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Barriers and facilitators to the prescription of the registered nurse: Protocol for a qualitative meta-synthesis

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Abstract

Introduction

With the development of the medical system and the diversification of patient needs, registered nurses play an increasingly important role in medical practice, assuming more responsibilities and powers, including the right to prescribe. However, in the process of exercising the right to prescribe, registered nurses may face various obstacles, and there are also some promoting factors. Therefore, this study aims to deeply explore the obstacles and promoting factors in the prescription process of registered nurses through a qualitative meta-analysis and comprehensive method, so as to provide a basis for improving the prescription practice of registered nurses, improving nursing quality and patient satisfaction.

Methods and analysis: This study will adhere to the Joanna Briggs Institute framework and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses

(PRISMA-P). A comprehensive literature search and analysis of studies on nurse prescribing via PubMed, Embase, Web of Science, CINAHL, and the Cochrane Library. Two independent reviewers will select articles, extract data, and appraise study quality. Content analysis will be used to synthesize outcomes, and methodological quality and evidence quality will be assessed. The quality of the articles will be assessed using the 10-item Joanna Briggs Institute Critical Appraisal Checklist for Qualitative Research.

Ethics and dissemination Ethical approval will not be required for this study, as it solely encompasses data derived from previously published research. The findings will be disseminated through publication in a peer-reviewed journal. Moreover, the results will be presented at relevant academic conferences to guarantee that the study's outcomes reach pertinent stakeholders. This protocol is registered with the PROSPERO prospective database of systematic review.

PROSPERO registration number: CRD42023398567.

KEYWORDS

barriers, facilitators, registered nurses, prescription, meta-synthesis

Strength and limitations of this study

- By using a qualitative meta-synthesis approach, this study integrates multiple studies to provide a comprehensive understanding of the barriers and facilitators in the registered nurse's prescription process.
- This study not only focuses on the barriers and facilitators themselves, but also delves into how these factors influence the registered nurses' prescription behavior and how to improve their prescription abilities.
- The findings of this study can provide practical recommendations for policy makers and educators on how to optimize the training and practice environment for registered nurses.
- Qualitative meta-analysis has its own limitations, such as the possibility of not being able to obtain specific, detailed primary data, but rather relying on analyzing existing literature to draw conclusions.
- Different regions and cultural backgrounds may affect the prescription behavior of registered nurses and the barriers and facilitators they face. Therefore, the results of this

study may not be fully applicable to all cultures and regions.

INTRODUCTION

As the population ages and living standards improve, there is a significant increase in demand for healthcare services, while global healthcare resources remain severely limited. In response to this challenge, countries worldwide have expanded the scope of nursing practice since the 1960s by authorizing nurses to prescribe medication across various categories. This move primarily addresses the shortage of medical resources and inadequate medical service coverage by doctors [1].

The prescription refers to the process of ordering or authorizing a medication or treatment plan for a patient by a qualified healthcare professional, and the definition of nurse prescribing refers to the ability of registered nurses to prescribe medications, order diagnostic tests, and initiate treatments under their authority or in collaboration with a physician [2-3].

Numerous studies have confirmed the advantages of nurse prescribing. According to a report by the World Health Organization (WHO) in 2016, nurse prescribing has been shown to improve patient outcomes, increase access to healthcare services, and reduce healthcare costs. Nurse prescribing can help reduce the workload of doctors, improved access to treatment, enhanced care and increase the utilization of medical resources while improving patient care efficiency and promoting a comprehensive upgrade of medical services [4-5]. Ultimately, this can benefit the healthcare industry as a whole. Nurse prescribing implementation can better meet the personalized needs of patients, empower nurses to utilize their professional skills and clinical experience more effectively, and improve the specificity and effectiveness of medical services [6]. It can also enable nurses to offer patients additional guidance and advice on health management and disease prevention, fostering patients' health management and self-care abilities, leading to lower healthcare costs and reduced waste of medical resources. Additionally, nurse prescribing can effectively alleviate the inconvenience and burden that patients may experience due to difficulties, high costs, or long wait times for medical care [7]. This can enhance patient access and improve the overall quality of

medical services.

However, the practice of nurse prescribing also faces some controversy and challenges. Concerns exist about whether nurses have sufficient professional competence and knowledge to prescribe medication and whether nurse prescribing could increase the risks of drug abuse, such as the abuse of prescribing authority or the production of counterfeit drugs. Safety issues associated with nurse prescribing include prescription errors, allergic reactions, or adverse drug reactions [8]. Moreover, the education level and professional quality of nurses vary widely. Research has shown that their professional quality and career development level are closely related to their education level and work experience. Therefore, strict management and supervision are necessary to ensure that nurse prescribing is practiced within a safe and effective scope.

The concept of nurse prescribing has been implemented in various countries worldwide, including the United Kingdom, Australia, and Canada [9-11]. In the United Kingdom, nurse prescribing has been in place since 1992 and is highly effective in improving patient outcomes. Similarly, nurse prescribing has been implemented in Australia since 2010 and is a valuable addition to the healthcare workforce [12]. However, there needs to be more research and policy exploration related to nurse prescribing in developing countries like China and India and some countries with poor healthcare conditions. Scholars have conducted research on nurse prescribing rights, but there is a lack of evidence from the perspective of nurses themselves [13-14].

Hence, this research aims to integrate the existing qualitative research and clarify the challenges and facilitating factors in implementing nurse prescribing to provide helpful experience for policy-making and clinical performance of nurse prescribing rights.

OBJECTIVES

This qualitative synthesis aims to summarize the barriers and facilitators to nurse prescribing practices, and provide supporting evidence to advise health policy makers and managers.

METHOD

Registration

To improve the quality of this protocol, the guidelines of the Preferred Reporting Items

for Systematic Reviews and Meta-Analyses Protocols (PRISMA-P) have been followed [15-17]. In line with these guidelines, the brief version of the protocol has been registered on the International Prospective Register of Systematic Reviews (PROSPERO) (Registration number: CRD42023398567). This meta-synthesis will also follow the PRISMA guidelines.

Design

This is a protocol for a qualitative meta-synthesis.

Eligibility criteria

Inclusion criteria

We will include the following:

(1) Studies that are in the English language because of limited financial resources for translation.

(2) Qualitative studies or mixed studies containing qualitative research components, such as phenomenology, grounded theory, action research, ethnography, and other qualitative research designs.

(3) Studies published between the establishment of the database and December 31, 2024.

(4) Studies that focus on registered nurses who work in hospitals or communities and have the authority to prescribe medication.

(5) Studies that aim to explore and understand registered nurses' experiences, perceptions, and attitudes related to medication prescription.

Exclusion criteria

(1) Qualitative studies published in peer-reviewed journals or grey literature, as well as study protocols.

(2) Secondary research will be excluded; however, the reference lists of any literature reviews (of any design) retrieved in the search will be manually searched for primary studies to include.

(3) Articles with incomplete data.

Type of phenomena of interest

The synthesis will encompass studies that concentrate on descriptions and interpretations of registered nurses' experiences with prescribing authority, as reported

by the registered nurses themselves.

Type of outcomes studied

This encompasses examining their emotions and personal experiences with the subject matter.

Search strategy

A systematic search of papers indexed in the databases PubMed, CINAHL, EMBASE, Web of Science, and Cochrane Library will be conducted. These databases were selected in consultation with an information specialist to ensure the inclusion of a broad range of literature related to the fields of healthcare and nursing. The search terms were selected through discussion among the review team and are listed in Box 1. Please refer to the attached document for detailed retrieval procedures (see Appendix 1&2).

The search results from each database will be imported into Endnote and duplicate documents will be removed. To establish an unbiased and consistent data collection strategy, 10% of studies will be independently screened by three members of the review team based on title and abstract. Following this, two members of the team will screen all studies based on title and abstract (see Appendix 3). Any studies that meet the inclusion criteria will undergo full-text screening by the same two members of the team. To further enhance the search strategy, we will adopt a second approach. This involves manually reviewing the reference lists of the included articles to identify any additional relevant studies that might have been missed during the initial screening. Additionally, we will manually review any relevant literature reviews, regardless of their design, that were retrieved during the initial screening phase. This will help us identify primary studies that might meet our inclusion criteria and provide a more comprehensive overview of the existing literature.

In cases where there are disagreements between reviewers during the abstract or full-text screening phase, these will be resolved through discussion until a consensus is reached (see Appendix 4). If necessary, a third reviewer will be consulted to help resolve any discrepancies. This approach, known as investigator triangulation, aims to reduce biased decisions and ensure that decisions are made collaboratively.

Before progressing to the next stage of the review, all reviewers will inspect the final

list of included studies to ensure that it is accurate and complete. This step is essential to minimize the risk of errors and ensure that all relevant studies have been identified and included in the review.

Box 1 search strategy example (PubMed)

((("Nurses"[Mesh]) OR (((((((Nurse[Title/Abstract]) OR (Personnel, Nursing[Title/Abstract])) OR (Nursing Personnel[Title/Abstract])) OR (Registered Nurses[Title/Abstract])) OR (Nurse, Registered[Title/Abstract])) OR (Nurses, Registered[Title/Abstract])) OR (Registered Nurse[Title/Abstract]))) AND (("Prescriptions"[Mesh]) OR ((((((((((Prescription[Title/Abstract]) OR (Prescriptions, Non-Drug[Title/Abstract])) OR (Non-Drug Prescription[Title/Abstract])) OR (Non-Drug Prescriptions[Title/Abstract])) OR (Prescription, Non-Drug[Title/Abstract])) OR (Prescriptions, Non Drug[Title/Abstract])) OR (Prescriptions, Nondrug[Title/Abstract])) OR (Nondrug Prescription[Title/Abstract])) OR (Nondrug Prescriptions[Title/Abstract])) OR (Prescription, Nondrug[Title/Abstract])))) AND ((((((((((((((qualitative research[Title/Abstract]) OR (qualitative study[Title/Abstract])) OR (focus group[Title/Abstract])) OR (interview[Title/Abstract])) OR (semi-structured interview[Title/Abstract])) OR (unstructured interview[Title/Abstract])) OR (narration[Title/Abstract] OR narrative[Title/Abstract] OR hermeneutic[Title/Abstract])) OR (phenomenolog[Title/Abstract])) OR (phenomenological research[Title/Abstract])) OR (ethnographic research[Title/Abstract])) OR (thematic analys[Title/Abstract])) OR (content analys[Title/Abstract])) OR (grounded theory[Title/Abstract])) OR (experience[Title/Abstract])) OR (facilitator[Title/Abstract])) OR (barrier[Title/Abstract]))

Selection of studies

All search results will be combined and imported into the EndNote bibliographic software (V.9, Clarivate Analytics, Philadelphia, Pennsylvania, USA). After screening and removing duplicates, the remaining articles' titles, abstracts, and summaries will be

assessed against the established eligibility criteria by two independent researchers R1 and R2. Two authors will evaluate the titles and abstracts of the retrieved references in a blinded manner to determine their potential suitability. Reasons for exclusion will be documented at the full-text screening stage. If consensus cannot be reached, a third reviewer, who is also a study team member, will be consulted to achieve a consensus-based decision on whether the record should be retained or excluded (R3). This evaluation will consider whether the studies meet all predetermined criteria, including 1) research design, 2) participant characteristics, 3) explored interventions or phenomena, and 4) assessed outcomes. The selection procedure will be depicted in a PRISMA flow diagram, as illustrated in Figure 1.

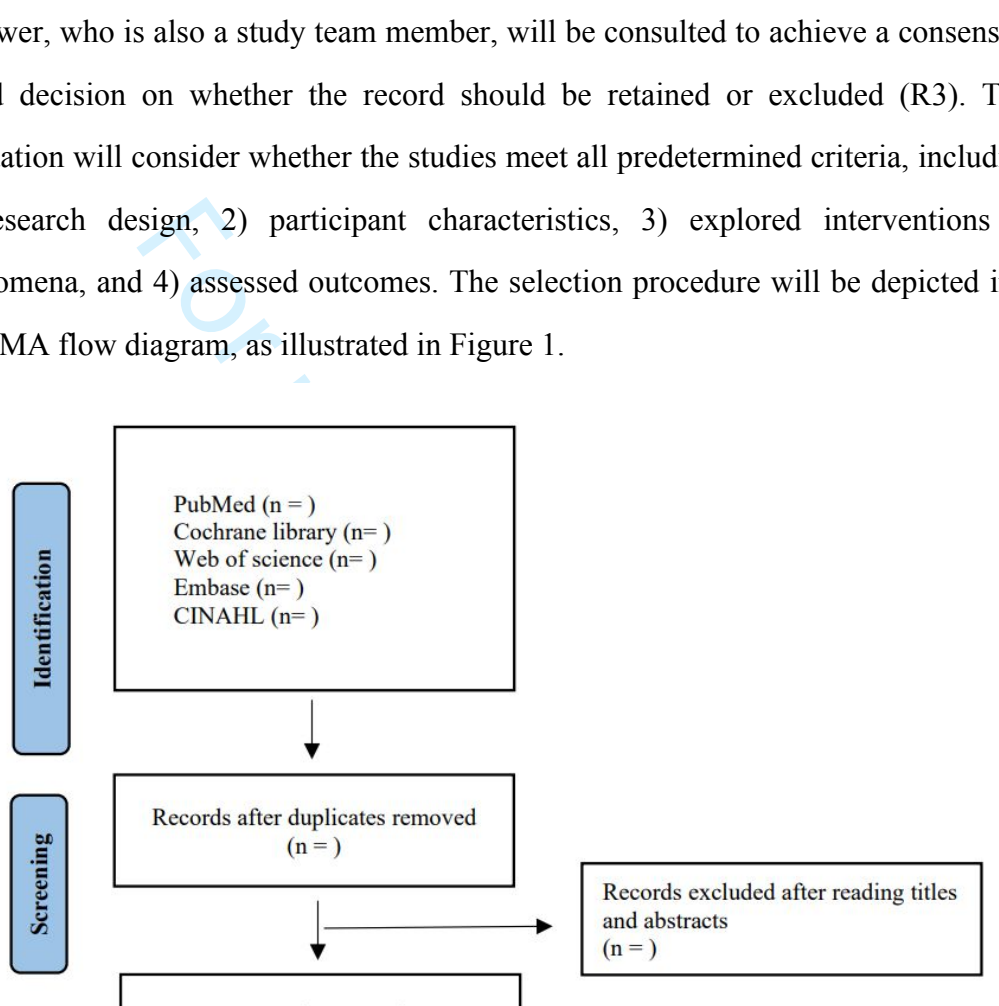

Figure 1 Prisma flow diagram of the study selection process

Data extraction

The data extraction form will be designed to capture information about the selected studies, including author and year, aim, study setting, study population, exposure, and outcome. This information will be included in the appendix (see Appendix 6).

To ensure accuracy and consistency, two reviewers will independently complete the data extraction form for each study. Both reviewers will compare their completed forms to identify any discrepancies and resolve them through discussion and consensus. This process will ensure the accuracy and completeness of the extracted data. The form will include the following fields:

(1) General information: author names, year of publication, and study aim;

(2) Participants: sample size, demographic characteristics, methods of participant recruitment and selection;

(3) Setting: type of healthcare, conditions, and countries where the study was conducted;

(4) Method of data collection: type of qualitative research design (e.g., phenomenology, grounded theory, ethnography), data collection methods (e.g., interviews, focus groups), and data analysis methods;

(5) Outcome themes: key findings related to registered nurses' experiences, perceptions, and attitudes towards medication prescription.

Quality appraisal

The review team will conduct a critical appraisal of all the included articles, with each article being assessed independently by two members using the 10-item Joanna Briggs Institute Critical Appraisal Checklist for Qualitative research to evaluate their quality [18-19]. The appraisal process will be conducted by two researchers. In case of any discrepancy in the scoring results, a third independent reviewer will be used for arbitration (see Appendix 5).

Data synthesis

The analysis will consist of three main stages following Thomas and Hardens' three-stage thematic synthesis approach [20-22]. Firstly, relevant texts will undergo line-by-line coding, with first author generating initial codes inductively for ideas in the data over several iterations until no new codes are necessary to capture ideas. Single data

fragments may be assigned multiple codes for accuracy, with a second author checking a randomly selected 10% of coded data for coding accuracy. Disagreements will be discussed and resolved by drawing on another author.

Secondly, codes will be organized into descriptive themes, with two authors independently organizing individual codes into broader themes. The two authors will then collaborate to develop one common descriptive theme, which will be discussed with the broader author group. Themes will be revised until their fit with the data is optimized.

Lastly, the authors will develop analytical themes, which will be interpretative and seek to generate new ideas. two authors will independently re-examine the data organized into descriptive themes to identify barriers and facilitators to the prescription of registered nurses. This phase will rely on the authors' subjectivities, and a reflexive approach will be taken to minimize problems in interpretation and improve transparency in analysis. Two authors will meet to compare their analytical themes, and descriptive and analytical themes will be tabulated and paired with exemplary data fragments. A separate table will display how the data from each study is represented in the coding. NVivo (version 12) will be used to assist in processing and analyzing text to generate more standardized and convenient codes and topics.

Assessment of confidence in the evidence

The Confidence in the Evidence from Reviews of QUALitative research (GRADE-CERQual) approach will be used to establish the degree of confidence that may be placed in the findings from this systematic review and qualitative synthesis. The GRADE-CERQual approach was chosen as the preferred method for evaluating the quality of evidence due to its specific emphasis on qualitative research, its incorporation of multiple interdependent components in the assessment of evidence confidence, and its alignment with other established GRADE approaches frequently utilized for appraising evidence quality. The GRADE-CERQual approach is designed to evaluate the confidence in individual review findings by appraising the methodological limitations of the included studies, coherence (i.e., the alignment between primary data and the review finding), data adequacy, and relevance (i.e., the extent to which data

from primary studies supporting a review finding apply to the context specified in the review question. The overall confidence in each review finding (i.e., for each generated theme) will be rated as high, moderate, low, or very low. GRADE-CERQual assessments will be conducted independently by two authors, Sun and Lei. Any disagreements will be resolved through discussion until a consensus is reached.

Patient and public involvement

The involvement of patients and the public is crucial in conducting relevant, meaningful, and impactful research. In this study, we will solicit advice from the patients and healthcare professionals, all of whom will provide valuable insights with a significant impact on the formation of our study protocol.

Publishing the protocol

Publishing in peer-reviewed journals promotes transparency, credibility, and quality. It enables feedback, increases visibility, and advances the field.

Ethics and dissemination

External ethical approval is unnecessary for this review, as it involves retrospective analysis and secondary utilization of publicly available primary data. The findings from this review will be shared through publication in a peer-reviewed manuscript, as well as through conference symposia and presentations.

DISCUSSIONS

This qualitative integrative will seek to comprehensively synthesize the existing nurse prescribing research related to the research barriers and enablers. The findings of this qualitative study will be valuable for enhancing the education system of nurses in the future. Specifically, the results can inform efforts to strengthen the training of nurses in pharmaceutical knowledge and clinical skills. Authorizing nurses to prescribe can help to alleviate the issue of insufficient medical resources [23]. As nurses can perform certain basic medical services, it can reduce the workload of doctors and ease the problem of medical resource scarcity. Additionally, authorizing nurses to prescribe can enhance the efficiency of medical services. For the diagnosis and treatment of minor and common illnesses, nurses possess sufficient medical skills to promptly provide patients with treatment recommendations and medication prescriptions, thereby

improving the speed and efficiency of medical services. Although authorizing nurses to prescribe medication has numerous benefits, it also has some disadvantages. Nurses must possess a certain level of medical knowledge and professional skills to prescribe medication. However, currently, the qualifications and knowledge levels of nurses vary greatly, and some may lack the necessary expertise to prescribe medication. This may increase the risk of drug abuse, such as the misuse of prescription drugs or the production of counterfeit drugs. Additionally, due to their limited understanding and use of medications compared to doctors, there may be safety concerns, including inappropriate medication use and adverse reactions [24-25]. This qualitative synthesis offers insight into these concepts in relation to an important target population: the future nursing workforce, training program for nurses.

Implications

The findings of this synthesis will have significant implications for future research and clinical practice. This synthesis will provide a comprehensive overview of current barriers and facilitators to nurse prescribing. The evidence from this overview can serve as the basis for developing clinical policy guidelines. By summarizing the evidence, relevant measures can be developed to improve the efficiency and quality of medical services, reduce waiting times, and better meet the needs and expectations of patients. Additionally, it will contribute to optimizing policies related to nurse prescribing power and help guide registered nurses to work more effectively.

Study Status

The review is ongoing and is expected to be completed by the end of 2024.

Author Contributions

The inception of this study was developed by contributors Sun and Li, who also composed the initial draft of the protocol. Sun, Lei, Zhou, Luo, and Li significantly contributed to refining the protocol design and preparing subsequent drafts. All authors have approved the submitted protocol and assume responsibility for its content.

Funding statement Not applicable.

Competing interests The authors have no competing interests.

Patient consent for publication Not applicable.

Ethics approval and consent to participate Since this review does not involve human participants, there is no need for ethical approval.

Availability of data and materials Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

1. Marć M, Bartosiewicz A, Burzyńska J, Chmiel Z, Januszewicz P. A nursing shortage - a prospect of global and local policies. *Int Nurs Rev*. 2019;66(1):9-16.

2.International Council of Nurses. (2021, September 22). Guidelines on prescriptive authority for nurses [PDF file]. Retrieved August 1, 2022, from:https://www.icn.ch/system/files/202109/ICN_Nurse_prescribing_guidelines_EN_WEB.pdf.

3. Kroezen M, van Dijk L, Groenewegen PP, Francke AL. Nurse prescribing of medicines in Western European and Anglo-Saxon countries: a systematic review of the literature. *BMC Health Serv Res*. 2011;11:127.

4. Maier CB. Nurse prescribing of medicines in 13 European countries. *Hum Resour Health*. 2019;17(1):95.

5. Pearson M, Papps E, Walker RC. Experiences of registered nurse prescribers; a qualitative study. *Contemp Nurse*. 2020;56(4):388-399.

6. Abuzour AS, Lewis PJ, Tully MP. Practice makes perfect: A systematic review of the expertise development of pharmacist and nurse independent prescribers in the United Kingdom. *Res Social Adm Pharm*. 2018;14(1):6-17.

7. Hopia H, Karhunen A, Heikkilä J. Growth of nurse prescribing competence: facilitators and barriers during education. *J Clin Nurs*. 2017;26(19-20):3164-3173.

8. Latter S, Courtenay M. Effectiveness of nurse prescribing: a review of the literature. *J Clin Nurs*. 2004;13(1):26-32.

9. Bradley E, Hynam B, Nolan P. Nurse prescribing: reflections on safety in practice. *Soc Sci Med*. 2007;65(3):599-609.

10. Bates AE, Martin-Misener R. *Facilitators* and Barriers to Nurse Practitioners Prescribing Methadone for Opioid Use Disorder in Nova Scotia: A Qualitative Study. *Can J Nurs Res*.

2022;54(1):15-26.

11. Bowers B, Redsell SA. A qualitative study of community nurses' decision-making around the anticipatory prescribing of end-of-life medications. *J Adv Nurs*. 2017;73(10):2385-2394.

12. Dunn SV, Cashin A, Buckley T, Newman C. Nurse practitioner prescribing practice in Australia. *J Am Acad Nurse Pract*. 2010;22(3):150-155.

13.Foster, J. P. (2010). A history of the early development of the nurse practitioner role in New South Wales, Australia (Doctoral dissertation).

14. Badnapurkar A, Bressington D, Jones M, et al. Perception of nurse prescribing among nurses and psychiatrists in a developing country: A cross-sectional survey. *Int J Ment Health Nurs*. 2018;27(2):866-876.

15. Ladd E, Schober M. Nurse Prescribing From the Global Vantage Point: The Intersection Between Role and Policy. *Policy Polit Nurs Pract*. 2018;19(1-2):40-49.

16. Moher D, Shamseer L, Clarke M, et al. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Syst Rev*. 2015;4(1):1.

17. Liberati A, Altman DG, Tetzlaff J, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *PLoS Med*. 2009;6(7):e1000100.

18. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;372:n71.

19.The Joanna Briggs Institute. (2017). The Joanna Briggs Institute Critical Appraisal Tools for use in JBI Systematic Reviews: Checklist for Qualitative Research. Retrieved from: https://joannabriggs.org/

20.Aromataris, E., & Munn, Z. (Eds.). (2020). *JBI manual for evidence synthesis*. https://doi.org/10.46658/JBIMES-20-01

21. Thomas J, Harden A. Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Med Res Methodol*. 2008;8:45.

22. Athanasakis E. A meta-synthesis of how registered nurses make sense of their lived experiences of medication errors. *J Clin Nurs*. 2019;28(17-18):3077-3095.

23. Bressan V, Cadorin L, Stevanin S, Palese A. Patients experiences of bedside handover: findings from a meta-synthesis. *Scand J Caring Sci*. 2019;33(3):556-568.

24. Kooienga S, Wilkinson J. RN Prescribing: An Expanded Role for Nursing. *Nurs Forum*. 2017;52(1):3-11.

25. Cashin A, Stasa H, Dunn SV, Pont L, Buckley T. Nurse practitioner prescribing practice in Australia: confidence in aspects of medication management. Int J Nurs Pract. 2014;20(1):1-7.

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Appendix 1

Database	Total studies
1.Pubemd	395
2.Embase	12
3.Cochane library	153
4. Web of science	2733
5.CINAHL	6

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Appendix 2 Search strategy example (PubMed)

Search step	Search query	Results
#1	"Nurses"[MeSH Terms]	97451
#2	"Nurse"[Title/Abstract] OR "personnel nursing"[Title/Abstract] OR "nursing personnel"[Title/Abstract] OR "registered nurses"[Title/Abstract] OR "nurse registered"[Title/Abstract] OR "nurses registered"[Title/Abstract] OR "registered nurse"[Title/Abstract]	149463
#3	#1or #2	212650
#4	"Prescriptions"[MeSH Terms]	41121
#5	"Prescription"[Title/Abstract] OR (("Prescriptions"[MeSH Terms] OR "Prescriptions"[All Fields] OR "Prescription"[All Fields]) AND "Non-Drug"[Title/Abstract]) OR "non drug prescription"[Title/Abstract] OR "non drug prescriptions"[Title/Abstract] OR (("Prescriptions"[MeSH Terms] OR "Prescriptions"[All Fields] OR "Prescription"[All Fields]) AND "Non-Drug"[Title/Abstract]) OR (("Prescriptions"[MeSH Terms] OR "Prescriptions"[All Fields] OR "Prescription"[All Fields]) AND "Non-Drug"[Title/Abstract]) OR (("Prescriptions"[MeSH Terms] OR "Prescriptions"[All Fields] OR "Prescription"[All Fields]) AND "Nondrug"[Title/Abstract]) OR (("Nondrug"[All Fields] OR "nondrugs"[All Fields]) AND "Prescription"[Title/Abstract]) OR "nondrug prescriptions"[Title/Abstract] OR (("Prescriptions"[MeSH Terms] OR "Prescriptions"[All Fields] OR "Prescription"[All Fields]) AND "Nondrug"[Title/Abstract])	101452
#6	#4 or #5	126356
#7	"qualitative research"[Title/Abstract] OR "qualitative study"[Title/Abstract] OR "focus group"[Title/Abstract] OR "interview"[Title/Abstract] OR "semi structured interview"[Title/Abstract] OR "unstructured interview"[Title/Abstract] OR ("narration"[Title/Abstract]	1300677

	OR "narrative"[Title/Abstract] OR "hermeneutic"[Title/Abstract]) OR "phenomenological research"[Title/Abstract] OR "ethnographic research"[Title/Abstract] OR (("thematic"[All Fields] OR "thematically"[All Fields] OR "thematized"[All Fields]) AND "analys"[Title/Abstract]) OR (("content"[All Fields] OR "contents"[All Fields]) AND "analys"[Title/Abstract]) OR "grounded theory"[Title/Abstract] OR "experience"[Title/Abstract] OR "facilitator"[Title/Abstract] OR "barrier"[Title/Abstract]	
#8	#3 and #6 and #7	395

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Appendix 3 Abstract Selection form

Time stamp	Author and date	Title	Is this a qualitative study?	Does the study present evidence of the prescription of the registered nurse?	Does the study express the nurses' understanding of prescription?	Initials of screener

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Appendix 4: Full Article Screening Form

Author Date	Title	Is this a qualitive study?	Does the study present evidence of the prescription of the registered nurse?	Does the study express the nurses' understanding of prescription?	Initials of the screener

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Appendix 5: Joanna Briggs Institute Critical Appraisal Domain

Congruous philosophical perspective and methodology	Congruous methodology and research question of objectives	Congruous methodology and methods of data collection	Congruous methodology and representation and analysis of data	Congruous methodology and interpretation of results	Statement locating the research culturally or theoretically	Influence of researcher on the research, and vice-versa, addressed	Participants, and their voices, adequately represented	Ethical study according to current criteria or evidence of ethical approval	Conclusions flow from analysis/interpretation of the data

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Appendix 6: Data Extraction Tool

Author, Date	Country	Title	Study aim	Study Design	Study setting	Study Population	Inclusion and exclusion criteria	Findings

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Primary Subject Heading:	Nursing
Secondary Subject Heading:	Nursing
Keywords:	Nursing Care, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Health Services

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Abstract

Introduction

With the development of the medical system and the diversification of patient needs, nurse practitioners (NP) play an increasingly important role in medical practice, assuming more responsibilities and powers, including the right to prescribe. However, in the process of exercising the right to prescribe, NPs may face various obstacles, and there are also some promoting factors. Therefore, this study aims to deeply explore the obstacles and promoting factors in the prescription process of NPs through a qualitative meta-analysis and comprehensive method, so as to provide a basis for improving the prescription practice of NPs, improving nursing quality and patient satisfaction.

Methods and analysis: This study will adhere to the Joanna Briggs Institute framework and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses

(PRISMA-P). A comprehensive literature search and analysis of studies on nurse prescribing via PubMed, Embase, Web of Science, CINAHL, and the Cochrane Library. Two independent reviewers will select articles, extract data, and appraise study quality. Content analysis will be used to synthesize outcomes, and methodological quality and evidence quality will be assessed. The quality of the articles will be assessed using the 10-item Joanna Briggs Institute Critical Appraisal Checklist for Qualitative Research.

Ethics and dissemination Ethical approval will not be required for this study, as it solely encompasses data derived from previously published research. The findings will be disseminated through publication in a peer-reviewed journal. In addition,, the results will beactively shared at major academic conferences focused on nursing research and healthcare policy to ensure that the study's outcomes reach key stakeholders, including healthcare practitioners, policymakers, and researchers. . This targeted dissemination strategy aims to promote the integration of the findings into practice and future research. This protocol is registered with the PROSPERO prospective database of systematic review.

PROSPERO registration number: CRD42023398567.

KEYWORDS

barriers, facilitators, RNs, prescription, meta-synthesis

Strength and limitations of this study

- This study will employ a qualitative meta-synthesis approach to integrate findings from multiple studies, aiming to provide a comprehensive view of the barriers and facilitators in NP prescribing practices.
- In addition to identifying key factors, this study will explore how these barriers and facilitators are expected to influence NPs' prescribing behavior and will aim to highlight strategies to enhance their prescribing skills.
- The findings are anticipated to offer actionable recommendations for policymakers and educators to optimize NP training and practice environments, potentially improving prescribing practices.
- The study's reliance on existing literature rather than primary data may limit the ability

to capture nuanced insights that could be obtained through direct data collection.

•Variations in geographic, cultural, and healthcare system contexts among the included studies may limit the generalizability of the findings to regions and contexts not represented.

INTRODUCTION

As the population ages and living standards improve, there is a significant increase in demand for healthcare services, while global healthcare resources remain severely limited. In response to this challenge, countries worldwide have expanded the scope of nursing practice since the 1960s by authorizing nurses to prescribe medication across various categories. This move primarily addresses the shortage of medical resources and inadequate medical service coverage by doctors [1].

The prescription refers to the process of ordering or authorizing a medication or treatment plan for a patient by a qualified healthcare professional, and the definition of nurse prescribing refers to the ability of NPs to prescribe medications, order diagnostic tests, and initiate treatments under their authority or in collaboration with a physician [2-3]. Another definition describes a nurse practitioner (NP) as a registered nurse who is educated and authorized to practice both autonomously and collaboratively in an advanced, expanded clinical role [4].

Numerous studies have confirmed the advantages of nurse prescribing. According to a report by the World Health Organization (WHO) in 2016, nurse prescribing has been shown to improve patient outcomes, increase access to healthcare services, and reduce healthcare costs [5]. Courtwright's research indicates that health policies granting PNPs prescriptive authority are linked to shorter hospital stays, reduced costs, comparable care quality to that provided by physicians, and an increased emphasis on health promotion [6]. Nurse prescribing can help reduce the workload of doctors, improved access to treatment, enhanced care and increase the utilization of medical resources while improving patient care efficiency and promoting a comprehensive upgrade of medical services [7-9]. Ultimately, this can benefit the healthcare industry as a whole. Nurse prescribing implementation can better meet the personalized needs of patients,

empower nurses to utilize their professional skills and clinical experience more effectively, and improve the specificity and effectiveness of medical services [10]. It can also enable nurses to offer patients additional guidance and advice on health management and disease prevention, fostering patients' health management and self-care abilities, leading to lower healthcare costs and reduced waste of medical resources [11]. Additionally, nurse prescribing can effectively alleviate the inconvenience and burden that patients may experience due to difficulties, high costs, or long wait times for medical care [12]. This can enhance patient access and improve the overall quality of medical services.

However, the practice of nurse prescribing also faces some controversy and challenges. Concerns exist about whether nurses have sufficient professional competence and knowledge to prescribe medication and whether nurse prescribing could increase the risks of drug abuse, such as the abuse of prescribing authority or the production of counterfeit drugs [13]. Safety issues associated with nurse prescribing include prescription errors, allergic reactions, or adverse drug reactions [14]. Moreover, the education level and professional quality of nurses vary widely. Research has shown that their professional quality and career development level are closely related to their education level and work experience. Therefore, strict management and supervision are necessary to ensure that nurse prescribing is practiced within a safe and effective scope [15].

The concept of nurse prescribing has been implemented in various countries worldwide, including the United Kingdom, Australia, the United States, and Canada [16-18]. In the United Kingdom, nurse prescribing has been implemented since 1992 and has proven highly effective in improving patient outcomes, many believe that nurse prescribing in the UK improves access to medications for patients by increasing the availability of healthcare providers who can prescribe, and represents a more efficient use of skills through utilising the existing expertise within the nursing workforce [19]. Similarly, Australia adopted nurse prescribing in 2010, making it a valuable addition to the healthcare workforce, specifically, nurse prescribing in cancer and palliative care has

been shown to support nurses' ability to provide care in community settings and have the reciprocal benefitof instilling patient confidence in the care they receive [20-21]. In the United States, advanced practice nurses have had prescriptive authority since 1990, NPs provide a wide range of healthcare services including assessment, diagnosis, management of health problems, prescribing medication and treatment, health education and health promotion, as well as counselling individuals and families [22]. Despite the potential benefits, there is limited research and policy development on nurse prescribing in developing countries such as China and India, as well as in regions with limited healthcare resources. While scholars have examined nurse prescribing rights, there remains a lack of evidence from the nurses' perspectives, especially in these global contexts [23-24].

This study aims to integrate existing qualitative research to clarify the challenges and enabling factors in implementing nurse prescribing, providing valuable insights for policy-making and enhancing clinical practices globally. By examining diverse healthcare settings, this research seeks to offer practical guidance that can inform policies and support the effective implementation of nurse prescribing rights in both developed and developing countries.

STUDY AIMS

The aim of this study is to conduct a qualitative meta-synthesis to identify and synthesize the barriers and facilitators affecting registered nurse-led prescribing practices across different healthcare settings. Specifically, this review seeks to address the following research questions:

1. *What are the main barriers that registered nurses encounter when engaging in prescribing practices?*
2. *What factors facilitate the ability of registered nurses to effectively carry out prescribing roles?*

By addressing these questions, the study aims to provide a comprehensive understanding of the factors that influence nurse-led prescribing, thereby informing the development of supportive policies, training programs, and clinical guidelines to enhance prescribing practices among registered nurses.

METHOD

Registration

To enhance the transparency and completeness of the reporting, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols (PRISMA-P) guidelines have been followed [25-27]. In line with these guidelines, the brief version of the protocol has been registered on the International Prospective Register of Systematic Reviews (PROSPERO) (Registration number: CRD42023398567). This meta-synthesis will also follow the PRISMA guidelines.

Design

This is a protocol for a qualitative meta-synthesis.

Eligibility criteria

Inclusion criteria

We will include the following:

(1) Peer-reviewed studies that are in the English language due to limited financial resources for translation.

(2) Qualitative studies or mixed method studies containing qualitative research components, such as phenomenology, grounded theory, action research, ethnography, and other qualitative research designs.

(3) Studies published between the establishment of the database and December 31, 2024.

(4) Studies that focus on NPs who work in hospitals or communities and have the authority to prescribe medication.

(5) Studies that aim to explore and understand NPs' experiences, perceptions, and attitudes related to medication prescription.

Exclusion criteria

(1) Qualitative studies published in non-peer-reviewed venues or grey literature, such as conference abstracts, government reports, and unpublished theses, will be excluded to maintain the methodological integrity of the synthesis.

(2) Quantitative studies, regardless of publication venue, will also be excluded, as our focus is on qualitative research.

(3) Secondary research, including systematic reviews, meta-analyses, and any other

forms of aggregated studies will be excluded to focus on primary qualitative research. (4) Articles with incomplete data or those that do not provide adequate information to assess the barriers and facilitators in nurse-led prescribing practices will be excluded.

Type of phenomena of interest

The synthesis will encompass studies that concentrate on descriptions and interpretations of NPs' experiences with prescribing authority, as reported by the NPs themselves.

Type of outcomes studied

This encompasses examining their emotions and personal experiences with the subject matter.

Search strategy

The JBI three-step search strategy will be used for the literature search. For step 1, a preliminary search of the Pubmed database will be performed on June 2024, analysing the titles, abstracts and subject terms in the articles. For step 2, a comprehensive search will be undertaken across all included databases suing keywords and index terms; the databases will include PubMed (MEDLINE), CINAHL, EMBASE, Web of Science, and Cochrane Library. For step 3, all reference lists of the included literature published before 31 December 2024 will be searched to complement other relevant literature. These databases were selected in consultation with an information specialist to ensure the inclusion of a broad range of literature related to the fields of healthcare and nursing. The scoping stage serves to familiarise oneself with existing literature, refine search parameters, identify MeSH terms and keywords and test the preliminary search strategy (table 1). Please refer to the attached document for detailed retrieval procedures (see Appendix 1&2).

The search results from each database will be imported into Endnote and duplicate documents will be removed. To establish an unbiased and consistent data collection strategy, 10% of studies will be independently screened by three members of the review team based on title and abstract. Following this, two members of the team will screen all studies based on title and abstract (see Appendix 3). Any studies that meet the inclusion criteria will undergo full-text screening by the same two members of the team.

To further enhance the search strategy, we will adopt a second approach. This involves manually reviewing the reference lists of the included articles to identify any additional relevant studies that might have been missed during the initial screening. Additionally, we will manually review any relevant literature reviews, regardless of their design, that were retrieved during the initial screening phase. This will help us identify primary studies that might meet our inclusion criteria and provide a more comprehensive overview of the existing literature.

In cases where there are disagreements between reviewers during the abstract or full-text screening phase, these will be resolved through discussion until a consensus is reached (see Appendix 4). If necessary, a third reviewer will be consulted to help resolve any discrepancies. This approach, known as investigator triangulation, aims to reduce biased decisions and ensure that decisions are made collaboratively.

Before progressing to the next stage of the review, all reviewers will inspect the final list of included studies to ensure that it is accurate and complete. This step is essential to minimize the risk of errors and ensure that all relevant studies have been identified and included in the review.

Table 1 Search strategy example (PubMed)

Search step	Search query
#1	'Nurses'[MeSH]
#2	((((((((((Nurse[Title/Abstract]) OR (Nursing Personnel[Title/Abstract])) OR (Personnel, Nursing[Title/Abstract])) OR (Registered Nurses[Title/Abstract])) OR (Nurse, Registered[Title/Abstract])) OR (Nurses, Registered[Title/Abstract])) OR (Registered Nurse[Title/Abstract])) OR (nurse prescribers[Title/Abstract]))) OR (advanced practice nurse[Title/Abstract])) OR (advanced registered nurse[Title/Abstract])) OR (nurse practitioner[Title/Abstract])
#3	#1 OR #2
#4	'Prescriptions'[Mesh]
#5	((((((((((Prescription[Title/Abstract]) OR (Prescriptions, Non-Drug[Title/Abstract])) OR (Non-Drug Prescription[Title/Abstract])) OR (Non-Drug Prescriptions[Title/Abstract])) OR (Prescription, Non-

	Drug[Title/Abstract])) OR (Prescriptions, Non Drug[Title/Abstract])) OR (Prescriptions, Nondrug[Title/Abstract])) OR (Nondrug Prescription[Title/Abstract])) OR (Nondrug Prescriptions[Title/Abstract])) OR (Prescription, Nondrug[Title/Abstract])) OR (non- medical prescribing[Title/Abstract])
#6	#4 OR #5
#7	((((((((((((((qualitative research[Title/Abstract]) OR (qualitative study[Title/Abstract])) OR (focus group[Title/Abstract])) OR (interview[Title/Abstract])) OR (semi-structured interview[Title/Abstract])) OR (unstructured interview[Title/Abstract])) OR (narration[Title/Abstract] OR narrative[Title/Abstract] OR hermeneutic[Title/Abstract])) OR (phenomenolog[Title/Abstract])) OR (phenomenological research[Title/Abstract])) OR (ethnographic research[Title/Abstract])) OR (thematic analys[Title/Abstract])) OR (content analys[Title/Abstract])) OR (grounded theory[Title/Abstract])) OR (experience[Title/Abstract])) OR (facilitator[Title/Abstract])) OR (barrier[Title/Abstract]))
#8	#3 AND #6 AND #7

Selection of studies

All search results will be combined and imported into the EndNote bibliographic software (V.9, Clarivate Analytics, Philadelphia, Pennsylvania, USA). After screening and removing duplicates, the remaining articles' titles, abstracts, and summaries will be assessed against the established eligibility criteria by two independent researchers R1 and R2. Two authors will evaluate the titles and abstracts of the retrieved references in a blinded manner to determine their potential suitability. Reasons for exclusion will be documented at the full-text screening stage. If consensus cannot be reached, a third reviewer, who is also a study team member, will be consulted to achieve a consensus-based decision on whether the record should be retained or excluded (R3). This evaluation will consider whether the studies meet all predetermined criteria, including 1) research design, 2) participant characteristics, 3) explored interventions or phenomena, and 4) assessed outcomes. The selection procedure will be depicted in a PRISMA flow diagram, as illustrated in Figure 1.

Data extraction

The data extraction form will be designed to capture information about the selected studies, including author and year, aim, study setting, study population, exposure, and outcome. This information will be included in the appendix (see Appendix 6).

To ensure accuracy and consistency, two reviewers will independently complete the data extraction form for each study. Both reviewers will compare their completed forms to identify any discrepancies and resolve them through discussion and consensus. This process will ensure the accuracy and completeness of the extracted data. The form will include the following fields:

(1) General information: author names, year of publication, and study aim;

(2) Participants: sample size, demographic characteristics, methods of participant recruitment and selection;

(3) Setting: type of healthcare, conditions, and countries where the study was conducted;

(4) Method of data collection: type of qualitative research design (e.g., phenomenology, grounded theory, ethnography), data collection methods (e.g., interviews, focus groups), and data analysis methods;

(5) Outcome themes: key findings related to NPs' experiences, perceptions, and attitudes towards medication prescription.

Quality appraisal

The review team will conduct a critical appraisal of all the included articles, with each article being assessed independently by two members using the 10-item Joanna Briggs Institute Critical Appraisal Checklist for Qualitative research to evaluate their quality [28-29]. The appraisal process will be conducted by two researchers. In case of any discrepancy in the scoring results, a third independent reviewer will be used for arbitration (see Appendix 5).

Data synthesis

The analysis will consist of three main stages following Thomas and Hardens' three-stage thematic synthesis approach [30-32]. Firstly, relevant texts will undergo line-by-line coding, with first author generating initial codes inductively for ideas in the data over several iterations until no new codes are necessary to capture ideas. Single data

fragments may be assigned multiple codes for accuracy, with a second author checking a randomly selected 10% of coded data for coding accuracy. Disagreements will be discussed and resolved by drawing on another author.

Secondly, codes will be organized into descriptive themes, with two authors independently categorizing individual codes into broader themes. The two authors will then collaborate to compare and reconcile their thematic categorizations, ultimately agreeing on a unified set of **descriptive themes** that best represent the data. These descriptive themes will be discussed with the broader author group to ensure their comprehensiveness and accuracy. Themes will be iteratively refined until they optimally reflect the data. Lastly, the authors will develop analytical themes, which will be interpretative and seek to generate new ideas. two authors will independently re-examine the data organized into descriptive themes to identify barriers and facilitators to the prescription of NPs. This phase will rely on the authors' subjectivities, and a reflexive approach will be taken to minimize problems in interpretation and improve transparency in analysis. Two authors will meet to compare their analytical themes, and descriptive and analytical themes will be tabulated and paired with exemplary data fragments. A separate table will display how the data from each study is represented in the coding. NVivo (version 12) will be used to assist in processing and analyzing text to generate more standardized and convenient codes and topics.

Assessment of confidence in the evidence

The Confidence in the Evidence from Reviews of QUALitative research (GRADE-CERQual) approach will be used to establish the degree of confidence that may be placed in the findings from this systematic review and qualitative synthesis. The GRADE-CERQual approach was chosen as the preferred method for evaluating the quality of evidence due to its specific emphasis on qualitative research, its incorporation of multiple interdependent components in the assessment of evidence confidence, and its alignment with other established GRADE approaches frequently utilized for appraising evidence quality. The GRADE-CERQual approach is designed to evaluate the confidence in individual review findings by appraising the methodological limitations of the included studies, coherence (i.e., the alignment between primary data

and the review finding), data adequacy, and relevance (i.e., the extent to which data from primary studies supporting a review finding apply to the context specified in the review question). The overall confidence in each review finding (i.e., for each generated theme) will be rated as high, moderate, low, or very low. GRADE-CERQual assessments will be conducted independently by two authors, R2 and R3. Any disagreements will be resolved through discussion until a consensus is reached.

Patient and public involvement

The involvement of patients and healthcare professionals will play a key role in shaping the study protocol to ensure its relevance and impact. We will engage a group of patients who have received nursing-led care in local healthcare settings, as well as healthcare professionals experienced in nurse prescribing practices. This group may include professionals from regions with established nurse prescribing frameworks and areas where this practice is emerging.

To gather comprehensive insights, we will conduct semi-structured interviews and focus group discussions with these stakeholders. Their feedback on barriers and facilitators of nurse prescribing will help us capture factors that may not be fully addressed in existing literature. Patients and professionals will be recruited primarily from local healthcare facilities, with supplemental recruitment from collaborating institutions in different regions if necessary.

Their insights will be used to refine the research questions and inform the development of inclusion criteria for the meta-synthesis. Additionally, participants will review the preliminary study design in a series of two feedback sessions to offer input on theme selection and suggest modifications that may enhance the study's real-world relevance. This collaborative approach ensures that the study addresses practical challenges and has direct implications for improving nurse prescribing practices across different healthcare settings.

Publishing the protocol

We will publish the protocol in a peer-reviewed journal to ensure transparency, credibility, and quality in our research process. This will allow the academic

community to provide constructive feedback, thereby enhancing the rigor of the study. Furthermore, publication will help increase the visibility of the findings, contributing to the advancement of nurse-led prescribing practices research.

Ethics and dissemination

Since this review involves a retrospective analysis and secondary use of publicly available data, external ethical approval is not required. However, we will adhere to ethical guidelines for conducting systematic reviews. The findings from this review will be disseminated through several channels , such as publication, conference presentations, patient and public involvement.

Study Status

The review is ongoing and is expected to be completed by the end of 2024.

DISCUSSIONS

This qualitative meta-synthesis review aims to comprehensively synthesize existing research on nurse prescribing, specifically focusing on the barriers and enablers identified in the literature. The findings from this synthesis will be valuable for informing and improving the future education of nurses. Specifically, the results can inform efforts to strengthen the training of nurses in pharmaceutical knowledge and clinical skills.

Authorizing nurses to prescribe can help alleviate the issue of insufficient medical resources [33]. By enabling nurses to perform certain basic medical services, this approach can reduce the workload of doctors and ease the problem of medical resource scarcity. Furthermore, empowering nurses to prescribe can enhance the efficiency of medical services.

For the diagnosis and treatment of minor and common illnesses, there is evidence suggesting that nurses possess sufficient medical skills to provide patients with treatment recommendations and medication prescriptions promptly. This capability can significantly improve the speed and efficiency of medical services [34-35].

While authorizing nurses to prescribe medication has numerous benefits, it also presents challenges. Nurses must possess a certain level of medical knowledge and

professional skills to prescribe safely. Currently, the qualifications and knowledge levels of nurses vary greatly, and some may lack the necessary expertise to prescribe medication effectively. This variability

may increase the risk of drug misuse, including the inappropriate use of prescription drugs or the production of counterfeit medications. Additionally, due to their limited understanding and use of medications compared to physicians, safety concerns may arise, including inappropriate medication use and adverse reactions [36-37].

This qualitative synthesis offers valuable insights into these concepts, particularly in relation to an important target population: the future nursing workforce and their training programs. By addressing these issues, we can better prepare nurses for the responsibilities of prescribing, ultimately enhancing patient care and safety.

Implications

The findings of this synthesis will have significant implications for future research, clinical practice, and policy development, both locally and globally. This synthesis provides a comprehensive overview of current barriers and facilitators to nurse prescribing, which can inform clinical policy guidelines in various healthcare contexts. Globally, the evidence from this review can serve as a foundation for countries considering expanding nurse prescriptive authority, helping to shape policies that enhance the role of nurses in healthcare delivery. By identifying key challenges and enablers, this synthesis supports the development of strategies to improve the efficiency and quality of medical services, reduce waiting times, and better meet the needs and expectations of patients across different healthcare systems.

Furthermore, this work can contribute to the global discussion on optimizing nurse prescribing practices and guide nurse practitioners (NPs) to work more effectively within diverse regulatory frameworks, ensuring their role is maximized to benefit healthcare systems worldwide.

Author Contributions

The conception and design of this study were developed by contributors Sun and Li, who also drafted the initial version of the protocol. Sun, Lei, Zhou, Luo, and Li made significant contributions to refining the protocol and preparing subsequent drafts.

Cheng Lei acted as the guarantor, assuming responsibility for the overall content and integrity of the study. All authors have reviewed and approved the submitted protocol and are accountable for its content.

Funding statement Not applicable.

Competing interests The authors have no competing interests.

Patient consent for publication Not applicable.

Ethics approval and consent to participate Since this review does not involve human participants, there is no need for ethical approval.

Availability of data and materials Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

1. Marć M, Bartosiewicz A, Burzyńska J, Chmiel Z, Januszewicz P. A nursing shortage - a prospect of global and local policies. *Int Nurs Rev*. 2019;66(1):9-16.

2.International Council of Nurses. (2021, September 22). Guidelines on prescriptive authority for nurses [PDF file]. Retrieved August 1, 2022, from:https://www.icn.ch/system/files/202109/ICN_Nurse_prescribing_guidelines_EN_WEB.pdf.

3. Kroezen M, van Dijk L, Groenewegen PP, Francke AL. Nurse prescribing of medicines in WesteNP European and Anglo-Saxon countries: a systematic review of the literature. *BMC Health Serv Res*. 2011;11:127.

4. Australian Nursing and Midwifery Council. (2006). National competency standards for the nurse practitioner. Canberra: Australian Nursing and Midwifery Council.

5. World Health Organization 2020. https://www.who.int/andorra/publications/m/item/case-study--improving-access-to-medicines-in-primary-care--nurse-prescribing-in-poland-%282020%29

6. Courtwright SE, Turi E, Barr EA, et al. Facilitators and Barriers to Pediatric Nurse Practitioner Practice in the United States: A Systematic Review. *J Pediatr Health Care*. 2024;38(4):520-543. doi:10.1016/j.pedhc.2023.12.003

7. Maier CB. Nurse prescribing of medicines in 13 European countries. *Hum Resour Health*. 2019;17(1):95.

8. Pearson M, Papps E, Walker RC. Experiences of NP prescribers; a qualitative study. *Contemp Nurse*. 2020;56(4):388-399.

9. Dunn J, Pryor C. Non-medical prescribing in nursing: the history and evolution of independent and supplementary prescribing. Br J Nurs. 2023;32(20):1004-1008. doi:10.12968/bjon.2023.32.20.1004

10. Abuzour AS, Lewis PJ, Tully MP. Practice makes perfect: A systematic review of the expertise development of pharmacist and nurse independent prescribers in the United Kingdom. *Res Social Adm Pharm*. 2018;14(1):6-17.

11. Courtenay M, Carey N, Gage H, Stenner K, Williams P. A comparison of prescribing and non-prescribing nurses in the management of people with diabetes. J Adv Nurs. 2015;71(12):2950-2964. doi:10.1111/jan.12757

12. Hopia H, Karhunen A, Heikkilä J. Growth of nurse prescribing competence: facilitators and barriers during education. *J Clin Nurs*. 2017;26(19-20):3164-3173.

13. Dydyk AM, Sizemore DC, Haddad LM, Lindsay L, Porter BR. NP Safe Prescribing of Controlled Substances While Avoiding Drug Diversion. In: StatPearls. Treasure Island (FL): StatPearls Publishing; January 29, 2023.

14. Latter S, Courtenay M. Effectiveness of nurse prescribing: a review of the literature. *J Clin Nurs*. 2004;13(1):26-32.

15. Gielen SC, Dekker J, Francke AL, Mistiaen P, Kroezen M. The effects of nurse prescribing: a systematic review. *Int J Nurs Stud*. 2014;51(7):1048-1061. doi:10.1016/j.ijnurstu.2013.12.003

16. Bradley E, Hynam B, Nolan P. Nurse prescribing: reflections on safety in practice. *Soc Sci Med*. 2007;65(3):599-609.

17. Bates AE, Martin-Misener R. *Facilitators* and Barriers to Nurse Practitioners Prescribing Methadone for Opioid Use Disorder in Nova Scotia: A Qualitative Study. *Can J Nurs Res*. 2022;54(1):15-26.

18. Bowers B, Redsell SA. A qualitative study of community nurses' decision-making around the anticipatory prescribing of end-of-life medications. *J Adv Nurs*. 2017;73(10):2385-2394.

19. Mangle L, Phillips P, Pitts M, Laver-Bradbury C. Implementation of independent nurse prescribing in UK mental health settings: focus on attention-deficit/hyperactivity

disorder. *Atten Defic Hyperact Disord*. 2014;6(4):269-279. doi:10.1007/s12402-014-0138-x

20. Dunn SV, Cashin A, Buckley T, Newman C. Nurse practitioner prescribing practice in Australia. *J Am Acad Nurse Pract*. 2010;22(3):150-155.

21. Lee J, Han CY, Fox A, et al. Are Australian Cancer and Palliative Care Nurses Ready to Prescribe Medicines? A National Survey. Semin Oncol Nurs. 2024;40(1):151578. doi:10.1016/j.soncn.2023.151578

22. Li Q, Liu M, Davidson PM, Reynolds NR, Buerhaus PI. A tale of two countries: Nurse practitioners in the United States and China. J Adv Nurs. 2020;76(4):924-926. doi:10.1111/jan.14292

23.Foster, J. P. (2010). A history of the early development of the nurse practitioner role in New South Wales, Australia (Doctoral dissertation).

24. Badnapurkar A, Bressington D, Jones M, et al. Perception of nurse prescribing among nurses and psychiatrists in a developing country: A cross-sectional survey. *Int J Ment Health Nurs*. 2018;27(2):866-876.

25. Ladd E, Schober M. Nurse Prescribing From the Global Vantage Point: The Intersection Between Role and Policy. *Policy Polit Nurs Pract*. 2018;19(1-2):40-49.

26. Moher D, Shamseer L, Clarke M, et al. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Syst Rev*. 2015;4(1):1.

27. Liberati A, Altman DG, Tetzlaff J, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *PLoS Med*. 2009;6(7):e1000100.

28. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;372:n71.

29.The Joanna Briggs Institute. (2017). The Joanna Briggs Institute Critical Appraisal Tools for use in JBI Systematic Reviews: Checklist for Qualitative Research. Retrieved from: https://joannabriggs.org/

30.Aromataris, E., & Munn, Z. (Eds.). (2020). *JBI manual for evidence synthesis*. https://doi.org/10.46658/JBIMES-20-01

31. Thomas J, Harden A. Methods for the thematic synthesis of qualitative research in systematic

reviews. *BMC Med Res Methodol*. 2008;8:45.

32. Athanasakis E. A meta-synthesis of how RNs make sense of their lived experiences of medication errors. *J Clin Nurs*. 2019;28(17-18):3077-3095.

33. Bressan V, Cadorin L, Stevanin S, Palese A. Patients experiences of bedside handover: findings from a meta-synthesis. *Scand J Caring Sci*. 2019;33(3):556-568.

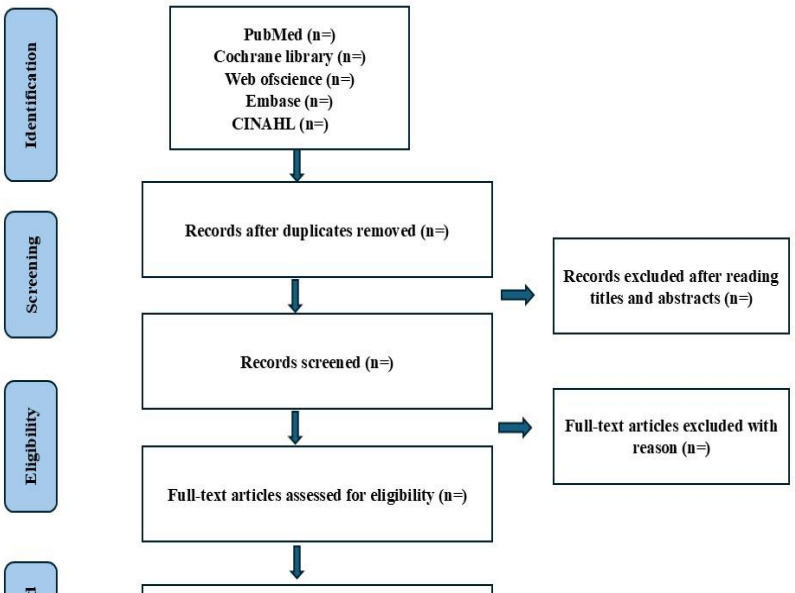
34. Faeda MS, Perroca MG. Conformity of nurse prescribing to care needs: nurses' understanding. Rev Bras Enferm. 2017;70(2):400-406. doi:10.1590/0034-7167-2016-0107

35. Lara JCP, March-Cerdà JC, Ponce-Blandón JA, Pabón-Carrasco M, Jiménez-Picón N. Effectiveness and Health Outcomes of Collaborative Nurse Prescribing for Patients Anticoagulated with Antivitamin K in Primary Care: A Study Protocol. Healthcare (Basel). 2024;12(3):347. Published 2024 Jan 30. doi:10.3390/healthcare12030347

36. Kooienga S, Wilkinson J. NP Prescribing: An Expanded Role for Nursing. *Nurs Forum*. 2017;52(1):3-11.

37. Cashin A, Stasa H, Dunn SV, Pont L, Buckley T. Nurse practitioner prescribing practice in Australia: confidence in aspects of medication management. Int J Nurs Pract. 2014;20(1):1-7.

Figure 1 Prisma flow diagram of the study selection process



Barriers and facilitators in registered nurse-led prescribing practices: Protocol for a qualitative meta-synthesis

Appendix 1

Database	Total studies
1.Pubemd	395
2.Embase	12
3.Cochane library	153
4. Web of science	2733
5.CINAHL	6

Barriers and facilitators in registered nurse-led prescribing practices: Protocol for a qualitative meta-synthesis

Appendix 2 Search strategy example (PubMed)

Search step	Search query	Results
#1	"Nurses"[MeSH Terms]	97451
#2	"Nurse"[Title/Abstract] OR "personnel nursing"[Title/Abstract] OR "nursing personnel"[Title/Abstract] OR "registered nurses"[Title/Abstract] OR "nurse registered"[Title/Abstract] OR "nurses registered"[Title/Abstract] OR "registered nurse"[Title/Abstract]	149463
#3	#1or #2	212650
#4	"Prescriptions"[MeSH Terms]	41121
#5	"Prescription"[Title/Abstract] OR (("Prescriptions"[MeSH Terms] OR "Prescriptions"[All Fields] OR "Prescription"[All Fields]) AND "Non-Drug"[Title/Abstract]) OR "non drug prescription"[Title/Abstract] OR "non drug prescriptions"[Title/Abstract] OR (("Prescriptions"[MeSH Terms] OR "Prescriptions"[All Fields] OR "Prescription"[All Fields]) AND "Non-Drug"[Title/Abstract]) OR (("Prescriptions"[MeSH Terms] OR "Prescriptions"[All Fields] OR "Prescription"[All Fields]) AND "Non-Drug"[Title/Abstract]) OR (("Prescriptions"[MeSH Terms] OR "Prescriptions"[All Fields] OR "Prescription"[All Fields]) AND "Nondrug"[Title/Abstract]) OR (("Nondrug"[All Fields] OR "nondrugs"[All Fields]) AND "Prescription"[Title/Abstract]) OR "nondrug prescriptions"[Title/Abstract] OR (("Prescriptions"[MeSH Terms] OR "Prescriptions"[All Fields] OR "Prescription"[All Fields]) AND "Nondrug"[Title/Abstract])	101452
#6	#4 or #5	126356
#7	"qualitative research"[Title/Abstract] OR "qualitative study"[Title/Abstract] OR "focus group"[Title/Abstract] OR "interview"[Title/Abstract] OR "semi structured interview"[Title/Abstract] OR "unstructured interview"[Title/Abstract] OR ("narration"[Title/Abstract]	1300677

	OR "narrative"[Title/Abstract] OR "hermeneutic"[Title/Abstract]) OR "phenomenological research"[Title/Abstract] OR "ethnographic research"[Title/Abstract] OR (("thematic"[All Fields] OR "thematically"[All Fields] OR "thematized"[All Fields]) AND "analys"[Title/Abstract]) OR (("content"[All Fields] OR "contents"[All Fields]) AND "analys"[Title/Abstract]) OR "grounded theory"[Title/Abstract] OR "experience"[Title/Abstract] OR "facilitator"[Title/Abstract] OR "barrier"[Title/Abstract]	
#8	#3 and #6 and #7	395

Barriers and facilitators in registered nurse-led prescribing practices: Protocol for a qualitative meta-synthesis

Appendix 3 Abstract Selection form

Time stamp	Author and date	Title	Is this a qualitative study?	Does the study present evidence of the prescription of the registered nurse?	Does the study express the nurses' understanding of prescription?	Initials of screener

Barriers and facilitators in registered nurse-led prescribing practices: Protocol for a qualitative meta-synthesis

Appendix 4: Full Article Screening Form

Author Date	Title	Is this a qualitive study?	Does the study present evidence of the prescription of the registered nurse?	Does the study express the nurses' understanding of prescription?	Initials of the screener

Barriers and facilitators in registered nurse-led prescribing practices: Protocol for a qualitative meta-synthesis

Appendix 5: Joanna Briggs Institute Critical Appraisal Domain

Congruous philosophical perspective and methodology	Congruous methodology and research question of objectives	Congruous methodology and methods of data collection	Congruous methodology and representation and analysis of data	Congruous methodology and interpretation of results	Statement locating the research culturally or theoretically	Influence of researcher on the research, and vice-versa, addressed	Participants, and their voices, adequately represented	Ethical study according to current criteria or evidence of ethical approval	Conclusions flow from analysis/interpretation of the data

Barriers and facilitators in registered nurse-led prescribing practices: Protocol for a qualitative meta-synthesis

Appendix 6: Data Extraction Tool

Author, Date	Country	Title	Study aim	Study Design	Study setting	Study Population	Inclusion and exclusion criteria	Findings	Quality appraisal score(JBI)

BMJ Open

Barriers and Facilitators in Nurse Prescribing Practices: A Protocol for Qualitative Meta-synthesis from Nurses' Perspectives

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Primary Subject Heading:	Nursing
Secondary Subject Heading:	Nursing, Health policy, Public health
Keywords:	Nursing Care, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Health Services

Barriers and Facilitators in Nurse Prescribing Practices: A Protocol for Qualitative Meta-synthesis from Nurses' Perspectives

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Abstract

Introduction

With the development of the medical system and the diversification of patient needs, nurse practitioners (NP) play an increasingly important role in medical practice, assuming more responsibilities and powers, including the right to prescribe. However, in the process of exercising the right to prescribe, NPs may face various obstacles, and there are also some promoting factors. Therefore, this study aims to deeply explore the obstacles and promoting factors in the prescription process of NPs through a qualitative meta-analysis and comprehensive method, so as to provide a basis for improving the prescription practice of NPs, improving nursing quality and patient satisfaction.

Methods and analysis: This study will adhere to the Joanna Briggs Institute framework and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses

(PRISMA-P). A comprehensive literature search and analysis of studies on nurse prescribing via PubMed, Embase, Web of Science, CINAHL, and the Cochrane Library. Two independent reviewers will select articles, extract data, and appraise study quality. Content analysis will be used to synthesize outcomes, and methodological quality and evidence quality will be assessed. The quality of the articles will be assessed using the 10-item Joanna Briggs Institute Critical Appraisal Checklist for Qualitative Research.

Ethics and dissemination Ethical approval will not be required for this study, as it solely encompasses data derived from previously published research. The findings will be disseminated through publication in a peer-reviewed journal. In addition,, the results will beactively shared at major academic conferences focused on nursing research and healthcare policy to ensure that the study's outcomes reach key stakeholders, including healthcare practitioners, policymakers, and researchers. This targeted dissemination strategy aims to promote the integration of the findings into practice and future research. This protocol is registered with the PROSPERO prospective database of systematic review.

PROSPERO registration number: CRD42023398567.

KEYWORDS

barriers, facilitators, nurse practitioner, prescription, meta-synthesis

Strength and limitations of this study

- This study will employ a qualitative meta-synthesis approach to integrate findings from multiple studies, aiming to provide a comprehensive view of the barriers and facilitators in NP prescribing practices.
- In addition to identifying key factors, this study will explore how these barriers and facilitators are expected to influence NPs' prescribing behavior and will aim to highlight strategies to enhance their prescribing skills.
- The findings are anticipated to offer actionable recommendations for policymakers and educators to optimize NP training and practice environments, potentially improving prescribing practices.
- The study's reliance on existing literature rather than primary data may limit the ability

to capture nuanced insights that could be obtained through direct data collection.

•Variations in geographic, cultural, and healthcare system contexts among the included studies may limit the generalizability of the findings to regions and contexts not represented.

INTRODUCTION

As the population ages and living standards improve, there is a significant increase in demand for healthcare services, while global healthcare resources remain severely limited. In response to this challenge, countries worldwide have expanded the scope of nursing practice since the 1960s by authorizing nurses to prescribe medication across various categories. This move primarily addresses the shortage of medical resources and inadequate medical service coverage by doctors [1].

The prescription refers to the process of ordering or authorizing a medication or treatment plan for a patient by a qualified healthcare professional, and the definition of nurse prescribing refers to the ability of NPs to prescribe medications, order diagnostic tests, and initiate treatments under their authority or in collaboration with a physician [2-3]. Another definition describes a nurse practitioner (NP) as a registered nurse who is educated and authorized to practice both autonomously and collaboratively in an advanced, expanded clinical role [4].

Numerous studies have confirmed the advantages of nurse prescribing. According to a report by the World Health Organization (WHO) in 2016, nurse prescribing has been shown to improve patient outcomes, increase access to healthcare services, and reduce healthcare costs [5]. Courtwright's research indicates that health policies granting PNPs prescriptive privileges are associated with shorter hospital stays, reduced costs, comparable care quality to that provided by physicians, and an increased emphasis on health promotion, particularly for medically underserved children [6]. Nurse Practitioners (NPs) are often involved in chronic care delivery due to their unique nursing training and education, which integrates knowledge and skills related to patients, families, and communities. This holistic approach enables NPs to address the diverse needs of individuals with chronic illnesses [7]. In many studies nurse prescribing has been found to have the potential to alleviate the workload of doctors,

improve access to treatment, and enhance the quality of care, while also optimizing the use of medical resources. It also offers greater autonomy to nurses, reduces reliance on other healthcare professionals, and has been associated with high levels of patient satisfaction. Furthermore, it may contribute to greater efficiency in patient care and support a broader enhancement of healthcare services. Differences in training, governance, and scope of practice, however, may influence how nurse prescribing is implemented in different contexts, depending on specific goals, caseloads, staffing profiles, and resources. [8-12]. Ultimately, this can benefit the healthcare industry as a whole. Nurse prescribing implementation can better meet the personalized needs of patients, empower nurses to utilize their professional skills and clinical experience more effectively, and improve the specificity and effectiveness of medical services [13]. It can also enable nurses to offer patients additional guidance and advice on health management and disease prevention, fostering patients' health management and self-care abilities, leading to lower healthcare costs and reduced waste of medical resources [14]. Additionally, nurse prescribing can effectively alleviate the inconvenience and burden that patients may experience due to difficulties, high costs, or long wait times for medical care [15]. This can enhance patient access and improve the overall quality of medical services.

However, the practice of nurse prescribing also faces some controversy and challenges. Concerns exist about whether nurses have sufficient professional competence and knowledge to prescribe medication and whether nurse prescribing could increase the risks of drug abuse, such as the abuse of prescribing authority or the production of counterfeit drugs [16]. Safety issues associated with nurse prescribing include prescription errors, allergic reactions, or adverse drug reactions [17]. Moreover, the education level and professional quality of nurses vary widely. Research has shown that their professional quality and career development level are closely related to their education level and work experience. Therefore, strict management and supervision are necessary to ensure that nurse prescribing is practiced within a safe and effective scope [18].

The concept of nurse prescribing has been implemented in various countries worldwide,

including the United Kingdom, Australia, the United States, and Canada [19-21]. In the United Kingdom, nurse prescribing has been implemented since 1992 and has proven highly effective in improving patient outcomes, many believe that nurse prescribing in the UK improves access to medications for patients by increasing the availability of healthcare providers who can prescribe, and represents a more efficient use of skills through utilising the existing expertise within the nursing workforce [22]. Similarly, Australia adopted nurse prescribing in 2010, making it a valuable addition to the healthcare workforce, specifically, nurse prescribing in cancer and palliative care has been shown to support nurses' ability to provide care in community settings and have the reciprocal benefit of instilling patient confidence in the care they receive [23-24]. In the United States, advanced practice nurses have had prescriptive authority since 1990, NPs provide a wide range of healthcare services including assessment, diagnosis, management of health problems, prescribing medication and treatment, health education and health promotion, as well as counselling individuals and families [25]. Despite the potential benefits, there is limited research and policy development on nurse prescribing in developing countries such as China and India, as well as in regions with limited healthcare resources. While scholars have examined nurse prescribing rights, there remains a lack of evidence from the nurses' perspectives, especially in these global contexts [26-27].

This study aims to integrate existing qualitative research to clarify the challenges and enabling factors in implementing nurse prescribing, providing valuable insights for policy-making and enhancing clinical practices globally. By examining diverse healthcare settings, this research seeks to offer practical guidance that can inform policies and support the effective implementation of nurse prescribing rights in both developed and developing countries.

STUDY AIMS

The aim of this study is to conduct a qualitative meta-synthesis to identify and synthesize the barriers and facilitators affecting registered nurse-led prescribing practices across different healthcare settings. Specifically, this review seeks to address the following research questions:

1. *What are the main barriers that registered nurses encounter when engaging in prescribing practices?*
2. *What factors facilitate the ability of registered nurses to effectively carry out prescribing roles?*

By addressing these questions, the study aims to provide a comprehensive understanding of the factors that influence nurse-led prescribing, thereby informing the development of supportive policies, training programs, and clinical guidelines to enhance prescribing practices among registered nurses.

METHOD

Registration

To enhance the transparency and completeness of the reporting, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols (PRISMA-P) guidelines have been followed [28-30]. In line with these guidelines, the brief version of the protocol has been registered on the International Prospective Register of Systematic Reviews (PROSPERO) (Registration number: CRD42023398567). This meta-synthesis will also follow the PRISMA guidelines.

Design

This is a protocol for a qualitative meta-synthesis.

Eligibility criteria

Inclusion criteria

We will include the following:

(1) Peer-reviewed studies that are in the English language due to limited financial resources for translation.

(2) Qualitative studies or mixed method studies containing qualitative research components, such as phenomenology, grounded theory, action research, ethnography, and other qualitative research designs.

(3) Studies published between the establishment of the database and December 31, 2024.

(4) Studies that focus on NPs who work in hospitals or communities and have the authority to prescribe medication.

(5) Studies that aim to explore and understand NPs' experiences, perceptions, and

attitudes related to medication prescription.

Exclusion criteria

(1) Qualitative studies published in non-peer-reviewed venues or grey literature, such as conference abstracts, government reports, and unpublished theses, will be excluded to maintain the methodological integrity of the synthesis.

(2) Quantitative studies (those focusing solely on statistical data without qualitative analysis) will be excluded.

(3) Secondary research, including systematic reviews, meta-analyses, and any other forms of aggregated studies will be excluded to focus on primary qualitative research.

(4) Articles with incomplete data or those that do not provide adequate information to assess the barriers and facilitators in nurse-led prescribing practices will be excluded.

Type of phenomena of interest

The synthesis will encompass studies that concentrate on descriptions and interpretations of NPs' experiences with prescribing authority, as reported by the NPs themselves.

Type of outcomes studied

This encompasses examining their emotions and personal experiences with the subject matter.

Search strategy

The JBI three-step search strategy will be used for the literature search. For step 1, a preliminary search of the PubMed database will be performed on June 2024, analysing the titles, abstracts and subject terms in the articles. For step 2, a comprehensive search will be undertaken across all included databases using keywords and index terms; the databases will include PubMed (MEDLINE), CINAHL, EMBASE, Web of Science, and Cochrane Library. For step 3, all reference lists of the included literature published before 31 December 2024 will be searched to complement other relevant literature. Search strategies will be formulated in consultation with a literature search expert to ensure the correctness of the relevant studies included. The scoping stage serves to familiarise oneself with existing literature, refine search parameters, identify MeSH terms and keywords and test the preliminary search strategy (table 1). Please refer to

the attached document for detailed retrieval procedures (see Appendix 1&2).

The search results from each database will be imported into Endnote and duplicate documents will be removed. To establish an unbiased and consistent data collection strategy, 10% of studies will be independently screened by three members of the review team based on title and abstract. Following this, two members of the team will screen all studies based on title and abstract (see Appendix 3). Any studies that meet the inclusion criteria will undergo full-text screening by the same two members of the team. To further enhance the search strategy, we will adopt a second approach. This involves manually reviewing the reference lists of the included articles to identify any additional relevant studies that might have been missed during the initial screening. Additionally, we will manually review any relevant literature reviews, regardless of their design, that were retrieved during the initial screening phase. This will help us identify primary studies that might meet our inclusion criteria and provide a more comprehensive overview of the existing literature.

In cases where there are disagreements between reviewers during the abstract or full-text screening phase, these will be resolved through discussion until a consensus is reached (see Appendix 4). If necessary, a third reviewer will be consulted to help resolve any discrepancies. This approach, known as investigator triangulation, aims to reduce biased decisions and ensure that decisions are made collaboratively.

Before progressing to the next stage of the review, all reviewers will inspect the final list of included studies to ensure that it is accurate and complete. This step is essential to minimize the risk of errors and ensure that all relevant studies have been identified and included in the review.

Table 1 Search strategy example (PubMed)

Search step	Search query
#1	'Nurses'[MeSH]
#2	((((((((((Nurse[Title/Abstract]) OR (Nursing Personnel[Title/Abstract])) OR (Personnel, Nursing[Title/Abstract])) OR (Registered Nurses[Title/Abstract])) OR (Nurse, Registered[Title/Abstract])) OR (Nurses, Registered[Title/Abstract])) OR (Registered

	Nurse[Title/Abstract])) OR (nurse prescribers[Title/Abstract]))) OR (advanced practice nurse[Title/Abstract])) OR (advanced registered nurse[Title/Abstract])) OR (nurse practitioner[Title/Abstract])
#3	#1 OR #2
#4	'Prescriptions'[Mesh]
#5	((((((((((Prescription[Title/Abstract]) OR (Prescriptions, Non-Drug[Title/Abstract])) OR (Non-Drug Prescription[Title/Abstract])) OR (Non-Drug Prescriptions[Title/Abstract])) OR (Prescription, Non-Drug[Title/Abstract])) OR (Prescriptions, Non Drug[Title/Abstract])) OR (Prescriptions, Nondrug[Title/Abstract])) OR (Nondrug Prescription[Title/Abstract])) OR (Nondrug Prescriptions[Title/Abstract])) OR (Prescription, Nondrug[Title/Abstract])) OR (non- medical prescribing[Title/Abstract])
#6	#4 OR #5
#7	((((((((((((((qualitative research[Title/Abstract]) OR (qualitative study[Title/Abstract])) OR (focus group[Title/Abstract])) OR (interview[Title/Abstract])) OR (semi-structured interview[Title/Abstract])) OR (unstructured interview[Title/Abstract])) OR (narration[Title/Abstract] OR narrative[Title/Abstract] OR hermeneutic[Title/Abstract])) OR (phenomenolog[Title/Abstract])) OR (phenomenological research[Title/Abstract])) OR (ethnographic research[Title/Abstract])) OR (thematic analys[Title/Abstract])) OR (content analys[Title/Abstract])) OR (grounded theory[Title/Abstract])) OR (experience[Title/Abstract])) OR (facilitator[Title/Abstract])) OR (barrier[Title/Abstract]))
#8	#3 AND #6 AND #7

Selection of studies

All search results will be combined and imported into the EndNote bibliographic software (V.9, Clarivate Analytics, Philadelphia, Pennsylvania, USA). After screening and removing duplicates, the remaining articles' titles, abstracts, and summaries will be assessed against the established eligibility criteria by two independent researchers R1 and R2. Two authors will evaluate the titles and abstracts of the retrieved references in a blinded manner to determine their potential suitability. Reasons for exclusion will be

documented at the full-text screening stage. If consensus cannot be reached, a third reviewer, who is also a study team member, will be consulted to achieve a consensus-based decision on whether the record should be retained or excluded (R3). This evaluation will consider whether the studies meet all predetermined criteria, including 1) research design, 2) participant characteristics, 3) explored interventions or phenomena, and 4) assessed outcomes. The selection procedure will be depicted in a PRISMA flow diagram, as illustrated in Figure 1.

Data extraction

The data extraction form will be designed to capture information about the selected studies, including author and year, aim, study setting, study population, exposure, and outcome. This information will be included in the appendix (see Appendix 6).

To ensure accuracy and consistency, two reviewers will independently complete the data extraction form for each study. Both reviewers will compare their completed forms to identify any discrepancies and resolve them through discussion and consensus. This process will ensure the accuracy and completeness of the extracted data. The form will include the following fields:

(1) General information: author names, year of publication, and study aim.

(2) Participants: sample size, demographic characteristics, methods of participant recruitment and selection.

(3) Setting: type of healthcare, conditions, and countries where the study was conducted;

(4) Method of data collection: type of qualitative research design (e.g., phenomenology, grounded theory, ethnography), data collection methods (e.g., interviews, focus groups), and data analysis methods.

(5) Outcome themes: key findings related to NPs' experiences, perceptions, and attitudes towards medication prescription.

Quality appraisal

The review team will conduct a critical appraisal of all the included articles, with each article being assessed independently by two members using the 10-item Joanna Briggs Institute Critical Appraisal Checklist for Qualitative research to evaluate their quality [31-32]. The appraisal process will be conducted by two researchers. In case of any

discrepancy in the scoring results, a third independent reviewer will be used for arbitration (see Appendix 5).

Data synthesis

The analysis will consist of three main stages following Thomas and Hardens' three-stage thematic synthesis approach [33-35]. Firstly, relevant texts will undergo line-by-line coding, with first author generating initial codes inductively for ideas in the data over several iterations until no new codes are necessary to capture ideas. Single data fragments may be assigned multiple codes for accuracy, with a second author checking a randomly selected 10% of coded data for coding accuracy. Disagreements will be discussed and resolved by drawing on another author.

Secondly, codes will be organized into descriptive themes, with two authors independently categorizing individual codes into broader themes. The two authors will then collaborate to compare and reconcile their thematic categorizations, ultimately agreeing on a unified set of **descriptive themes** that best represent the data. These descriptive themes will be discussed with the broader author group to ensure their comprehensiveness and accuracy. Themes will be iteratively refined until they optimally reflect the data. Lastly, the authors will develop analytical themes, which will be interpretative and seek to generate new ideas. two authors will independently re-examine the data organized into descriptive themes to identify barriers and facilitators to the prescription of NPs. This phase will rely on the authors' subjectivities, and a reflexive approach will be taken to minimize problems in interpretation and improve transparency in analysis. Two authors will meet to compare their analytical themes, and descriptive and analytical themes will be tabulated and paired with exemplary data fragments. A separate table will display how the data from each study is represented in the coding. NVivo (version 12) will be used to assist in processing and analyzing text to generate more standardized and convenient codes and topics.

Assessment of confidence in the evidence

The Confidence in the Evidence from Reviews of QUALitative research (GRADE-CERQual) approach will be used to establish the degree of confidence that may be placed in the findings from this systematic review and qualitative synthesis. The

GRADE-CERQual approach was chosen as the preferred method for evaluating the quality of evidence due to its specific emphasis on qualitative research, its incorporation of multiple interdependent components in the assessment of evidence confidence, and its alignment with other established GRADE approaches frequently utilized for appraising evidence quality. The GRADE-CERQual approach is designed to evaluate the confidence in individual review findings by appraising the methodological limitations of the included studies, coherence (i.e., the alignment between primary data and the review finding), data adequacy, and relevance (i.e., the extent to which data from primary studies supporting a review finding apply to the context specified in the review question). The overall confidence in each review finding (i.e., for each generated theme) will be rated as high, moderate, low, or very low. GRADE-CERQual assessments will be conducted independently by two authors, R2 and R3. Any disagreements will be resolved through discussion until a consensus is reached.

Patient and public involvement

The involvement of patients and healthcare professionals will play a key role in shaping the study protocol to ensure its relevance and impact. To ensure a balanced perspective, we will engage a diverse group of patients, including those who have received nursing-led care as well as those who did not receive such care or who had negative experiences with it in local healthcare settings. Additionally, we will engage healthcare professionals experienced in nurse prescribing practices, including professionals from regions with established nurse prescribing frameworks and areas where this practice is emerging.

To gather comprehensive insights, we will conduct semi-structured interviews and focus group discussions with these diverse stakeholders, ensuring we capture a wide range of experiences, both positive and negative, with nurse-led care. Their feedback on the barriers and facilitators of nurse prescribing will help us capture factors that may not be fully addressed in existing literature, particularly those related to both successful and challenging aspects of nurse-led care.

Their insights, including both positive and critical perspectives, will be used to refine the research questions and inform the development of inclusion criteria for the meta-

synthesis. Additionally, participants will review the preliminary study design in a series of two feedback sessions to offer input on theme selection and suggest modifications that may enhance the study's real-world relevance and applicability. Including patients with diverse experiences will ensure the study design addresses both the benefits and potential challenges of nurse-led care.

Publishing the protocol

This protocol is being published in a peer-reviewed journal to ensure transparency, credibility, and quality in our research process. Publishing the protocol also allows the academic community to provide constructive feedback, thereby enhancing the rigor of the study. Furthermore, this publication will help increase the visibility of the findings and contribute to the advancement of nurse-led prescribing practices research.

Ethics and dissemination

Since this review involves a retrospective analysis and secondary use of publicly available data, external ethical approval is not required. However, we will adhere to ethical guidelines for conducting systematic reviews. The findings from this review will be disseminated through several channels,such as publication, conference presentations, patient and public involvement.

Study Status

The review is ongoing and is expected to be completed by the end of 2024.

DISCUSSIONS

This qualitative meta-synthesis review aims to comprehensively synthesize existing research on nurse prescribing, specifically focusing on the barriers and enablers identified in the literature. The findings from this synthesis will be valuable for informing and improving the future education of nurses. Specifically, the results can inform efforts to strengthen the training of nurses in pharmaceutical knowledge and clinical skills.

Authorizing nurses to prescribe can help alleviate the issue of insufficient medical resources [36]. By enabling nurses to perform certain basic medical services, this approach can reduce the workload of doctors and ease the problem of medical resource scarcity. Furthermore, empowering nurses to prescribe can enhance the efficiency of

medical services.

For the diagnosis and treatment of minor and common illnesses, there is evidence suggesting that nurses possess sufficient medical skills to provide patients with treatment recommendations and medication prescriptions promptly. This capability can significantly improve the speed and efficiency of medical services [37-38].

While authorizing nurses to prescribe medication has numerous benefits, it also presents challenges. Nurses must possess a certain level of medical knowledge and professional skills to prescribe safely. Currently, the qualifications and knowledge levels of nurses vary greatly, and some may lack the necessary expertise to prescribe medication effectively. This variability

may increase the risk of drug misuse, including the inappropriate use of prescription drugs or the production of counterfeit medications. Additionally, due to their limited understanding and use of medications compared to physicians, safety concerns may arise, including inappropriate medication use and adverse reactions [39-40].

This qualitative synthesis offers valuable insights into these concepts, particularly in relation to an important target population: the future nursing workforce and their training programs. By addressing these issues, we can better prepare nurses for the responsibilities of prescribing, ultimately enhancing patient care and safety.

Implications

The findings of this synthesis will have significant implications for future research, clinical practice, and policy development, both locally and globally. This synthesis provides a comprehensive overview of current barriers and facilitators to nurse prescribing, which can inform clinical policy guidelines in various healthcare contexts. Globally, the evidence from this review can serve as a foundation for countries considering expanding nurse prescriptive authority, helping to shape policies that enhance the role of nurses in healthcare delivery. By identifying key challenges and enablers, this synthesis supports the development of strategies to improve the efficiency and quality of medical services, reduce waiting times, and better meet the needs and expectations of patients across different healthcare systems.

Furthermore, this work can contribute to the global discussion on optimizing nurse prescribing practices and guide nurse practitioners (NPs) to work more effectively within diverse regulatory frameworks, ensuring their role is maximized to benefit healthcare systems worldwide.

Author Contributions

The conception and design of this study were developed by contributors Sun and Li, who also drafted the initial version of the protocol. Sun, Lei, Zhou, Luo, and Li made significant contributions to refining the protocol and preparing subsequent drafts. Cheng Lei acted as the guarantor, assuming responsibility for the overall content and integrity of the study. All authors have reviewed and approved the submitted protocol and are accountable for its content.

Funding statement Not applicable.

Competing interests The authors have no competing interests.

Patient consent for publication Not applicable.

Ethics approval and consent to participate Since this review does not involve human participants, there is no need for ethical approval.

Availability of data and materials Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

1. Marć M, Bartosiewicz A, Burzyńska J, Chmiel Z, Januszewicz P. A nursing shortage - a prospect of global and local policies. Int Nurs Rev. 2019;66(1):9-16. doi:10.1111/inr.124732.International Council of Nurses. (2021, September 22). Guidelines on prescriptive authority for nurses [PDF file]. Retrieved August 1, 2022, from:https://www.icn.ch/system/files/202109/ICN_Nurse_prescribing_guidelines_EN_WEB.pdf.

3. Kroezen M, van Dijk L, Groenewegen PP, Francke AL. Nurse prescribing of medicines in Western European and Anglo-Saxon countries: a systematic review of the literature. BMC Health Serv Res. 2011;11:127. Published 2011 May 27. doi:10.1186/1472-6963-11-127

4. Australian Nursing and Midwifery Council. (2006). National competency standards for the nurse

practitioner. Canberra: Australian Nursing and Midwifery Council. Australian Nursing & Midwifery Accreditation Council

5. World Health Organization 2020. https://www.who.int/andorra/publications/m/item/case-study--improving-access-to-medicines-in-primary-care--nurse-prescribing-in-poland-%282020%29

6. Courtwright SE, Turi E, Barr EA, et al. Facilitators and Barriers to Pediatric Nurse Practitioner Practice in the United States: A Systematic Review. *J Pediatr Health Care*. 2024;38(4):520-543. doi:10.1016/j.pedhc.2023.12.003

7. Poghosyan L, Liu J, Perloff J, et al. Primary Care Nurse Practitioner Work Environments and Hospitalizations and ED Use Among Chronically Ill Medicare Beneficiaries. Med Care. 2022;60(7):496-503. doi:10.1097/MLR.0000000000001731

8. Maier CB. Nurse prescribing of medicines in 13 European countries. Hum Resour Health. 2019;17(1):95. Published 2019 Dec 9. doi:10.1186/s12960-019-0429-6

9. Pearson M, Papps E, Walker RC. Experiences of registered nurse prescribers; a qualitative study. Contemp Nurse. 2020;56(4):388-399. doi:10.1080/10376178.2020.1813044

10. Dunn J, Pryor C. Non-medical prescribing in nursing: the history and evolution of independent and supplementary prescribing. Br J Nurs. 2023;32(20):1004-1008. doi:10.12968/bjon.2023.32.20.1004

11. Black A, Courtenay M, Norton C, Dean Franklin B, Murrells T, Gage H. Independent nurse medication provision: A mixed method study assessing impact on patients' experience, processes, and costs in sexual health clinics. J Adv Nurs. 2022;78(1):239-251. doi:10.1111/jan.15075

12. Norman IJ, Coster S, McCrone P, Sibley A, Whittlesea C. A comparison of the clinical effectiveness and costs of mental health nurse supplementary prescribing and independent medical prescribing: a post-test control group study. BMC Health Serv Res. 2010;10:4. Published 2010 Jan 5. doi:10.1186/1472-6963-10-4

13. Abuzour AS, Lewis PJ, Tully MP. Practice makes perfect: A systematic review of the expertise development of pharmacist and nurse independent prescribers in the United Kingdom. Res Social Adm Pharm. 2018;14(1):6-17. doi:10.1016/j.sapharm.2017.02.002 14. Courtenay M, Carey N, Gage H, Stenner K, Williams P. A comparison of prescribing and non-prescribing nurses in the management of people with diabetes. J Adv Nurs. 2015;71(12):2950-2964.

doi:10.1111/jan.12757

15. Hopia H, Karhunen A, Heikkilä J. Growth of nurse prescribing competence: facilitators and barriers during education. J Clin Nurs. 2017;26(19-20):3164-3173. doi:10.1111/jocn.13665

16. Dydyk AM, Sizemore DC, Haddad LM, Lindsay L, Porter BR. NP Safe Prescribing of Controlled Substances While Avoiding Drug Diversion. In: StatPearls. Treasure Island (FL): StatPearls Publishing; January 29, 2023. 17. Latter S, Courtenay M. Effectiveness of nurse prescribing: a review of the literature. J Clin Nurs. 2004;13(1):26-32. doi:10.1046/j.1365-2702.2003.00839.x

18. Gielen SC, Dekker J, Francke AL, Mistiaen P, Kroezen M. The effects of nurse prescribing: a systematic review. Int J Nurs Stud. 2014;51(7):1048-1061. doi:10.1016/j.ijnurstu.2013.12.003

19. Bradley E, Hynam B, Nolan P. Nurse prescribing: reflections on safety in practice. Soc Sci Med. 2007;65(3):599-609. doi:10.1016/j.socscimed.2007.03.051 20. Bates AE, Martin-Misener R. Facilitators and Barriers to Nurse Practitioners Prescribing Methadone for Opioid Use Disorder in Nova Scotia: A Qualitative Study. Can J Nurs Res. 2022;54(1):15-26. doi:10.1177/0844562121996222

21. Bowers B, Redsell SA. A qualitative study of community nurses' decision-making around the anticipatory prescribing of end-of-life medications. J Adv Nurs. 2017;73(10):2385-2394. doi:10.1111/jan.13319 22. Mangle L, Phillips P, Pitts M, Laver-Bradbury C. Implementation of independent nurse prescribing in UK mental health settings: focus on attention-deficit/hyperactivity disorder. Atten Defic Hyperact Disord. 2014;6(4):269-279. doi:10.1007/s12402-014-0138-x 23. Dunn SV, Cashin A, Buckley T, Newman C. Nurse practitioner prescribing practice in Australia. J Am Acad Nurse Pract. 2010;22(3):150-155. doi:10.1111/j.1745-7599.2009.00484.x 24. Lee J, Han CY, Fox A, et al. Are Australian Cancer and Palliative Care Nurses Ready to Prescribe Medicines? A National Survey. Semin Oncol Nurs. 2024;40(1):151578. doi:10.1016/j.soncn.2023.151578 25. Li Q, Liu M, Davidson PM, Reynolds NR, Buerhaus PI. A tale of two countries: Nurse practitioners in the United States and China. J Adv Nurs. 2020;76(4):924-926. doi:10.1111/jan.14292

26.Foster, J. P. (2010). A history of the early development of the nurse practitioner role in New South Wales, Australia (Doctoral dissertation).

27. Badnapurkar A, Bressington D, Jones M, et al. Perception of nurse prescribing among nurses and psychiatrists in a developing country: A cross-sectional survey. Int J Ment Health Nurs. 2018;27(2):866-876. doi:10.1111/inm.12375 28. Ladd E, Schober M. Nurse Prescribing From the Global Vantage Point: The Intersection Between Role and Policy. Policy Polit Nurs Pract. 2018;19(1-2):40-49. doi:10.1177/1527154418797726 29. Moher D, Shamseer L, Clarke M, et al. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. Syst Rev. 2015;4(1):1. Published 2015 Jan 1. doi:10.1186/2046-4053-4-1 30. Liberati A, Altman DG, Tetzlaff J, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. PLoS Med. 2009;6(7):e1000100. doi:10.1371/journal.pmed.1000100

31. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ. 2021;372:n71. Published 2021 Mar 29. doi:10.1136/bmj.n71 32.The Joanna Briggs Institute. (2017). The Joanna Briggs Institute Critical Appraisal Tools for use in JBI Systematic Reviews: Checklist for Qualitative Research. Retrieved from: https://joannabriggs.org/

33.Aromataris, E., & Munn, Z. (Eds.). (2020). JBI manual for evidence synthesis. https://doi.org/10.46658/JBIMES-20-01

34. Thomas J, Harden A. Methods for the thematic synthesis of qualitative research in systematic reviews. BMC Med Res Methodol. 2008;8:45. Published 2008 Jul 10. doi:10.1186/1471-2288-8-45 35. Athanasakis E. A meta-synthesis of how registered nurses make sense of their lived experiences of medication errors. J Clin Nurs. 2019;28(17-18):3077-3095. doi:10.1111/jocn.14917

36. Bressan V, Cadorin L, Stevanin S, Palese A. Patients experiences of bedside handover: findings from a meta-synthesis. Scand J Caring Sci. 2019;33(3):556-568. doi:10.1111/scs.12673 37. Faeda MS, Perroca MG. Conformity of nurse prescribing to care needs: nurses' understanding. Rev Bras Enferm. 2017;70(2):400-406. doi:10.1590/0034-7167-2016-0107

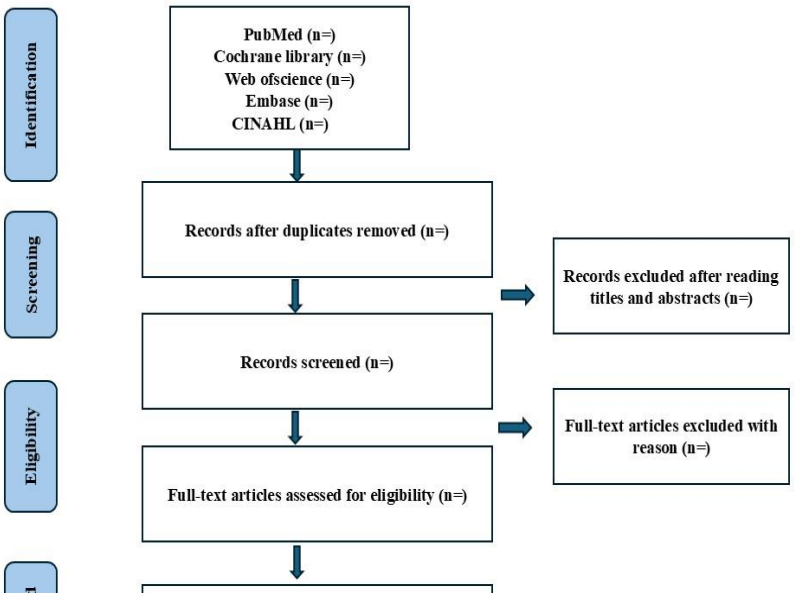
38. Lara JCP, March-Cerdà JC, Ponce-Blandón JA, Pabón-Carrasco M, Jiménez-Picón N. Effectiveness and Health Outcomes of Collaborative Nurse Prescribing for Patients

Anticoagulated with Antivitamin K in Primary Care: A Study Protocol. Healthcare (Basel). 2024;12(3):347. Published 2024 Jan 30. doi:10.3390/healthcare12030347

39. Kooienga S, Wilkinson J. RN Prescribing: An Expanded Role for Nursing. Nurs Forum. 2017;52(1):3-11. doi:10.1111/nuf.12159

40. Cashin A, Stasa H, Dunn SV, Pont L, Buckley T. Nurse practitioner prescribing practice in Australia: confidence in aspects of medication management. Int J Nurs Pract. 2014;20(1):1-7. doi:10.1111/ijn.12237

Figure 1 Prisma flow diagram of the study selection process



Barriers and Facilitators in Nurse Prescribing Practices: A Protocol for Qualitative Meta-Synthesis from Nurses' Perspectives

Appendix 1

Database	Total studies
1.PubMed	395
2.Embase	12
3.Cochane library	153
4. Web of science	2733
5.CINAHL	6

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Appendix 2 Search strategy example (PubMed)

Search step	Search query	Results
#1	"Nurses"[MeSH Terms]	97451
#2	"Nurse"[Title/Abstract] OR "personnel nursing"[Title/Abstract] OR "nursing personnel"[Title/Abstract] OR "registered nurses"[Title/Abstract] OR "nurse registered"[Title/Abstract] OR "nurses registered"[Title/Abstract] OR "registered nurse"[Title/Abstract]	149463
#3	#1or #2	212650
#4	"Prescriptions"[MeSH Terms]	41121
#5	"Prescription"[Title/Abstract] OR (("Prescriptions"[MeSH Terms] OR "Prescriptions"[All Fields] OR "Prescription"[All Fields]) AND "Non-Drug"[Title/Abstract]) OR "non drug prescription"[Title/Abstract] OR "non drug prescriptions"[Title/Abstract] OR (("Prescriptions"[MeSH Terms] OR "Prescriptions"[All Fields] OR "Prescription"[All Fields]) AND "Non-Drug"[Title/Abstract]) OR (("Prescriptions"[MeSH Terms] OR "Prescriptions"[All Fields] OR "Prescription"[All Fields]) AND "Non-Drug"[Title/Abstract]) OR (("Prescriptions"[MeSH Terms] OR "Prescriptions"[All Fields] OR "Prescription"[All Fields]) AND "Nondrug"[Title/Abstract]) OR (("Nondrug"[All Fields] OR "nondrugs"[All Fields]) AND "Prescription"[Title/Abstract]) OR "nondrug prescriptions"[Title/Abstract] OR (("Prescriptions"[MeSH Terms] OR "Prescriptions"[All Fields] OR "Prescription"[All Fields]) AND "Nondrug"[Title/Abstract])	101452
#6	#4 or #5	126356
#7	"qualitative research"[Title/Abstract] OR "qualitative study"[Title/Abstract] OR "focus group"[Title/Abstract] OR "interview"[Title/Abstract] OR "semi structured interview"[Title/Abstract] OR "unstructured interview"[Title/Abstract] OR ("narration"[Title/Abstract] OR "narrative"[Title/Abstract] OR	1300677

	"hermeneutic"[Title/Abstract]) OR "phenomenological research"[Title/Abstract] OR "ethnographic research"[Title/Abstract] OR (("thematic"[All Fields] OR "thematically"[All Fields] OR "thematized"[All Fields]) AND "analys"[Title/Abstract]) OR (("content"[All Fields] OR "contents"[All Fields]) AND "analys"[Title/Abstract]) OR "grounded theory"[Title/Abstract] OR "experience"[Title/Abstract] OR "facilitator"[Title/Abstract] OR "barrier"[Title/Abstract]	
#8	#3 and #6 and #7	395

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Appendix 3 Abstract Selection form

Time stamp	Author and date	Title	Is this a qualitative study?	Does the study present evidence of the prescription of the registered nurse?	Does the study express the nurses' understanding of prescription?	Initials of screener

Barriers and Facilitators in Nurse Prescribing Practices: A Protocol for Qualitative Meta-Synthesis from Nurses' Perspectives

Appendix 4: Full Article Screening Form

Author Date	Title	Is this a qualitive study?	Does the study present evidence of the prescription of the registered nurse?	Does the study express the nurses' understanding of prescription?	Initials of the screener

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Appendix 5: Joanna Briggs Institute Critical Appraisal Domain

Congruous philosophical perspective and methodology	Congruous methodology and research question of objectives	Congruous methodology and methods of data collection	Congruous methodology and representation and analysis of data	Congruous methodology and interpretation of results	Statement locating the research culturally or theoretically	Influence of researcher on the research, and vice-versa, addressed	Participants, and their voices, adequately represented	Ethical study according to current criteria or evidence of ethical approval	Conclusions flow from analysis/interpretation of the data

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Appendix 6: Data Extraction Tool

Author, Date	Country	Title	Study aim	Study Design	Study setting	Study Population	Inclusion and exclusion criteria	Findings	Quality appraisal score(JBI)