

Impact of Nurse Interventions on Diabetic Patient Outcomes

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ABSTRACT

As the global prevalence of diabetes mellitus continues to surge, particularly Type 2 Diabetes Mellitus (T2DM), there is an urgent need for innovative models of care and practice in its management. This study explores the critical role of nurses, especially Diabetes Inpatient Specialist Nurses (DISNs), in enhancing diabetes care through

education and support. A comprehensive review of existing literature highlights various nursing interventions that improve patient knowledge, self-management behaviors, and clinical outcomes, including glycosylated hemoglobin (A1C) levels. The objectives of this study are threefold: to assess the impact of nurse-led educational interventions on patient knowledge and attitudes, to quantify reductions in A1C levels among nursing intervention groups compared to standard care, and to evaluate patient satisfaction and quality of life post-intervention. Findings underscore the significance of nurse-led Diabetes Self-Management Education and Support (DSME), which have demonstrated enhanced patient satisfaction, reduced hospital admissions, and decreased lengths of hospital stays. The study also addresses the barriers faced by nurses in diabetes care, advocating for systemic changes in policies, education, and professional recognition to better integrate and expand the role of nurses in diabetes management. Ultimately, this review emphasizes that empowering nursing professionals is essential for optimizing diabetes care delivery and improving patient outcomes in the context of a growing global health challenge.

KEYWORDS: diabetes mellitus, chronic patients, nurse-led interventions, selfmanagement, patient outcomes.

Introduction

The worldwide incidence of people with diabetes mellitus (PWD) is on the rise. The increasing prevalence of type 2 diabetes mellitus (T2DM) highlights the necessity for innovative models of practice and care in managing this condition. Numerous studies have indicated the need to equip nurses with the essential knowledge to promote optimal practices for PWD. Furthermore, the American Diabetes Association (ADA) has acknowledged the significance of Nurse-Led Diabetes Self-Management Education and Support (DSME) for PWD, recommending the integration of nurseled DSMES into diabetes management strategies [1]. Nurses provide education and support to both patients and healthcare staff across various specialties and offer clinic or phone consultations to ensure timely patient discharge or to prevent unnecessary hospital admissions. Given that nurses spend the majority of their time with patients, they are in a unique position to deliver care and education to PWD more effectively than other healthcare professionals. Additionally, nurses are better equipped to implement effective measures and best care practices for diabetes management than other healthcare providers, including physicians. A study by Lou et al. [2] found that nurses tend to be more attentive listeners and have a superior understanding of PWD compared to their counterparts in other healthcare roles. Overall, these results indicate that nurses generally exhibit a stronger commitment and outlook towards the care of People With Diabetes (PWD) compared to other healthcare professionals. Diabetes inpatient specialist nurses (DISNs) are proficient nurses capable of coordinating, educating, counseling, motivating, leading, and assisting in the care management of PWD within diabetes care. Furthermore, while nurses significantly contribute to effective diabetes management, their collaborative efforts with other healthcare providers are often underappreciated [3]. However, there is a growing trend within healthcare systems towards adopting nurse-led models, which are oriented more towards patient-centered care as opposed to traditional physician-led models that

emphasize a medically-focused approach. Evidence shows that with appropriate training, nurses can perform critical roles in diabetes management, and current trends indicate a shift in responsibilities traditionally handled by physicians to nurses. In addition, nurses have the capacity to develop, implement, and oversee effective diabetes management interventions by directly delivering care, supervising care processes, and training non-medical staff to provide diabetes care for a diverse patient population [4]. This review article outlines various nursing interventions and the roles of nurses as educators, motivators, and caregivers that are crucial in managing Type 2 Diabetes Mellitus (T2DM). It also extensively discusses various outcomes measured to assess the impact of nursing interventions and strategies to address the existing and emerging challenges faced by nurses in the field of diabetes care. Conversely, diabetes nurse educators (DNEs) play a vital role in empowering patients with the confidence and knowledge necessary to achieve self-care objectives for diabetes management. Seven key factors contribute to effective self-care management, including healthy coping strategies such as risk reduction, problem-solving, glucose level monitoring, medication adherence, regular exercise, and maintaining a balanced diet [5]. Nevertheless, the success of health education initiatives largely hinges on a patient's acceptance of their diabetes condition. Moreover, sociodemographic variables such as the individual's educational background can influence adherence to self-care practices in diabetes management. Care delivery methods must also be thoughtfully considered, with visual aids and teach-back strategies recommended for those with low literacy levels. Additionally, one-on-one consultations have proven to be more effective than group consultations. Numerous studies have assessed the impact of nursing care, confirming that nurses are instrumental in educating patients on disease management. Further research has shown that nurse-led education positively affects patient conditions, including improvements in glycemic control [6].

Objectives:

The study aimed to:

1. Assess how educational interventions delivered by nurses impact knowledge, attitudes, and self-care behaviors among diabetic patients.
2. Quantify the changes in glycosylated hemoglobin (A1C) levels in diabetic patients receiving specific nurse interventions versus those receiving standard care.
3. Measure the impact of nurse interventions on patient satisfaction with care and overall quality of life, utilizing validated survey tools to compare results pre- and post-intervention.

The role of nurses in increased patient satisfaction:

Disease-Specific Nurses (DSNs) play a crucial role in enhancing patient satisfaction. In a study involving 214 patients in the UK, Courtenay et al. [7] found that satisfaction among PWD improved when they consulted with prescribing nurses, attributed to longer consultation times and the development of relationships between patients and

nurses. Additionally, approximately 92% of patients indicated that the care management program led by DSNs was moderately to extremely supportive in helping them manage their conditions. Another study demonstrated that a DSN-led care program for newly diagnosed patients with T2DM was clinically effective, resulting in increased patient motivation and satisfaction. During workshops in London focused on enhancing the patient experience and diabetes management, patients with T1DM expressed a desire for more support and education for their friends and family. Meanwhile, patients with T2DM requested more personalized care and continuity by seeing the same healthcare provider. These findings suggest that DSNs can improve patient satisfaction through self-management empowerment, educational sessions, and longer, more personalized consultations [8].

Impact on Prevention of Hospital Admissions and Shorter Length of Hospital Stay:

Indeed, care provided by DISNs can lead to a reduced length of hospital stay for PWD. It was reported that a DISN (1 nurse per 250 inpatient beds) can decrease the length of stay (LOS) for inpatients with DM, and this finding is supported by various studies. A significant reduction in LOS was reported after the introduction of a wardbased diabetes nurse advisor. Pre- and post-intervention practice data collected by nurses suggested that the presence of a DSN prescriber resulted in a median LOS of PWD of 3 days, which led to significant cost savings. A team of DISNs can also ensure appropriate and timely follow-up and discharge [9]. PWD also reported that hospital admissions could be averted by involving DISNs in accident and emergency (A&E) departments. In that study, which was conducted over 3.5 years, the authors reported that a substantial number of people attending A&E received treatment and were discharged home without admission into the hospital. Interestingly, a cost of around GBP 35,000 was reduced at the hospital over 3.5 years by providing patientfocused care and reducing bed occupancy. In a different study, it was demonstrated that fewer hospital resources for patients were consumed whilst under DSN care, and markedly fewer hospitalisations and emergency room visits were observed for preventable diabetes-associated causes. The introduction of a DISN service also decreased the DM-associated excess bed occupancy in a 6-year study. DISNs play an important role in both the promotion of patient self-management and patient education. Increased knowledge regarding DM and greater awareness can lead to shorter hospitalisations. Moreover, educational programmes led by inpatient diabetes educators are associated with reduced readmissions [10].

Impact on Enhancing Diabetes Knowledge:

In nursing intervention studies, diabetes knowledge is frequently measured to assess the impact of education. A study developed and implemented by nurses that involved 52 contact hours over one year of instructional sessions and support on DM selfmanagement and basics observed substantial rises in diabetes knowledge compared to a wait-listed control group. The impact of interactive multimedia on self-directed learning in the knowledge of PWD utilising a collection of nursing and medical instructions regarding DM logged on compact discs was also studied. Diabetes selfmanagement counselling and a booklet were received by the control group.

Compared to the control group, substantial enhancement was observed in diabetes knowledge in the intervention group. In another study, the intervention group received monthly telephone discussions as well as group and individual educational sessions focused on family participation while the control group received the usual care. The knowledge scores of the intervention group were markedly greater than the control group [11]. A study assessed the effectiveness of continuous group-based DSME, where nursing-led educational sessions focused on T2DM addressed topics such as metabolic control improvement, physical activity, diet, complications, and fundamental concepts. Notably, the intervention group demonstrated a significant increase in diabetes knowledge [12]. Different studies have also reported significant improvements in diabetes knowledge among participants in the intervention group following educational interventions [13,14]. Various educational formats aimed at diabetes management have shown positive outcomes for both control and experimental groups. One such intervention involved a video behavior support program that included a brochure on diabetes self-management for the control group while providing telephone coaching sessions and a workbook by a registered nurse for the experimental group. Interestingly, both groups exhibited significant increases in knowledge, with no differences noted between them [15]. In another study, modest improvements in diabetes knowledge were recorded in the experimental group after delivering needs-driven and patient-centered educational sessions, alongside traditional DSME for the control group; however, no significant differences were found between the groups. The feasibility of diabetes and cardiac self-management programs was examined in a separate pilot study, where a nurse conducted three educational sessions and a follow-up telephone call one week postdischarge. Text messaging was utilized to address questions related to selfmanagement a week after the telephone intervention. Slight enhancements in diabetes knowledge were noted following this intervention, though there were no significant differences between the control and experimental groups [16].

The Role of Nurses in Self-Management Behaviours:

PWD are actively engaged in the planning and implementation of their care. Healthcare professionals should assist patients in self-management to empower PWD to effectively and confidently handle DM. Nurses play a vital role in aiding PWD with problem-solving and establishing goals for successful DM management. According to the American Diabetes Association, PWD receive support for selfmanagement activities such as monitoring for complications, taking medications, performing self-blood glucose monitoring, engaging in physical activity, and maintaining healthy eating habits. Nursing interventions also contribute to behavior change in patients for the efficient management of DM. Nurse-led interventions have been shown to promote healthier behaviors among adult PWD. This educational program for patients incorporated visual aids, problem-solving tasks, discussions, and presentations of content. The experimental group demonstrated a statistically significant improvement in health-promoting behaviors, which included preventing

complications, maintaining hygiene, managing medication, exercising, and dietary practices, when compared to the control group receiving standard care. In another related study, a notable improvement in glucose self-monitoring, medication compliance, physical activity, and dietary practices was observed in adult patients with T2DM in the experimental group [17].

A symptom-focused, nurse-delivered, and in-home counselling and education intervention provided DM intervention modules for patients with T2DM. An extensive improvement was observed in glucose monitoring, diet, and medication practices in the experimental group. However, no significant differences were observed between groups in terms of exercise. A study also evaluated the efficacy of a structured diabetes education programme on self-care. Telephone and face-to-face educational sessions were delivered by nurses addressing problem-solving and selfcare. Participation in physical activity and self-blood glucose monitoring were markedly ameliorated in the experimental group, and the alteration was also noteworthy compared to the control group [18]. A psychologist and certified diabetes education nurse cofacilitated sessions that particularly focused on diabetes selfmanagement problem-solving, goal-setting, coping, experiential learning, and questions in a 24-month study. A marked improvement was observed in foot complications, blood glucose monitoring, and diet after 6 months. On the other hand, marked improvements were observed in insulin usage and diet after 24 months [19].

Overcoming the Challenges for Nurses in Diabetes Care:

In addition to adequate training, it is crucial to implement significant changes across nursing education, health systems, policy, and societal levels to enhance the involvement of nurses in the care, management, and prevention of diabetes. These initiatives are vital to enable nurses to fulfil their potential in addressing global challenges. A referendum held in Switzerland in 2021 highlighted the importance of nursing and the nation's obligation to ensure an adequate supply of nurses, thereby enhancing the recognition of the significant roles that nurses play [20]. Despite their vital contributions, nurses frequently do not receive sufficient acknowledgment in governance structures. Switzerland addresses the leadership deficit within the nursing field by integrating a cantonal nurse specifically tasked with conveying the unique perspectives of nurses and engaging with policymakers and various stakeholders. Modifying the types of services provided by nurses and increasing compensation for nurse-delivered services are effective strategies to acknowledge the significance of their roles. Within a health system, it is essential to identify obstacles to expanding the roles of nurses. For instance, in Kyrgyzstan, which is categorized as a low-income and middle-income country (LMIC), the inability of nurses to prescribe medications represents a key barrier from both a systemic and legal standpoint [21]. Furthermore, the general public's and even physicians' perceptions of nurses' roles in managing non-communicable diseases, including diabetes, present an additional limitation to the responsibilities that nurses can undertake.

It is important to address more practical elements along with the introduction of DSNs to enable nurses to exert roles in prescribing medicines, running nursedirected diabetes

clinics, carrying out diabetes research, and providing diabetes education. A successful extension of nursing roles has been implemented in Thailand, where nurses play various roles as advanced practice nurses, case managers, and educators in diabetes care. Nonetheless, studies have reported that these measures in LMICs resulted in a moderate outcome on DM management associated with reduced blood glucose levels [22]. Nurses ought to have a fundamental role in management and prevention in order to ensure access to diabetes care and to reach global targets. Alongside the global rise in the prevalence of DM, it is important to increase the number of nurses and to improve leadership and training. Moreover, it is crucial to exert fundamental changes within the general nursing environment. It is also important to provide better employment opportunities with clear career paths and better professional recognition. Global issues of migration and retention need customised solutions to ensure that resolving staff shortage issues in one country does not lead to the depletion of nurses in other countries. Along with societal recognition by the population and policymakers, the health system ought to completely acknowledge the significance of the roles played by nurses within the health system [23].

Conclusion:

In conclusion, this study highlights the critical role that nurses play in the management of diabetes mellitus, particularly Type 2 diabetes. The evidence demonstrates that nurse-led interventions significantly enhance patient education, self-care behaviors, and overall satisfaction, while also reducing hospital admissions and lengths of stay. As front-line caregivers, nurses contribute uniquely to diabetes care by fostering patient engagement and providing personalized support that extends beyond traditional clinical paradigms. However, in order to fully realize the potential of nursing in diabetes management, systemic barriers must be addressed, including enhancing training, advocating for recognition within healthcare governance, and improving the overall working environment for nurses. By embracing a collaborative and empowered approach, healthcare systems can better harness the expertise of nurses to meet the growing challenges posed by the increasing prevalence of diabetes.

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