The Role of Nurse Education in Enhancing Knowledge and Skills of Diabetes Management in Patients

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Abstract. Diabetes is a chronic condition that requires effective management to prevent complications and improve patients' quality of life. Nurse education plays a crucial role in enhancing patients' knowledge and skills for diabetes management. This systematic review aims to assess the role of nurse education in improving knowledge and skills related to diabetes management among patients. A systematic review was conducted following the PRISMA guidelines. Electronic databases, including PubMed, Scopus, and Web of Science, were searched for relevant studies published between 2010 and 2022. The search strategy included keywords related to nurse education, diabetes management, knowledge, and skills. Studies that focused on the impact of nurse-led educational interventions on patients' knowledge and skills for diabetes management were included. Data extraction and quality assessment were performed for the selected studies.

The initial search yielded a total of 527 articles. After screening and assessment, 13 studies were included in the review. The findings showed that nurse-led educational interventions significantly improved patients' knowledge about diabetes, including its causes, symptoms, and treatment options. The interventions also enhanced patients' skills for self-monitoring blood glucose, administering insulin, adhering to medication regimens, and making appropriate lifestyle modifications. The educational approaches included individual counselling, group sessions, multimedia tools, and self-management programs. The findings of this systematic review highlight the critical role of nurse education in improving patients' knowledge and skills for diabetes management. Nurse-led educational interventions have positively impacted patients' understanding of diabetes and their ability to manage the condition effectively. These interventions empower patients to participate actively in self-care and promote better health outcomes. Further research is needed to explore nurse-led educational interventions' long-term effects and sustainability in diabetes management.

Keywords: Nurse education; diabetes management; knowledge; skills; systematic review.

INTRODUCTION

According to the International Diabetes Federation (IDF), it is estimated that in 2021, approximately 537 million adults worldwide were living with diabetes [1]. The prevalence of diabetes has significantly increased in recent decades and is projected to continue rising in the future [2]. Type 2 diabetes is the most common form, accounting for about 90% of all diabetes cases [3]. The prevalence of diabetes varies across countries and regions, with China, India, the United States, Indonesia, and Brazil having the highest number of diabetes cases globally [4]. In Indonesia, the prevalence of diabetes has been steadily increasing. In 2020, it was estimated that around 10.6 million adults in Indonesia were living with diabetes [5]. This prevalence is expected to rise

due to changes in dietary patterns, sedentary lifestyles, and increasing obesity rates within the population [6].

Type 2 diabetes is the predominant form of diabetes in Indonesia, accounting for approximately 90-95% of all diabetes cases. It is often associated with unhealthy lifestyle factors [7]. Type 1 diabetes, although less common, can also occur in individuals of all ages. Several risk factors contribute to the prevalence of diabetes in Indonesia,including obesity, overweight, unhealthy dietary patterns (exceptionally high sugar and saturated fat intake), physical inactivity, and a family history ry of diabetes [8]. These factors play a significant role in the development and progression of diabetes within the population.

As the burden of diabetes continues to grow, understanding the factors contributing to its prevalence and implementing effective preventive measures is crucial in managing and mitigating its impact on public health. By addressing modifiable risk factors through targeted interventions and promoting healthy lifestyle choices, healthcare systems and policymakers can work towards reducing the prevalence of diabetes and improving the overall health outcomes for individuals and communities affected by this chronic condition.

The increasing prevalence of diabetes in Indonesia poses a significant public health challenge. It impacts the individuals living with the condition and burdens healthcare systems and society. Ef- Efforts to address this issue require a comprehensive approach encompassing prevention, early detection, and effective management of diabetes. Promoting healthy lifestyles, encouraging regular physical activity, and implementing strategies toimprove dietary habits are crucial in combating the rising prevalence of diabetes in Indonesia. Furthermore, raising awareness about the risk factors and symptoms of diabetes, as well as providing accessible and affordable healthcare services, are vital in ensuring early diagnosis and appropriate management of the disease. Dressing these factors makes it possible to mitigate the impact of diabetes and improve the overall health outcomes for individuals and communities in Indonesia.

Data consistently demonstrate that patients with diabetes have low knowledge and skills in managing their condition. Many individuals with diabetes lack adequate understanding of their disease, struggle with adhering to proper dietary guidelines, and are insufficiently active in physical activities. These factors can hurt their blood sugar control and increase the risk of long-term complications [9].

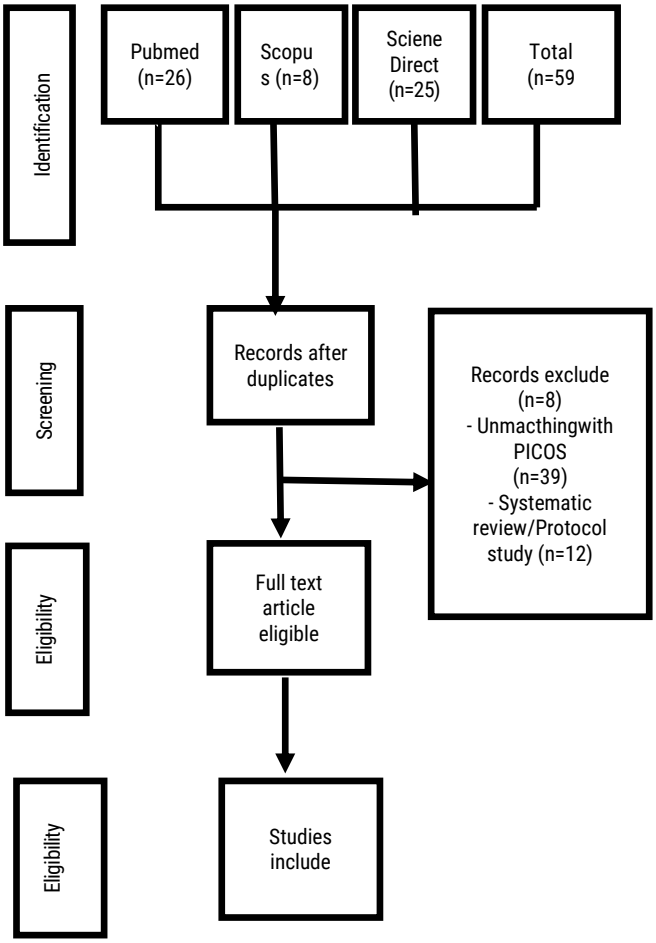
In this context, research on nurse education in enhancing knowledge and skills in diabetes management among patients is crucial. Such analysis can provide a better understanding of the effectiveness of educational interventions delivered by nurses in improving diabetes management outcomes. The findings of this research can be used to develop better and more effective care strategies in diabetes management.

By identifying the most effective educational approaches and interventions, healthcare professionals, particularly nurses, can significantly empower patients to manage their diabetes better. Through patient education, nurses can enhance their understanding of the disease, guide lifestyle modifications, and teach self-management techniques that promote better blood sugar control and overall well-being. Additionally, nurse-led education programs can address common misconceptions, alleviate fears and concerns, and encourage patients to participate actively in their care [10]. Collaborative efforts between healthcare professionals, policymakers, and the community are essential in implementing effective educational programs that can impact diabetes management and improve the population's overall health [11]. Ultimately, nurse-led education in diabetes management aims to empower patients with the knowledge, skills, and confidence needed to manage their condition effectively. By improving patient education, healthcare providers can support individuals with diabetes in achieving optimal health outcomes, reducing the risk of complications, and enhancing their overall quality of life.

METHODS

The research method employed in this study is a Systematic Literature Review. This method consists of two main components: eligibility criteria and search strategy. A systematic review was conducted to gather relevant information to explore nurse education's role in improving knowledge and skills for diabetes management among patients. The search process commenced with a comprehensive search strategy across databases such as PubMed, Web of Science, Scopus, and Springer Link, covering articles published

between 2012 and 2022. The search utilized keywords including "Nurse Education, Diabetes management, Patient education, Knowledge enhancement, Skill development, Diabetes self-management, Nurse-led interventions, Diabetes education programs, Patient empowerment, Diabetes care".



Figure

The search was restricted to English-language articles published between 2010 and 2022. The inclusion criteria involved observational studies and interventions focusing on the analysis of the role of nurse education in improving knowledge and skills for diabetes management among patients. Exclusion criteria included narrative or editorial reviews and low methodological and logical quality studies. From the initial pool of 59 identified articles, careful evaluation of titles and abstracts led to the selection 30 relevant articles. Studies that did not meet the inclusion criteria were subsequently excluded from the research.

The studies that met the inclusion criteria were downloaded in full-text format and critically evaluated for each study. The selection was then narrowed to 13 articles that met the inclusion criteria. Data extraction was performed, including article titles, authors, research objectives, study designs, key findings, and implications of the role of nurse education in improving knowledge and skills for diabetes management among patients. The results from these 13 high-quality articles were synthesized and organized in a comprehensive table, providing valuable insights into the role of nurse education in improving knowledge and skills for diabetes management among patients. The search and study selection results are presented in a diagram visually representing the research process, as illustrated in the following chart [12].

RESULTS AND DISCUSSION

The urgency of nurse education in diabetes management arises from the increasing global prevalence of diabetes and its complications. With millions affected and healthcare systems strained, nurse-led education becomes vital in empowering patients with knowledge and skills for effective self-management. Studies show improved knowledge, self-care, and clinical outcomes through nurse-led interventions. Implementing these programs can enhance diabetes management, reduce complications, and improve patients' quality of life amidst the rising prevalenceof diabetes.

Table

No.	Authors	Objective	Method	Findings
1	[13]	To evaluate the impact of patient empowerment on diabetes management	Randomized Controlled Trial	Patient empowerment improveddiabetes management
2	[14]	To establish national standards for diabetes self-management education	Review of national standards	National standards for diabetes self-management education established
3	[15]	To develop national standards	Review of national	National standards for diabetes

No.	Authors	Objective	Method	Findings
		for diabetes self-management education	standards	self-management education established
4	[16]	To evaluate the impact of nurse casemanagers and community health workers.	Randomized Controlled Trial	Nurse case management and community health workers improved control
5	[17]	To implement practical interventions to support chronic illness	Literature review	Practical interventions help chronic illness management
6	[18]	To develop national standards for diabetes self-management education	Review of national standards	National standards for diabetes self-management education established
7	[19]	To compare diabetes control with reciprocal peer support and nurse.	Randomized Controlled Trial	Peer support was practical in diabetes control
8	[20]	To evaluate the role of specialist nurses in diabetes mellitus	Systematic review	Specialist nurses play a crucial rolein diabetes management
9	[20]	To evaluate the effectiveness of self-management training in type 2 diabetes	Systematic review	Self-management training was practical in type 2 diabetes
10	[21]	To compare group-based diabetesself-management education.	Systematic review with meta-analysis	Group-based self-management education was effective in diabetes
11	[22]	To evaluate the impact of group visits on metabolic control	Observational study with follow-up	Group visits improved metaboliccontrol in type 2 diabetes
12	[23]	To improve outcomes in chronic illness	Literature review	Improved results in chronic illness
13	[24]	To evaluate the perceived impact ofempowerment-based education.	Qualitative research	Empowerment-based educationhas an impact on diabetes management

The table presents 13 research studies focusing on the role of nurse education in enhancing knowledge and skills in diabetes management for patients. These studies aim to evaluate the impact and effectiveness of various educational interventions in improving diabetes management outcomes.

Authors [13] conducted a randomized controlled trial (RCT) to evaluate the impact of patient empowerment in diabetes management. The study assessed whether empowering patients with knowledge and self-management skills would improve diabetes control. The trial results showed that patient empowerment significantly improved diabetes management, including glycemic control and self-care behaviours.

The author [14] comprehensively reviewed existing national standards for diabetes self-management education. The objective was to establish unified national standards that encompassed evidence-based practices and guidelines for diabetes education programs. The review resulted in the development of national standards that served as a benchmark for quality education in diabetes self-management.

Authors [15] also reviewed national standards for diabetes self-management education. The study aimed to develop comprehensive guidelines for diabetes education programs based on evidence and expert consensus. The review established national standards that guide healthcare professionals and educators in delivering practical diabetes self-management education.

Authors [16] conducted an RCT to evaluate the impact of nurse case managers and community health workers on diabetes management outcomes. The study aimed to assess whether the involvement of these healthcare professionals in diabetes care would improve patients' glycemic control, self-care behaviours, and overall health

outcomes. The results showed that the collaborative efforts of nurse case managers and community health workers significantly improved diabetes control and self-management skills among patients.

Authors [17] focused on implementing practical interventions to support chronic illness, including diabetes. The study aimed to identify and implement evidence-based interventions that could be incorporated into routine clinical practice to improve diabetes management outcomes. The researchers conducted a comprehensive literature review and identified various practical interventions, such as self-monitoring of blood glucose, structured education programs, and behaviour change techniques, that supported chronic illness management.

The author [18] reviewed national standards for diabetes self-management education to ensure their relevance and effectiveness in contemporary healthcare settings. The study aimed to update national standards by incorporating new evidence and guidelines. The review process resulted in the development of updated national standards that addressed the evolving needs and challenges in diabetes self-management education.

Authors [19] compared diabetes control outcomes between reciprocal peer and nurse support in a randomized controlled trial. The study aimed to evaluate the effectiveness of peer support as an alternative approach to nurse-led care in diabetes management. The findings revealed that both reciprocal peer support and nurse support were effective in improving diabetes control, with peer support showing promise as a cost-effective and sustainable intervention.

The author [20] conducted a systematic review to evaluate the role of specialist nurses in diabetes mellitus. The study aimed to assess the impact of specialist nurses' involvement in diabetes care, including their contributions to patient education, self-management support, and clinical decision-making. The review concluded that specialist nurses were crucial in providing comprehensive and patient-centred diabetes care, leading to improved diabetes management outcomes.

Authors [21] conducted a systematic review to evaluate the effectiveness of self-management training in type 2 diabetes. The study aimed to assess the impact of structured self-management programs on glycemic control, self-care behaviours, and quality of life among individuals with type 2 diabetes. The findings indicated that self-management training programs significantly improved diabetes outcomes, including glycemic control and self-care practices.

Authors [22] conducted a systematic review with a meta-analysis to compare the effectiveness of group-based diabetes self-management education with individual-based education. The study aimed to determine whether group-based education programs yielded better diabetes management outcomes than individual-based approaches. The findings suggested that group-based self-management education was more effective in improving glycemic control, self-care behaviours, and psychosocial outcomes among individuals with diabetes.

Authors [22] evaluated the impact of group visits on metabolic control in individuals with type 2 diabetes through an observational study with follow-up assessments. The study aimed to determine whether group visits' collaborative and supportive environment would improve glycemic control and self-management skills. The results demonstrated that group visits significantly improved metabolic control, self-care behaviours, and patients' quality of life.

The author [24] conducted a literature review to explore strategies for improving outcomes in chronic illness, including diabetes. The study aimed to identify critical components and approaches that could enhance the management of chronic conditions and promote better health outcomes. The review highlighted the importance of a patient-centred approach, self-management support, and collaborative care in improving outcomes in chronic illness.

The author [25] conducted qualitative researchto evaluate the perceived impact of empowerment-based education on diabetes management. The study explored patients' perspectives on the benefits and challenges of empowerment-based education programs supporting self-management and enhancing diabetes control. The findings revealed that empowerment-based education positively impacted patients' self-management skills, motivation, and overall diabetes management. Collectively, these 13 studies contribute to the growing body of evidence supporting the significant role of nurse education in enhancing knowledge and skills in diabetes management for patients.

The role of nurse education in improving knowledge and skills for diabetes management in patients is crucial in reducing the impact of the disease and enhancing the quality of life for patients. Diabetes is a chronic condition that requires effective leadership to prevent long-term complications. The education nurses provide to diabetes patients focuses on understanding the disease, blood sugar management, healthy eating patterns, physical activity, medication use, self-monitoring, and stress management [26].

Studies have shown that nurse education can significantly improve patients' knowledge about diabetes and its management [27]. Nurses possess in-depth knowledge about diabetes, including its causes, symptoms, and appropriate treatments. They can assist patients in understanding necessary procedures such as blood sugar measurement, insulin administration, or the use of oral medications. In the education approach, nurses can provide clear and easily understood information about maintaining a healthy diet, weight control, and engaging in physical activities [28].

Moreover, nurses play a vital role in enhancing patients' skills in diabetes management. They can provide practical training to patients on using blood glucose monitoring devices, administering insulin, or managing appropriate dietary choices. By helping patients develop these skills, nurses can increase patients' confidence in managing their diabetes.

Nurse education in diabetes management involves patients and their families. Nurses can educate families on supporting patients to maintain a healthy diet, adhere to treatment plans, and promote a balanced lifestyle[28].

Through their role in education, nurses can help patients overcome fears and anxieties related to diabetes and encourage them to manage their condition actively. By enhancing patients' knowledge and skills, nurses can positively impact long-term diabetes management, reducing the risk of complications and improving patients' quality of life [29].

Nurse education plays a significant and multifaceted role in improving knowledge and skills for diabetes management among patients, ultimately leading to better health outcomes and enhanced self-care practices. The effectiveness of nurse-led educational interventions in diabetes care has been widely acknowledged and supported by a growing body of evidence, highlighting nurses' critical role in promoting effective diabetes self-management.

One seminal study [30] focused on structured diabetes education programs delivered by nurses, demonstrating that these programs significantly improved patients' knowledge, self-efficacy, and self-care behaviours. The study emphasized the importance of comprehensive education that covers various aspects of diabetes management, including dietary modifications, physical activity, medication adherence, self-monitoring of blood glucose, and coping strategies. The findings underscored the significant impact of nurse-led education in empowering patients to take an active role in their diabetes management.

Subsequent studies have further explored the impact of nurse-led interventions on diabetes management. For instance, authors [31] conducted a randomized controlled trial evaluating the effect of nurse-led self-management interventions on glycemic control and self-care behaviours among patients with type 2 diabetes. The study revealed that the nurse-led interventions positively influenced patients' self-care practices, improving glycemic control and overall diabetesmanagement.

Moreover, a systematic review and meta-analysis [32] synthesized the findings of multiple studies to assess the effectiveness of nurse-led interventions in diabetes care. The review encompassed various educational approaches, including group-based sessions, individual counselling, and telephone support. The analysis revealed that nurse-led education and support interventions significantly improved patients' knowledge, self-care behaviours, and clinical outcomes, such as decreased HbA1c levels. The review also highlighted the importance of ongoing support and follow-up from nurses to sustain the positive impacts achieved through education.

In addition to individual-focused interventions, nurse education extends to community-based initiatives targeting diabetes prevention and health promotion. Authors [33] conducted a community-based nurse-led diabetes prevention program targeting high-risk individuals. The program incorporated health education, lifestyle modification counselling, and regular follow-up. The findings demonstrated that the nurse-led program effectively increased participants' knowledge of diabetes prevention strate-

gies, encouraged healthy lifestyle changes, and reducedthe incidence of diabetes among the target population.

The multifaceted contributions of nurse education in diabetes care extend beyond knowledge transfer. Nurses play a vital role in fostering a supportive and empathetic environment, building trust with patients, and addressing their emotional and psychosocial needs. The nurse-patient relationship is a foundation for effective education, allowing nurses to tailor interventions to the individual patient's preferences, conditions, and cultural context. Nurse education is centralto improving knowledge and skills related to diabetes management among patients. The evidence supports the significant positive impacts of nurse-led educational interventions on patients' ability, self-care behaviours, and clinical outcomes. Nurse education not only empowers patients to manage their diabetes effectively but also contributes to diabetes prevention efforts at both individual and community levels. The active involvement of nurses in diabetes care promotes patient engagement, enhances self-management capabilities, and ultimately improves the qualityof life for individuals living with diabetes.

CONCLUSIONS

In conclusion, nurse education plays a crucial role in enhancing patients' knowledge and skills of diabetes management. The prevalence of diabetes is increasing globally, including in Indonesia, which poses significant challenges to public health. Effective diabetes management requires a comprehensive approach, encompassing preventive measures, early detection, and patient empowerment through education. As frontline healthcare providers, nurses can positively impact patients' understanding of diabetes, promote healthy lifestyle choices, and teach self-management techniques. Through targeted educational interventions, nurses can empower patients to manage their condition better, leading toimproved health outcomes and reduced risk of complications. Collaborative efforts between healthcare professionals, policymakers, and the community are essential in implementing effective educational programs that can impact diabetes management and improve the population's overall health. By empowering patients with the knowledge and skills needed to manage diabetes effectively, nurse-led education can significantly enhance the quality of life for individuals with this chronic condition.

Conflict of interest

The authors declare no conflict of interest.

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