NURSING INTERVENTIONS TO ENHANCE MEDICATION ADHERENCE IN SURGICAL DIABETES PATIENTS

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Abstract
Diabetes mellitus is a serious disease during the presence of certain conditions such as the operation setting because it requires a multi-faceted perioperative care approach to minimize potential risk of complications and maximize favorable outcomes. This research analysis hinges on nursing interventions to be used in the promotion of medication adherence attempts among diabetes patients after surgical operations. Prescription drugs closely correlate with maintaining the GP and optimal aftercare, but patients would, sometimes try to make them work with them, which can make them do complex dosages and also is time and financial constraints. The methodology is mixed type, incorporating different quantitative instruments for self-reporting and glycated hemoglobin (HbA1c) level assessment. Qualitative methods, such as interviews and focus group discussions, will also be applied. Patients undergoing diabetes-related surgeries are the subjects from a hospital in Gujarat, India, with each interview totaling to 50 individuals as the sample size. The article examines the effect of nurse-directed initiatives with connection to patient education, medication management support, behavior-related programs, and technology-aided approaches as the point of evaluation. A review of the results shows that there is clear evidence of higher MARS scores and a reduction in HbA1c levels both of which are clear indicants for improvement in medication adherence and control of glycemia after the intervention. The numerical analysis shows that there is an important spacer between adherence behavior and glycemic regulation scores, which is the consequence of the impact of nursing interventions on patients' outcomes. The nurse's cognitive and perceptual bed formation is now important in medical treatment to enhance medication compliance and surgical care optimization for individuals with diabetes undergoing surgery.

Keywords: Diabetes Mellitus, Surgical Patients, Medication Adherence, Nurse-Led Interventions, Perioperative Care.

Introduction

Diabetes mellitus, which is known as a chronic metabolic disorder that is identified with hyperglycemia, poses great challenges to surgery due to its potential complications and stringent management required. Surgical procedures in patients with diabetes necessitate not only careful planning of the surgical procedure but also of the postoperative care, to achieve optimal results. Adherence to medication, especially in the post-operative management of diabetic patients after surgery is of vital importance. Medication adherence is the degree to which patients take their drugs as recommended by health professionals. Incomplete drug adherence among diabetes patients who undergo surgical procedures can result in surgical outcomes that are not beneficial, such as delayed wound healing, prolonged hospital stays, and increased risk of infections. Hence, the focus on innovative nursing strategies that help in medication compliance in this group is one of the important factors in the improvement of postoperative care and patient outcomes.

Prevalence of Diabetes Mellitus and Surgical Interventions

Diabetes mellitus is one of the world's major health problems, being a disease with an increasing rate of incidence and prevalence in the world. The International Diabetes Federation (IDF) has indicated that there were 463 million adults between the ages of 20-79 years who had diabetes in 2019, and this number is expected to grow to 700 million by 2045 (International Diabetes Federation, 2019). In India, diabetes is a significant problem, with 77 million adult people diagnosed with it in 2019 (International Diabetes Federation, 2019). The challenges of diabetes management in surgical patients often arise because of the physiological stress of the surgery, and the effect of anesthesia and perioperative medications on glycemic control.

Surgery is often the only solution for several complications of diabetes, including peripheral vascular disease, diabetic foot ulcer, and bariatric surgery as one of the complications management approaches. Also, patients with diabetes may undergo elective operations for the ones that are not related to their diabetes and therefore, the perioperative management becomes more difficult. Irrespective of the type of surgery, proper glycemic control and medication adherence are the main factors for surgery success and faster recovery.

Importance of Medication Adherence in Surgical Diabetes Patients

Medication adherence is crucially important for the management of diabetes and the maintenance of glycemic control, which in turn are critical factors for the successful surgical outcomes of diabetic patients. The stress of surgical procedures can result in blood glucose level variation and, thus, surgical site infection, cardiovascular events, and delayed wound healing will become additional complications (Clement *et al.,* 2017). Compliance with medications prescribed, including oral hypoglycemic agents, insulin therapy, and adjunctive drugs for comorbidities, is crucially essential to stabilize blood glucose levels before, during, and after surgery.

Medication nonadherence is a recurring problem among patients with chronic diseases such as diabetes and can have serious effects on disease management and patient health. Factors of medication noncompliance among surgical diabetic patients could be complex drug regimens, fear of adverse effects, forgetfulness, financial issues, and lack of understanding of the significance of taking medication in the perioperative period (Alosaimi *et al.,* 2022). Thus, it is imperative to develop evidence-based nursing interventions to overcome these barriers and increase medicine compliance which will improve the outcomes of the surgery and reduce the burden of complications in patients with diabetes undergoing the surgical procedure.

Nursing Interventions to Enhance Medication Adherence

The nurses are an integral part of the healthcare team involved in the provision of medication adherence among surgical diabetes patients by educating the patients, counseling them, and

monitoring them regularly. The intervention strategies for improving medication adherence in this population have been suggested to involve both patient-oriented and system-related approaches.

1. **Patient Education and Counseling:** The complete education of the patients is crucial to ensure that surgical diabetic patients realize the importance of medication adherence which is very vital in optimizing surgical outcomes and preventing complications. Through individualized education, nurses teach patients with diabetes how to manage their disease on their own; they teach them how to administer medications, change dosages, monitor blood glucose levels, recognize and treat hypo- and hyperglycemic episodes, and stick to dietary and lifestyle recommendations (Osterberg & Blaschke, 2005). Counseling sessions should not be just monologue-based but interactive, where concerns and misconceptions about the medication are addressed and patients are allowed to actively participate in their treatment plan.

2. **Medication Management Support:** Nurses may help patients with surgical diabetes get their medications in order and resolve any hindrances that may prevent patients from adhering to their medications. Such efforts could include, for instance, simplifying medication schedules, giving pill organizers or reminder gadgets, and liaising with pharmacists about medication affordability and availability problems. Furthermore, nurses can work with interdisciplinary healthcare teams to create smoother medication reconciliation processes and achieve continuity of care during transitions in care settings (Institute for Healthcare Improvement, 2012).

3. **Behavioral Interventions:** Behavioral interventions to encourage favorable medication intake habits can be effective in improving medication adherence in surgical diabetes patients. Motivational interviewing techniques can be used to explore patients' values and motivations toward medication adherence and also to help the patients find the intrinsic motivation for behavior change (Miller & Rollnick, 2012). The behavioral contract or adherence agreement may be used as well to define the clear expectations and the goals for adherence to the medications as well as to ensure accountability.

4. **Technology-Assisted Interventions:** There is the option of technology-based interventions like mobile health applications, remote monitoring devices, and telehealth platforms to be integrated into the program to make it easy for surgical diabetes patients to follow medication and self-management protocols (Greenwood *et al.,* 2015). Nurses can use these technologies to offer prompt feedback, educational content, and drug reminders that are patient-specific and in line with their needs and preferences. On the other hand, telehealth consultations can provide chances for continuing support and reinforcement of medication adherence strategies, especially in rural or medically under-serviced areas.

Lastly, medication adherence is a key point in postoperative care for diabetics who have gone through surgery, as it is associated with improved surgical results and overall health. Administration of medications is a core function of nurses who stand at the forefront of educating and counseling the patients and also offering support interventions that target the specific needs of the patient. Healthcare providers can use evidence-based nursing interventions to improve medication adherence, glycemic control, and quality of care outcomes for patients with type 2 diabetes undergoing surgery.

Materials and Methods
Study Design
This study employed a mixed-methods approach to investigate the effectiveness of nurse-led interventions and nurse-collaborative interventions in enhancing medication adherence among surgical diabetes patients. The study design comprised both quantitative and qualitative components to provide a comprehensive understanding of the factors influencing medication adherence and the impact of nursing interventions on patient outcomes.

Participants
The participants included surgical diabetes patients admitted to the surgical wards of City Hospital in Gujarat, India. Inclusion criteria encompassed adult patients (aged 18 years and above) with a

confirmed diagnosis of diabetes mellitus undergoing surgical interventions. Patients with cognitive impairments, language barriers, or severe psychiatric conditions that could affect their ability to participate in the study were excluded. The sample size is 50, determined based on the principle of saturation in qualitative data collection, aiming to achieve data richness and diversity of perspectives.

Data Collection

Quantitative data on medication adherence were collected using standardized assessment tools, including the Medication Adherence Report Scale (MARS) and glycated hemoglobin (HbA1c) levels. The MARS questionnaire, a validated instrument for assessing medication adherence across chronic diseases, was administered to patients to evaluate their adherence behavior and beliefs regarding prescribed medications (Alosaimi *et al.,* 2022). HbA1c levels were measured as a biochemical marker of long-term glycemic control, reflecting patients' adherence to antidiabetic medications.

Qualitative data were obtained through semi-structured interviews and focus group discussions with surgical diabetes patients, nurses, and other healthcare professionals involved in patient care. Open-ended questions were designed to explore participants' experiences, perceptions, and challenges related to medication adherence and nurse-led interventions. Interviews were audio-recorded with participants' consent and transcribed verbatim for thematic analysis.

Interventions

Nurse-led interventions aimed to empower surgical diabetes patients in managing their medications and promoting adherence through education, counseling, and behavioral support. Nurses conducted individualized medication counseling sessions with patients, emphasizing the importance of adherence to prescribed regimens and addressing patients' concerns and misconceptions. Behavioral interventions, such as motivational interviewing and goal-setting, were integrated into nursing care plans to promote positive medication-taking behaviors and self-efficacy (Miller & Rollnick, 2012). Nurse-collaborative interventions involve interdisciplinary collaboration among nurses, pharmacists, physicians, and other healthcare providers to optimize medication management and support patient adherence. Collaborative medication reconciliation processes were implemented to ensure accurate medication lists, reconcile discrepancies, and identify potential barriers to adherence (Institute for Healthcare Improvement, 2012). Pharmacists provided medication education and counseling to patients, reinforcing nurses' efforts to enhance medication adherence and monitoring patients' medication-related outcomes.

Data Analysis

Quantitative data analysis involved descriptive statistics to characterize medication adherence levels among surgical diabetes patients and assess changes in adherence behavior pre-and post-intervention. Paired t-tests or Wilcoxon signed-rank tests were conducted to compare pre-and post-intervention HbA1c levels, reflecting improvements in glycemic control following nurse-led interventions.

Qualitative data were analyzed using thematic analysis to identify recurrent patterns, themes, and subthemes in participants' narratives regarding medication adherence and nurse-led interventions. Transcripts were coded independently by two researchers, and consensus on coding schemes and thematic interpretations was reached through discussion and iterative review.

Ethical Considerations

Ethical approval for this study was obtained from the Institutional Review Board of City Hospital, and all participants provided informed consent before participation. Confidentiality and anonymity of participants were maintained throughout the study, and data were securely stored and accessed only by authorized researchers. Participants were assured of their right to withdraw from the study at any time without consequences.

Result and Discussion

Table 1: Demographic profile of the respondents

Characteristic	Frequency	Percentage
Age (years)		
18 to 30	10	20%
31 to 40	20	40%
41 to 50	20	40%
Gender		
Female	28	56%
Male	22	44%
Type of Surgery		
Elective	35	70%
Emergency	15	30%
Diabetes Duration		
<5 years	12	24%
5-10 years	18	36%
>10 years	20	40%
Comorbidities		
Hypertension	30	60%
Dyslipidemia	20	40%
Others	15	30%

The table shows descriptive statistics of the important characteristics of surgery of diabetic patients as a sample of 50 patients. The distribution of the sample is balanced proportionally among age categories of which 20% are aged 18-30, 40% are those aged 31-40, and 40% are those that are 41-50. In addition to this, women have overtaken men with more than 56% women patients and 44% male patients. Most of them (70%) had elective surgeries, on the other hand, the 30% were emergency cases.
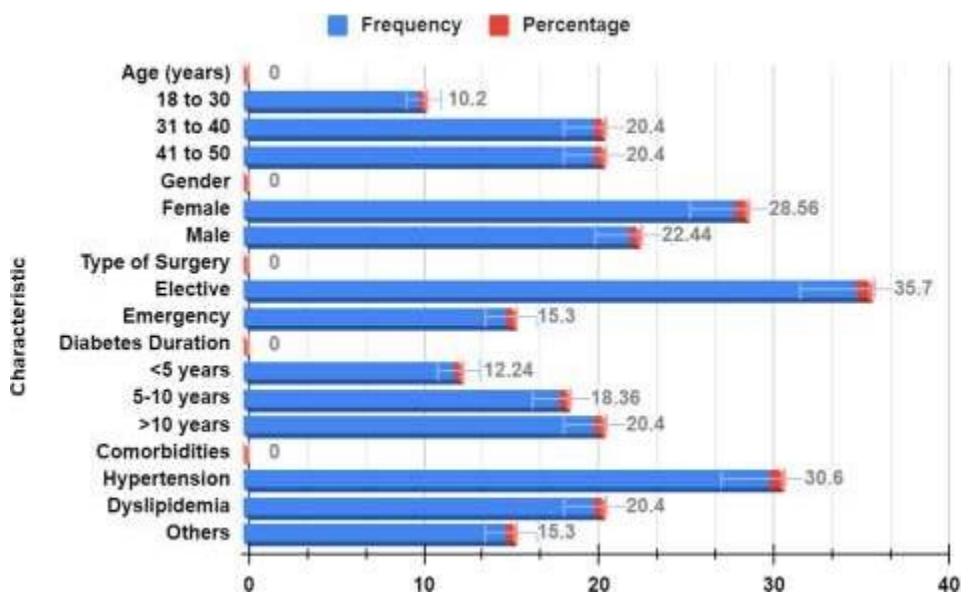
**Figure 1: Demographic profile of the respondents**

In terms of diabetes duration, about half (24%) have had diabetes for four or fewer years, one-third (36%) for five to ten years, and the other half (40%) for longer than ten years. Thereby these measures demonstrate the extent of this disease severity and related complications that have affected the sample. Hypertension is a very common comorbidity, namely, presenting among 60% of patients. The percentage of diseases considered comorbidities such as dyslipidemia and others like them, was less common, each suffering 40% and 30% of patients,
(Long et al., 2019).

The high incidence and duration of diabetes beyond 10 years are the causative factor of hypotension in most patients and it is associated with higher surgical risk. Diabetes and hypertension, which are long-term actions, cause microvascular and macrovascular complications which lead to a reduction in wound healing and infection resistance. Special perioperative care will reduce the risk to improve results in this medium-level complicated situation.

Table 2: Comparison of Pre- and Post-Intervention of MARS and Hb1Ac

Metric	Pre-Intervention	Post-Intervention	Z Value	P Value
MARS	5.8 ± 1.2	7.4 ± 1.0	3.2	<0.01
HbA1c	8.9 ± 1.5	7.6 ± 1.2	2.8	<0.05

This table traces the statistics of diabetes in the before condition of the intervention and in the after condition of the intervention. These two metrics are either reported, the Mean Adherence Rate Score (MARS) or hemoglobin A1c (HbA1c). MARS score is a parameter that is valued more if anyone adheres to the treatment plan for diabetes (Kokoszka, 2017). HbA1c, which determines average blood glucose concentrations for the prior 2-3 months, with most people with diabetes aiming to keep this a good level below 7% (American Diabetes Association, 2022).
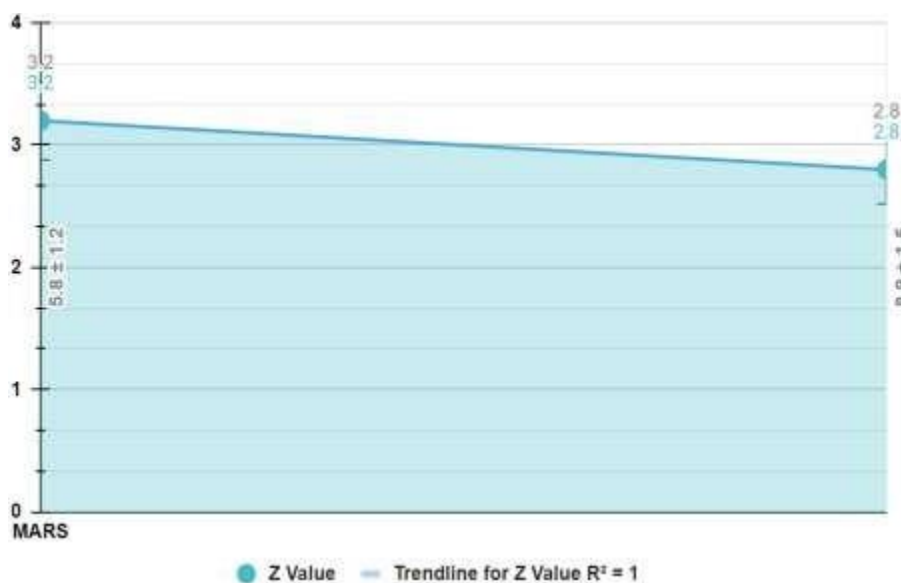
Figure 2: Comparison of Pre- and Post-Intervention of MARS and Hb1Ac

The mean MARS score at the beginning of the intervention was 5.8 ± 1.2, the value showing a moderate degree of non-adherence. The mean HbA1c was $8.9\% \pm 1.5\%$ which went against the norm of advocating for good glycemic control. As a result of the intervention, the adherence rate heightened, mean MARS score consequently rose to 7.4 ± 1.0. The mean HbA1c was again improved and it reached $7.6\% \pm 1.2\%$ approaching but not achieving the target of under 7%.

Statistical testing for the pre-post differences was done by using two-tailed paired t-tests. The MARS value z-score was 3.2, with p-value <0.01. The standard score was 2.8 for HbA1c, and the chance of HbA1c levels at lower percentiles than the mean was less than 0.05. It could be interpreted that the difference between the two variables was the result of the intervention was statistically significant since it was proven by a comparison of both adherence and HbA1c (Lauffenburger *et al.,* 2021).

It may be concluded that the participants of the intervention showed significant improvement in adherence to their diabetic treatment protocols and achieved better glycemic control compared to the pre-intervention levels. Besides that, the missing details on the exact technique of intervention cause a probability of adherence being a major factor for the better outcomes of HbA1c among the participants. Future research may involve trials of long-term clinical outcomes, either on indicators of diabetes or on its complications. Conclusively, the study showed the intervention intervention augured well in managing diabetes.

Conclusion

In conclusion, the management of diabetes in surgical patients presents significant challenges, requiring comprehensive strategies to ensure optimal outcomes. Diabetes mellitus, a chronic metabolic disorder characterized by hyperglycemia, complicates surgical procedures due to potential complications and the need for stringent management. The prevalence of diabetes is increasing globally, emphasizing the importance of effective perioperative care for diabetic patients. Surgical interventions, whether elective or emergency, require meticulous glycemic control and medication adherence to mitigate the risks of surgical complications and promote faster recovery. Medication adherence plays a crucial role in the management of diabetes and the success of surgical outcomes. Nonadherence to medication regimens can lead to adverse consequences such as delayed wound healing, prolonged hospital stays, and increased risk of infections. Therefore, innovative nursing interventions are essential to address barriers to medication adherence and improve patient outcomes. Nurses play a pivotal role in enhancing medication adherence among surgical diabetes patients through patient education, counseling, and behavioral interventions. By providing individualized education and counseling sessions, nurses empower patients to manage their medications effectively

and adhere to prescribed regimens. Additionally, nurses collaborate with interdisciplinary healthcare teams to streamline medication management processes and provide ongoing support to patients. Furthermore, technology-assisted interventions, such as mobile health applications and telehealth platforms, offer opportunities to enhance medication adherence and self-management among surgical diabetes patients. These interventions provide patients with personalized feedback, educational resources, and medication reminders, thereby facilitating adherence to treatment protocols. In summary, effective medication adherence is essential for optimizing surgical outcomes and reducing the burden of complications in patients with diabetes undergoing surgical procedures. Nurses play a critical role in implementing evidence-based interventions to improve medication adherence, glycemic control, and overall quality of care for surgical diabetes patients. By addressing barriers to medication adherence and promoting patient engagement, nurses contribute significantly to the success of perioperative management in diabetic patients undergoing surgery.

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