

BMJ Open Core competencies for diabetes specialist nurses: a scoping review protocol

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ABSTRACT

Introduction Diabetes is a serious health condition that challenges a person's daily life, emotional well-being and perceived quality of life. It increases one's risk of developing other health-related complications and encountering an early death. People with diabetes require comprehensive and meticulous management through a collaborative clinical multidisciplinary team. Optimal management reduces the risk of diabetes-related health issues. Significantly, people's knowledge of diabetes and its management depends, to a large extent, on the adequacy and effectiveness of the diabetes-related care and education they receive. Diabetes specialist nurses (DSNs) are essential in diabetes care and education. The management of diabetes is rapidly changing, with advances in technologies to monitor glycaemic control, growth in new therapies and devices, and new ways of interacting with people with diabetes instead of traditional face-to-face consultations. DSNs are at the forefront in delivering diabetes care and have had to adapt their practice and learn new skills to embrace these changes. Meanwhile, the competency framework has evolved to keep abreast of these changes and ensure that nurses provide high-quality care for people with diabetes. A scoping review of the global core competencies of DSNs and identifying a worldwide framework of core competencies holds significant importance for their professional growth and role standardisation worldwide.

Methods and analysis The scoping review will be conducted in accordance with Arksey and O'Malley's framework and the Joanna Briggs Institute methodology. Moreover, this protocol will be reported in accordance with the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols checklist. The following online databases will be searched from the earliest available record to 4 October 2024, including CINAHL (EBSCO), Embase, PubMed, Scopus and Web of Science. Grey literature will be retrieved through OAlster, Google Scholar and OpenGrey, supplemented by targeted manual searches of official websites of national diabetes associations of different countries. Study selection and data extraction of the full text will be done independently by two reviewers based on the inclusion criteria and a predetermined data extraction form. In the event of any discrepancies, they will be resolved through discussion with the third reviewer. The extracted data will be summarised and exhibited in tabular or graphical form.

Ethics and dissemination This study does not require ethical approval, as all data will be collected

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ All available evidence is identified through a systematic search of electronic databases and official websites.
- ⇒ The scoping review will adhere rigorously to the methodology for conducting such reviews set forth by the Joanna Briggs Institute.
- ⇒ This study will include only English-language literature, which may have missed high-quality articles in other languages.

from published and grey literature. The findings will be presented at relevant conferences and submitted to peer-reviewed journals for publication.

BACKGROUND

Diabetes is a group of metabolic disorders characterised by elevated blood glucose levels, resulting from defects in insulin secretion or action.¹ Globally, 537 million adults aged 0–79 (10.5%) are affected by diabetes, equating to an average of one in ten individuals. It is anticipated that the global prevalence of diabetes will continue to rise in the coming decades, from 537 million cases in 2021 to 783 million in 2045.² The most readily apparent clinical manifestation of diabetes is hyperglycaemia.³ Long-term hyperglycaemia has been linked to significant damage to various organs and systems throughout the body.^{4 5} Diabetes has a significant impact on people's physical and mental well-being, as well as on their financial status. People with diabetes are prone to anxiety, depression, diabetes-related pain and other psychological problems, due to their long-term struggle with the disease and fear of possible complications.^{6 7} A multidisciplinary approach is essential for providing comprehensive and meticulous management to individuals with diabetes. Optimal management reduces the risk of diabetes-related health issues, including cardiovascular disease, eye and kidney disease, lower limb amputations and

poor mental health.⁸ Significantly, people's knowledge of diabetes and its management depends, to a large extent, on the adequacy and effectiveness of the diabetes-related care and education they receive. For individuals living with diabetes, nurses serve as essential care coordinators. They facilitate connections to crucial support services and demystify medical information, empowering people with diabetes to assume control of their health.⁹

Diabetes specialist nurse (DSN) is defined as a registered nurse who holds a valid nursing licence and a bachelor's degree or higher, has completed systematic theoretical and practical training in diabetes care, demonstrates specialised clinical competencies in diabetes management, proficiently applies evidence-based knowledge and technical skills to deliver professional services (eg, glycaemic management, complication prevention and self-management education) for individuals with diabetes, and is certified through standardised assessments to validate expertise in diabetes nursing.^{10 11} The designation is awarded to those who have completed the examination and obtained the specialist qualification certificate. Specialist nurses can accurately assess people's condition and develop a personalised care plan. They possess a comprehensive understanding of multiple disciplines, including medicine, nutrition, psychology and so on, enabling them to provide comprehensive care for people with diabetes.¹² Therefore, when the treatment and management of diabetes requires multidisciplinary collaboration, the DSN, as an important member of the multidisciplinary team, can facilitate communication and collaboration between disciplines and improve the overall efficiency of the healthcare team. Evidence indicates DSNs enhance people's satisfaction through extended, personalised consultations, structured educational programmes and empowerment-based self-management support.¹³ NHS England asserts that DSNs reduce inpatient harms by reducing medication errors and hypoglycaemic events.^{14 15}

In addition, with the shift in the chronic disease management model, diabetes, as a common chronic disease, requires long-term management and care. Specialist nurses can adapt to this shift and provide people with a full continuum of care in different places, such as hospitals, communities and homes, to realise a seamless transition and improve the treatment outcome and quality of life.^{16 17} DSNs must complete thorough professional training to develop a strong understanding of diabetes care. They should also be skilled in essential practices such as insulin injections, blood glucose monitoring and foot care. This expertise is crucial for enhancing the safety and effectiveness of nursing care.¹¹ Therefore, it is necessary to constantly develop and improve the quality standards of DSNs, standardise nursing behaviour and provide new ideas and methods for developing diabetes nursing through research and innovation.

Competence can be defined as a synthesis of knowledge, abilities, values and attitudes that collectively underpin effective performance in each profession.

Core competencies establish a structured framework delineating the essential knowledge, skills and clinical capabilities required across distinct proficiency levels throughout the diabetes care continuum, thereby enabling standardised performance benchmarks and quality assurance.¹⁸

Internationally, countries have developed standards for DSNs in accordance with their respective medical systems and the specific requirements of diabetes prevention and control. In the USA, the Association of Experts in Diabetes Care and Education requires core competencies including the ability to practise and integrate clinical management, communication and advocacy, research and quality improvement, systems-based practice and professional practice.¹⁹ In New Zealand, the core competencies of DSNs include specialist nursing, complication care, care of pregnant women, health education, and management of children and adolescents, and the content is more detailed.²⁰ In China, the current core competency framework for DSNs excludes nursing research and management competencies. Only competency frameworks for primary-level specialist nurses have been established, failing to address the complex demands of advanced nursing specialists in diabetes care.¹⁰ Variations in core competency standards for diabetes nurses across countries are associated with differences in healthcare priorities, cultural contexts and resource allocations. These disparities hinder the harmonisation of professional standards and international collaboration. Also, with the development of new technologies in the field of diabetes nursing, the requirements for DSNs' roles and competencies have been broadened. Consequently, a systematic scoping review of global diabetes specialist nursing competencies is necessary to identify similarities, discrepancies and new developments.²¹ This process would support the development of a flexible international competency framework that integrates evidence-based best practices while remaining adaptable to regional healthcare needs. Such a framework could narrow competency disparities and elevate the quality of diabetes care delivery worldwide.

Although a recent literature review identified the core competencies of diabetes educators (DEs), the distinct roles and potential overlaps between DEs and DSNs remain to be fully elucidated. For instance, both require a solid understanding of diabetes, including its aetiology, pathophysiology, clinical manifestations, treatment methods and complication prevention.²² However, there are also differences in the certification methods and role positioning. The background of DEs may be drawn from a variety of disciplines. It is not a prerequisite for this role to have background training in nursing; educators may have got trained in other related fields, such as health education and nutrition.⁸ DSNs must have completed a specialised nursing education programme and hold certification in diabetes care.²³ While DEs and DSNs are essential to diabetes care, their primary objectives and areas of emphasis in clinical practice diverge. The role

of DEs focuses on providing educational services across a spectrum of settings, ranging from community centres to clinical healthcare facilities. DSNs operate primarily in healthcare settings like hospital-based diabetes wards or outpatient clinics. They provide cross-specialty education and support for both staff and patients and play a pivotal role in facilitating discharge.¹⁶

Meanwhile, the nomenclature for DEs has undergone a series of changes. For example, the American Association of Diabetes Educators defined DE as a knowledgeable and supportive advocate and coach who provides person-centred education to people with diabetes.¹⁹ However, in 2019, DE was renamed as a Diabetes care and education specialist. Moreover, in Australia, the role is designated as a Credentialed Diabetes Educator.²⁴ Documentation from both two countries indicates that becoming a DE requires specialised training and professional credentialing, and that the scope of practice and responsibilities closely align with those of a DSN.

To comprehensively map the competencies of DSNs worldwide, nurses in countries without a formal DSN certification system will also be included if they have completed specialised diabetes training and passed a competency assessment. These nurses are considered to perform roles comparable to those of formally certified DSNs and will therefore be deemed eligible for inclusion in the study.

OBJECTIVES

The objectives of the proposed review are to summarise the core competencies of DSNs across different countries from the related literature and review the criteria currently used to assess these competencies.

METHODS

This scoping review will apply Arksey and O'Malley's framework with the following six stages: (1) identifying the research question; (2) identifying relevant studies; (3) study selection; (4) charting the data; (5) collating, summarising and reporting the results and (6) stakeholder consultation.²⁵ This scoping review will be conducted in accordance with the methodology set out by the Joanna Briggs Institute for such studies.²⁶ Furthermore, this protocol will be reported in accordance with the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) checklist.²⁷ A completed PRISMA-P checklist is provided as an online supplemental file 1. The protocol was registered on the Open Science Framework. (Registration DOI: <https://doi.org/10.17605/OSF.IO/EWJA9>)

The study is scheduled to commence in October 2024 and conclude by August 2025.

Patient and public involvement

None.

Eligibility criteria

The inclusion criteria are formulated according to the elements of population, concept and context (PCC) framework and types of evidence sources.²⁸

Population

This study will include registered nurses with formal DSN certification, regardless of gender, age or ethnicity. They should hold a bachelor's degree or higher. For nations without an established DSN credential, nurses will be eligible if they have completed specialised training in diabetes care, passed a competency certification and then perform roles comparable to those of DSNs, for example, the Diabetes Care and Education Specialist in the USA.²¹ Exclusion criteria are as follows: (1) practitioners engaged solely in basic diabetes care (eg, routine blood glucose monitoring); (2) non-specialised nursing personnel and (3) experienced practitioners without formal diabetes-specific training or certification.

Concept

The proposed review is designed to describe the core competencies reported for DSNs. Therefore, all articles focusing on DSN competencies will be considered. In alignment with patient-centred care principles, evidence regarding patient perspectives on DSNs' core competencies will be systematically synthesised alongside professional standards.

Context

This scoping review will be conducted from an international perspective. Eligible practice settings include all healthcare environments, such as outpatient clinics, inpatient wards and community-based care contexts. Studies carried out in diverse medical institutions—including hospitals, regional health centres and specialised diabetes facilities—will be included.

Types of literature

Eligibility criteria are designed to capture diverse evidence on DSN's core competencies, including any published, preprint or grey literature. We will include all types of literature, such as quantitative, qualitative, mixed-methods studies, reviews, Delphi studies and others. However, studies that do not specifically address DSN's competency frameworks will be excluded. Thematic boundaries will strictly align with the PCC framework.

Stage 1: identifying the research question

This scoping review of the literature aims to provide a comprehensive and objective assessment of the literature regarding the core competencies of DSNs. It will identify the specific categories and important components of their core competencies. We have developed the following research questions in line with the objectives of this scoping review:

1. What are the core competencies reported for diabetes specialist nurses?

2. What are the criteria for evaluating the core competencies of diabetes specialist nurses?

Stage 2: identifying relevant studies

The literature search will be conducted across five electronic databases: CINAHL (via EBSCO), Embase, PubMed, Scopus and Web of Science. A preliminary search will be performed in PubMed to develop the search strategy using keywords and Boolean operators. To refine the search strategy, this initial phase will involve scrutinising text words in titles/abstracts and index terms (eg, MeSH) of retrieved articles. The optimised strategy will then be systematically applied to all included databases, with a search strategy adapted to database-specific parameters to ensure comprehensive literature identification. All the search strategies will be developed by QT and YaL and reviewed by Paulo Moreira. In addition, they will be checked by an information specialist from the hospital library. A sample search strategy for the PubMed database is provided as online supplemental appendix 2. All searches will cover records of databases from inception to 4 October 2024.

Additionally, grey literature will be retrieved through OAlster, Google Scholar and OpenGrey, supplemented by targeted manual searches of official websites of key organisations, including: national diabetes associations of different countries (eg, American Diabetes Association, Diabetes UK, the International Diabetes Federation and Training Research and Education for Nurses in Diabetes-UK), to identify unpublished English-language documents and international guidelines on DSNs. Finally, reference lists of all included studies will be manually screened to identify potentially omitted relevant publications.

Stage 3: study selection

First, all retrieved literature will be incorporated into EndNote V.20, with any duplicate records deleted. The titles and abstracts will be screened and evaluated by two independent reviewers per the established inclusion criteria, after which they will be selected for full-text reading. It is imperative that the articles included contain pertinent content, definitions, frameworks or evaluation criteria about the core competencies of DSNs. Papers deemed outside the review's scope, as defined by the inclusion criteria, will be excluded. The rationale for exclusion will be provided as an appendix to the final scoping review report. The search results will be presented per the PRISMA guidelines and the PRISMA extension for Scoping Reviews flow chart.^{28 29} In the event of any discrepancies between the two reviewers, they will be resolved through discussion or by recourse to the judgement of a third reviewer.

This review incorporates quantitative, qualitative and mixed-method studies, reviews (eg, systematic, narrative or scoping reviews), Delphi consensus studies and grey literature. Included English-language publications must define core competency frameworks for DSNs or provide

evaluation metrics assessing these competencies. Publications failing to align with the PCC framework eligibility criteria will be excluded.

Stage 4: charting the data

Data will be extracted from the literature included in the scoping review by QT and YaL, using a data extraction tool developed by the aforementioned reviewers. Data extracted from the included studies will be disaggregated according to the following variables: author, year of publication, study location, participant details, definition, research methodology, training methods, certification standards, competencies identified and competency assessments. To ensure the feasibility of the data extraction form, two researchers (QT and YaL) will pilot the form independently on a random 10% sample of the included studies. If necessary, the draft of the data extraction form will be adjusted. The final form will be applied to all included literature and presented in the scoping review report. A draft of the data extraction form is presented as an online supplemental appendix 3online supplemental file 3. These changes will be documented in the comprehensive scoping review. Any discrepancies between the two reviewers will be resolved through discussion or by recourse to the judgement of a third reviewer.

Stage 5: collating, summarising and reporting the results

Data extracted from the included literature will be presented visually in graphs or tables to provide a concise overview of the findings. The integrated research data extraction will consist of three stages: comparing the results, extracting key themes and grouping them into categories. The discussion section will critically analyse and discuss each paper and summarise the concept of core competencies of DSNs in different countries, including competency requirements and evaluation tools. Such collation and synthesis of knowledge will help to understand the current situation of core competencies of DSNs and provide suggestions for future research in this field.

Step 6: stakeholder consultation

We will conduct a stakeholder consultation to validate the review's findings, add new evidence and identify gaps for further research. Stakeholders will comprise researchers specialising in diabetes, hospital nursing managers and DSNs. The consultation will involve presenting the study and its findings to an expert panel and collecting their feedback. This input will guide the final presentation and interpretation of the results in the article.

DISCUSSION

This scoping review aims to provide a comprehensive and objective assessment of the literature regarding DSN's core competencies. This study aims to identify and delineate the essential components of DSN's core competencies. Furthermore, we will summarise commonly used evaluation methods—such as questionnaire assessments

and tests—and offer evidence-informed recommendations for establishing a tiered evaluation system for DSNs. The study results are expected to provide reference for the training, assessment and career development of DSNs, optimise diabetes nursing services and improve the overall management of diabetes.

Ethics and dissemination

This study does not require ethical approval, as all data will be collected from published and grey literature. The findings will be presented at relevant conferences and submitted to peer-reviewed journals for publication.

Contributors YaL and QT were pivotal in conceiving and writing the review protocol and were responsible for defining keywords and search strategies. YuL, TJ and PM played crucial roles in revising and improving the protocol. All authors have made a significant and active contribution to the article and have approved the final version submitted for publication. QT is the guarantor.

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Competing interests None declared.

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Patient consent for publication Not applicable.

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REFERENCES

- Harreiter J, Roden M. Diabetes mellitus: definition, classification, diagnosis, screening and prevention (Update 2023). *Wien Klin Wochenschr* 2023;135:7–17.
- Sun H, Saeedi P, Karuranga S, et al. IDF Diabetes Atlas: Global, regional and country-level diabetes prevalence estimates for 2021 and projections for 2045. *Diabetes Res Clin Pract* 2022;183:109119.
- Lyssenko V, Vaag A. Genetics of diabetes-associated microvascular complications. *Diabetologia* 2023;66:1601–13.
- Chong DD, Das N, Singh RP. Diabetic retinopathy: Screening, prevention, and treatment. *Cleve Clin J Med* 2024;91:503–10.
- Samsu N. Diabetic Nephropathy: Challenges in Pathogenesis, Diagnosis, and Treatment. *Biomed Res Int* 2021;2021:1497449.
- Chae WR, Kohring C, Rohde C, et al. Eight-year nationwide study of the bidirectional association between type 2 diabetes and depression in nearly 8 million German outpatients. *BMJ Open Diabetes Res Care* 2024;12:e003903.
- Zhang R, Lai M, Wang D. Psychologic Impacts on Diabetic Neuropathic Pain. *Curr Pain Headache Rep* 2022;26:423–7.
- Australian Diabetes Educators Association. National diabetes nursing education framework. National diabetes services scheme. n.d. Available: <https://www.ndss.com.au/about-diabetes/resources/find-a-resource/national-diabetes-nursing-education-framework/>
- McLaughlin S C D, Belton AB, Garst J. International standards for education of diabetes health professionals. International Diabetes Federation; 2015.
- Xing Q, Zhang M, Zhao F, et al. The Development of a Standardized Framework for Primary Nurse Specialists in Diabetes Care in China: A Delphi Study. *J Nurs Res* 2019;27:e53.
- Loveman E, Royle P, Waugh N. Specialist nurses in diabetes mellitus. *Cochrane Database Syst Rev* 2003;2003:CD003286.
- James J, Gosden C, Winocour P, et al. Diabetes specialist nurses and role evolution: a survey by Diabetes UK and ABCD of specialist diabetes services 2007. *Diabet Med* 2009;26:560–5.
- Lawler J, Trevatt P, Elliot C, et al. Does the Diabetes Specialist Nursing workforce impact the experiences and outcomes of people with diabetes? A hermeneutic review of the evidence. *Hum Resour Health* 2019;17:65.
- NHS England. National diabetes treatment and care programme, introduction to and supporting documentation for value based transformation funding site selection five year forward view. 2016. Available: <https://bit.ly/2ljkDcf>
- Evans NR, Richardson LS, Dhatariya KK, et al. Diabetes specialist nurse telemedicine: admissions avoidance, costs and casemix. *Eur Diabetes Nurs* 2012;9:17–21.
- Akiboye F, Sihre HK, Al Mulhem M, et al. Impact of diabetes specialist nurses on inpatient care: A systematic review. *Diabet Med* 2021;38:e14573.
- Cabr  Font C, Colungo Francia C, Vinagre Torres I, et al. A therapeutic education program with a diabetes specialist nurse for type 2 diabetes patients using insulin in a primary care setting. *Endocrinol Diabetes Nutr (Engl Ed)* 2021.
- Simmons D, Deakin T, Walsh N, et al. Diabetes UK Position Statement. Competency frameworks in diabetes. *Diabet Med* 2015;32:576–84.
- Ryan D, Burke SD, Litchman ML, et al. Competencies for Diabetes Care and Education Specialists. *Diabetes Educ* 2020;46:384–97.
- Snell H, Wood S, Hansen C. National diabetes nursing knowledge and skills framework. Palmerston North Midcentral District Health Board; 2018. Available: https://www.acdn.org.nz/site_files/34755/upload_files/2018-NationalDiabetesNursingKnowledgeandSkillsFramework2018.pdf?dl=1
- Gao Y, Zhou M, Liu YY, et al. Influential factors associated with core competencies of diabetes specialist nurses and correlation with self-directed learning ability: A cross-sectional study. *Nurs Open* 2024;11:e2234.
- Alharbi T, McIntyre M, Thomacos N, et al. Core competencies for diabetes educators: a scoping review protocol. *JBIM Database System Rev Implement Rep* 2018;16:1381–6.
- Bostr m E, Isaksson U, Lundman B, et al. Patient-centred care in type 2 diabetes - an altered professional role for diabetes specialist nurses. *Scand J Caring Sci* 2014;28:675–82.
- Australian Diabetes Educators Association. National competencies for credentialed diabetes educators. 2017.
- Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol* 2005;8:19–32.
- Peters MDJ, Godfrey C, Mclnerney P, et al. Chat 11: scoping reviews. In: *JBIM manual for evidence synthesis*. 10. 2020: 10–46658.
- Shamseer L, Moher D, Clarke M. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. *BMJ* 2016;354:i4086.
- Peters MDJ, Marnie C, Tricco AC, et al. Updated methodological guidance for the conduct of scoping reviews. *JBIM Evid Implement* 2021;19:3–10.
- Tricco AC, Lillie E, Zarin W, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med* 2018;169:467–73.