



THE EFFECTIVENESS OF NURSE-LED INTERVENTIONS IN MANAGING DIABETES

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Abstract:

Background: Diabetes mellitus (DM) is a prevalent chronic metabolic disorder affecting millions globally. The rise in DM cases poses a significant public health challenge, with associated complications leading to increased healthcare resource utilization. Nurses play a crucial role in DM management, including patient education, self-management support, interprofessional teamwork, prescribing medications, telephone interventions, and psychological care. **Objective:** This research article aims to underscore the vital contributions of nurses in the comprehensive management of diabetes mellitus. By examining the various roles and interventions carried out by nurses in diabetes care, the study seeks to highlight the impact of nurse-led initiatives on patient outcomes, self-care practices, and overall health management for individuals with diabetes. **Conclusion:** Nurses are pivotal in the holistic care of individuals with diabetes, offering a range of services from education to psychological support. Nurse-led interventions have been shown to improve patient outcomes, enhance self-care knowledge, and promote better health management in diabetes. By empowering patients, bridging communication gaps, and providing tailored support, nurses play a critical role in enhancing the quality of life and clinical outcomes for those living with diabetes. The findings underscore the indispensable contribution of nurses in the multidimensional care of individuals with diabetes, emphasizing the significance of nurse-led interventions in optimizing diabetes management and patient well-being.

Keywords: diabetes mellitus, chronic patients, nurse-led interventions, self-management, patient outcomes.

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Introduction:

Diabetes mellitus (DM) is a persistent metabolic condition arising from deficiencies in insulin function, insulin secretion, or both, leading to elevated blood glucose levels. DM ranks among the top four non-communicable diseases globally and is the most prevalent metabolic disorder. The primary types of DM are type 1 DM (T1DM) and type 2 DM (T2DM), with T2DM being more widespread, accounting for 90–95% of all DM cases [1]. The escalating prevalence of DM poses a significant public health challenge worldwide, with the World Health Organization (WHO) reporting a substantial increase in the number of People with Diabetes (PWD) from 108 million in 1980 to 422 million in 2014, projected to rise to 592 million by 2025. The global prevalence of DM in adults has nearly doubled since 1980, climbing from 4.7% to 8.5%. Notably, DM-related deaths surged by 70% between 2000 and 2019, with developing countries bearing a substantial burden, hosting around 77% of PWD in low- and middle-income nations [2]. Projections from the International Diabetes Federation suggest that DM cases will continue to rise, reaching 9.9% globally by 2030 [3].

PWD face increased risks of complications and extended hospital stays, as evidenced by the National Diabetes Inpatient Audit (NaDIA) in 2019, indicating that 18% of hospital beds were occupied by PWD, up from 14% in 2010 [4]. Consequently, the management of DM demands attention due to potential complications leading to poor health outcomes and excessive healthcare resource utilization. While DM is often a secondary reason for hospital admissions, non-diabetes specialists typically oversee patient care, with reports indicating that doctors in training lack comprehensive knowledge in DM management, with only 28% exhibiting full confidence in this area [5].

Specialist nurses are increasingly assuming roles in caring for PWD, providing education and support across specialties to ensure timely patient discharge and prevent hospital admissions. Their continuous presence allows for better patient education and care practices compared to other healthcare professionals, given their frequent interactions with patients [6]. Studies, such as the one by Lou et al. [7], highlight nurses' superior listening skills and knowledge in managing PWD, underscoring their commitment and attitude towards patient care. Diabetes inpatient specialist nurses (DISNs) play a crucial role in coordinating, educating, counseling, motivating, and leading PWD care, with recommendations from the National Institute of

Clinical Excellence (NICE) advocating for at least one DISN per 300 hospital beds [8]. Despite these recommendations, a significant number of hospitals still lack dedicated DISNs, as reported by NaDIA in 2018 [9].

The increasing prevalence of T2DM emphasizes the necessity for novel care models in T2DM management and the essential role of nurses in facilitating optimal care practices for PWD. While nurses' contributions to efficient DM management are significant, their collaborative efforts with other healthcare providers are often undervalued, particularly in countries like Saudi Arabia where DISNs are not formally recognized. Healthcare systems are gradually adopting nurse-led models that prioritize patient-centered care over traditional physician-led models, reflecting a shift towards more holistic care approaches. With adequate training, nurses can effectively manage DM, with recent trends showing a transition in responsibilities from physicians to nurses. Nurses can spearhead the development, implementation, and oversight of effective DM interventions by directly delivering care, supervising care delivery, and training non-medical staff in DM care for diverse patient populations [11].

Objectives:

The main objective of this review is to analyze the various roles of nurses in management of patients with diabetes mellitus.

Roles of Nurses in the Management of Diabetes Educating Patients with Diabetes:

In contemporary healthcare settings, diabetes nurse educators (DNEs) play a crucial role in empowering patients with the necessary knowledge and skills to effectively manage diabetes mellitus (DM) through self-care practices. Research has identified seven key factors that contribute to successful self-care management, encompassing strategies such as adopting healthy coping mechanisms, minimizing risks, problem-solving, regular monitoring of glucose levels, adhering to medication regimens, engaging in physical exercise, and maintaining a balanced diet [12]. The efficacy of health education interventions is contingent upon patients' acceptance of their diabetes diagnosis, with sociodemographic variables like educational attainment influencing adherence to self-care behaviors in DM management. Tailoring care delivery methods to individual needs is essential, with visual aids and teach-back techniques recommended for patients with limited literacy skills [13].

Moreover, personalized one-on-one consultations have been shown to be more effective than group-based sessions in facilitating patient education and promoting disease self-management [14,15]. Numerous studies have underscored the pivotal role of nurses in educating patients about managing their diabetes and have highlighted the positive impact of nurse-led educational initiatives on patient outcomes, including enhanced glycemic control [16]. Recent research by Bostrom et al. emphasized the critical role of diabetes specialist nurses (DSNs) in patient education, with a focus on teaching individuals about diabetes, interpreting diagnostic test results, and potential complications associated with the condition [17].

In a randomized trial conducted by Wexler et al., participants who received formal education and intervention care from specialist nurses demonstrated significantly lower mean glucose levels and improved glycated hemoglobin A1c (HbA1c) levels post-discharge compared to those receiving standard care [18]. HbA1c testing, a key indicator of long-term blood glucose control, revealed notable improvements in glycemic management among patients in the intervention group. Additionally, Raballo et al. found that patients receiving group care led by a multidisciplinary team of healthcare professionals exhibited more positive attitudes and better health outcomes compared to those receiving traditional individual care [19,20].

The evolving role of nurses in diabetes education is pivotal in enhancing glycemic control and fostering patient empowerment, as evidenced by the shift towards more collaborative and comprehensive care approaches [21].

Nurse-Led Diabetes Self-Management Education and Support (DSMES) and Educational Intervention:

Previous research has demonstrated that enhancing self-care knowledge and practices can be achieved through diabetes self-management support and patient education. Notably, the American Diabetes Association (ADA) has emphasized the significance of Diabetes Self-Management Education (DSME) for people with diabetes (PWD) and has recommended the integration of nurse-led DSME programs in diabetes management. Similarly, the International Diabetes Federation, Centers for Disease Control and Prevention, and the World Health Organization have also advocated for the incorporation of nurse-led DSME initiatives in the management of diabetes. Key objectives of DSME, as routinely

monitored and evaluated, encompass enhancing quality of life, improving health status, facilitating self-management support, and enhancing clinical outcomes [22]. In a research study carried out at an American Diabetes Association center, Brunisholz and colleagues illustrated that Diabetes Self-Management Education (DSME) provided by certified diabetes educators, including a registered nurse or dietitian, can significantly improve various aspects of diabetes care bundle outcomes. These improvements include maintaining HbA1c levels below 8.0%, reducing low-density lipoprotein levels below 100 mg/dL, managing blood pressure below 140/90 mmHg, ensuring nephropathy screening or prescribing angiotensin receptor or angiotensin-converting enzyme blockers, and conducting retinal eye exams. The results highlight the advantages of incorporating DSME programs into the treatment of Persons with Diabetes (PWD) [23]. Additionally, such programs are cost-effective [24].

Furthermore, nurses have implemented a variety of techniques in diverse healthcare settings. Sherifali et al. [25] examined the effects of a personalized patient-tailored and computer-generated feedback intervention on glycemic control [26]. Another study evaluated a clinic-based intervention aimed at improving glycemic control [27]. Kang et al. [28] compared the effectiveness of conventional care with a family partnership intervention in managing diabetes mellitus. Nurse-led studies often focus on culturally appropriate diabetes management interventions.

Several studies have investigated the impact of nurse-led educational interventions. One study utilized focus groups with individuals diagnosed with Type 2 Diabetes Mellitus (T2DM) to identify educational needs and develop an intervention based on the focus group findings [29]. A symptom-based educational intervention was created to address diabetes symptoms and empower patients to choose self-management strategies based on their preferences and needs. Additionally, a web-based DSME program was designed to allow patients to progress through modules at their own pace and achieve set goals. Educational intervention studies have been developed to evaluate the effects of specific diabetes education programs on outcomes such as HbA1c levels, self-management behaviors, and diabetes knowledge [30]. Conversely, other studies have explored innovative educational approaches like telephone-delivered education, multimedia education programs, web-based diabetes education, and personalized educational programs [31].

Cumulatively, the results from these studies demonstrate the favorable impact of the educational methods mentioned above.

Interprofessional Teamwork in Diabetes Care:

In the realm of healthcare, nurses play a crucial role within interprofessional teams by employing a variety of strategies to aid in the self-management of individuals with diabetes (PWD). Collaboration between nutritionists and nurses is often seen, as they work together to offer guidance on appropriate dietary intake and food selections, an area recognized as particularly challenging in the self-management of diabetes [32]. Additionally, nurses collaborate with psychologists to provide counseling for individuals with diabetes, and they closely coordinate with physicians to conduct patient screenings and adjust healthcare plans as necessary. According to the American Diabetes Association (ADA), individuals with diabetes should receive Diabetes Self-Management Education (DSME) in accordance with the National Standards for DSME upon diagnosis and subsequently as needed. This education is delivered through both group sessions led by nurses and individualized educational sessions, with the possibility of utilizing web-based platforms for educational purposes [33]. Furthermore, it is recommended that partners or family members of individuals with diabetes also receive education as part of the nursing intervention.

Nurse Prescribing in Diabetes Care:

Nurse-led clinics have emerged as a novel approach in the management of diabetes, offering a promising avenue for enhancing disease control. These clinics exhibit variability in their organizational structure and the extent of responsibilities delegated to nurses. In the realm of diabetes management, nurses play a pivotal role in patient education and support, particularly focusing on insulin administration. Recent developments have seen some clinics expand the scope of nursing duties to encompass prescription authority and monitoring of drug therapies. Within these clinics, nurses serve as valuable complements to physicians in the comprehensive management of diabetes, aiming to facilitate timely access to effective and safe healthcare.

The core objective of this care model is to empower individuals to receive timely and high-quality healthcare services. Nurse prescribers in these settings are tasked with prescribing medications, encompassing tasks such as initiating, adjusting, or discontinuing drug regimens. The extent of autonomy granted to nurse prescribers can vary

widely, ranging from adherence to strict protocols delineating specific indications and drug choices to a more independent approach encompassing all aspects of prescribing [34].

The regulatory framework and training requirements play a crucial role in shaping the operational dynamics of nurse-led clinics in different healthcare settings. For instance, in New Zealand, registered nurses working in specialized teams and primary healthcare settings are authorized by the Nursing Council of New Zealand to prescribe certain medications, including antidiabetic drugs, upon completion of a Nursing Council-approved postgraduate diploma.

Multiple studies have underscored the positive impact of nurses in enhancing diabetes management outcomes [35]. While existing research predominantly highlights the favorable contributions of nurses in chronic disease management, the focus on nurse prescribers remains relatively limited. A meta-analysis conducted in 2010 examined the efficacy of nurse case management interventions on glycemic control, demonstrating a clinically significant improvement in blood glucose levels, as indicated by HbA1c measurements.

Furthermore, structured nurse-led interventions, incorporating care algorithms, have been associated with reductions in cardiovascular disease risk factors, such as hypertension in diabetic patients. Contrary to expectations, a study by Martinez-Gonzalez et al. found no significant disparity in HbA1c reduction between physician-led and nurse-led care models, emphasizing the potential of nurses in delivering effective diabetes management strategies [36].

Nurse-Led Telephone Interventions:

Telephone counseling sessions are utilized to offer support and education to individuals with diabetes (PWD). In a study, participants were contacted by a registered nurse at least once a week over a twelve-week period. These calls involved monitoring blood glucose levels, medications, physical activity, and discussing dietary habits. Participants were encouraged to ask questions and make adjustments to their treatment plans based on their dietary choices and blood glucose readings. In another study, participants received pre-recorded weekly telephone calls. Additionally, participants received automated health education messages, and nurses followed up with phone calls based on participants' responses during these interactions [37].

Individualized care through telephone counseling has been shown to be effective for individuals with diabetes, as demonstrated in a study where participants completed self-management questionnaires. The responses provided valuable information for tailoring instruction and support during telephone sessions. Nurses can monitor and educate individuals through telephone interventions. For diabetes management, a telehealth nurse in a study monitored insulin doses and blood glucose levels online. After reviewing patient data, telehealth nurses contacted participants as needed to recommend follow-up with primary healthcare providers or modifications to the treatment plan [38].

On the other hand, personalized interventions involve adapting strategies to meet individual preferences, abilities, and needs, with nurses supporting individuals in adhering to recommended treatment plans. Nurses can provide customized education plans based on patient-set goals and assessments for managing diabetes. Educational sessions can be adjusted according to participants' self-management experiences and inquiries [39]. Nurses emphasize experiential learning to address challenges and establish objectives for diabetes self-management. Serving as coaches, nurses guide individuals through their self-management plans and help them establish personal goals. Nurses assist patients in problem-solving and adjusting goals if challenges arise, drawing on their expertise in diabetes care or collaborating with the healthcare team's protocols [40].

Psychological Care and Counselling:

In both primary and secondary healthcare settings, Diabetes Specialist Nurses (DSNs) play vital roles during hospital stays. A review of interventions indicated that patients showed a preference for contacting their DSNs over their General Practitioners (GPs). DSNs offer social, psychological, and emotional support to patients and their families, leading to higher satisfaction levels among patients who maintain contact with them. Their positive influence on diabetes patient outcomes is evident. DSNs are crucial for building confidence and trust in healthcare providers and promoting optimal health for both patients and their families [41].

DSNs also help bridge communication gaps between patients and healthcare providers, serving as intermediaries to prevent issues from escalating, which is particularly important as diabetes

management progresses and treatment adjustments become necessary. Patients with diabetes often experience fear and anxiety, especially when facing medical complications and poor metabolic outcomes. Psychological support and care are essential for patients with diabetes, especially in hospital settings [42].

Nurses play a key role in motivating patients with diabetes, with studies highlighting their importance in providing psychological support. Nurses are more attuned to patient needs and psychosocial issues, which significantly impact patients' self-care and disease management. While nurses excel in providing psychosocial care, they may feel less equipped to address patients' psychosocial needs compared to their physical care requirements, leading to referrals to specialists. Nurses strive to instill hope and security in their diabetes patients, assisting them in addressing issues such as illiteracy and denial. Various strategies employed by nurses include humanizing care, nurturing relationships, advocating for patients, and empowering through education [43].

Conclusion:

In conclusion, the research article highlights the critical role of nurses in the management of diabetes mellitus (DM). Nurses play a pivotal role in educating patients with diabetes, providing self-management support and education, engaging in interprofessional teamwork, prescribing medications, conducting telephone interventions, and offering psychological care and counseling. The article emphasizes the importance of nurse-led interventions in improving patient outcomes, enhancing self-care knowledge and practices, and promoting better health management for individuals with diabetes. Nurses are essential in empowering patients, providing support, and bridging communication gaps in diabetes care, ultimately contributing to improved quality of life and clinical outcomes for patients with diabetes.

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