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MEASURED AND PERCEIVED IMPACTS OF EVIDENCE-BASED LEADERSHIP IN NURSING: A MIXED-METHODS SYSTEMATIC REVIEW PROTOCOL

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ABSTRACT

Introduction: Despite the abundance of existing literature on evidence-based nursing practice, knowledge regarding evidence-based leadership, i.e., leadership supported by an evidence-based approach, is lacking. Our aim is to conduct a mixed-methods systematic review to examine the measured and perceived effects of evidence-based leadership on nurses' and nurse managers' performance, organizational and clinical outcomes.

Methods and analysis: We will search the following databases with no year limit: CINAHL (EBSCO), Cochrane Library, Embase (Elsevier), PubMed (MEDLINE), PsycINFO (EBSCO), Scopus (Elsevier) and Web of Science. Grey literature will be researched using Google Scholar, Emerald, Academy of Management (AOM) and the website for the Center for Evidence-Based Management (CEBMa). In addition, we will screen databases for prospectively registered trials and other systematic reviews. Articles using any type of research design will be included as long as the study includes a component of an evidence-based leadership approach. Three reviewers will independently screen all titles, abstracts and full-text articles, and two reviewers will extract the data according to the appropriate checklists. The quality of each study will be appraised using the Mixed Methods Appraisal Tool (MMAT). The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) grid and Meta-Analysis Protocols (PRISMA-P) will guide the study process and reporting. Outcomes related to individual or group performance of nurses or nurse managers regarding leadership skills (e.g., communication skills), organizational outcomes (e.g., work environment, costs), or clinical outcomes (e.g., patient quality of life, treatment satisfaction) will be extracted and synthesized.

Ethics and dissemination: This mixed-methods systematic review will not include empirical data, and therefore, ethics approval will not be sought. The results of the review will be published in a peer-reviewed scientific journal. We will thus engage relevant stakeholders within our team to determine the best possible approaches for dissemination.

Systematic review registration: PROSPERO CRD42021259624

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This mixed-methods systematic review is justified by the lack of synthesized knowledge on impacts of evidence-based leadership in nursing, an issue that is needed to answer current challenges in health care.
- A comprehensive literature search using several electronic databases and a manual search will be supplemented by a search of grey literature.
- Including grey literature articles that have not undergone the peer-review process may increase the variation in the methodological quality.
- To ensure transparent and complete reporting, the protocol has been written following the PRISMA-P guidelines.
- To promote the dissemination and the use of evidence produced, the review findings will be validated in collaboration with nursing associations.

INTRODUCTION

Around 20 million nurses make up nearly half of the global health workforce.[1] WHO has estimated a need to increase this number by 9 million nurses and midwives by the year 2030.[2] The nursing profession thus has a demanding target to meet to be able to address current and future health needs.[3] From the viewpoint of collective leadership, acts of leadership should come from any nurse rather than only from formal nursing leaders.[4] The American Nurses Association has stated that registered nurses demonstrate leadership in their profession, and this association highlights the importance of strengthening nurses' leadership competences, including competences in leading oneself, leading others and leading the organization.[5] Effective leadership is, after all, one of the contributions of nurses in improving global health.[2]

According to the Royal College of Nursing,[4] the role of leadership is to promote direction, alignment, and commitment among teams and organizations. Vender[6] defines leadership as "a combination of position, responsibilities, attitude, skills, and behaviors that allows someone to bring out the best in others, and the best in their organization, in a sustainable manner", while Carney[7] defines clinical leadership as "providing health care through a collaborative and ethical process that uses advocacy to effect change for the benefit of patients". Stanley[8] describes a clinical leader as a "clinician who is an expert in their field, and who, because they are approachable, effective communicators and empowered, are able to act as a role model, motivating others by matching their values and beliefs about nursing and care to their practice".

Leadership involves showing others the path to be taken.[9] Leadership occurs whenever a person attempts to influence the behavior of individuals or a group based on personal goals or for the goals of others congruent with organizational goals.[10] Those who are effective nurse leaders engage others to work together effectively in pursuit of a shared goal. Leadership is

based on influence and shared meaning.[11] Therefore, leading requires the ability to diagnose or understand a situation to be influenced, the ability to communicate, and the ability to adapt to behaviors and resources that will help goals be met.[10]

In the literature, there are discussions about whether there is a distinction between the concepts of leadership and management. It has been stated that managers are formally designated and assigned to their role,[11] while leaders have an informal role achieved based on their own skills.[8, 11] Management involves getting work done through others based on authority[11] and is about handling situations through control,[9] while being a nurse leader does not require a position of authority.[8, 9, 12] On the other hand, management and leadership often go hand in hand; in modern health care environments, managers are required to be leaders. Therefore, the distinction between managers and leaders is becoming blurred,[12] and some authors[e.g., 13] do not distinguish between leading and managing.

There is already a large knowledge base in systematic reviews regarding leadership in different professional health care areas. Reed et al.[14] summarized the results of 44 articles in the field of pharmacy and found great variation in definitions of leadership. Leaders were said to influence, motivate, enable and empower others in relation to a specific goal or change. The review found that a conceptualization of leadership competences was often lacking. Berghout et al.[15] reviewed 34 articles about medical leadership conceptualized by physicians. Several skills and competences emerged, such as skills related to communication and empowering, conflict resolving, and clinical knowledge. On the contrary, a review of leadership among dentists found that the literature mirrors generic leadership theories for health care, and that knowledge supporting leadership specifically in dental practice is still lacking.[16] Further, Reichenpfader et al.[17] focused on leadership in evidence-based practice. Out of 17 studies included, 11 studies

referred to nursing. The review found definitional imprecision and conceptual inconsistency over the concept of leadership: it was understood to be a modifier of implementation effectiveness or use of research evidence, where leaders' positive influences and direct or indirect facilitative behaviors on implementation success were emphasized.

There are numerous publications on the topic of leadership in the field of nursing. We found another 28 systematic reviews related to the concept of nursing leadership. The reviews focused on skills and competences required of nurse leaders.[18–22] Leadership has been described to have an impact on nurses' job satisfaction,[23–25] motivation, ability to perform their job,[26] use of research evidence,[27] and intention to stay in their job.[23–24, 28] Reviews have also reported how leadership has impacted organizational outcomes, such as work culture and climate,[23, 29] work environment[30] and costs.[23] Further, several clinical outcomes have been studied: quality of care including pain, restraint use, medication errors,[31] patient safety,[32] patient satisfaction, and adverse events.[23, 33–34]

Reviews have focused on how leadership skills are supported, and examples include administrative clinical supervision[35] and training.[36] Cummings et al. found that leadership can be promoted by educational activities, although evidence is limited due to weaknesses in study designs.[37] In their recent review, Cummings et al. identified that high-quality evidence is lacking in relation to specific nurse characteristics and organizational factors that most effectively contribute to educational interventions.[38] Husebø and Akerjordet reviewed quantitative studies to examine the impact of multi-professional teamwork and leadership training interventions on patient outcomes.[39] Again, due to research designs used, no recommendations could be made to nursing practice.

More recently, literature has described the concept of evidence-based management (EBMgt), which incorporates the best available scientific evidence in making managerial decisions. Four essential elements are crucial in practicing EBMgt: external scientific evidence; practitioner's experience and judgment; stakeholders' preferences or values; and different contexts and organizational factors.[40–41] We found five systematic reviews focusing on evidence-based management (EBMgt) in health care. Hasanpoor et al.[42] conducted a meta-synthesis based on qualitative studies (n=23) among health care managers. The meta-synthesis identified facilitators, barriers, sources of evidence used, and the process of decision making in EBMgt. Barriers in implementing EBMgt included a lack of time or limited access to evidence despite positive attitudes towards EBMgt among managers. Roshanghalb et al.[43] summarized 20 empirical studies and 10 previous reviews, and concluded that the main sources of evidence are published studies, real world evidence and experts' opinions. EBMgt was used to make staff performance assessments, change management, transfer organizational knowledge and do strategic planning. Another literature review by Young[44] reported that, although EBMgt was emphasized, it was used limitedly due to a lack of research on management activities, policy constraints, and a lack of time. Factors promoting the use of EBMgt included research culture, personal beliefs, good work organization and sufficient self-discipline. Jaana et al.[45] reviewed systematic reviews and meta-analyses to explore if research evidence is available for health care managers. They found that most of the 75 reviews included addressed clinical topics, and they rarely provided evidence of management-related interventions.

Despite of the wide base of existing knowledge, reviews regarding evidence-based leadership, i.e., leadership supported by an evidence-based approach, are rare. Evidence-based leadership was used as a concept in one previous systematic literature review. Geerts et al.[46] focused on

evidence-based leadership development for physicians. The review found that improvements could be achieved at the individual and organizational level and for the benefit of patients. Especially effective interventions for the development of leadership included, for instance, interactive workshops, video-recorded simulations, coaching, and mentoring.[46] To answer to the call to promote leadership in nursing,[1] we postulate that evidence-based approaches should be used in supporting nursing leadership because insufficient evidence-based decision making and management have been identified in nursing, and leaders do not always understand how evidence could be translated into practice.[47] Another reported reason is a lack of research on evidence-based management and leadership that is specific to the nursing field.[48] Currently, leaders do not have sufficient skills for refined problem-solving and making decisions based on data,[49] and leadership decisions are mostly based on experience and intuition[50–51] or the personal views of other leaders.[48] It is therefore time to rethink how an evidence-based approach could be used by nurse leaders in their decision making. Thus, in this review we will synthesize the existing knowledge on how and why evidence is used to solve leadership problems and to support leadership in daily nursing practice.

METHODS AND ANALYSIS

Aim and research questions

The overall aim of this mixed-methods systematic review is to examine the evidence of the measured and perceived effects of evidence-based leadership on nurses and nurse managers' performance, organizational and clinical outcomes. The review questions are as follows: (1) What leadership problems are solved using an evidence-based approach? (2) What are the main features in evidence-based leadership? (3) What are the perceived effects of evidence-based leadership on nurses' performance, organizational and clinical outcomes? (4) What are the

measured effects of evidence-based leadership on nurses' performance, organizational and clinical outcomes?

Design

In this review, we will use a mixed-methods approach by combining narrative and quantitative synthesis to search, appraise and synthesize empirical evidence. The approach is usable to our review as it provides the potential for gaining a more complete picture and holistic understanding of the topic. Further, this approach is useful for our purpose as our narrative synthesis focuses on a wide range of questions, not only those relating to the effectiveness of a particular intervention.[52]

To ensure transparent and complete reporting, this review protocol is designed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) grid and Meta-Analysis Protocols (PRISMA-P). The review protocol has been registered with CRD42021259624 in PROSPERO (International Prospective Register of Systematic Reviews).

Eligibility criteria

Study design

Articles using any type of research design will be included as long as the study includes a topic of leadership and any component of an evidence-based leadership approach.

The PICO

The PICO (population, intervention, comparison, outcome) approach will be used to specify the eligibility of studies.

Population (P): Articles should include nurses, nurse managers or other nursing staff working in a health care context. They can have an official or unofficial managerial role.[53] Articles

involving other health care professionals will be excluded if nurses are not clear majority (50% or more) in the sample.

Intervention (I): Leadership refers to the process of when a person attempts to influence the behavior of individuals or a group in an organization for any reason[53], while an evidence-based leadership occurs when the behavior of individuals or a group is affected using an evidence-based approach. We propose that evidence-based leadership is analogous to evidence-based management,[40–41] but the role or position of the leader may not always be assigned or officially approved of by the organization.

We assume that evidence-based leadership is a process that includes the following steps: 1) a practitioner identifies a clearly stated leadership problem, question, or issue in their practice, 2) organizational evidence or data about the leadership problem or issue are collected and analyzed to check for relevance and validity, and the problem is restated, reformulated or made more specific, 3) scientific evidence from published research about the leadership problem is researched, identified and critically appraised, 4) the views of stakeholders (patients, clinicians, family members, for example) are considered, together with ethical implications of the decision, and 5) all sources of information are critically appraised.[54] The articles to be included in this review should identify some or all of the five steps of the EBP process.[55–56]

Comparison (C): If an included study has used a randomized trial design, we will include another type of intervention as a comparison.

Outcomes

Studies will describe any outcomes related to individual or group performance of nurses or nurse managers regarding leadership skills (e.g., communication skills), organizational outcomes (e.g.,

work environment, costs), health care provider outcomes (e.g., job satisfaction), or clinical outcomes (e.g., patient quality of life, treatment satisfaction).

Other

Articles will be limited to peer-reviewed, published full-text articles. There will be no language restriction. Theoretical papers, statistical reviews, books and book chapters, letters, dissertations, editorials, and study protocols will be excluded.

Data sources

A comprehensive literature search, with no specific year limits, will be conducted. The following electronic databases will be used: CINAHL (EBSCO), Cochrane Library (academic database for medicine and health science and nursing), Embase (Elsevier), PubMed (MEDLINE), PsycINFO (EBSCO), Scopus (Elsevier), and Web of Science (academic database across all scientific and technical disciplines, ranging from medicine and social sciences to arts and humanities). These databases will allow for a wide literature search within our review topic. The reference lists of the selected papers will also be screened for additional studies. In addition, grey literature will be researched using Google Scholar, Emerald, Academy of Management (AOM) and the website for the Center for Evidence-Based Management (CEBMa).

Search strategy

The search strategy will be elaborated upon and implemented prior to the study selection. We will use the PRISMA-P checklist for guidance. A controlled vocabulary thesaurus (such as medical subject heading terms, CINAHL headings, PsycINFO thesaurus) and their keywords will be verified for each database. The search terms will be combined using the Boolean operators “AND” and “OR.” Advice on using keywords to search for studies will be sought from

a faculty librarian. An example of the PubMed database and the search terms used is presented in Table 1.

Table 1. Example of the PubMed database and search terms used (10 May 2021).

Database	Search terms	Number of hits
PubMed	("nursing leadership*"[tw] OR "leadership in nursing*"[tw] OR "nurse leader*"[tw] OR "nurse manag*"[tw] OR "nursing manag*"[tw] OR "nursing supervisor*"[tw] OR "nurse supervisor*"[tw] OR "Nursing, Supervisory"[Mesh] OR "director of nursing*"[tw] OR "nursing director*"[tw] OR "nurse director*"[tw] OR "nurse administrator*"[tw] OR "Nurse Administrators"[Mesh] OR "nursing administrator*"[tw] OR "nurse executive*"[tw] OR "executive nurse*"[tw] OR "primary nurse*"[tw] OR "chief nurse*"[tw] OR "chief nursing officer*"[tw] OR "head nurse*"[tw] OR "matron*"[tw] OR "charge nurse*"[tw] OR "sister nurse*"[tw] OR "ward sister*"[tw] OR "nurse executive*"[tw] OR "nursing executive*"[tw]) AND ("evidence based leadership*"[tw] OR EBL[tw] OR "evidence based management*"[tw] OR EBM[tw] OR "evidence based practice*"[tw] OR "Evidence-Based Practice"[Mesh] OR EBP[tw] OR "evidence based nursing*"[tw] OR "Evidence-Based nursing"[Mesh] OR EBN[tw] OR "evidence based health*"[tw]) AND (leadership*[tw] OR lead*[tw] OR "Leadership"[Mesh] OR manag*[tw] OR organiz*[tw] OR "Organization and Administration"[Mesh] OR influenc*[tw] OR "Peer Influence"[Mesh] OR administrat*[tw] OR superv*[tw])	882

Data management

EndNote or some other type of reference manager will be used to efficiently manage records, document the process, and manage duplicate study papers.

Selection process

The study selection process will consist of four steps (Figure 1). First, titles and abstracts will be independently assessed by three authors (MV, KH, TL) according to the inclusion criteria. Second, the abstracts of the papers will be screened for relevance and eligibility, by the same

three authors (MV, KH, TL). Third, the full texts of the selected articles will be screened by three authors (MV, KH, XL) according to the inclusion and exclusion criteria. In cases of discrepancy between the three screening authors, the paper will be discussed with another author (TL). Papers that do not meet the inclusion criteria will be rejected, and the reason for exclusion will be recorded to increase transparency in the selection process. Fourth, the full texts of the studies that meet the inclusion criteria will be obtained for further detailed assessment. The reference lists of the selected papers will also be screened and checked for additional papers that meet the inclusion criteria (JV, GL).

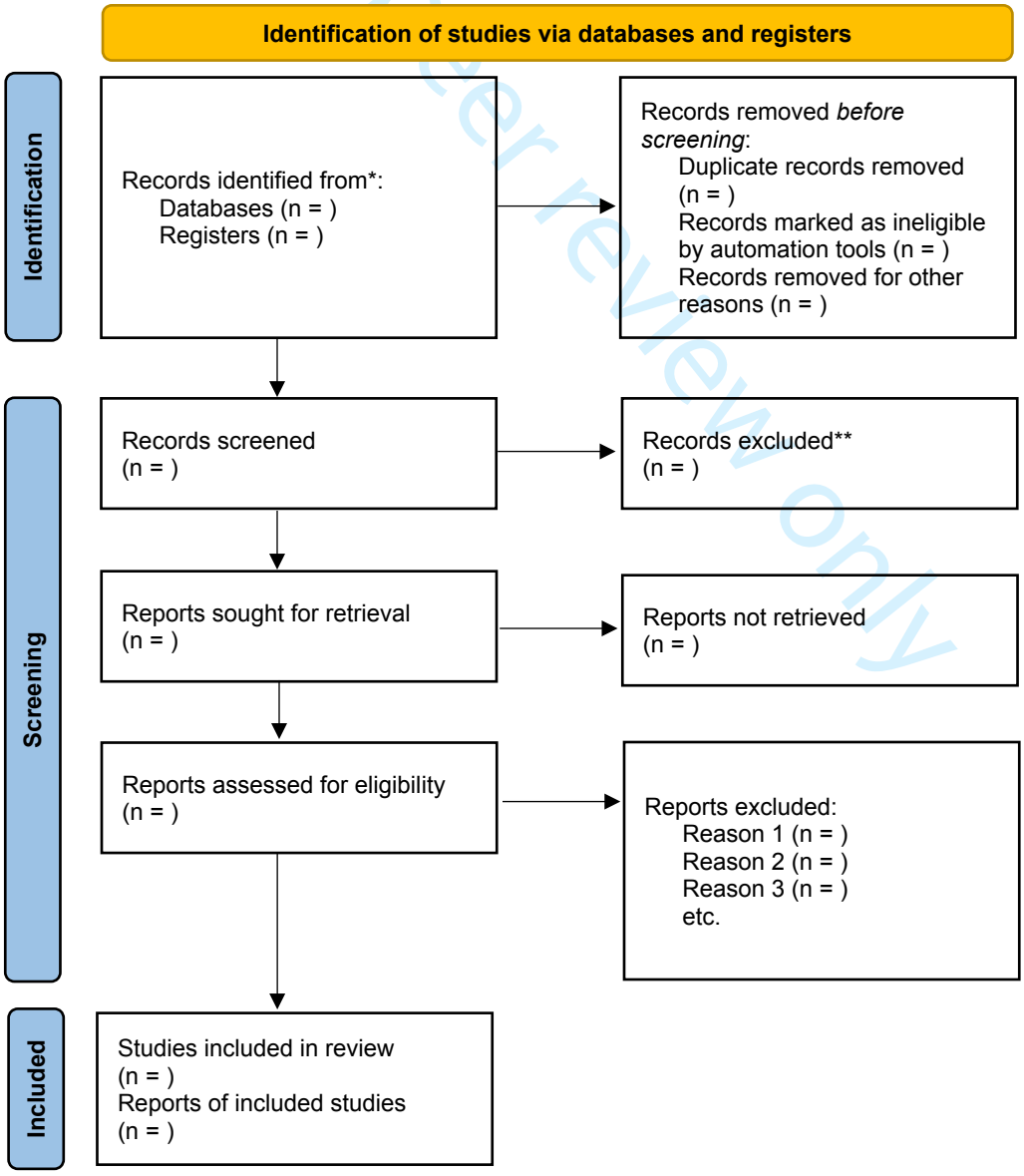

Figure 1. PRISMA flow chart.[57]

Data collection and extraction process

To answer the review questions, specific tables will be created to collect data from selected papers. The effectiveness data will be extracted by three authors (TL, MV, WC) and will be reviewed for completeness and accuracy by another author (XL).

Three data extraction forms will be used for the experimental and qualitative studies included in the review. The selected papers will be extracted by three authors (YT, SH, WC), and inputted into predesigned tables; the process will be validated (MV).

Quantitative data will be extracted from papers included in the review using the standardized data extraction tool from JBI-MAStARI.[58] The data extracted will include specific details about the populations, study methods and outcomes significant to the review question and the specific objectives.

Qualitative data will be extracted from papers included in the review using the standardized data extraction tool from JBI-QARI.[58] The data extracted will include specific details about the populations, study methods and outcomes significant to the review question and the specific objectives.

If available, economic data will be extracted from papers included in the review using the standardized data extraction tool from JBI-ACTUARI.[56] The data extracted will include specific details about the populations, study methods and outcomes significant to the review question and the specific objectives.

In addition, details of the evidence-based leadership interventions will be extracted following the TIDIeR checklist:[59] brief name; why the intervention is essential; materials and procedures; providers and their expertise; models of delivery; location and infrastructure; sessions; tailoring; modifications; planned and actual adherence or fidelity. The data will be extracted by two authors (JV, KH).

Risk of bias in individual studies

During the review process, studies will be deemed to have risk of bias if they fail to make objective decisions on study design and on the level of quality required.[60]

The quality of each study will be appraised using the Mixed Methods Appraisal Tool (MMAT). The tool is usable as a checklist for concomitantly appraising and/or describing studies included in systematic mixed studies reviews (reviews including original qualitative, quantitative and mixed methods studies). The quantitative studies will be assessed according to their respective characteristics, including the sampling strategy, the measuring instruments, and the response rate. For qualitative studies, the assessment criteria will include context, data sources, and data analysis. The evaluation criteria for the mixed-methods studies will include the integration of the methods and the limitations presented. Three reviewers (YT, SH, XL), for each of the criteria, will independently assign a score based on “yes,” “no,” “unspecified,” or “not applicable” responses. Any disagreement between the reviewers will be resolved by discussion or by requesting the assessment of a fourth reviewer (XL).

The Cochrane Collaboration’s tool for assessing risk of bias in randomized trials will also be used to assess the quality of randomized trial articles included in the review.[61] Each area to be

assessed will be rated as “low risk,” “high risk” or “unclear risk” of bias. The overall quality of an article using a randomized controlled trial design will be rated as “good,” “fair” or “poor.”

Data synthesis

Initial descriptive synthesis will be conducted by tabulating details on study type, interventions, number of participants and an overview of participant characteristics, to form a clear descriptive summary of the included studies.[62] The descriptive process will be conducted explicitly and rigorously, and decisions on how to group and tabulate data will be made based on the protocol and review questions. The Grading of Recommendations Assessment, Development and Evaluation (GRADE) will be used to evaluate the quality of evidence.[63]

Patient and public involvement

Patients will not be directly involved in the design of this study. As this is a protocol for a systematic review and no participant recruitment will take place, their involvement in the recruitment as well as the dissemination of findings to participants will not be applicable. However, the results of the review will be validated in close collaboration with national and international nursing associations. This will ensure that the findings are presented in a way that is easy-to-use and feasible for leadership communities globally.

DISCUSSION

In the course of a decade, the call for evidence has swept the health care landscape in medicine and more recently in nursing. However, health care managers and leaders have somehow escaped the call for the use of evidence in their own practice. The time has come for organizational leaders to join clinicians in using the strongest evidence available to effect change and guide decision making.[64] To answer the call, this mixed-methods review will provide

greater insights into the available literature on evidence-based leadership in nursing. Based on both quantitative and qualitative findings, we will summarize and synthetize the available results regarding the impact of the evidence-based leadership on nurses' and nurse managers' individual and team-based leadership skills, as well as organizational and clinical outcomes. We expect to gain evidence that will benefit nursing leaders in health care organizations worldwide.

In general, leadership and management training programs have not only positively impacted individuals' leadership skills, but also patient safety, satisfaction, and cost savings in organizations.[65] Good leadership in health organizations also has the potential to positively impact employees' well-being, for example, an increase in work engagement and a decrease in exhaustion and turnover intention.[66] This is highly important as the existing nursing shortage, the ageing of the nursing workforce, and the COVID-19 pandemic has created an alarming situation in health care settings globally. The International Council of Nurses has already estimated that up to 13 million nurses will be needed to fill the global nurse shortage gap in the near future.[67] Strong evidence-based leadership in nursing is therefore needed more than ever before. To attract new generations of nurses to the health care business, and to cost-effectively run health care organizations, nursing leaders who based their leadership decisions on the best available evidence are needed. Thus, a review of evidence-based leadership among nurses is required to direct research and education efforts toward more effective leadership styles and inform service provisions of the best investment methods for the future nursing workforce.

A limitation of this review may be the exclusion of studies that are not peer-reviewed or included in the major international databases, which could potentially result in less generalizable findings outside of the English language. We also predict that it is not possible to conduct a meta-analysis to reveal the effectiveness of evidence-based leadership due to a lack of studies or high

heterogeneity of the data. Despite the possible limited number of RCT studies from which to pool quantitative evidence, we still assume that using descriptive synthesis will provide good groundwork for the topic to be used to satisfy future needs in the nursing workforce.

Amendments

Any amendments to this protocol will be documented.

Planned start and end date

The review is planned to start on 1 September 2021 and end on 28 February 2022.

ETHICS AND DISSEMINATION

No data collection for the systematic review will involve human subjects, and therefore no ethical approval will be required. The results will be disseminated in a peer-reviewed journal and in a conference presentation.

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Authors' contributions

MV: conception (generator of the review) and responsible for the study design, identifying preliminary literature for the background, writing the manuscript; TL: identifying preliminary literature for the background, planning search strategy for papers, writing the manuscript; KH: identifying preliminary literature for the background, planning search strategy for papers, writing the manuscript; JV: search strategy for papers, commenting on the manuscript; GL: commenting on the manuscript; YT: commenting on the manuscript; WC: commenting on the manuscript; SH: commenting on the manuscript; XL: commenting on the manuscript.

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Competing interests

The authors declare that they have no competing interests.

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PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol*

Section and topic	Item No	Checklist item	Page No
ADMINISTRATIVE INFORMATION			
Title:			
Identification	1a	Identify the report as a protocol of a systematic review	1
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	n/a
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number	2, 8
Authors:			
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	1
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	25
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	17
Support:			
Sources	5a	Indicate sources of financial or other support for the review	25
Sponsor	5b	Provide name for the review funder and/or sponsor	25
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	25
INTRODUCTION			
Rationale	6	Describe the rationale for the review in the context of what is already known	4-7
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	7-8
METHODS			
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	8-10
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	10-11
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	10-11

Study records:			
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	12
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	12
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	13-14
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	13-14
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	10, 14
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	14-15
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	n/a
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2, Kendall's τ)	n/a
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	n/a
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	17
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	16-17
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	15

*** It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.**

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MEASURED AND PERCEIVED IMPACTS OF EVIDENCE-BASED LEADERSHIP IN NURSING: A MIXED METHODS SYSTEMATIC REVIEW PROTOCOL

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MEASURED AND PERCEIVED IMPACTS OF EVIDENCE-BASED LEADERSHIP IN NURSING: A MIXED METHODS SYSTEMATIC REVIEW PROTOCOL

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ABSTRACT

Introduction: Despite the abundance of existing literature on evidence-based nursing practice, knowledge regarding evidence-based leadership, i.e., leadership supported by an evidence-based approach, is lacking. Our aim is to conduct a mixed methods systematic review with qualitative and quantitative studies to examine how evidence is used to solve leadership problems and to describe the measured and perceived effects of evidence-based leadership on nurses and nurse leaders and their performance as well as on organizational and clinical outcomes.

Methods and analysis: We will search the following databases with no year limit or language restrictions: CINAHL (EBSCO), Cochrane Library, Embase (Elsevier), PsycINFO (EBSCO), PubMed (MEDLINE), Scopus (Elsevier) and Web of Science. In addition, the databases for prospectively registered trials and other systematic reviews will be screened. We will include articles using any type of research design as long as the study includes a component of an evidence-based leadership approach. Three reviewers will independently screen all titles, abstracts and full-text articles, and two reviewers will extract the data according to the appropriate checklists. The quality of each study will be appraised using specific appraisal tool fitting in study design used in each study. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) grid, the Meta-Analysis Protocols (PRISMA-P), SWiM, and ENTREQ will guide the study process and reporting. Outcomes related to individual or group performance of nurses or nurse managers regarding leadership skills (e.g., communication skills), organizational outcomes (e.g., work environment, costs), and clinical outcomes (e.g., patient quality of life, treatment satisfaction) will be extracted and synthesized.

Ethics and dissemination: This systematic review will not include empirical data, and therefore, ethics approval will not be sought. The results of the review will be disseminated in a peer-reviewed scientific journal and in a conference presentation.

Systematic review registration: PROSPERO CRD42021259624

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This mixed methods systematic review is justified by the lack of synthesized knowledge on impacts of evidence-based leadership in nursing, an issue that is needed to answer current challenges in health care.
- A comprehensive literature search using several electronic databases and a manual search will be supplemented.
- To ensure transparent and complete reporting, the protocol has been written following the PRISMA-P guidelines.
- To promote the dissemination and the use of evidence produced, the review findings will be validated in collaboration with nursing associations.

INTRODUCTION

The nursing profession has an important role in addressing current and future health needs.[1] Today, around 20 million nurses make up nearly half of the global health workforce[2], and still, 5.9 million more nurses will be needed in the future to meet the global demand.[3] In improving global health, effective leadership is one of the contributions of nurses[3], and therefore, nurses must be empowered and enabled to lead to fulfill global requirements.[4] However, nurse leaders often lack skills in refined problem-solving and decision making[5], and their decisions are based on experience, intuition[6–7] or personal views.[8] Inconclusive, poor-quality or non-representative information can further lead to inappropriate and costly care decisions that impact organizations, staff and patients.[9–11]

The Royal College of Nursing[12] has emphasized the role of leadership in promoting direction, alignment, and commitment among teams and organizations. Therefore, leadership requires the ability to understand the situation that needs changing, the ability to communicate and adapt to new behaviors, and the ability to secure resources that will help goals be met.[13] For these requirements, evidence-based knowledge has an impactful role.[14] A large knowledge base already exists related to leadership among different professionals in health care.[15–18] Previous literature reviews have also focused on the roles and behaviors of leaders in implementing evidence-based knowledge into clinical practice[16–19] as well as how leaders can inhibit nurses' competency and knowledge management in the organization.[20] More recently, literature reviews have focused on how evidence has been used by leaders themselves to solve managerial problems in health care. In this task, evidence-based management (EBMgt), defined as how the best available scientific evidence is used, has been incorporated in making managerial decisions. Four elements in practicing EBMgt are crucial: external scientific evidence,

practitioner's experience and judgment, stakeholders' preferences or values, and different contexts and organizational factors.[14, 21]

We systematically searched and found six reviews related to leadership and an evidence-based approach. Young[22] focused on definitions and acceptance of evidence-based management (EBMgt) in health care, while Hasanpoor et al.[23] identified facilitators and barriers, sources of evidence used, and the role of evidence in the process of decision-making. Both reviews[22–23] concluded that EBMgt was emphasized but limitedly used. Other identified problems included a lack time and a lack of research on management activities, and policy constraints [22]. Roshanghalb et al.[24] concluded that leaders based their decisions mainly on published studies, real world evidence and experts' opinions, while Jaana et al.[25] found that systematic reviews and meta-analyses rarely provided evidence of management-related interventions. In addition, Tate et al.[10] reviewed the effectiveness of interventions in enhancing leaders' use of research evidence.

Despite the wide range of existing literature related to an evidence-based approach used by leaders in health care contexts, as far as we are aware, the concept of evidence-based leadership has only been used in one review, by Geerts et al.[9], who focused on physician leadership development interventions. Therefore, a clear knowledge gap can be identified in the literature regarding how an evidence-based approach could be used to support the role of nurse leaders and what the impact of the evidence is on nurses and nurse leaders themselves as well as on clinical practice and organizational outcomes. This topic is important as evidence-based management is already considered to produce the best professional practice.[26] However, health care leaders in nursing have somehow escaped the call for the use of evidence in their own practice.[8] Nurse leaders do not use research evidence in their management practice[10], and they acknowledge

personal[27] and professional experience[26] over research evidence. Evidence-based knowledge in the context of leadership is still important, not only in supporting research or clinical practice but also in guiding management and leadership decisions.[9] Therefore, the time has come for nursing leaders to join clinicians in using the strongest evidence available to effect change and guide decision making.[28]

To promote leadership in nursing,[2] we postulate that evidence-based approaches should be used in supporting leadership in nursing.[8] To answer the global call for nurses,[1, 3] this systematic review aims to examine how evidence is used to solve leadership problems and to describe the measured and perceived effects of evidence-based leadership on nurses and nurse leaders and their performance, as well as organizational and clinical outcomes. We will use a mixed methods approach by combining both qualitative and quantitative studies to provide greater insights into the available literature[29] and synthesize the existing knowledge on how evidence is used to solve leadership problems and support leadership in daily nursing practice, and what the impact of the evidence-based leadership style is. The information to be gained by using rigorous research methods is needed for developing nursing leadership practices in the future. As the American Nurses Association has stated, registered nurses should demonstrate leadership in their profession, and therefore, nurses' leadership competences should be strengthened.[30] Our review can direct education efforts for nurse leaders toward more effective leadership styles. The ability of nurse leaders to use and critically appraise research evidence may influence the way policy is enacted and how resources and staff are utilized to meet certain objectives set by policy, which can influence staff and workforce outcomes.[10] The information of this systematic review could therefore be used to inform service provisions of the best investment methods for the future nursing workforce. Further, the review could provide direction

for researchers in choosing their future research topics to fill the knowledge gap in the effectiveness of evidence-based leadership styles. We therefore expect that this systematic review will gain evidence that will benefit nursing leaders in health care organizations worldwide.

Study objectives

The overall aim of this mixed methods systematic review is to examine how evidence is used to solve leadership problems and to describe the measured and perceived effects of evidence-based leadership on nurses and nurse leaders and their performance as well as organizational and clinical outcomes. The review questions are as follows: (1) What leadership problems are solved using an evidence-based approach? (2) What are the main features in evidence-based leadership? (3) What are the perceived effects of evidence-based leadership on nurses' performance, organizational and clinical outcomes? (4) What are the measured effects of evidence-based leadership on nurses' performance, organizational and clinical outcomes?

METHODS AND ANALYSIS

Design

In this review, we will use a mixed methods approach[29] combining narrative and quantitative synthesis to appraise and synthesize empirical evidence. In this approach, a comprehensive synthesis of two or more types of data is first performed and then aggregated into a combined synthesis.[29] The approach is usable in our review as it provides the potential for gaining a more complete picture and holistic understanding of the topic; our review focuses on a wide range of questions, not only those relating to the effectiveness of a particular intervention but also to describe the existing situation.[31]

To ensure transparent and complete reporting, this review protocol is designed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA[32]) grid, the Meta-Analysis Protocols (PRISMA-P[33]), the guideline for Synthesis Without Meta-analysis (SWiM) items,[34] and the synthesis of qualitative research (ENTREQ) statement.[35] The review protocol has been registered with CRD42021259624 in PROSPERO (International Prospective Register of Systematic Reviews).

Eligibility criteria

Study design

Articles using any type of research design will be included as long as the study includes a topic of leadership and any component of an evidence-based leadership approach.

The PICO

The PICO (population, intervention, comparison, outcome) approach will be used to specify the eligibility of studies.

Population (P): Articles should include nurses, nurse managers or other nursing staff working in a health care context. They can have an official or unofficial managerial role as leadership occurs whenever a person attempts to influence the behavior of individuals or a group based on personal goals or for the goals of others congruent with organizational goals.[13] Articles involving other health care professionals will be excluded if nurses are not clear majority (50% or more) in the sample.

Intervention (I): Leadership refers to the process of when a person attempts to influence the behavior of individuals or a group in an organization for any reason,[13] while evidence-based leadership is when the behavior of individuals or a group is affected using an evidence-based

approach. We propose that evidence-based leadership is analogous to evidence-based management,[14, 21] but the role or position of the leader may not always be assigned or officially approved of by the organization.

We assume that evidence-based leadership is a process that includes the following steps: 1) a practitioner identifies a clearly stated leadership problem, question, or issue in their practice, 2) organizational evidence or data about the leadership problem or issue are collected and analyzed to check for relevance and validity, and the problem is restated, reformulated or made more specific, 3) scientific evidence from published research about the leadership problem is researched, identified and critically appraised, 4) the views of stakeholders (patients, clinicians, family members, for example) are considered, together with ethical implications of the decision, and 5) all sources of information are critically appraised.[36] The articles to be included in this review should identify some or all of the five steps of the EBP process.[37, 38]

Comparison (C): If an included study has used a randomized trial design, we will include another type of intervention as a comparison.

Outcomes

Studies will describe any outcomes related to individual or group performance of nurses or nurse managers regarding leadership skills (e.g., communication skills), organizational outcomes (e.g., work environment, costs), health care provider outcomes (e.g., job satisfaction), or clinical outcomes (e.g., patient quality of life, treatment satisfaction).

Other

Articles will be limited to peer-reviewed, published full-text articles. There will be no language restriction. Theoretical papers, statistical reviews, books and book chapters, letters, dissertations, editorials, and study protocols will be excluded.

Data sources

A comprehensive literature search, with no specific year limits, will be conducted. The following electronic databases will be used: CINAHL (EBSCO), Cochrane Library (academic database for medicine and health science and nursing), Embase (Elsevier), PsycINFO (EBSCO), PubMed (MEDLINE), Scopus (Elsevier) and Web of Science (academic database across all scientific and technical disciplines, ranging from medicine and social sciences to arts and humanities). These databases will allow for a wide literature search within our review topic. The reference lists of the selected papers will also be screened for additional studies. If a high number of studies are found using a hand search, the search strategy will be modified.[39]

Search strategy

The search strategy will be elaborated upon and implemented prior to the study selection. We will use the PRISMA-P checklist for guidance as well as a controlled vocabulary thesaurus (such as medical subject heading terms, CINAHL headings, PsycINFO thesaurus). The keywords for each database are “nurse leader” or similar terms that describe a nurse’s position as a leader, manager or administrator; “evidence-based leadership” or similar terms that describe practice as being founded on evidence; and “leadership” and its synonyms and other similar terms that describe the actions of nurse leaders. Each keyword has been verified for each database.
The search terms will be combined using the Boolean operators “AND” and “OR.” Advice on using keywords to search for studies has been sought from a librarian of the faculty of medicine

at the University of Turku. Full search strategies to be used across databases are described in a supplementary file.

Data management

A reference management software will be used to efficiently manage records, document the process, and manage duplicate study papers.

Selection process

The study selection process will consist of four steps (Figure 1).[32] First, titles and abstracts will be independently assessed by three authors (MV, KH, TL) according to the inclusion criteria. Second, the abstracts of the papers will be screened for relevance and eligibility, by the same three authors (MV, KH, TL). Third, the full texts of the selected abstracts will be obtained. If access to any full-text article is lacking, we will contact the study authors to obtain the full text or the findings of the study. All full-text articles will then be screened by three authors (MV, KH, XL) according to the inclusion and exclusion criteria. In cases of discrepancy between the three screening authors, the paper will be discussed with another author (TL). Papers that do not meet the inclusion criteria will be rejected, and the reason for exclusion will be recorded to increase transparency in the selection process. Fourth, the full texts of the studies that meet the inclusion criteria will be obtained for further detailed assessment. The reference lists of the selected papers will also be screened and checked for additional papers that meet the inclusion criteria (JV, GL).

Figure 1 about here

Data collection and extraction process

To answer the review questions, specific tables will be created to collect data from selected papers. The effectiveness data will be extracted by three authors (TL, MV, WC) and the tabled extractions will be reviewed for completeness and accuracy by another author (XL).

Quantitative data will be extracted from papers included in the review using the standardized data extraction tool from JBI-MAStARI.[29] The data extracted will include specific details about each study. Details of the evidence-based leadership interventions will be extracted following the TIDIeR checklist:[40] brief name; why the intervention is essential; materials and procedures; providers and their expertise; models of delivery; location and infrastructure; sessions; tailoring; modifications; planned and actual adherence or fidelity. The intervention data will be extracted by two authors (JV, KH).

Qualitative data to answer the research questions will be extracted from papers included in the review using the standardized data extraction tool from JBI-QARI.[29] The data extracted will include outcomes significant to the review question and the specific objectives. If available, economic data will be extracted from papers included in the review using the standardized data extraction tool from JBI-ACTUARI.[29]

Relevant results from included papers will be extracted and inputted into predesigned tables by three authors (YT, SH, WC); the process will be validated with the following steps with the guidance of MV. First, at the beginning of the extraction process, the authors (YT, SH, WC) will familiarize themselves with study data. Second, the three authors will independently extract data from the first five studies using the pre-prepared tables. Third, the authors will meet to discuss and determine whether their approaches to data extraction are consistent with each other's extraction, the research question and the purpose of the review. Fourth, the data extraction form will be refined if any uncertainties are found. The authors will again review a study as many times is necessary to achieve common agreement within this stage.[41]

Risk of bias in individual studies

The quality of each study will be appraised using different appraisal tools selected based on the study design used in the specific study. Qualitative studies will be assessed using the Critical Appraisal Skills Programme (CASP) checklists for qualitative research.[42] The quantitative studies will be assessed using the STROBE checklist for cohort, case-control and cross-sectional studies,[43] while the Cochrane Collaboration's tool for assessing risk of bias in randomized trials will be used to assess the quality of randomized trial articles included in the review.[44] In addition, the mixed methods studies will be appraised using the Mixed Methods Appraisal Tool.[45] Three reviewers (YT, SH, XL) will conduct the assessment. Any disagreement between the reviewers will be resolved by discussion or by requesting the assessment of a fourth reviewer (XL).

Data synthesis

In this mixed methods systematic review, we will use segregated methodology, in which the qualitative, quantitative and economic data are synthesized separately prior to reaching mixed methods synthesis.[46] First, to form a clear descriptive summary of the included studies, a narrative synthesis will be conducted by summarizing the tabulated study details. The content of each study will also be summarized to answer the descriptive review objectives.[47] With narrative synthesis we are referring to a synthesis of findings from multiple studies that relies primarily on textual approach and the use of words and text to summarize and explain the findings from the included studies.[48] Narrative synthesis of effectiveness data will also be used if statistical meta-analysis is not possible or advisable.[49] The methods used to synthesize the effects for each outcome and assess the certainty of the synthesis findings will be described and justified when it is not possible to undertake a meta-analysis of effect estimates. This descriptive process will be conducted explicitly and rigorously. Decisions on how to group and synthesize

tabulated data will be made based on the review protocol, review questions, and with the support of existing guidelines on how to synthetize and report qualitative systematic reviews (SWiM[34], ENTREQ[35]). Second, a statistical meta-analysis based on the RCT studies will be conducted only if the usable data is available. The Grading of Recommendations Assessment, Development and Evaluation (GRADE) will be used to evaluate the quality of evidence.[50] Further, economic findings, where possible, will be pooled using JBI-ACTUARI[29] and presented in a tabular summary. If this is not possible, findings will be presented in narrative form only. Finally, in a mixed methods synthesis, qualitative findings will be used to contextualize the meta-analytical results and generate possible reasons behind the quantitative data, when usable.[29]

To add to the rigorousness of the review, the results will be validated in close collaboration with national and international nursing associations. This will, in turn, offer additional sources of information, perspectives, meaning, and applicability to the review results.[51] We will invite appropriate stakeholders, around 10–20 nurses or nurse leaders, to take part in the survey. We will first share with them the review results and then ask them to answer the prespecified open-ended questions in written format; the responses will be analyzed using content analysis. The stakeholders will then be invited to join a face-to-face meeting to discuss the summary of the feedback. The conclusion of the validation process will be integrated into the review outcomes by reporting the experience in the discussion part of the review. We assume that sharing the preliminary review results with stakeholders is necessary to achieve a higher level of meaning in our review results, support the feedback from the content experts, and offer new perspectives on our preliminary findings.[41] We also believe that the validation of the results will offer an ideal mechanism for enhancing the validity of the study outcome while translating the findings for the global audience.

Patient and public involvement

There will be no patient or public involvement in the study.

ETHICS AND DISSEMINATION

No data collection for the systematic review will involve human subjects, and therefore no ethical approval will be required. The results will be disseminated in a peer-reviewed journal and in a conference presentation.

DISCUSSION

In the course of a decade, the call for evidence has swept the health care landscape in medicine and more recently in nursing. As the future of nursing success depends on strong leaders, nurses need to feel secure in their leadership and have confidence that their managers are reliable and educated about the best ways to manage situations.[8] Good leadership in health organizations has the potential to positively impact employees' well-being, for example, an increase in work engagement and a decrease in exhaustion and turnover intention.[52] This is highly important as the existing nursing shortage, the ageing of the nursing workforce, and the COVID-19 pandemic has created an alarming situation in health care settings globally. The International Council of Nurses has already estimated that up to 13 million nurses will be needed to fill the future global nurse shortage gap.[53] Strong evidence-based leadership in nursing is therefore needed more than ever before. Therefore, to attract new generations of nurses to the health care business, and to cost-effectively run health care organizations, nursing leaders who based their leadership decisions on the best available evidence are needed. Therefore, in this systematic review, we will examine how evidence is used to solve leadership problems and describe the measured and

perceived effects of evidence-based leadership on nurses and nurse managers' performance, organizational and clinical outcomes.

Our systematic review may also include shortcomings and limitations, which need to be taken into account. First, despite a wide search strategy, we may miss studies not included in the major international databases. This could potentially result in less generalizable findings outside of the English language. We also predict that it is not possible to conduct a meta-analysis to reveal the effectiveness of evidence-based leadership if the designs of the studies are too different or if the outcomes measured are not sufficiently similar for an average result across the studies to be meaningful, or if there are concerns about the quality of the studies.[54] We may also find a limited number of studies in which all—or even few—of the elements of an evidence-based approach are used. Despite the possible limited number of RCT studies from which to pool quantitative evidence, we still assume that using a narrative synthesis will provide good groundwork for the topic to be used to satisfy future needs in the nursing workforce. On the other hand, our narrative synthesis can hypothetically be biased, especially if selected results are over emphasized without clear justification or the conclusions are made based on subjective interpretations due to a lack of transparency in how the data were presented and how the conclusions were reached in the systematic reviews.[55] Other risks in our data synthesis could be a lack of description of the methods used, unclear links between the included data, the synthesis, and the conclusions, and inadequate reporting of the limitations of the synthesis.[34]

To avoid possible methodological shortcomings, a rigorous data synthesis will be conducted. Our proposed protocol is registered with pre-defined methods to add transparency and reliability of our review results; a review registration is still lacking in many previous reviews.[56] Our

review process and its reporting are guided by rigorous guidelines such as PRISMA, PRISMA-P, SWiM and ENTREQ. The results will be stronger and more complete than those of other reviews in terms of a comprehensive literature search. Our systematic review is also strengthened by a mixed methods approach combining a narrative synthesis and meta-analysis, which both appear to make different contributions to a systematic review and add meaning and value to the findings.[29] In addition, the results of the review might have an added value compared to previous systematic reviews concerning leadership and an evidence-based approach, as most existing systematic reviews describe the role of nurse leaders in implementing and maintaining evidence-based nursing. Therefore, our mixed methods review will fill the gap regarding how nurse leaders themselves use evidence to guide their leadership role and what the measured and perceived impact of evidence-based leadership is in nursing.

Amendments

Any amendments to this protocol will be documented.

Planned start and end date

The review is planned to start on 1 January 2022 and end on 30 June 2022.

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Authors' contributions

MV: conception (generator of the review) and responsible for the study design, identifying preliminary literature for the background, writing the manuscript; TL: identifying preliminary literature for the background, planning search strategy for papers, writing the manuscript; KH: identifying preliminary literature for the background, planning search strategy for papers, writing the manuscript; JV: search strategy for papers, commenting on the manuscript; GL: commenting on the manuscript; YT: commenting on the manuscript; WC: commenting on the manuscript; SH: commenting on the manuscript; XL: commenting on the manuscript.

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Competing interests

The authors declare that they have no competing interests.

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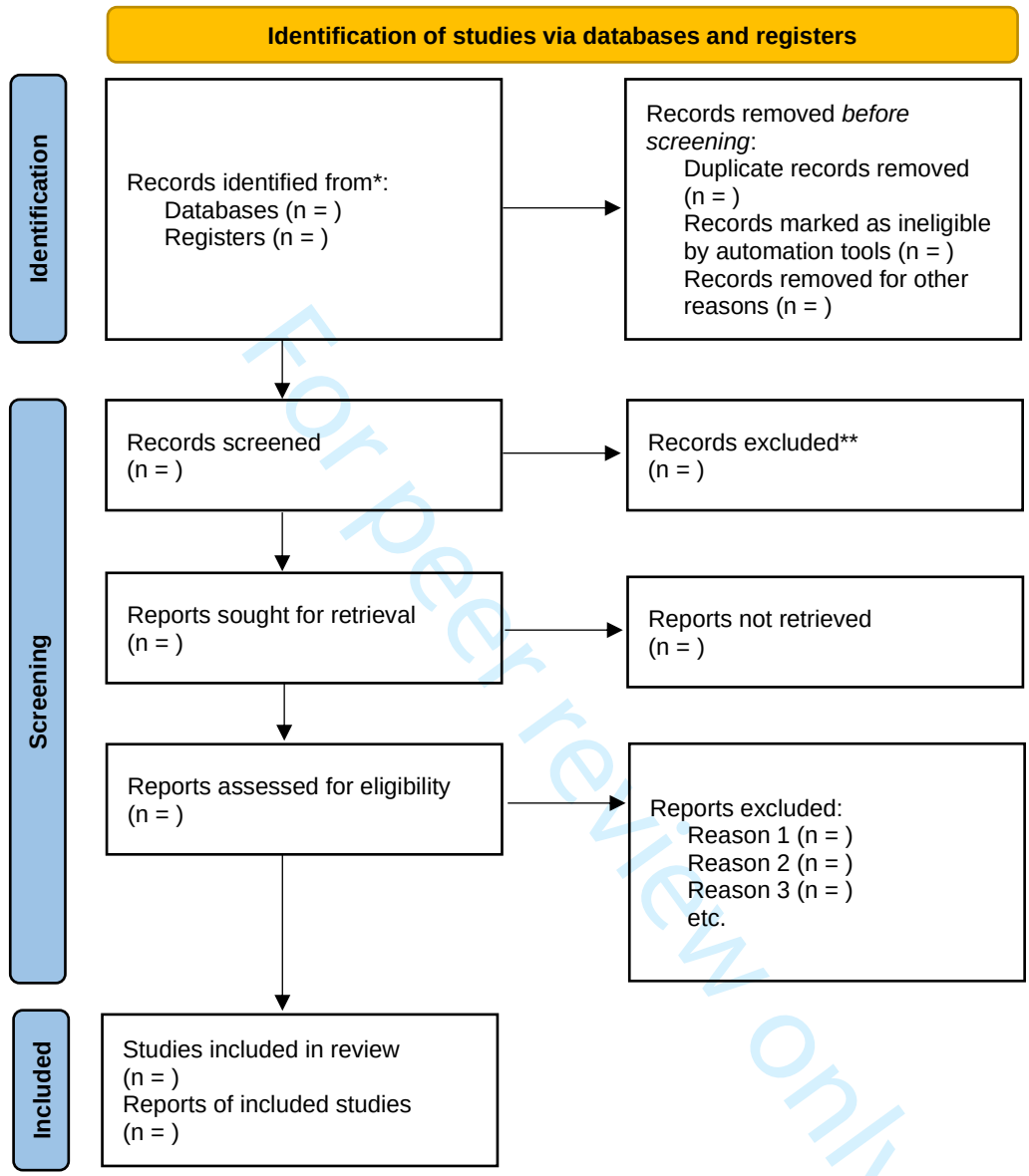

Figure 1. PRISMA flow chart.[32]

Supplementary Table 1. The search terms across data bases

Database	Search terms
CINAHL (EBSCO)	("nursing leadership*" OR "leadership in nursing*" OR "nurse leader*" OR "nurse manag*" OR "nursing manag*" OR "nursing supervisor*" OR "nurse supervisor*" OR MH "Nursing Management" OR "director of nursing*" OR "nursing director*" OR "nurse director*" OR "nurse administrator*" OR MH "Nurse Administrators" OR "nursing administrator*" OR "nurse executive*" OR "executive nurse*" OR "primary nurse*" OR "chief nurse*" OR "chief nursing officer*" OR "head nurse*" OR matron* OR "charge nurse*" OR "sister nurse*" OR "ward sister*" OR "nurse executive*" OR "nursing executive*" OR "unit manag*") AND ("evidence based leadership*" OR EBL OR "evidence based management*" OR EBM OR "evidence based practice*" OR MH "Professional Practice, Evidence-Based" OR EBP OR "evidence based nursing*" OR MH "Nursing Practice, Evidence-Based" OR EBN OR "evidence based health*" OR "evidence-informed" OR "evidence informed*") AND (leadership* OR lead* OR MH "Leadership" OR manag* OR organiz* OR MH "Management" OR influenc* OR "peer influence*" OR administrat* OR superv*)
Cochrane Library	(nursing NEXT leadership* OR leadership NEXT in NEXT nursing* OR nurse NEXT leader* OR nurse NEXT manag* OR nursing NEXT manag* OR nursing NEXT supervisor* OR nurse NEXT supervisor* OR director NEXT of NEXT nursing* OR nursing NEXT director* OR nurse NEXT director* OR nurse NEXT administrator* OR nursing NEXT administrator* OR nurse NEXT executive* OR executive NEXT nurse* OR primary NEXT nurse* OR chief NEXT nurse* OR chief NEXT nursing officer* OR head NEXT nurse* OR matron* OR charge NEXT nurse* OR sister NEXT nurse* OR ward NEXT sister* OR nurse NEXT executive* OR nursing NEXT executive* OR unit NEXT manag*) AND (evidence NEXT based NEXT leadership* OR EBL OR evidence NEXT based NEXT management* OR EB OR evidence NEXT based NEXT practice* OR EBP OR evidence NEXT based NEXT nursing* OR EBN OR evidence NEXT based NEXT health* OR evidence-informed* OR evidence NEXT informed*) AND (leadership* OR lead* OR manag* OR organiz* OR influenc* OR administrat* OR superv*)
Embase (Elsevier)	("nursing leadership*" OR "leadership in nursing*" OR "nurse leader*" OR "nurse manag*" OR "nursing manag*" OR "nursing supervisor*" OR "nurse supervisor*" OR 'nursing management'/exp OR "director of nursing*" OR "nursing director*" OR "nurse director*" OR "nurse administrator*" OR 'nurse administrator'/exp OR "nursing administrator*" OR "nurse executive*" OR "executive nurse*" OR "primary nurse*" OR "chief nurse*" OR "chief nursing officer*" OR "head nurse*" OR matron* OR "charge nurse*" OR "sister nurse*" OR "ward sister*" OR "nurse executive*" OR "nursing executive*" OR "unit manag*") AND ("evidence based leadership*" OR EBL OR "evidence based management*" OR EBM OR "evidence based practice*" OR 'evidence based practice'/exp OR EBP OR "evidence based nursing*" OR 'evidence based nursing'/exp OR EBN OR "evidence based health*" OR "evidence-informed" OR "evidence informed*") AND (leadership* OR lead* OR 'leadership'/exp OR manag* OR organiz* OR 'management'/exp OR influenc* OR "peer influence*" OR administrat* OR superv*)

PsycINFO (EBSCO)	("nursing leadership*" OR "leadership in nursing*" OR "nurse leader*" OR "nurse manag*" OR "nursing manag*" OR "nursing supervisor*" OR "nurse supervisor*" OR "director of nursing*" OR "nursing director*" OR "nurse director*" OR "nurse administrator*" OR "nursing administrator*" OR "nurse executive*" OR "executive nurse*" OR "primary nurse*" OR "chief nurse*" OR "chief nursing officer*" OR "head nurse*" OR matron* OR "charge nurse*" OR "sister nurse*" OR "ward sister*" OR "nurse executive*" OR "nursing executive*" OR "unit manag*") AND ("evidence based leadership*" OR EBL OR "evidence based management*" OR EBM OR "evidence based practice*" OR DE "evidence based practice" OR EBP OR "evidence based nursing*" OR EBN OR "evidence based health*" OR "evidence-informed" OR "evidence informed*") AND (leadership* OR lead* OR DE "Leadership" OR manag* OR organiz* OR DE "Management" OR influenc* OR "peer influence*" OR administrat* OR superv*)
PubMed (MEDLINE)	("nursing leadership*"[tw] OR "leadership in nursing*"[tw] OR "nurse leader*"[tw] OR "nurse manag*"[tw] OR "nursing manag*"[tw] OR "nursing supervisor*"[tw] OR "nurse supervisor*"[tw] OR "Nursing, Supervisory"[Mesh] OR "director of nursing*"[tw] OR "nursing director*"[tw] OR "nurse director*"[tw] OR "nurse administrator*"[tw] OR "Nurse Administrators"[Mesh] OR "nursing administrator*"[tw] OR "nurse executive*"[tw] OR "executive nurse*"[tw] OR "primary nurse*"[tw] OR "chief nurse*"[tw] OR "chief nursing officer*"[tw] OR "head nurse*"[tw] OR matron*[tw] OR "charge nurse*"[tw] OR "sister nurse*"[tw] OR "ward sister*"[tw] OR "nurse executive*"[tw] OR "nursing executive*"[tw] OR "unit manag*"[tw]) AND ("evidence based leadership*"[tw] OR EBL[tw] OR "evidence based management*"[tw] OR EBM[tw] OR "evidence based practice*"[tw] OR "Evidence-Based Practice"[Mesh] OR EBP[tw] OR "evidence based nursing*"[tw] OR "Evidence-Based nursing"[Mesh] OR EBN[tw] OR "evidence based health*"[tw] OR evidence-informed[tw] OR "evidence informed*"[tw]) AND (leadership*[tw] OR lead*[tw] OR "Leadership"[Mesh] OR manag*[tw] OR organiz*[tw] OR "Organization and Administration"[Mesh] OR influenc*[tw] OR "Peer Influence"[Mesh] OR administrat*[tw] OR superv*[tw])
Scopus (Elsevier)	("nursing leadership*" OR "leadership in nursing*" OR "nurse leader*" OR "nurse manag*" OR "nursing manag*" OR "nursing supervisor*" OR "nurse supervisor*" OR "director of nursing*" OR "nursing director*" OR "nurse director*" OR "nurse administrator*" OR "nursing administrator*" OR "nurse executive*" OR "executive nurse*" OR "primary nurse*" OR "chief nurse*" OR "chief nursing officer*" OR "head nurse*" OR matron* OR "charge nurse*" OR "sister nurse*" OR "ward sister*" OR "nurse executive*" OR "nursing executive*" OR "unit manag*") AND ("evidence based leadership*" OR EBL OR "evidence based management*" OR EBM OR "evidence based practice*" OR EBP OR "evidence based nursing*" OR EBN OR "evidence based health*" OR "evidence-informed" OR "evidence informed*") AND (leadership* OR lead* OR manag* OR organiz* OR influenc* OR "peer influence*" OR administrat* OR superv*)
Web of Science	(TS=(("nursing leadership*" OR "leadership in nursing*" OR "nurse leader*" OR "nurse manag*" OR "nursing manag*" OR "nursing supervisor*" OR "nurse supervisor*" OR "director of nursing*" OR "nursing director*" OR

	"nurse director*" OR "nurse administrator*" OR "nursing administrator*" OR "nurse executive*" OR "executive nurse*" OR "primary nurse*" OR "chief nurse*" OR "chief nursing officer*" OR "head nurse*" OR matron* OR "charge nurse*" OR "sister nurse*" OR "ward sister*" OR "nurse executive*" OR "nursing executive*" OR "unit manag*") AND ("evidence based leadership*" OR EBL OR "evidence based management*" OR EBM OR "evidence based practice*" OR EBP OR "evidence based nursing*" OR EBN OR "evidence based health*" OR "evidence-informed" OR "evidence informed*") AND (leadership* OR lead* OR manag* OR organiz* OR influenc* OR "peer influence*" OR administrat* OR superv*))

PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol*

Section and topic	Item No	Checklist item	Page No
ADMINISTRATIVE INFORMATION			
Title:			
Identification	1a	Identify the report as a protocol of a systematic review	1
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	n/a
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number	2, 7
Authors:			
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	1
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	23
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	16
Support:			
Sources	5a	Indicate sources of financial or other support for the review	23
Sponsor	5b	Provide name for the review funder and/or sponsor	23
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	23
INTRODUCTION			
Rationale	6	Describe the rationale for the review in the context of what is already known	4-5
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	7-8
METHODS			
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	9
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	9
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	9, suppl. table

Study records:			
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	10
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	10
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	10-11
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	10-11
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	8, 11
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	11
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	n/a
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2, Kendall's τ)	n/a
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	n/a
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	12
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	15
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	13

*** It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.**

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