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Systematic Review

Diabetes Nursing Education Its Implication Towards an Improved Quality of Life of Persons with Diabetes: A Systematic Review

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Abstract: **Background:** Diabetes is a chronic global health issue that requires effective management to improve patient outcomes and quality of life. Nursing education plays a critical role in empowering diabetic patients with self-management skills. Aim This systematic review evaluates the impact of diabetes-focused nursing education on patient outcomes and quality of life. **Methods:** This study uses PRISMA guidelines and a systematic approach to identify and evaluate relevant literature. **Results and Discussion:** Among the 14 studies reviewed, eight emphasized self-management education, while four incorporated multidisciplinary approaches. Findings consistently demonstrated that structured nursing education programs significantly improved self-management behaviors, glycemic control, and patient knowledge. For instance, nurse-led self-management programs resulted in substantial enhancements in self-care skills and diabetes-related knowledge. Moreover, interventions that combined health education with psychological support were particularly effective, leading to better blood glucose control and increased adherence to treatment. Studies that examined quality of life reported reductions in anxiety, improved lifestyle habits, and better overall self-management. These findings highlight the multifaceted benefits of nursing education, suggesting that structured, supportive programs positively impact both clinical and psychological aspects of diabetes care. **Conclusion:** The review emphasizes the value of comprehensive nursing education that integrates both clinical guidance and psychological support for holistic diabetes management. **Implications**: Ongoing professional development and culturally sensitive education programs are recommended to address the diverse needs of diabetic patients. Future research should investigate the long-term effects of nursing education and explore innovative strategies to enhance diabetes management outcomes.

Keywords: Diabetes, Nursing, Diabetes Education, Quality of Life, Systematic Review

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Highlights

What is Known on the Topic

1. Diabetes is a global health issue, with rising prevalence and significant complications affecting quality of life.
2. Nursing education plays a crucial role in improving diabetes self-management and patient outcomes.
3. Tailored education programs improve glycemic control, reduce complications, and enhance patients' quality of life.

What This Paper Adds

1. Structured nursing education programs improve self-management behaviors, glycemic control, and emotional well-being.
2. Multifaceted interventions, including psychological support, enhance both clinical outcomes and quality of life.
3. Diverse approaches, such as culturally sensitive and multidisciplinary programs, address the unique needs of diabetic patients.

1. Introduction

Diabetes is a chronic condition characterized by the body's inability to produce enough insulin or to use insulin effectively. Diabetes encompasses a range of metabolic disorders marked by chronic hyperglycemia due to defects in insulin secretion, insulin action, or both, leading to microvascular complications affecting the eyes, kidneys, and nerves, and macrovascular complications such as heart disease and stroke [1]. It has several types that present as health challenge for many individuals in the world. Type 1 diabetes is an autoimmune condition, often diagnosed in childhood, where the immune system attacks insulin-producing cells in the pancreas. Type 2 diabetes, the most common form, results from a combination of insulin resistance and relative insulin deficiency, frequently associated with obesity and a sedentary lifestyle. Gestational diabetes occurs during pregnancy and increases the risk of developing Type 2 diabetes later in life. Other specific types of diabetes can result from genetic mutations, endocrine disorders, or drug-induced conditions. [2,1] In terms of prevalence, diabetes is a global concern. The global prevalence of diabetes is highest in the Middle East and North Africa (MENA) region, with a comparative prevalence of 18.1%, while the lowest is in the Africa (AFR) region at 5.3%. The Western Pacific region, which includes the Philippines, has the largest number of people with diabetes, estimated at 206 million. The number of people with diabetes is expected to grow the most in the MENA and AFR regions by 2045 due to factors such as population growth, aging, and urbanization [3]. Globally, diabetes-related health expenditures are substantial, amounting to 966 billion USD in 2021 and projected to exceed one trillion USD by 2045 [3].

In the Philippines, an estimated 4.3 million Filipinos were diagnosed with diabetes, while approximately 2.8 million remained undiagnosed, indicating that 1 in 14 Filipino adults has diabetes. The prevalence of diabetes in the Philippines has been increasing, and this trend is expected to continue. By 2045, the number of Filipinos with diabetes is projected to reach 7.5 million, highlighting the urgent need for enhanced management and prevention strategies [4]. This increasing prevalence mirrors the global trend, where the prevalence of diabetes among adults aged 20-79 is estimated to be 10.5%, translating to approximately 536.6 million individuals in 2021, with projections suggesting a rise to around 783.2 million by 2045 [3].

It also significantly impacts mortality in the Philippines, ranking as the fourth leading cause of death in 2022, with 26,744 diabetes-related deaths, accounting for 6.4% of total deaths [4]. The increasing prevalence and mortality associated with diabetes necessitate healthcare interventions and policies to manage and mitigate the disease's impact on the Filipino population. In this regard, nursing education plays a crucial role in promoting the self-management of diabetes.

[5] notes that nursing education equips individuals with the skills and knowledge necessary to manage their condition effectively, including monitoring blood glucose levels, administering insulin, and making appropriate dietary and lifestyle choices. Nurses utilize various educational interventions, such as motivational interviewing and therapeutic play, to enhance adolescents' ability to manage their diabetes. These interventions have demonstrated improvements in health outcomes, including better glycemic control, reduced hospitalization rates, and an overall enhancement in the quality of life for these young patients [5].

In hospital settings, nursing education significantly impacts the management of diabetes by enhancing the knowledge and skills of nursing staff. Structured educational programs, both online and face-to-face, improve nurses' competence and confidence in managing diabetic patients. These programs cover essential aspects such as glucose monitoring, insulin administration, and patient education. Nurses who participate in these educational interventions demonstrate better management of blood glucose levels and appropriate treatment of hypoglycemia, leading to improved patient outcomes [6, 5].

Against this, there is benefit in understanding the impact of diabetes nursing education on the quality of life of people with diabetes, especially as the growing prevalence of diabetes and the need for specialized nursing education. Hence, this systematic review focuses on the determination of the effectiveness of diabetes nursing education programs. Specifically, it aims to determine how nursing education improves patient outcomes as well as determining the role of nursing education in improving the quality of life of diabetic patients through reviewed literature and studies.

2. Materials and Methods

The PRISMA flow diagram (Figure 1) illustrates the systematic process guided to evaluate the impact of nursing education on diabetes management and quality of life. Initially, 210 articles were identified using Boolean logic and keywords such as "diabetes AND nursing education," "nursing education AND diabetes outcomes," and "nursing education AND quality of life AND diabetes" from databases including PubMed, Scopus, Wiley, ScienceDirect, and Elsevier. Abstract screening narrowed the pool to 100 articles, and 50 full-text studies were further assessed for relevance. Following this detailed review process, 14 studies were ultimately included, highlighting the rigorous and transparent approach undertaken.

In the eligibility stage, the remaining 18 articles were evaluated against specific inclusion criteria. The Population included diabetic patients of all ages and backgrounds to ensure a broad understanding across demographics, excluding studies unrelated to diabetic populations. The Intervention criterion required a focus on nursing education programs designed specifically for diabetes management, excluding general nursing education studies. The Outcomes needed to address glycemic control, self-management, or quality of life, while studies without these metrics were excluded. Finally, Study Characteristics required articles to be peer-reviewed, clinical trials, or longitudinal studies published from 2019 onward. Non-peer-reviewed articles, inaccessible full texts, and irrelevant studies were excluded to ensure high-quality evidence. This process resulted in the selection of 14 robust studies for the systematic review.

Table 1. PICO Framework

Component	Details
Population	Diabetic patients of all ages and demographic backgrounds. Studies involving non-diabetic populations were excluded.
Intervention	Nursing education programs specifically designed for diabetes management, including self-management and glycemic control interventions. General nursing education studies were excluded.
Comparison	Studies comparing outcomes of nursing education programs versus usual care or other interventions for diabetes management.
Outcomes	Key metrics included glycemic control, diabetes-related complications, self-management behaviors, and quality of life. Studies that did not report on these outcomes were excluded.
Study Characteristics	Peer-reviewed articles, clinical trials, and longitudinal studies published from 2019 onwards. Non-peer-reviewed articles, abstracts, posters, reviews, opinion pieces, and inaccessible full texts were excluded.

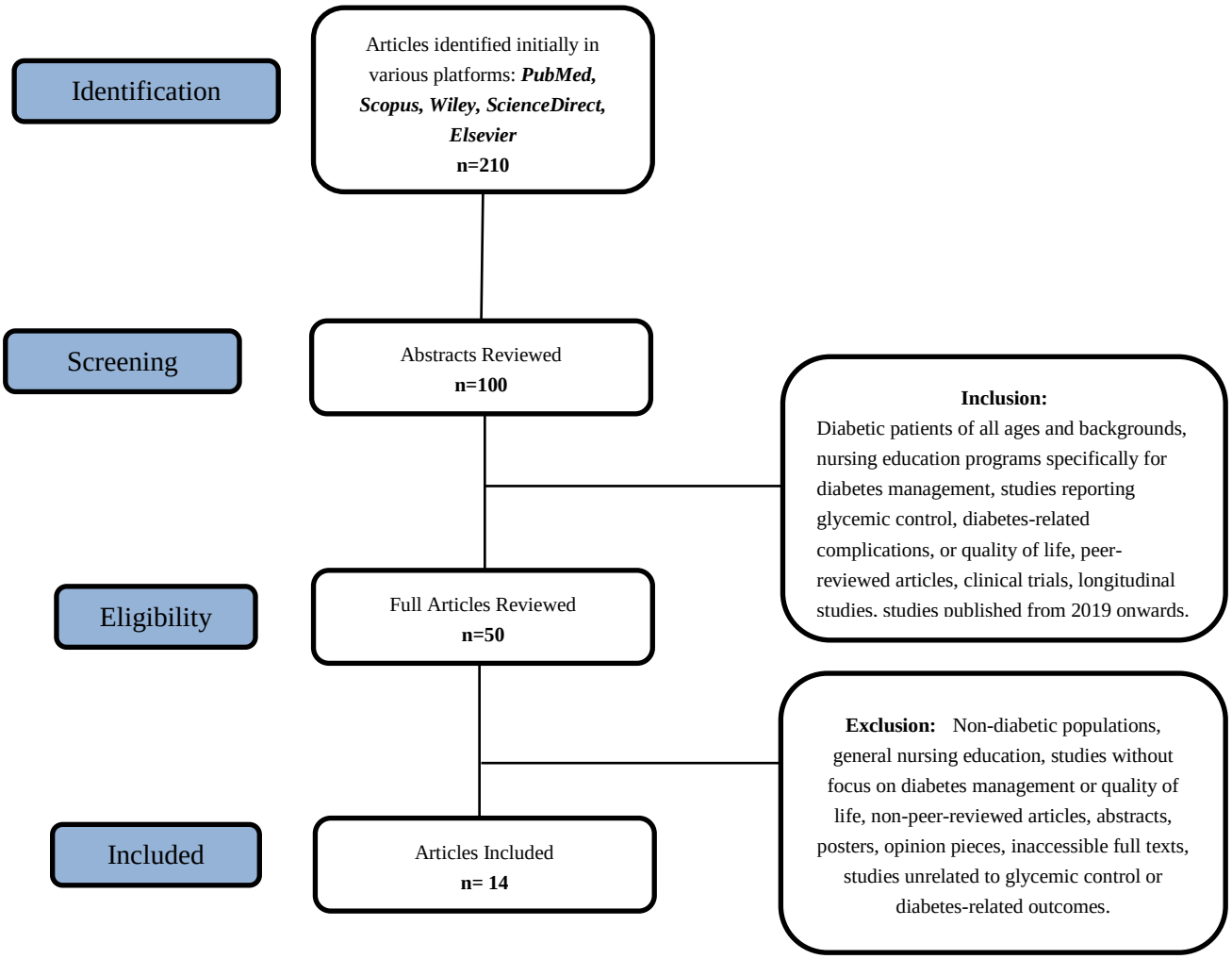

Figure 1. PRISMA Flow Diagram

3. Results

The summary of the study characteristics, as outlined in Table 2, provides a comprehensive overview of the various research designs, objectives, and types of diabetes assessed in recent studies on diabetes nursing education.

The studies predominantly employed quantitative research methods, with 11 out of the 14 studies utilizing this approach. These included pilot studies, quasi- experimental designs, cross-sectional surveys, and randomized controlled trials. One study utilized a mixed-methods approach, integrating both qualitative and quantitative data. The remaining two studies used qualitative methods, specifically semi-structured interviews. The majority of studies focused on Type 2 diabetes, with 10 out of 14 addressing this common form of the disease. Two studies encompassed both Type 1 and Type 2 diabetes. One study examined gestational diabetes, while another focused on diabetic kidney disease. The studies span from 2019 to 2024 with the distribution is as follows: two studies in 2019, four studies in 2021, five studies in 2022, two studies in 2023, and one study in 2024.

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Table 2. Summary of Study Characteristics and Type of Diabetes Assessed

Title	Year	Year and Author(s) (APA 7th)	Study Design	Objectives	Type of Diabetes Assessed
Diabetes specialist nurses' knowledge, skills, and personal attributes for providing competent health education practice, and its influencing factors: A cross- sectional survey	2024	Li, L., Xu, L., & Chen, J.	Quantitative, Cross- sectional	Investigates the knowledge, skills, and personal attributes necessary for diabetes specialist nurses to provide competent health education.	General
The impact of diabetes specialist nurses' in-reach service on people with diabetes on haemodialysis: A pilot study 'education to protect tomorrow'	2024	Joseph, K., Avari, P., Goldet, G., Edwards, C., McCarthy, S., Reed, J., Duncan, N., & Hui, E.	Quantitative, Pilot Study	Examines the effect of diabetes specialist nurses' in-reach service on patients with diabetes undergoing haemodialysis.	Type 2
Nurse-led self-management education and support programme on self-management behaviour and quality of life among adults with type 2 diabetes: A pilot randomized controlled trial	2023	Diriba, D. C., Leung, D. Y. P., & Suen, L. K. P.	Quantitative, Pilot Randomized Controlled Trial	Evaluates the impact of a nurse- led self-management education and support program on self- management behavior and quality of life in adults with type 2 diabetes.	Type 2
Effects of Nurse-Led diabetes Self-Management education on Self-Care knowledge and Self- Care behavior among adult patients with type 2 diabetes mellitus attending diabetes follow- up clinic: A Quasi-Experimental study design	2023	Tamiru, S., Dugassa, M., & Tsegaye, D.	Quantitative, Quasi-Experimental	Analyzes the effects of nurse-led self-management education on self-care knowledge and behavior among adults with type 2 diabetes.	Type 2
Developing the Diabetes Workforce Through Education of Advanced Practice Nurses	2023	McGrath, M., Khamarko, K., & Noya, C.	Quantitative, Survey	Focuses on the development of the diabetes workforce through the education of advanced practice nurses.	Type 1 and Type 2
The Effect of Health Education Combined with Personalized Psychological Nursing Intervention on Pregnancy Outcome of Pregnant Women with Gestational Diabetes Mellitus	2022	He, R., Lei, Q., Hu, H., Li, H., Tian, D., & Lai, Z.	Quantitative, Experimental	Evaluates the effect of health education combined with personalized psychological nursing intervention on the pregnancy outcomes of women with gestational diabetes mellitus (GDM).	Gestational Diabetes

Study on the Nursing Effect of Diabetes Health Education Nursing Methods Applied to Diabetes Patients in the Endocrinology Department	2022	Wang, J., Zhao, Y., & Xie, F.	Quantitative, Comparative	Studies the effects of diabetes health education nursing methods on patients in the endocrinology department.	Type 2
Effects of Systematic Diet Education Combined with Multidisciplinary Nursing on Nutritional Status and Calcium and Phosphorus Metabolism in Patients with Diabetic Kidney Disease in Uremic Phase after Treatment with Alogliptin	2022	Guo, N., Li, N., Zhao, Y., Sun, H., & Liu, K.	Quantitative, Randomized Controlled Trial	Evaluates the effects of systematic diet education combined with multidisciplinary nursing on nutritional status and metabolic outcomes in patients with diabetic kidney disease.	Diabetic Kidney Disease
Effect of locally-contextualized nurse-led diabetes self- management education on psychosocial health and quality of life: A controlled before-after study	2021	Hailu, F. B., Hjortdahl, P., & Moen, A.	Quantitative, Controlled Before-After	Investigates the impact of nurse- led, locally contextualized diabetes self-management education on psychosocial health and quality of life.	Type 2
A therapeutic education program with a diabetes specialist nurse for type 2 diabetes patients using insulin in a primary care setting	2021	Font, C., Colungo Francia, C., & Conget Donlo, I.	Quantitative, Prospective Longitudinal	Evaluates a therapeutic education program led by a diabetes specialist nurse for type 2 diabetes patients using insulin in primary care.	Type 2
Effectiveness of a nurse-led online educational programme based on basic insulin therapy in patients with diabetes mellitus: A quasi-experimental trial	2021	Huang, W., Wei, W., Wang, J., Lyu, Y., & Li, L.	Quantitative, Quasi-Experimental	Assesses the effectiveness of a nurse-led online educational program on basic insulin therapy for diabetes patients.	Type 2
Trends in diabetes care and education by primary health care nurses in Auckland, New Zealand	2021	Daly, B. M., Arroll, B., & Scragg, R. K. R.	Quantitative, Cross- Sectional Surveys	Examines trends in diabetes care and education provided by primary health care nurses in Auckland, New Zealand.	Type 2
Exploring the provision of diabetes nutrition education by practice nurses in primary care settings	2019	Gianfrancesco, C., & Johnson, M.	Qualitative, Semi-Structured Interviews	Explores the role of practice nurses in providing diabetes nutrition education in primary care settings.	Type 2
A culturally sensitive nurse-led structured education programme in patients with type 2 diabetes	2019	Liu, Y., Jiang, X., Jiang, H., Lin, K., & Li, M.	Mixed-Method	Evaluates the effectiveness of a culturally sensitive nurse-led structured education program for patients with type 2 diabetes.	Type 2

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3.1. The Role of Nursing Education in Patient Outcomes Improvement for Diabetic Patients

Table 3 presents a detailed examination of various studies that focus on the impact of nursing education on diabetes management and patient outcomes. The table outlines the specific nursing education interventions and their reported effects on diabetic patients, highlighting the diverse approaches and their effectiveness in improving diabetes-related health outcomes.

Table 3. Studies on Nursing Education and Its Impact on Diabetes Management and Outcomes

Study	Nursing Education Focus in Relation to Diabetes	Role of Nursing Education in Diabetes Patient Outcomes
Li et al. (2024)	Health education competence, continuous education, knowledge, skills, and personal attributes.	Diabetes specialist nurses demonstrated moderate to high levels of health education knowledge, skills, and attitudes, but lacked educational skills.
Joseph et al. (2024)	Diabetes education during dialysis sessions, using intermittent continuous glucose monitoring (isCGM)	Improved glycaemic control, increased diabetes knowledge, better engagement with diabetes care
Diriba et al. (2024)	Nurse-led self-management education and support programme	Improved self-management behaviors with large effect sizes immediately post-intervention and at 2 months follow-up. Enhanced diabetes-related self- management skills.
Tamiru et al. (2023)	Diabetes self-management education (DSME) focusing on self-care knowledge and behaviors.	Significant improvement in self-care knowledge and self-care behavior after nurse-led DSME.
McGrath et al. (2023)	Diabetes care, medical management, and behavioral approaches to self-management	Graduates reported high preparedness in diabetes care, with significant predictors being regular continuing education and years since graduation. High preparedness and camp involvement were linked to better care abilities.
He et al. (2022)	Health education combined with personalized psychological nursing interventions for GDM patients.	Improved blood glucose control, compliance, disease awareness, and better pregnancy outcomes
Wang et al. (2022)	Diabetes health education focusing on diet, medication, blood glucose monitoring, and self-management	Significantly better conditions in patients receiving health education compared to conventional methods; lower fasting and post-meal blood glucose levels, higher disease awareness, reduced complications, and higher treatment compliance.
Guo et al. (2022)	Systematic diet education combined with multidisciplinary nursing	Improved nutritional status, better calcium and phosphorus metabolism, enhanced compliance, reduced anxiety
Hailu et al. (2021)	Nurse-led diabetes self- management education (DSME)	Education was reported to help manage stress and depressive symptoms, but no significant difference in clinical outcomes was found
Font et al. (2021)	Therapeutic education program with a diabetes specialist nurse (DSN)	Improved HbA1c, reduced hypoglycemia episodes, improved diabetes knowledge and self- management skills

Huang et al. (2021)	Nurse-led online education for insulin therapy	Improved blood glucose control, reduced insulin dosage, increased knowledge and compliance rates
Daly, Arroll, & Scragg (2021)	Diabetes management education for primary health care nurses	Education associated with better management practices and nurses feeling more valued
Gianfrancesco & Johnson (2019)	Provision of diabetes nutrition education in primary care settings	Addressed gaps in knowledge and skills, highlighted the need for structured support and training for nurses, and identified time constraints as a major barrier
Liu et al. (2019)	Culturally sensitive nurse-led structured education programme	Significant improvements in diabetes knowledge, self-efficacy, self-management behaviors, and clinical outcomes such as A1C, fasting blood glucose, and LDL

Most interventions focus on improving self-management behaviors, glycemic control, and patient knowledge. Specific approaches include health education competence [7], diabetes education during dialysis sessions [8], and nurse-led self-management programs [9,10].

Out of the 14 studies listed, a significant number—eight (57%)—emphasize self-management education as a core component of nursing interventions. These studies consistently report positive outcomes, such as improved self-care knowledge and behaviors [10], better engagement with diabetes care [8], and enhanced self-management skills [9]. This focus on self- management underscores the importance of empowering patients to take active roles in managing their diabetes.

Additionally, four studies (29%) incorporated a multidisciplinary approach, combining nursing education with other forms of healthcare support, such as personalized psychological interventions [11], systematic diet education [12], and therapeutic education programs [13]. These interventions often resulted in improved nutritional status, better metabolic control, and reduced anxiety, highlighting the benefits of comprehensive, multifaceted care.

Table 3 reveals that out of the 14 studies reviewed, six (43%) explicitly discuss the impact of nursing education on the quality of life for diabetic patients. These studies emphasize various aspects such as enhanced self-management, psychological support, and improved lifestyle and adherence to care.

For instance, [8] and [9]) report significant improvements in patient self-management and overall quality of life, with [9]. highlighting the role of family support and culturally tailored education. Similarly, [11] and [13] note enhancements in self-management abilities, reduced anxiety, and better pregnancy outcomes, with a notable percentage of patients acknowledging the essential role of diabetes specialist nurses (DSNs) in managing their condition.

While [14] and [15] also indicate improvements in quality of life through better disease management and enhanced self- efficacy, they do not explicitly quantify these outcomes. Instead, they focus on the educational and support aspects that indirectly contribute to an improved quality of life.

The remaining studies (57%) do not explicitly mention quality of life but imply potential benefits through improved patient compliance, better disease management, and increased satisfaction and engagement with healthcare workers. For example, [16] suggest that graduates' increased confidence and empathy could positively impact patient quality of life, while [17] imply that better disease management could enhance overall well-being.

3.2. The Role of Nursing Education in Quality-of-Life Improvement for Diabetic Patients

Table 4 presents a detailed analysis of various studies that explore the impact of nursing education on the quality of life for diabetic patients. The table highlights the specific roles that nursing education plays in enhancing patient outcomes, with a particular focus on self-management, psychological support, and overall lifestyle improvements.

Table 4. Impact of Nursing Education on Quality of Life in Diabetes Management Studies

Study	Nursing Role on Patient Quality of Life Based on the Study
Joseph et al. (2024)	Enhanced patient self-management and awareness, improved coordination of care during dialysis sessions.
Diriba et al. (2024)	Significant improvement in quality of life at 2 months post-intervention. Family support and culturally tailored education contributed to better quality of life.
He et al. (2022)	Enhanced self-management ability, reduced anxiety, and improved pregnancy outcomes through personalized psychological support.
Font et al. (2021)	Significant improvements in lifestyle, adherence to care, and perception of quality of life; 98% found the DSN role essential for managing their condition.
Gianfrancesco & Johnson (2019)	Improved quality of life by addressing nutritional needs, but explicit QOL outcomes not discussed; study focused more on educational and support aspects.
Liu et al. (2019)	Improved quality of life through better disease management, enhanced self-efficacy, and self-care activities; ongoing support expected to maintain health behaviors.
Li et al. (2024)	NA - The study primarily focuses on the health education competence of nurses rather than direct patient outcomes or quality of life.
Tamiru et al. (2023)	NA - The study focused on self-care knowledge and behavior rather than direct patient quality of life.
McGrath et al. (2023)	NA - Quality of life not explicitly mentioned but graduates' increased confidence and empathy imply a positive impact on patient quality of life.
Wang et al. (2022)	NA - Although the study mentions improved patient compliance and better disease management, it does not explicitly address quality of life.
Guo et al. (2022)	NA - Not explicitly mentioned, but implies improved nutritional status and reduced anxiety, enhancing overall quality of life.
Hailu et al. (2021)	NA - Despite no statistically significant difference, participants reported DSME sessions as helpful for managing stress and depressive symptoms, indicating a potential positive impact on quality of life.
Huang et al. (2021)	NA - Not explicitly mentioned, but implies increased satisfaction and engagement with healthcare workers.
Daly et al. (2021)	NA - Increased engagement in glycaemic control and medication management, though HbA1c levels unchanged, no explicit mention of quality of life.

4. Discussion

Results overall illustrates the broad scope of nursing education interventions and their significant roles in enhancing diabetes management. [7] emphasize the importance of health education competence, revealing that while diabetes specialist nurses possess considerable knowledge and skills, there is a need for improvement in educational skills. [8] shows that diabetes education during dialysis, coupled with intermittent continuous glucose monitoring, leads to improved glycemic control and better patient engagement.

[9] and [10] both focus on nurse-led self- management education programs, reporting substantial improvements in self- management behaviors and diabetes-related skills. These findings underscore the efficacy of structured educational interventions in fostering self-care among diabetic patients. [11] and [17] further demonstrate the benefits of

combining health education with personalized psychological interventions, resulting in better blood glucose control, increased compliance, and enhanced disease awareness.

Other studies, such as those by [12] and [13], highlight the advantages of multidisciplinary approaches and therapeutic education programs, respectively, which lead to improved nutritional status, better metabolic control, and reduced hypoglycemia episodes. The inclusion of technology, as seen in [18], with online education programs for insulin therapy, also shows positive outcomes in terms of blood glucose control and compliance rates.

The consistent improvement in glycemic control, self-management behaviors, and patient knowledge across various studies underscores the crucial role that well-structured nursing education plays in effective diabetes care. The integration of psychological support within educational programs, as noted in studies by [11] and [17], highlights the importance of addressing the emotional and mental well-being of patients alongside clinical management.

Furthermore, the diverse range of educational approaches—from face-to-face interventions and continuous education to online programs and multidisciplinary strategies—reflects the adaptability and comprehensive nature of nursing education. This adaptability is vital for meeting the unique needs of different patient populations, as evidenced by the positive outcomes reported across various types of diabetes, including Type 2 diabetes, gestational diabetes, and diabetic kidney disease.

Meanwhile, the data from Table 3 highlights the crucial role of nursing education in enhancing the quality of life for diabetic patients. The studies that explicitly mention quality of life improvements consistently report positive outcomes such as better self-management, reduced anxiety, and improved lifestyle adherence. These findings underscore the multifaceted benefits of nursing education, which not only addresses clinical aspects of diabetes care but also supports the psychological and emotional well-being of patients. The focus on self-management education, as seen in studies like [9] and [13], indicates that empowering patients with the knowledge and skills to manage their condition is a key factor in improving their quality of life. This empowerment is further enhanced by personalized psychological support, which addresses the emotional challenges associated with diabetes management.

Moreover, the studies imply that continuous support and culturally tailored education play significant roles in maintaining health behaviors and improving patient outcomes. The importance of diabetes specialist nurses in providing this ongoing support is evident, with patients recognizing their critical role in managing their condition effectively.

5. Recommendations

To improve diabetes nursing education, it is essential to incorporate continuous professional development programs that focus on enhancing educational skills and competencies. Integrating technology, such as online education platforms and mobile health applications, can provide scalable and accessible educational resources for both patients and healthcare providers. Additionally, developing culturally sensitive and personalized education programs can better address the diverse needs of diabetic patients, leading to improved engagement and outcomes.

In clinical practice, there should be a stronger emphasis on multidisciplinary approaches that combine nursing education with other healthcare supports, such as psychological counseling and nutritional guidance. Implementing regular follow-ups and support sessions can help maintain patient engagement and adherence to self-management practices. Future research should focus on longitudinal studies to evaluate the long-term impact of nursing education on patient outcomes and quality of life. Exploring innovative educational strategies and their integration into routine clinical practice can provide deeper insights into effective diabetes management.

6. Conclusion

The systematic review underscores the pivotal role of nursing education in enhancing diabetes management and improving the quality of life for diabetic patients. The findings consistently indicate that structured nursing education programs lead to significant improvements in self-management behaviors, glycemic control, and patient knowledge. Studies highlighted the importance of multidisciplinary approaches and personalized psychological support, which not only improve clinical outcomes but also address the emotional and mental well-being of patients. The consistent positive outcomes across various types of diabetes demonstrate the adaptability and effectiveness of nursing education interventions in diverse patient populations.

The review also reveals that while many studies focus on clinical outcomes, the impact of nursing education on the quality of life is equally critical. Enhanced self-management, reduced anxiety, and improved lifestyle adherence are key benefits that contribute to a better quality of life for diabetic patients. These findings highlight the necessity for ongoing, comprehensive nursing education that integrates both clinical and psychological support to foster holistic diabetes care. The role of diabetes specialist nurses in providing continuous support and culturally tailored education is crucial in achieving these outcomes.

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References

[1] Egan, A. M., & Dinneen, S. F. (2018). What is diabetes? Medicine, 47(1), 1-4. https://doi.org/10.1016/j.mpmed.2018.10.002

[2] Magliano, D. J., & Boyko, E. J. (2021). What is diabetes?. In IDF Diabetes Atlas (10th ed.). International Diabetes Federation. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK581938/

[3] Sun, H., Saeedi, P., Karuranga, S., Pinkepank, M., Ogurtsova, K., Duncan, B. B., ... & Magliano, D. J. (2022). IDF Diabetes Atlas: Global, regional and country-level diabetes prevalence estimates for 2021 and projections for 2045. Diabetes Research and Clinical Practice, 183, 109119. https://doi.org/10.1016/j.diabres.2021.109119

[4] Cando, L. F. T., Quebral, E. P. B., Ong, E. P., Catral, C. D. M., Relador, R. J. L., Velasco,A. J. D., Alcazar, R. M. U., Reyes, N. A. L., Pilotin, E. J. B., Ornos, E. D. B., Paz- Pacheco, E., & Tantengco, O. A. G. (2024). Current status of diabetes mellitus care and management in the Philippines. Diabetes & Metabolic Syndrome: Clinical Research & Reviews, 18, 102951. https://doi.org/10.1016/j.dsx.2024.102951

[5] Pereira, C., Catarino, M., & Nunes, A. C. (2023). Therapeutic Nursing Education in Promoting Self-Management of Adolescents with Type 1 Diabetes Mellitus: Integrative Literature Review. Nursing Reports, 13, 470-479. https://doi.org/10.3390/nursrep13010043

[6] Piya, M. K., Fletcher, T., Myint, K. P., Zarora, R., Yu, D., & Simmons, D. (2022). The impact of nursing staff education on diabetes inpatient glucose management: a pilot cluster randomised controlled trial. BMC Endocrine Disorders, 22(61). https://doi.org/10.1186/s12902-022-00975-y

[7] Li, L., Xu, L., Jia, G., Zhou, X., Tang, X., Zhao, H., ... & Ma, P. (2024). Diabetes specialist nurses' knowledge, skills, and personal attributes for providing competent health education practice, and its influencing factors: A cross-sectional survey. *Nurse Education Today*, 106298.

[8] Joseph, K., Avari, P., Goldet, G., Edwards, C., McCarthy, S., Reed, J., ... & Hui, E. (2024). The impact of diabetes specialist nurses' in-reach service on people with diabetes on haemodialysis: A pilot study'education to protect tomorrow'. *Diabetic Medicine: a Journal of the British Diabetic Association*, e15306-e15306.

[9] Diriba, D. C., Leung, D. Y., & Suen, L. K. (2024). Nurse-led self-management education and support programme on self-management behaviour and quality of life among adults with type 2 diabetes: A pilot randomized controlled trial. *International Journal of Nursing Practice*, *30*(2), e13245.

[10] Tamiru, S., Dugassa, M., Amsalu, B., Bidira, K., Bacha, L., & Tsegaye, D. (2023). Effects of Nurse-Led diabetes Self-Management education on Self-Care knowledge and Self-Care behavior among adult patients with type 2 diabetes mellitus attending diabetes follow up clinic: A Quasi-Experimental study design. *International Journal of Africa Nursing Sciences*, *18*, 100548.

[11] He, R., Lei, Q., Hu, H., Li, H., Tian, D., & Lai, Z. (2022). The effect of health education combined with personalized psychological nursing intervention on pregnancy outcome of pregnant women with gestational diabetes mellitus. *BioMed Research International*, *2022*(1), 3157986.

[12] Guo, N., Li, N., Zhao, Y., Sun, H., & Liu, K. (2022). Effects of systematic diet education combined with multidisciplinary nursing on nutritional status and calcium and phosphorus metabolism in patients with diabetic kidney disease in uremic phase after treatment with alogliptin. *Journal of Healthcare Engineering*, *2022*(1), 1120242.

[13] Font, C. C., Francia, C. C., Torres, I. V., i Morató, M. J., & Donlo, I. C. (2021). A therapeutic education program with a diabetes specialist nurse for type 2 diabetes patients using insulin in a primary care setting. A diabetes education program with a diabetes specialist nurse in a primary care setting. *Endocrinología, Diabetes y Nutrición (English ed.)*, *68*(9), 628-635.

[14] Gianfrancesco, C., & Johnson, M. (2020). Exploring the provision of diabetes nutrition education by practice nurses in primary care settings. *Journal of human nutrition and dietetics*, *33*(2), 263-273.

[15] Liu, Y., Jiang, X., Jiang, H., Lin, K., Li, M., & Ji, L. (2019). A culturally sensitive nurse-led structured education programme in patients with type 2 diabetes. *International journal of nursing practice*, *25*(5), e12757.

[16] McGrath, M., Khamarko, K., & Noya, C. (2023). Developing the Diabetes Workforce Through Education of Advanced Practice Nurses. *The Journal for Nurse Practitioners*, *19*(3), 104408.

[17] Wang, J., Zhao, Y., & Xie, F. (2022). [Retracted] Study on the Nursing Effect of Diabetes Health Education Nursing Methods Applied to Diabetes Patients in the Endocrinology Department. *Journal of Healthcare Engineering*, *2022*(1), 3363096.

[18] Huang, W., Wei, W., Wang, J., Lyu, Y., & Li, L. (2022). Effectiveness of a nurse-led online educational programme based on basic insulin therapy in patients with diabetes mellitus: A quasi-experimental trial. *Journal of Clinical Nursing*, *31*(15-16), 2227- 2239.

[19] Celik, S., Olgun, N., Yilmaz, F. T., Anataca, G., Ozsoy, I., Ciftci, N., ... & Cetin, N. (2022). Assessment of the effect of diabetes education on self-care behaviors and glycemic control in the Turkey Nursing Diabetes Education Evaluating Project (TURNUDEP): a multi-center study. BMC Nursing, 21, 215. https://doi.org/10.1186/s12912-022-01001-1

[20] Daly, B. M., Arroll, B., & Scragg, R. K. R. (2021). Trends in diabetes care and education by primary health care nurses in Auckland, New Zealand. *Diabetes Research and Clinical Practice*, *177*, 108903.

[21] De la Fuente Coria, M. C., Cruz-Cobo, C., & Santi-Cano, M. J. (2020). Effectiveness of a primary care nurse delivered educational intervention for patients with type 2 diabetes mellitus in promoting metabolic control and compliance with long-term therapeutic targets: Randomized controlled trial. International Journal of Nursing Studies, 101, 103417. https://doi.org/10.1016/j.ijnurstu.2019.103417

[22] Hailu, F. B., Hjortdahl, P., & Moen, A. (2021). Effect of locally-contextualized nurse-led diabetes self-management education on psychosocial health and quality of life: A controlled before-after study. *International Journal of Africa Nursing Sciences*, *15*, 100325.

[23] Kolb, L., Mensing, C., Tomky, D., Moss-Barnwell, L., Colberg, S. R., Davidson, P., DeCoste, K. C., D'Hondt, N., Duker, P. N., LeBow, E., Maryniuk, M., McElwee- Malloy, M., Miller, D. K., Peeples, M., Rinker, J., Sauter, C., See, M. B., & Sisson, E. (2021). An Effective Model of Diabetes Care and Education: The ADCES7 Self- Care Behaviors™. The Science of Diabetes Self-Management and Care, 47(1), 30-50. https://doi.org/10.1177/0145721720978154

[24] Liu, X. (2023). Advances in Psychological and Social Aetiology of Patients with Diabetes. *Diabetes, Metabolic Syndrome and Obesity*, 4187-4194.

[25] Powers, M. A., Bardsley, J. K., Cypress, M., Funnell, M. M., Harms, D., Hess-Fischl, A.,... & Uelmen, S. (2020). Diabetes self-management education and support in adults with type 2 diabetes: A consensus report of the American Diabetes Association, the Association of Diabetes Care & Education Specialists, the Academy of Nutrition and Dietetics, the American Academy of Family Physicians, the American Academy of PAs, the American Association of Nurse Practitioners, and the American Pharmacists Association. Diabetes Care, 43(7), 1636-1649. https://doi.org/10.2337/dci20-0023

[26] Sørensen, M., Groven, K. S., Gjelsvik, B., Almendingen, K., & Garnweidner-Holme, L. (2020). The roles of healthcare professionals in diabetes care: a qualitative study in Norwegian general practice. Scandinavian Journal of Primary Health Care, 38(1), 12-23. https://doi.org/10.1080/02813432.2020.1714145

[27] Wang, X., Yuan, C. X., Xu, B., & Yu, Z. (2022). Diabetic foot ulcers: Classification, risk factors and management. *World journal of diabetes*, *13*(12), 1049.

[28] Young, H. M., Miyamoto, S., Dharmar, M., & Tang-Feldman, Y. (2020). Nurse coaching and mobile health compared with usual care to improve diabetes self-efficacy for persons with type 2 diabetes: randomized controlled trial. JMIR Mhealth Uhealth, 8(3), e16665. https://doi.org/10.2196/16665