

BMJ Open Informatics competencies for nurse leaders: protocol for a scoping review

Iman Kassam,¹ Lynn Nagle,² Gillian Strudwick³

To cite: Kassam I, Nagle L, Strudwick G. Informatics competencies for nurse leaders: protocol for a scoping review. *BMJ Open* 2017;7:e018855. doi:10.1136/bmjopen-2017-018855

► Prepublication history and additional material for this paper are available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2017-018855>).

Received 26 July 2017

Revised 9 October 2017

Accepted 8 November 2017

ABSTRACT

Introduction Globally, health information technologies are now being used by nurses in a variety of settings. However, nurse leaders often do not have the necessary strategic and tactical informatics competencies to adequately ensure their effective adoption and use. Although informatics competencies and competency frameworks have been identified and developed, to date there has not been review or consolidation of the work completed in this area. In order to address this gap, a scoping review is being conducted. The objectives of this scoping review are to: (1) identify informatics competencies of relevance to nurse leaders, (2) identify frameworks or theories that have been used to develop informatics competencies for nurse leaders, (3) identify instruments used to assess the informatics competencies of nurse leaders and (4) examine the psychometric properties of identified instruments.

Methods Using the Arksey and O'Malley five-step framework, a literature review will be conducted using a scoping review methodology. The search will encompass academic and grey literature and include two primary databases and five secondary databases. Identified studies and documents will be independently screened for eligibility by two reviewers. Data from the studies and documents will be extracted and compiled into a chart. Qualitative data will be subject to a thematic analysis and descriptive statistics applied to the quantitative data.

Ethics and dissemination Ethical approval was not required for this study. Results will be used to inform a future study designed to validate an instrument used to evaluate informatics competencies for nurse leaders within a Canadian context.

INTRODUCTION

Health information technologies are being widely and rapidly implemented in healthcare settings around the world.¹ As nurses represent the largest group of health professionals globally, nurses are also likely to be the largest group of users of these technologies. As such, there has been a concerted effort in several countries to ensure that nurses entering practice settings hold competencies that will allow them to use the technologies in meaningful and productive ways that can have benefits both to patients and professionals.^{2–4} These efforts have typically focused on the development and delivery of informatics

Strengths and limitations of this study

- First known literature review that will consolidate nurse informatics competencies for nurse leaders.
- Search strategy developed in collaboration with a research librarian well versed in research databases.
- Only studies and documents published in English will be included.

competencies in basic nursing education at the entry-to-practice level, and often to refer to these as 'nursing informatics competencies'. Nursing informatics is defined by the American Nurses Association as: "the specialty that integrates nursing science with multiple information management and analytical sciences to identify, define, manage, and communicate data, information, knowledge, and wisdom in nursing practice. NI supports nurses, consumers, patients, the interprofessional healthcare team, and other stakeholders in their decision-making in all roles and settings to achieve desired outcomes. This support is accomplished through the use of information structures, information processes, and information technology."⁵

At present, it is likely that the majority of nurse leaders (nurses in non-clinical, administrative roles) have neither received education inclusive of entry-to-practice informatics competencies nor have been provided with formal opportunities to develop those competencies within their practice settings.^{6,7} Therefore, nurse leaders today may not hold the informatics knowledge, let alone the more advanced competencies required to be able to effectively provide strategic and tactical leadership related to the adoption and use of information and communications technologies (ICTs).⁶ Thus, there are now efforts underway to identify informatics competencies of relevance for nurse leaders,^{6,8,9} but to date there is no known review or consolidation of the work done in this area.

In order to address this gap, a scoping review will be conducted. The objectives of the scoping review are to: (1) identify



CrossMark

¹Queen's University, Kingston, Ontario, Canada

²Lawrence S Bloomberg Faculty of Nursing, University of Toronto, Toronto, Ontario, Canada

³Information Management Group, Centre for Addiction and Mental Health, Toronto, Ontario, Canada

Correspondence to

Dr Gillian Strudwick;
gillian.strudwick@camh.ca

informatics competencies of relevance to nurse leaders, (2) identify frameworks or theories that have been used to develop informatics competencies for nurse leaders, (3) identify instruments that can be used to assess the informatics competencies of nurse leaders and (4) examine the psychometric properties of identified instruments.

METHODS AND ANALYSIS

The following scoping review protocol was developed using the five-step framework outlined by Arksey and O'Malley, and advanced by Levac and colleagues.^{10 11} The framework includes (1) identifying the research question, (2) identifying relevant studies, (3) study selection, (4) extracting the collected data and (5) reporting the results. These steps have been followed in the development of the scoping review protocol and are detailed in subsequent sections. Ethical approval was not required for this study. The authors have used both the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)¹² checklist and A Measurement Tool to Assess Systematic Reviews¹³ in the development of this protocol. The scoping review searches will be completed by the end of 2017, and subsequent analysis of the literature search findings will be completed in early 2018.

Step 1: identifying the research question

Four research questions were developed that reflect the objectives of the scoping review. These research questions are as follows:

1. What nurse leader informatics competencies have been identified in the literature?
2. What frameworks or theories have been used in the development of informatics competencies for nurse leaders?
3. What instruments have been developed and are being used to assess the informatics competencies for nurse leaders?
4. What are the psychometric properties of the instruments identified for the assessment of nurse leaders' informatics competencies?

These questions are being asked to solicit answers that will provide readers with a comprehensive understanding of the work that has been done to date in the development of informatics competencies for nurse leaders.

Step 2: identifying relevant studies

Eligibility criteria

All research, theoretical and opinion papers will be included within this scoping review of informatics competencies for nurse leaders. The studies and documents assessed will not be limited to their date of publication, country of origin or setting. Only studies published in English will be included. Informatics competencies described in the included studies and documents must be directed at nurses within leadership positions. Nurse leaders are defined as nurses who do not typically provide direct care to patients and are usually in formal leadership

roles with responsibility for both human and financial resource management in healthcare organisations. The job titles of nurses in leadership positions include, but are not limited to, nurse educator, nurse manager, nursing case manager, nurse administrator, nurse executive, clinical nurse leader, director, chief nursing officer, chief nurse executive and vice-president of care services. Documents that focus on informatics competencies directed at direct care nurses or nurse informaticians will not be included.

Search strategy

With the aid of an experienced research librarian, a search strategy has been developed using two primary electronic databases: (1) the Cumulative Index to Nursing and Allied Health Literature (CINAHL) and (2) Medline (Ovid interface); and five secondary electronic databases: (1) Education Resources Information Center, (2) Web of Science, (3) PsycINFO, (4) Proquest Dissertations and Theses Database and (5) Theses Canada. The search will not be limited to published peer-reviewed literature, but will also include unpublished grey literature pertaining to informatics competencies for nurse leaders. Grey literature will be searched using Google and the Canadian Agency for Drugs and Technologies in Health search tool. In addition, experts in the field of informatics and nursing will be consulted. These strategies will ensure that competency documents developed by nursing organisations are identified in the search of grey literature. To ensure accuracy when using the search strategy for grey literature, the Peer Review Election Search Strategies Checklist will be used.¹⁴ Peer-reviewed papers, research reports and grey literature that identify an approach for defining and/or measuring informatics leadership competencies for nurse leaders or domains of informatics competencies for nurse leaders will be of primary focus within this study.

A search strategy has been developed for Medline (Ovid interface) and is shown in online supplementary appendix A. This search strategy will be modified as required so that it can be used with CINAHL and the secondary electronic databases. There will be no limitations to the date or year the article was published, nor will there be limitations pertaining to the geographic location of the publication.

Once the initial searches of the databases and grey literature are completed, the research team will review the first 100 citations from each source to ensure that the most appropriate search terms and strategy are used. If required, the search strategy will be modified to improve the quantity and relevance of the findings.

Step 3: study selection

Following execution of the search strategy, the first stage of the selection process will take place during which titles and abstracts of publications will be read independently by two members of the research team and deemed eligible if inclusion and exclusion criteria are met. A primary

screening and data extraction software called Covidence will be used (Covidence systematic review software, Veritas Health Innovation, Melbourne, Australia). This software supports research teams in tracking the number of duplicate articles, facilitating the independent screening of the articles by two research team members and tracking the eligibility process. Studies that are duplicates, irrelevant or unrelated will be removed from the study at this time. If the relevancy of the publication is unclear from the title or abstract, the reviewer will then read the publication in full to determine the eligibility of the publication. Any further changes to the search criteria to improve the search findings will be made in this stage.

This process will first be completed on the first 100 citations and Cohen's kappa will be calculated. A minimum kappa of 0.80 has been set as a threshold to achieve before continuing with the study selection process. Once completed, the second stage of the selection process will commence. The eligible publications screened in the first stage will be independently read in full by two investigators to further establish whether the publication contains data/research relevant to informatics competencies for nurse leaders. When agreement cannot be reached, a third investigator will be consulted. Finally, the PRISMA flow diagram will be populated with the search and eligibility screening findings, and used to provide a visual of the data selection process.¹²

Step 4: data collection

The identified articles and documents that meet all of the eligibility criteria will be thoroughly read, and relevant data will be extracted by the investigators. On extracting data from each publication, it will be organised into a chart using the descriptive-analytical method described by Arksey and O'Malley.¹⁰ In following with this method, the quality of the publication will not be of importance; rather, the information presented will act as the primary focus.⁶

The chart will be divided into two sections. The first section, 'Overview', will summarise the basic information of the publication. The second section, 'Research Questions', will include the four research questions that should be answered on reviewing each piece of relevant literature. The 'Overview' section will include the name of the authors who conducted the study, the date in which the literature was published, whether the study is published or grey literature, the country in which the study took place or focuses on, the main objectives of the study, the methodology pertaining to how the study was conducted inclusive of the study design (including whether the researchers used quantitative, qualitative or mixed method approaches), the setting of the study, the type of nurse leader the competencies were developed for and the summarised results of the study. The 'Research Questions' section includes four main questions that reflect the objectives of this review. The first question focuses on specific informatics leadership competencies for nurse leaders that are reported in the literature. The second question is focused on the identification of frameworks

or theories that have been used to develop informatics competencies for nurse leaders. The third question aims to identify any instruments that have been developed, analysed or used to assess informatics competencies for nurse leaders. Lastly, the fourth question focuses on the identification of demonstrated psychometric properties of instruments developed, analysed or used to assess nurse leader informatics competencies. As such, the following data will be extracted from articles: reported nurse leader informatics competencies, the conceptual/theoretical organisation of reported nurse leader competencies, instruments used to assess nurse leader informatics competencies (name, number of items, what the instrument measures) and the psychometric properties of the instruments (eg, reliability, validity, factor analyses). Online supplementary appendix B shows the proposed data extraction table.

Step 5: reporting results

Data present in the chart will be used for both a qualitative and quantitative analysis, and to support data synthesis. Qualitative data from the data extraction table will be uploaded into QSR International's NVivo 11 qualitative data analysis software (Version 11, 2015) and a thematic analysis completed to synthesise the findings.^{15 16} Specifically, the list of competencies will be thematically analysed using an inductive approach to identify what themes emerge. To enhance the rigour of the analysis process and the trustworthiness of the findings, two members of the research team will complete data analysis independently. These individuals will then meet to discuss and finalise the competency themes. Any discrepancies will be resolved through discussion and when agreement cannot be reached another member of the research team will be consulted. Quantitative data related to the number of competencies identified, the number of frameworks and theories drawn on, the number of instruments used and their psychometric properties will be uploaded into SPSS V.24 for data synthesis (IBM Released 2016; IBM SPSS Statistics for Windows, V.24.0). Frequencies and percentages will be reported on both items from the overview section and research question section of the data extraction table. A list of all of the identified health informatics competencies that are relevant to nursing leaders will be presented in a table.

In addition to reporting the study results, the results of an assessment of the quality of each selected article will be completed using the Grading of Recommendations, Assessment, Development and Evaluations (GRADE) Criteria, when applicable.^{17 18} The score generated from the GRADE assessment will be entered into a column on the data extraction table shown in online supplementary appendix B.

DISCUSSION AND DISSEMINATION

The proposed scoping review is significant as it will allow for easier access and identification of informatics

competencies for nurse leaders, which are not currently summarised in any known document. Results of this scoping review will be of interest to healthcare and academic institutions, nursing leadership organisations (eg, Academy of Canadian Executive Nurses (ACEN), Nursing Leadership Network (NLN)), advanced practice educators, nurse leaders and informaticians in a variety of different roles and settings. Hence, dissemination strategies targeting these particular audiences are being planned.

The dissemination of the scoping review findings will be done through traditional end-of-study knowledge translation strategies. The authors will consider submitting abstracts for presentation to a national informatics conference (ie, eHealth, Vancouver, British Columbia, Canada, 2018), a national nursing conference (ie, Canadian Nurses Association Biennial Convention, Ottawa, Canada, 2018), a nursing leadership conference (ie, NLN, Toronto, Ontario, Canada, 2018), a national nursing informatics conference (ie, Canadian Nursing Informatics Association Conference, Vancouver, British Columbia, Canada, 2018) and an international nursing informatics conference (ie, International Congress on Nursing Informatics, Beijing, China, 2020). In addition, the authors intend to submit a manuscript for publication in a peer-reviewed journal.

Additionally, the results of this scoping review will be used to inform a future study focused on the validation of an existing instrument used to assess informatics competencies for nurse leaders¹⁹ in a Canadian context. This study will be conducted in two phases starting with a modified Delphi approach in phase one and a cross-sectional survey including psychometric testing in phase two. Given the current prevalence of health information technology implementations in Canadian healthcare settings, and that nurses typically represent the largest user group of these technologies, it is important that nursing leaders have the competencies required to support the successful procurement, design, implementation, and use and evaluation of these systems. Without informatics competent nursing leadership, organisations run the risk of not being able to obtain expected returns on investments or garner the potential safety and quality benefits of ICT for clinical care delivery. Moreover, without the informed engagement of nurse leaders throughout the systems life cycle of ICT, patient care and nursing practice may be inadvertently compromised.

Contributors IK, LN and GS conceptualised this study. IK and GS drafted the manuscript and LN made contributions to its development. All authors approved the final manuscript.

Competing interests None declared.

Provenance and peer review Not commissioned; externally peer reviewed.

Open Access This is an Open Access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>

© Article author(s) (or their employer(s) unless otherwise stated in the text of the article) 2017. All rights reserved. No commercial use is permitted unless otherwise expressly granted.

REFERENCES

1. Stone CP. A glimpse at EHR implementation around the world: the lessons the us can learn. 2014. cited 24 Jul 2017. http://www.e-healthpolicy.org/docs/A_Glimpse_at_EHR_Implementation_Around_the_World1_ChrisStone.pdf.
2. Canadian Association of Schools of Nursing. *Nursing informatics entry-to-practice competencies for registered nurses*. Ottawa, Canada: Canadian Association of Schools of Nursing, 2012:1–15.
3. Abdrrbo AA. Nursing informatics competencies among nursing students and their relationship to patient safety competencies: Knowledge, attitude, and skills. *Comput Inform Nurs* 2015;33:509–14.
4. The TIGER Initiative. Evidence and informatics transforming nursing: 3-year action steps toward a 10-year vision. cited 18 Jul 2017. <http://www.aacn.nche.edu/education-resources/TIGER.pdf>.
5. ANA. *Nursing informatics: scope and standards of practice*. 2nd edn. Maryland, USA: ANA, 2015.
6. Westra BL, Delaney CW. Informatics competencies for nursing and healthcare leaders. *AMIA Annu Symp Proc* 2008;6:804–8.
7. Remus S, Kennedy MA. Innovation in transformative nursing leadership: nursing informatics competencies and roles. *Nurs Leadersh* 2012;25:14–26.
8. Collins S, Yen P-Y, Phillips A, et al. Nursing informatics competency assessment for the nurse leader. *J Nurs Adm* 2017;47:212–8.
9. Kennedy M, Moen A. Nurse leadership and informatics competencies: shaping transformation of professional practice. In: Murphy J, ed. *Forecasting informatics competencies for nurses in the future of connected health*. Amsterdam: IOS Press, 2017:197–206.
10. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol* 2005;8:19–32.
11. Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implement Sci* 2010;5:69.
12. Moher D, Shamseer L, Clarke M, et al. Preferred Reporting Items for Systematic review and Meta-Analysis Protocols (PRISMA-P) 2015 statement. *Syst Rev* 2015;4:1.
13. AMSTAR. Assessing the methodological quality of systematic reviews. 2015. cited 25 Jun 2017. <https://amstar.ca/index.php>.
14. McGowan J, Sampson M, Salzwedel D, et al. PRESS - Peer Review of Electronic Search Strategies Guideline: explanation and elaboration. 2016. <https://www.cadth.ca/press-2015-guideline-explanation-and-elaboration>.
15. Clarke V, Braun V. Thematic analysis. *J Posit Psychol* 2017;12:297–8.
16. Braun V, Clarke V. What can "thematic analysis" offer health and wellbeing researchers? *Int J Qual Stud Health Well-being* 2014;9:26152.
17. British Medical Journal. What is GRADE? 2012. cited 27 Sep 2017. <http://clinicalevidence.bmj.com/x/set/static/ebm/learn/665072.html>.
18. Grade Working Group. GRADE. 2017. cited 27 Sep 2017. <http://www.gradeworkinggroup.org/>.
19. Yen P-Y, Phillips A, Kennedy MK, et al. Nursing informatics competency assessment for the nurse leader. *J Nurs Adm* 2017;47:271–7.