotion of working collaboratively with knowledgeable colleagues and mentors.

- Further articulation and validation of research competencies nurses need at each level of their work.

- Development of a research competency assessment tool to assess registered nurses' current research competencies (for users and producers) and guide achievement of advanced nurse research competencies.

- Enhancement of healthcare organizations' context to support nurses' evidence-based practice activities; potential interventions at the organizational level may be needed.

- Utilization of a research competency tool by employers to inform job descriptions for nursing roles that require a certain level of education (e.g., Master's degree) and to articulate expectations around research.

Conclusions

Nurses need to be research-competent so that they can appraise, synthesize, and implement research findings for evidence-based practice and improve quality of care. We propose the development of a nurse researcher pathway with two streams of research capacity: for research users (basic stream) and for research producers (advanced stream). Using the five-step evidence-based practice model (i.e., formation of answerable research questions, literature search and retrieval of the best available evidence, critical appraisal of the evidence, application of research findings into practice, and evaluation of performance based on the outcomes), nurse research competencies (i.e., attitudes, knowledge, skills) can be assessed, developed, and enhanced. To this end, our work continues to pilot and refine the pathway and to articulate its associated competencies.

Acknowledgement

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[Those marked with an asterisk (*) are included in the literature review]

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