The impact of nurse practitioner role in emergency departments: A protocol for a mixed studies systematic review

Sarah A. Lartey[1], Matthew J. Douma[2], Megan Kennedy[1], Greta G. Cummings[1], Charlotte Pooler[1,3], and Carmel L. Montgomery[1]

[1]Faculty of Nursing, College of Health Sciences, University of Alberta
[2]Department of Critical Care Medicine, University of Alberta
[3]Alberta Health Services

Corresponding author: Sarah A. Lartey, PhD Student, Faculty of Nursing, College of Health Sciences, University of Alberta, Level 3 ECHA, 11405 87 Avenue NW, Edmonton, AB, T6G1C9, slartey@ualberta.ca

Abstract

Background: Overcrowding and long wait times in the emergency department (ED) have resulted in decreased patient satisfaction and quality of care. One of the solutions proposed to address wait times is the introduction of the nurse practitioner (NP) role in the ED. We present a systematic mixed studies review protocol that aims to gather and analyze available knowledge on the impact of the NP role in the ED on patients, other healthcare providers, and organizations.

Methods: The review will employ a mixed studies analysis approach. Data will be gathered from peer-reviewed and grey literature in English with no time limit. All international publications on the impact of NP role implementation that meet the inclusion criteria in the ED setting will be included. Each study will be appraised for quality using the mixed methods appraisal tool and data extracted by two independent authors. In the presence of conflict, a third author will provide a resolution. Study characteristics and findings will be synthesized using descriptive analysis, meta-analysis, and a three-stage thematic analysis approach. The review results will be presented using the PRISMA checklist for systematic reviews.

Conclusions: The systematic review will present current evidence on the impact of the NP role implementation in the ED setting. The results are anticipated to support decisions and policymakers in their quest to decrease ED wait times and improve the quality of patient care in healthcare settings.

Keywords: nursing, nurse practitioner, emergency department, patient care, systematic review

Emergency departments (EDs) are increasingly caring for patients presenting with non-life-threatening conditions. The ED is open around the clock, with highly qualified healthcare providers available to care for any patient who reaches its doors (Tucker & Bernard, 2015). Hospitals have an obligation to provide medically necessary care in a publicly funded service; staff in the ED have a duty to provide any medically necessary healthcare support when an individual accesses the ED, regardless of their acuity (Health Canada, 2023). Persistent shortages of primary care practitioners and limited access to after-hours primary care services are driving an increase in patients accessing ED for care (Keough et al., 2016). In addition, limited accessibility to inpatient beds, aging populations, and service delivery factors (e.g., delay in discharge orinvestigations) have resulted in ED overcrowding and long wait times (Carter et al., 2014; Pearce et al., 2023). Because the ED's primary goal is to support complex patients with complex illness, prolonged wait times and decreased patient flow affects hospital staff morale, job satisfaction, and

patient quality of care (Hammer et al., 2022; Petrie & Comber, 2020). Overcrowding in the ED overwhelms resources and has been associated with higher mortality rates, patients leaving without being seen, long wait times, and low patient satisfaction (Bernstein et al., 2009; Javidan et al., 2021). The risk and impact of ED overcrowding and increased wait times have recently been reported in the media and literature (Bennett, 2022; Geary, 2017).

To decrease the risk to patients and increase the quality of care, hospital administrators and ED leaders are introducing nurse practitioners (NPs) in the ED to address overcrowding (Van der Linden et al., 2019). An ED nurse practitioner can help meet the care needs of patients with non-emergent presentations (Middleton et al., 2019). NPs are registered nurses with advanced nursing graduate education and experience, which enables them to practice independently (Canadian Nurses Association, 2016). They perform comprehensive assessments, diagnose health conditions, and treat illnesses using a holistic care model. NPs can order and interpret diagnostic tests, prescribe medications, and perform medical procedures within their scope of practice (Canadian Nurses Association, 2010). The addition of an NP in the ED can decrease the length of stay, reduce the number of patients who leave the ED without being seen, increase the number of patients being cared for, and improve patient satisfaction (Shand et al., 2020; Tucker & Bernard, 2015). This protocol aims to describe the components of a mixed studies review intended to integrate current evidence of the impact of the NP role in the ED on patient outcomes.

Background

Even though there are recent publications on the impact of the NP role in the ED, a search of the Cochrane Library and International Prospective Register of Systematic Reviews (PROSPERO) confirmed there are no similar reviews underway. The most recent related systematic review focused on cost, quality of care, satisfaction, and wait times (Jennings et al., 2015). No recent systematic reviews have examined the overall NP role impact on patient, provider, and organizational outcomes. This review will address the gap and provide aggregate data to advance knowledge in this area to inform health care policy decisions.

Method

This systematic review will be guided by the Cochrane Handbook and reported according to preferred reporting items for systematic reviews and meta-analysis (PRISMA) updated guidelines (Page et al., 2021). This protocol has been developed using the preferred reporting items for systematic reviews and meta-analysis protocol (PRISMA-P) statement checklist (Moher et al., 2015). The protocol has been registered with the PROSPERO (CRD42022330419).

Research question

The primary objective of the review is to identify and analyze data on the impact of the NP's role on patients receiving care in EDs compared to alternative interventions. Secondary objectives include collecting data from research databases and grey literature on the effect of the NP role on other healthcare providers (HCPs), patient families and caregivers, and healthcare organizations. Evidence on the overall impact of the NP role will be relevant for diverse healthcare decision-makers (administrators, leadership, and policymakers). The objectives are appropriate to the setting, meaningful to decision-makers, and purposeful in addressing the knowledge gap (Thabane et al., 2009). The population, intervention, comparison or context, outcome, and study design (PICOS) framework was used to develop the research question (Thomas et al., 2021; Table 1): What is the impact of the ED NP role on patient outcomes?

Study eligibility criteria

Inclusion and exclusion criteria

The systematic review will include data from EDs that support all patient populations. The review will focus on studies evaluating the impact of the NP role in EDs. The review will include studies reporting on patient-related outcomes (e.g., wait-time, satisfaction), other professional healthcare providers (e.g., reported satisfaction, experience), and organizations (e.g., ED performance measures) associated with the NP role in ED settings. All relevant peer-reviewed articles available in searched databases and additional studies from specific grey literature sources will be included without any time or geographic limitation (Meline, 2006). Any study articles that meet the inclusion criteria from the inception of the databases to the present will be included in the analysis. Quantitative, qualitative, and mixed-methods studies that meet the inclusion criteria will be retrieved, and the results analyzed for this review. The search will be limited to studies with titles and abstracts published in English. An eligibility screening form will support the selection of articles (see Additional File 1).

Search strategy

The following databases will be searched from inception to present using combination keywords and subject headings: CINAHL (EBSCO), MEDLINE (OVID), EMBASE (OVID), SCOPUS (Elsevier), Cochrane Library (Wiley). These databases were chosen for their ability to identify comprehensive health-related studies. The search terms will comprise "nurse

Table 1

Research Question Components

Population	All patients presenting to the ED
Intervention	NP practising in the ED
Comparisons	Standard of care, EDs with no NPs, care provided by other Health Care Providers
Outcomes	Primary Outcomes: • Patient-reported outcome measures • Patient-reported experience measures Secondary Outcomes: • Healthcare provider experience measures • Health system performance measures • Emergency department performance measures
Study design	Research studies that utilize randomized controlled trials, non-randomized controlled trials, observational studies, cross-sectional studies, qualitative studies, and mixed methods studies

practitioner," "advanced practice nurs*," "nurse clinician," "nurse consultant," "emergency department," "emergency room," "emergency unit,*" "trauma cent,*" and "urgent care." Truncation, subject headings, and combination terms using and/or will be employed to support the search terms and aid in the retrieval of all relevant available published articles in the databases.

Additional studies will be sought using expanded grey literature search methods. The inclusion of grey literature will ensure that all unpublished relevant study results will be captured in the analysis and reported in the review results (Hilbrecht et al., n.d.). Grey literature sources will include ProQuest Dissertation and Theses Global; World Health Organization (WHO) International Clinical Trials Registry Platform (ICTRP) and clinicaltrials.gov for ongoing trials. Citation chaining using SCOPUS to review reference lists and citations by documents of relevant studies suggested by PubMed and SCOPUS will be reviewed. Study authors will be contacted for additional information if needed (Mahood et al., 2014). The search strategy and results will be presented using the PRISMA flow diagram (Page et al., 2021). The sample search from MEDLINE is included in Table 2.

Data management

All included study articles, extant, and included grey literature will be uploaded into Mendeley to allow for convenient referencing and creation of the final bibliography for the systematic review reporting. Covidence (Veritas Health Innovation, Melbourne, Australia) will be used to support data management including the elimination of duplicates, title, and abstract screening, as well as full-text screening (Kellermeyer et al., 2018). The Covidence online data management software is free and widely available. All team members can have access to the platform to support or to track the reviewed articles and management of data. All articles retrieved from databases as per the search strategy will be uploaded from Mendeley into the Covidence data management software. Additional studies obtained through grey literature sources will be stored in a Google file during the data extraction process.

All retrieved full-text articles will be assessed independently for risk of bias by two reviewers. In the presence of conflicts, a consensus will be attempted and, if not reached, a third reviewer will be contacted to resolve any discrepancies (Boutron et al., 2022). The Mixed Methods Appraisal Tool (MMAT) will be applied to assess the quality of all included studies (Hong et al., 2018). The MMAT is a validated tool used to critically appraise all study types: quantitative, qualitative, and mixed methods. The tool requires evaluators to respond to two initial questions to determine if the tool is appropriate for evaluating the risk of bias. Within each of the categories, there are five questions to support the evaluation of each study for risk of bias. Quality assessment results from the MMAT will not be used to exclude studies from the analysis phase (Tricco et al., 2011). All articles that meet the inclusion criteria will be analyzed and data reported to show the breadth of evidence in the literature. The outcome of the quality assessment will be presented to provide comprehensive information about included studies (Tricco et al., 2011).

Data extraction

Data will be captured from all included studies using a customized data extraction form developed in Microsoft Excel. The following information will be extracted from each study.

Study characteristics
Author, publication year, country, trial registration number, funding source, setting (size, rural/urban), objective(s), research question(s), design, analysis method, recruitment process, sample, outcome measures, key findings (primary and secondary), reported limitations, author conclusions, and reviewer notes.

Population
Sample size, professional designation, intervention group, control group, age, gender, and triage level.

Intervention and comparators
Intervention name and type (i.e., NP role type), demographic data, the phenomenon of study, intervention descriptors, method of data collection, and timing of data collection (pre- and post-intervention).

For studies reporting quantitative results, additional statistical data including mean, median, standard deviations, and significance reported, will be captured. Data on coding and themes, as reported by qualitative studies, will also be captured in the extraction form. The extraction form contains elements necessary to capture findings from all included studies irrespective of

Table 2

Database (MEDLINE) Search Strategy

Search	Term	Results
S1	nurse practitioners/ or nurse clinicians	25,726
S2	Advanced Practice Nursing/	1,980
S3	("nurse practitioner*" or "advanced practice nurs*" or "nurse clinician" or "nurse consultant*").mp	35,233
S4	S1 or S2 or S3	35,233
S5	exp Emergency Service, Hospital/	93,539
S6	("emergency department*" or "emergency room*" or "emergency unit*" or "trauma cent*" or "urgent care").mp	158,524
S7	emergency medical services/ or triage/	58,592
S8	triag*.mp	30,705
S9	S5 or S6 or S7 or S8	241,245
S10	S4 and S9	1,743
S11	("home* health*" or "home*care" or "nursing home*" or "long term care" or "longterm care").ti.	41,617
S12	S10 not S11	1,710
S13	limit S12 to (case reports or comment or editorial or letter)	166
S14	S12 not S13	1,544
S15	limit S14 to English language	1,523

the methodology (i.e., quantitative, qualitative, and mixed methods). These extracted data will inform the analysis necessary to address the systematic review question.

The data extraction form (see Additional File 2 for elements) will be piloted on 5 to 10 % of the included study sample to ensure all reviewers involved in the extraction process are capturing information in a similar way (Systematic reviews, n.d.). The feedback information gathered during the pilot phase will be used to update the form prior to data extraction of the remaining study articles. Two authors will independently extract data from each included study. Data extraction forms will be compared once both authors have completed the extraction process to confirm the agreement and identify any discrepancies. Discrepancies will be resolved using a discussion and consensus approach (Li et al., 2022). If a discussion between the two authors does not resolve the difference, a third author will review the extraction data as well as the study report in question and confirm which data to include.

Data synthesis

The study and participant characteristics, as well as contextual factors extracted from the studies, will be presented in a descriptive format. Quantitative study outcomes will be synthesized if homogeneity is present among the data (Deeks et al., 2022). A subgroup analysis will be performed to investigate the heterogeneity of the quantitative data (Campbell et al., 2020). Similar study outcomes, including wait times and the number of patients who left without treatment, will be grouped to ensure appropriate comparison (McKenzie & Brennan, 2022). Extracted data, including sample size and reported findings for intervention and comparator, will be uploaded into ReviewManager (RevMan 5) for analysis (Higgins et al., 2022). The results of the meta-analysis will be presented in tables, charts, and forest plots demonstrating the confidence interval, relevant risk, weight, significance, and p-values reported by the RevMan 5 software (Higgins et al., 2022). Any reported quantitative data that are not suitable for meta-analysis will go through a vote counting based on the direction of the intervention effect. Studies with the most votes will be prioritized in the reporting of findings (Campbell et al., 2020; McKenzie & Brennan, 2022).

Extracted qualitative data will be analyzed using a three-stage thematic analysis approach as outlined by Thomas and Harden (2008). The coding stage will involve line-by-line coding by the authors and recording of the findings from each study to be examined for meaning. At the descriptive stage, the primary author will reorganize the themes into related categories. Each category will be examined for meaning, and any relevant properties captured. In the final analytical stage, the research team will compare categories to discover similarities. Similar categories will be grouped into themes using a higher-order abstraction of the underlying phenomenon (Butler et al., 2016; Thomas & Harden, 2008). Extracted data from mixed methods studies will be analyzed as part of the meta-analysis (if suitable) and the thematic analysis as appropriate. Otherwise, a descriptive analysis will be used to synthesize the study outcomes. The descriptive analysis will include grouping of similar themes into categories and describing the findings in a summary table. A data analysis results summary including the findings, quality, strength, relevance, applicability, and limitations of the studies and synthesis methods, will be presented in the discussion and implication for practice sections (Campbell et al., 2020).

Strengths and Limitations

The review has many methodological strengths. It will be guided by the Cochrane Handbook and reported according to the PRISMA guideline (Page et al., 2021). The review will include peer-reviewed, as well as grey literature from broad sources to capture all available data for analysis. The review will include many study types to support a rich knowledge generation. Quality assessments will be completed on all included studies and data analyzed using both descriptive and thematic approaches. Even though the review includes literature from a variety of sources, it would be limited to information published in the English language only. There may be studies or documents published in the grey literature in languages other than English that would not be included and, hence, factored into results and implications. In addition, only five databases will be included in the peer-reviewed search. There is a potential to miss studies if not published in the chosen databases. Finally, the broad scope of the review could require a high level of resources to support the quality assessment, data extraction, and data analysis.

Summary

The systematic review aims to gather and analyze the current evidence on the impact of the NP role in ED settings. The work of NPs in the ED has been reported to positively affect wait times and reduce overcrowding. Even though there is evidence to support the NP role in the ED setting, there has not been a recent review to aggregate these important findings. This protocol outlines the steps to be undertaken in a mixed studies systematic review that will retrieve and synthesize available international evidence to advance knowledge and support policy decisions on the NP role in the ED, its impact on patient outcomes, effects on other healthcare providers, and benefits to health care organizations.

Implications for emergency clinical practice

1. The review will provide new knowledge on the impact of the NP role in emergency departments. It can advance the current knowledge on how introducing an NP in the ED setting can support factors that, ultimately, lead to quality patient care, such as decreased wait times, increased flow, increased patient satisfaction, and decreased patient morbidity and mortality.
2. The review will provide an aggregate of the available data on the perspectives (positive and negative) of patients and other healthcare providers working with NPs in the ED setting.
3. Leaders, professional associations, and policymakers within the ED setting can use the results to guide future decisions about when, how, and why to utilize an NP in such settings.

About the authors

Sarah A. Lartey, RN, BScN, MN, is a registered nurse working as a nurse manager and completing her PhD in Nursing at the University of Alberta. Her research focus is on nursing leadership and healthcare policy. Her research explores nursing leadership

roles, including NPs, charge nurses, and managers, and examines how they and health policy impact patients, organizations, and communities.

Carmel L. Montgomery, RN, PhD, is an assistant professor in the Faculty of Nursing at the University of Alberta. Her program of research is focused on outcomes of critical illness in patients living with frailty as well as the impact of advanced practice nursing roles in the health care system.

Contributions of the authorship team & CRedIT author statement
Sarah A. Lartey: Main author. **Matthew J. Douma:** Contributor. **Megan Kennedy:** Database search and strategy development. **Greta Cummings:** Collaborator. **Charlotte Pooler:** Collaborator. **Carmel L. Montgomery:** Main contributor, guarantor, and supervision.

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Eligibility Form

NURSE PRACTITIONER IMPACT IN EMERGENCY DEPARTMENT

Date	
Assessor Name	
Study Author(s) & Publication Year	
Title	
Source (Journal, etc.)	
Eligibility Assessment	
Study Design	
Research Study?	Yes _____ No_____
Type of Study	Randomized control study Non-randomized control study Observational study Cross-sectional study Qualitative study Mixed-methods study Unclear
Participants	
Patients	Yes _____ No _____ Unclear _____
Healthcare Providers	Yes _____ No _____ Unclear _____
Setting	
Emergency Department	Yes _____ No _____ Unclear _____
Nurse Practitioner Role Impact	
NP/ENP/FNP/ANP*	Yes _____ No _____ Unclear _____
Outcome Measured	Patient _____ Family/caregiver _____ Healthcare Provider _____ Organizational _____
Decision	
Include	
Exclude	Reason: _____
Unsure	Follow Up Completed: _____ ____

*NP – Nurse Practitioner, ENP – Emergency Nurse Practitioner, FNP – Family Nurse Practitioner, ANP – Advanced Nurse Practitioner

Additional File 2

Data Extraction Form

Data extraction form fields:

1. Extractor Name

2. Extraction Date

3. General information (Author, publication year, country, theoretical framework)

4. Study Characteristics (objective, research question, design, recruitment procedure)

5. Participant's Characteristics (age, gender, profession, sample size)

6. ED characteristics (size, patient population, location)

7. Intervention and comparator characteristics (NP role type, demographic data, control group, phenomenon of study)

8. Primary findings and outcomes (patient-related)

9. Secondary findings and outcomes (HCPs, organization, setting related)

10. Reported study conclusions

11. Miscellaneous (reported limitations) / Reviewer notes