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EFFECTIVENESS OF MULTIDISCIPLINARY NURSING CARE ON SURGICAL OUTCOMES IN DIABETIC PATIENTS

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Abstract

Background: Patients with diabetes experience higher complications rates and worse surgical outcomes such as SSIs, delayed wound healing, and longer hospital stay. These risks are as a result of factors that include; immune system compromised state and insufficient circulation during the diabetic patient's surgery. These risks may not be adequately addressed by standard protocols of pre, intra and postoperative care. A combination of the input from nurses, endocrinologists, and surgeons may provide better solutions to these problems.

Objective: The purpose of this research was to assess the impact of Multidisciplinary Nursing Care on the surgical outcomes such as SSI, wound healing, glycemic

Methods: For this study, an open prospective cohort design was applied, including 280 diabetic patients, who were divided into two groups: a multidisciplinary care group (n=140) and a standard care group (n=140). The multidisciplinary care group had additional perioperative care such as, tight glycemic control, specialised wound care and interdisciplinary management, while the standard care group was managed within the general care setting. Postoperative infection incidence, wound complication, hospital stay duration, glycemic control, and patient satisfaction were obtained and evaluated.

Results: The multidisciplinary care group had a better outcome in comparison with the control group: fewer postoperative infections (10% vs. 21%, p=0.018), faster wound healing (85% vs. 70% by day 10, p=0.012), shorter hospital stay (4.7 vs. 6.2 days, p=0.001), improved glycemic control (postoperative blood glucose: 143 mg/dL vs. 155 mg/dL, p=0.029), higher patient satisfaction

Conclusion: Diabetic patients have better surgical results when they receive multidisciplinary nursing care. With a focus on expert care for nursing, endocrinology, and surgery, this approach decreases adverse events, improves healing, and increases patient satisfaction. Expanded use of multidisciplinary models in the care of the surgical patient with diabetes may enhance results and decrease the healthcare costs related to diabetic surgery.

Keywords: Diabetes, multidisciplinary care, surgical outcomes, glycemic control, wound care, elective surgery, patient satisfaction, surgical site infections, hospital stay, perioperative care.

Introduction

Diabetes mellitus is a real and basic bet factor for poor surgical outcomes. Patients with diabetes will undoubtedly experience burdens like surgical site infections (SSI), conceded wound recovering, and postponed hospital stays appeared differently in relation to non-diabetic patients. According to Dhatariya et al. (2012), these ensnarements come from various physiological components related with diabetes, including debilitated immune response, awful spread, and conceded tissue fix, which make diabetic patients particularly defenseless against postoperative infections and recovery delays. Additionally, Kirkland et al. (2013) highlighted that these disarrays impact patient prosperity as well as power a broad financial load on healthcare systems, as SSIs explicitly can provoke extended ghastliness, longer hospitalizations, and, shockingly, higher passing rates on occasion.

Given these raised risks, the perioperative organization of diabetic patients is urgent. While standard preoperative and postoperative care fundamentally revolves around standard infectious prevention shows and noticing, such a system may be missing for diabetic patients. Updated nursing care that facilitates a multidisciplinary approach — including the cooperative exertion of clinical chaperons, endocrinologists, and trained professionals — might perhaps basically deal with surgical outcomes in this general population. This approach thinks about the more raised organization of the original snares diabetic patients face, particularly as to glycemic control and wound care. As pointed out by Joret et al. (2019), multidisciplinary care models have shown practicality in various settings, particularly in diabetic foot care, where they have been shown to diminish hardships and lower healthcare costs. By loosening up these practices to the perioperative setting, healthcare providers could have the choice to ease a piece of the negative surgical outcomes generally associated with diabetes.

Glycemic control is a basic part of fruitful surgical outcomes for diabetic patients. Studies have shown that patients "with inadequately oversaw blood glucose levels are at a higher gamble of creating SSIs and encountering deferred wound recuperating (Moghissi et al., 2009). As a matter of fact, tight glycemic control during the perioperative period has been related with further developed mending and diminished disease rates in a few examinations. The American Diabetes Affiliation (ADA) and the American Relationship of Clinical Endocrinologists (AACE) have mutually suggested severe glycemic the executives for diabetic patients going through surgery to forestall these complexities (Powers et al., 2015). In spite of these rules, keeping up with ideal blood glucose levels in diabetic patients going through surgery stays a test, especially when patients are overseen by non-expert healthcare suppliers."

Notwithstanding glycemic control, wound care assumes a crucial part in working on surgical outcomes for diabetic patients. As verified by Buggy and Moore (2017), wound mending in diabetic patients is frequently compromised because of the mix of hyperglycemia and unfortunate dissemination. In this unique circumstance, the job of medical attendants in giving upgraded wound care turns out to be especially significant. By leading day to day wound appraisals and applying progressed wound-recuperating procedures, medical attendants can assist with distinguishing potential complexities early and forestall the improvement of infections or different issues that might defer recuperation. Besides, the contribution of a multidisciplinary group guarantees that wound care is definitely not a secluded exertion, yet rather one that is composed with generally speaking patient administration.

Literature Review

The Impact of Diabetes on Surgical Outcomes

The "connection among diabetes and antagonistic surgical outcomes has been widely archived in the writing. Diabetes mellitus is a very much perceived risk factor for a few postoperative confusions, especially surgical site infections (SSI), deferred wound mending, and broadened hospital stays. Dhatariya et al. (2012) underlined the expanded powerlessness of diabetic patients to infections and different confusions because of the impacts of hyperglycemia on the resistant framework and wound

recuperating processes." Their review prescribed more tight perioperative glycemic control to moderate these dangers, particularly during the basic periods of surgery and recuperation. They further contended that ideal glucose the board could diminish the uplifted weakness of diabetic patients to surgical infections and hence work on postoperative recuperation. In accordance with these discoveries, Kirkland et al. (2013) gave an extensive examination of the monetary and clinical weight presented by surgical site infections (SSI), particularly in diabetic populaces. Their exploration featured that diabetic patients with SSIs experience the ill effects of delayed hospital stays as well as bring about altogether higher healthcare costs because of expanded recuperation times and the requirement for extra mediations. As per their review, the typical expense of treating a postoperative disease in a diabetic patient can be considerably higher than that in non-diabetic people, with the gamble of bleakness and mortality expanding decisively in these patients. Kirkland et al. (2013) highlighted the requirement for particular mediations to forestall SSIs in diabetic patients, bringing up that customary perioperative care conventions may not do the trick in tending to the complicated necessities of this weak gathering.

The Role of Glycemic Control and Wound Care in Surgical Outcomes

Successful glycemic control during the perioperative period is basic to forestalling antagonistic surgical outcomes in diabetic patients. Moghissi et al. (2009) investigated the job of inpatient glycemic control in working on surgical outcomes and found that keeping up with tight blood glucose levels diminishes the probability of postoperative complexities, for example, SSIs and postponed wound mending. Hyperglycemia has been displayed to impede invulnerable capability, which compromises the body's capacity to battle infections and mend wounds. The analysts presumed that carrying out severe glucose observing conventions previously, during, and after surgery fundamentally lessens the frequency of intricacies, subsequently advancing quicker recuperation. Dhatariya et al. (2012) comparably supported for perioperative glycemic the board, recommending that hospitals lay out conventions for constant blood glucose observing to keep up with steadiness during the pressure of surgery.

The significance of improved wound care in diabetic patients going through surgery couldn't possibly be more significant. Diabetic patients are inclined to deferred wound recuperating because of elements like unfortunate flow and neuropathy. Buggy and Moore (2017) gave proof that proactive wound care conventions, including everyday wound evaluations and specific care methods, can fundamentally work on recuperating times in diabetic patients. Their methodical survey found that patients who got facilitated wound care from a multidisciplinary group, remembering medical attendants with particular preparation for wound administration, experienced better recuperation outcomes. Moreover, the review proposed that wound care ought to be coordinated with by and large glycemic the executives, as uncontrolled blood glucose levels further block the body's recuperating processes. Controls et al. (2015) expanded these discoveries by stressing the job of diabetes self-administration training in working on postoperative outcomes. Their exploration featured that patients who were taught on the most proficient method to deal with their diabetes, especially corresponding to surgery, were bound to comply to preoperative and postoperative rules, prompting improved outcomes. This schooling frequently elaborate showing patients blood glucose observing, drug adherence, and perceiving indications of disease. Drives et al. (2015) contended that when this schooling is conveyed as a component of a multidisciplinary collaboration, it prompts more effective patient outcomes, as patients become more drawn in and better prepared to deal with their condition during the perioperative period.

The Need for Multidisciplinary Interventions in Diabetic Surgical Care

The intricacy of overseeing diabetes in surgical patients requires an organized, multidisciplinary approach. Buggy and Moore (2017) noticed that one of the vital advantages of including numerous healthcare experts in diabetic care is the capacity to address the different complexities related with diabetes in a thorough way. For example, medical attendants can give everyday wound care and screen

blood glucose levels, while endocrinologists oversee insulin treatment, and specialists center around the patient's recuperation from surgery. By cooperating, these experts can guarantee that all parts of the patient's wellbeing are being tended to. Mitchell et al. (2012) further upheld this methodology, featuring the center standards and upsides of group based medical services. They contended that multidisciplinary groups are better prepared to convey customized care designs that address the interesting necessities of every patient, particularly while overseeing constant circumstances like diabetes.

The job of nursing staff in a multidisciplinary setting is especially significant for diabetic patients going through surgery. Buggy and Moore (2017) featured that medical attendants assume a critical part in wound care, glycemic control, and patient schooling, which are all significant for decreasing postoperative difficulties. Their review showed that when attendants are engaged with the abilities and information to give particular care, patient outcomes improve fundamentally. Besides, by working together with other healthcare experts, medical attendants can guarantee that patients get thorough care that tends to all aspects of their condition. The association of medical attendants in both preoperative and postoperative care helps overcome any barrier between various subject matters, guaranteeing that the patient's whole surgical experience is overseen actually.

Methodology

Study Design and Setting

This research used a prospective cohort design in order to compare the efficacy of a multidisciplinary nursing care model in diabetic patients undergoing elective surgery. This work was done at a tertiary care hospital where all details regarding the patient’s recovery, SSI, and postoperative results can be obtained. This prospective design allowed for the real time data entry and frequent assessment of the interventions.

Sample Size and Participant Selection

For the purpose of the study, 280 diabetic patients were enrolled with 140 patients put into the intervention group and 140 patients allocated to the control group. Systematic sampling was used to avoid subjectivity and selection of bias due to different factors that may have influenced the study.

- **Intervention Group (n = 140):** This group received a specialized, multidisciplinary care plan that focused on enhanced monitoring and team-based decision-making.
- **Control Group (n = 140):** This group received standard hospital care without the specialized interventions provided to the intervention group.

Inclusion Criteria

Participants met the following criteria to ensure uniformity in the study:

- Diagnosed with **Type 1 or Type 2 Diabetes Mellitus**.
- Aged **30-70 years**.
- Scheduled for **elective surgery**.
- **Able to provide informed consent**.

Exclusion Criteria

The following criteria were applied to avoid bias and confounding results:

- **Emergency surgeries** excluded to ensure a consistent preoperative process.
- Patients with **severe comorbidities** or **end-stage renal disease** were excluded due to their independent impact on recovery.
- **Immunocompromised patients**, such as those undergoing chemotherapy or with advanced HIV, were excluded.
- **Non-adherence** to diabetes management protocols was a disqualifying factor.

Intervention Description (Single-Liners)

- **Perioperative Glycemic Control:** Blood glucose levels were monitored daily with necessary insulin adjustments.
- **Specialized Wound Care:** Daily wound assessments were conducted to prevent infections and improve healing.
- **Multidisciplinary Team Collaboration:** Daily meetings between nurses, endocrinologists, and surgeons ensured coordinated care.
- **Patient Education:** Clear instructions were provided on managing diabetes and postoperative wound care.
- **Complication Monitoring:** Early intervention for potential complications based on continuous monitoring.
- **Customized Medications:** Adjustments to medication regimens were made based on individual needs.
- **Nutritional Support:** Dietary plans tailored to manage blood glucose levels during recovery.
- **Physical Therapy:** Early introduction of rehabilitation exercises to speed up recovery.

Data Collection

Data were systematically gathered from patient records and direct assessments. The primary outcomes measured included:

- **Surgical Site Infections (SSIs):** Diagnosed based on clinical signs like redness and discharge.
- **Delayed Wound Healing:** Monitored daily, with delays defined by set postoperative benchmarks.
- **Length of Hospital Stay:** Recorded from surgery until discharge.
- **Patient Satisfaction:** Assessed using a 10-point Likert scale to rate care satisfaction.

Statistical Analysis

Data collected were analysed using statistical software. Categorical variables like SSI were compared using chi-square tests while continuous variables like duration of hospital stay were compared using t-tests. The level of statistical significance for this study was set at $p<0.05$, which suggests that a significant difference existed between the experimental and control groups.

Results

Table 1: Demographic Characteristics of the Study Population

Characteristic	Multidisciplinary Care Group (n = 140)	Standard Care Group (n = 140)	Total (n = 280)
Mean Age (years)	60.3 ± 8.0	59.7 ± 7.4	60.0 ± 7.7
Gender (Male/Female)	76/64	70/70	146/134
Duration of Diabetes (years)	14.5 ± 6.0	13.2 ± 5.3	13.9 ± 5.6
Type of Diabetes			
- Type 1 (%)	32%	30%	31%
- Type 2 (%)	68%	70%	69%
BMI (kg/m²)	31.8 ± 4.6	31.1 ± 5.1	31.4 ± 4.8

This is an important finding as the two groups were similar in terms of the main demographic variables including age, sex, duration of diabetes, and BMI. There was no statistical difference in age between the multidisciplinary care group with a mean age of 60.3 years and the standard care group with a mean age of 59.7 years. The age and the gender were balanced between the two groups; the multidisciplinary care group had 76 males and 64 females while the standard care group had 70 males and 70 females. Duration of diabetes was also somewhat different, with the multidisciplinary care group having had diabetes for an average of 14.5 years while the standard care group had an average

of 13.2 years. The numbers of type 1 and type 2 diabetic patients were balanced in both groups, and therefore type of diabetes did not confound the results. The mean BMI was also somewhat greater in the multidisciplinary care group, but the two groups did not differ significantly in this regard, making it unlikely that differences in outcomes could be attributed to differences in demographic features.

Table 2: Incidence of Postoperative Infections

Group	Postoperative Infections (%)	P-value
Multidisciplinary Care Group	10%	0.018
Standard Care Group	21%	

Fewer patients in the multidisciplinary care group were found to have postoperative infections than those in the standard care group. More Specifically, 10 percent of the patients in the multidisciplinary care group developed postoperative infections in contrast to 21 percent for the standard care group. The p-value of 0.018 confirms that this difference is statistically significant, which proves that using a multidisciplinary approach to the care of diabetic patients who are undergoing surgery will minimise the risk of infection. This result indicates that the improved collaboration between nurses, endocrinologists, and surgeons in the multidisciplinary care group led to the improvement of infection prevention measures, including higher frequency of monitoring and individualised measures.

Table 3: Wound Healing Rates

Group	Complete Wound Healing by Day 10 (%)	P-value
Multidisciplinary Care Group	85%	0.012
Standard Care Group	70%	

At the 10th postoperative day, the percent of patients with complete wound healing in the multidisciplinary care group was 85%, while in the standard care group, was only 70%. The result is statistically significant with p-value of 0.012, indicating that the specialised wound care protocols that were used in the multidisciplinary group were effective in hastening and enhancing the healing process. Increased use of nursing staff experienced in wound care as well as overall increased collaboration between disciplines most likely played a role in better outcomes for wound healing.

These may have included more frequent cheques on the wound, improved dressings, and earlier management to avert issues such as infection or slow healing, which is typical in diabetic patients.

Table 4: Average Hospital Stay Duration

Group	Mean Length of Hospital Stay (days)	P-value
Multidisciplinary Care Group	4.7	0.001
Standard Care Group	6.2	

This parameter was also different with patients allocated to the multidisciplinary care group having a mean of 4.7 days in hospital while those in the standard care group had a mean of 6.2 days. With a p-value of 0.001 this difference shows the importance of having a coordinated care in order to ensure that the patient gets better in a short time. The use of the multidisciplinary team with strict control of blood glucose levels, individualised medical management, and early identification of complications would have contributed to early discharge.

Faster recovery in the multidisciplinary care group may also be associated with improved patient care including wound management and prevention of postoperative infections, which are both important in shortening the length of hospital stay.

Table 5: Postoperative Blood Glucose Control

Group	Preoperative Blood Glucose (mg/dL)	Postoperative Blood Glucose (mg/dL)	P-value
Multidisciplinary Care Group	137 ± 15	143 ± 18	0.029
Standard Care Group	142 ± 16	155 ± 21	

Hyperglycemia is an important issue in diabetic patients who are to undergo surgery as high levels of blood glucose may lead to complications such as infections and slow rate of wound healing. This study showed that the multidisciplinary care group had a better glycemic control after surgery with the average With a p-value of 0.029, the study demonstrates that the This is especially useful as closely controlling blood glucose levels after a surgery is crucial in order to prevent complications and to achieve better results in diabetic patients.

Table 6: Patient Satisfaction Scores (Overall Care)

Group	Mean Satisfaction Score (out of 10)	P-value
Multidisciplinary Care Group	9.2	<0.001
Standard Care Group	7.6	

The patients in the MC group reported a significantly better satisfaction with the overall received care, with the average of 9.2 points out of 10 in contrast with 7.6 points in the SC group. The p-value of.000, less than 0.05, means that there is a statistical difference suggesting that team-based patient-centred care is beneficial to the patient. The higher satisfaction scores in the multidisciplinary care group are most probably related to the extensive and individualised care that these patients received, including improved interaction with the healthcare team, more frequent evaluations, and timely care for both surgical and diabetic needs. This finding underscores the value of engaging a team of medical professionals in the improvement of the patient experience as well as the patient's health during and following surgery.

Table 7: Types of Elective Surgeries Performed

Type of Surgery	Multidisciplinary Care Group (n = 140)	Standard Care Group (n = 140)
General Surgery (%)	38%	40%
Orthopedic Surgery (%)	35%	33%
Vascular Surgery (%)	16%	15%
Gynecological Surgery (%)	11%	12%

There was no significant difference in distribution of elective surgeries between the two groups so that surgery type did not affect the results. The kinds of surgeries done were general, orthopaedic, vascular and gynaecological and there were no statistically significant differences between the two groups. This balance makes it possible for the results of the study to be more relevant to the type of care offered instead of being a factor of the kind of surgeries that the patients underwent.

Table 8: Non-Infectious Complications

Complication Type	Multidisciplinary Care Group (n = 140)	Standard Care Group (n = 140)	P-value
Respiratory Complications (%)	5%	11%	0.045
Cardiovascular Complications (%)	7%	13%	0.038
Renal Complications (%)	4%	9%	0.057

Non-Infectious complications were found to be less frequent in the multidisciplinary care group. In particular, respiratory complications occurred in 5% of the patients who received multidisciplinary care and in 11% of the patients who received standard care, with the difference being statistically significant at p=0.045. Likewise, the rate of cardiovascular complications also was found to be significantly lower in the multidisciplinary care group (7 % in the multidisciplinary group as compared to 13% in the standard care group; p = 0 Even though the difference in renal complications was not statistically significant (p = 0.057), the trend indicate that the patients in the multidisciplinary care group had fewer complications. These findings support the idea that a comprehensive, closely managed and timely intervention approach can minimise the risk of the adverse events that may worsen the condition in diabetic patients.

Discussion

Thus, the results of the present research emphasise the importance of using a multidisciplinary nursing care model in the treatment of diabetic patients undergoing surgery. The decrease in the rate of postoperative infections in the multidisciplinary care group shows the value of team care, especially in handling the enhanced susceptibility of diabetic patients to infections. Nurses, endocrinologists, and surgeons in this group ensured proper glycemic control and more timely wound management, thereby minimising SSIs, which are notorious in diabetic patients who undergo surgery. This leads to better health outcomes and decreased costs to the healthcare systems through decreased need for more expensive surgeries and longer hospital stays.

A significant result of this research was the quicker rate of wound healing in the patients who received multidisciplinary care where 85% of the patients achieved total healing by day 10 while 70% of the patients in the standard care group achieved the same. This major difference can be explained by the enhanced wound management practises that were put in place by the various members of the healthcare team such as the regular observation of the wound and the application of innovative measures for wound healing. This paper provides evidence of how through early identification and assessment of the wound, daily assessment by nurses, timely intervention, and collaborative decision making, it was possible to avoid delays in wound healing, a major problem in diabetic patients. This finding is consistent with prior research that supports the role of interdisciplinary wound care management to enhance healing (Buggy & Moore, 2017).

The beneficial effects of the multidisciplinary care are underpinned by the fact that patients in the multidisciplinary care group were discharged from the hospital 1.5 days earlier than patients in the standard care group, despite receiving similar surgical treatments. This study serves to underline the value of the MDM in managing postoperative care, whereby patients may be safely discharged sooner without overlooking issues such as glucose management, infection, and wound management. Shorter hospital stays are also more beneficial as they enhance patients' satisfaction, empty the available beds in the hospitals and cut down the total cost of health care services.

Patient satisfaction is an important indicator of the quality of care and this study evidenced that patients who were managed in a multidisciplinary manner expressed increased satisfaction than those who received conventional care. The enhanced satisfaction noted in this study could be attributed to the engagement of a specialty team of healthcare professionals who participated in the management of every aspect of the patient's care including glycemic control, wound care, and recovery. The members of the team were able to communicate effectively with the patients, and assess their needs more than once, and intervene accordingly. It is imperative to address the various aspects related to the patient in an effort to enhance the patient experience and enhance compliance to postoperative measures.

Conclusion

The results of this study provide a strong implication for providing multidisciplinary nursing care in diabetic surgical patients. The outcomes obtained here evidenced that multidisciplinary approach diminishes the rates of postoperative infections, accelerates the process of wound healing, decreases the length of patients' stay in the hospital, and increases their satisfaction level. Thus, the multidisciplinary care is the concept that involves the collaboration of different healthcare professionals such as nurses, endocrinologists, and surgeons to address the specific problems of diabetic patients during surgery. The study provides evidence for the need to expand the use of multidisciplinary care in surgical contexts to improve patient outcomes and minimise the risk of issues related to diabetes.

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