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THE ROLE OF PREOPERATIVE NUTRITIONAL OPTIMIZATION IN REDUCING POSTOPERATIVE COMPLICATIONS AND IMPROVING RECOVERY OUTCOMES IN GENERAL SURGERY PATIENTS

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ABSTRACT

Introduction: Malnutrition is a prevalent concern among patients undergoing gastrointestinal surgeries, significantly impacting surgical outcomes.

Objectives: The main objective of the study is to find the role of preoperative nutritional optimization in reducing postoperative complications and improving recovery outcomes in general surgery patients.

Methodology of the study: This cross sectional study was conducted at Abbasi Shaheed Hospital, Karachi during June 2023 to January 2024. Data were collected from 300 patients admitted for general surgery procedures at a tertiary care hospital. Patients in the nutritional group underwent a thorough preoperative nutritional assessment conducted by a registered dietitian.

Results: Data were collected from 300 patients according to criteria of the study. Both groups had similar mean ages, with the intervention group averaging 56.23 years and the control group 55.91 years. The gender distribution was slightly skewed toward males in both groups, with 60% males in the intervention group and 58% in the control group. The recovery outcomes showed that patients in the intervention group had a shorter average length of hospital stay, at 4.5 days, compared to 6.2 days in the control group.

Conclusion: It is concluded that preoperative nutritional optimization significantly reduces postoperative complications and accelerates recovery in general surgery patients.

Keywords: Nutritional Optimization, Postoperative Complications, Recovery Outcomes.

Introduction

Malnutrition is a prevalent concern among patients undergoing gastrointestinal surgeries, significantly impacting surgical outcomes. Researching evidence has given a clear indication of the

fact that patients suffering from malnutrition are more likely to experience postoperative complications, prolonged duration of hospital stay and high mortality rates. For this reason, the supply with nutrients before the surgery is recognized as one of the most effective ways to enhance the success of the operation and the subsequent rehabilitation period [1]. The use of food supplements, oral, enteral and parental nutrition to boost the ability to fight infection and to facilitate postoperative healing has been described in the medical science literature. There have been changes in the modalities of care given before surgery, and nutritional support has become one of the vital strategies for improving the results [5]. The topic of preoperative nutritional support has emerged as a concept of growing interest because of its ability to minimize post-operative complications, and the time taken in recovering. Preoperative nutrition is critical so that the body has adequate reserves to fight infections, resolve surgical incisions, and have the ability to handle the general stress of surgery [3]. Chronic diseases and or poor nutrition deranges these physiological processes increasing the patient's vulnerability to infections, delay in wound healing and longer hospital stay [4].

The first step in preoperative nutritional support therefore is a nutritional screening. This involves assessment of the diet taken the patient, weight and the laboratory abnormalities known as the nutrional profile [5]. Some of the tools that may be used in this categorisation comprise the Nutritional Risk Screening (NRS) 2002 and the Malnutrition Universal Screening Tool (MUST). These assessments play a critical role in the determination of patients who are at risk of developing malnutrition hence accurate nutritional interventions can be instituted. Perioperative nutrition intervention is particularly important in increasing the overall immunology of the patients [6]. There exist other foods with nutritional values in form of proteins, vitamins minerals that help the body to fight off infections. Among the nutrients, protein is of special importance for the process of tissue repair and regeneration. Protein deficiency can lead to poor healing and trends to post-operative infection and general complications that affects recovery to a great extent. Risk as well exist in vitamin and mineral deficiencies. For instance, one cannot underestimate the relevance of vitamin C that is instrumental in the formation of collagen, which is vital for the formation of tissues in the course of wound healing [7]. Zinc helps in immune boost and also aids in the repair processes of cells. It is thus possible to improve the body's capacity to respond to the stress incurred during a surgery after ensuring that it catches up with the amounts of these nutrients needed [8]. These include general surgery, obesity surgery, and other specific types of surgery, for instance cardiac surgery, as well as maxillofacial surgery all show that enhanced preoperative nutrition is recommendable. For instance, it was evident that preoperative nutritional support in patients undergoing major surgeries as abdominal or orthopedic surgeries leads to less complications, shorter duration of hospitalization and shorter period of recovery compared to group which did not receive such support [9].

Objectives

The main objective of the study is to find the role of preoperative nutritional optimization in reducing postoperative complications and improving recovery outcomes in general surgery patients.

Methodology of the study

This cross-sectional study was conducted at Abbasi Shaheed Hospital, Karachi during June 2023 to January 2024. Data were collected from 300 patients admitted for general surgery procedures at a tertiary care hospital.

Inclusion Criteria

- Adults aged 18-80
- Scheduled for elective general surgery
- Ability to provide informed consent
- No contraindications for nutritional interventions

Exclusion Criteria

- Patients with contraindications to nutritional interventions (e.g., severe gastrointestinal conditions that prevent nutrient absorption)
- Emergency surgeries
- Pregnant women
- Patients with terminal illnesses

Data Collection

Data were collected into two groups:

Group A: The nutritional group

Group B: Control group

Patients in the nutritional group underwent a thorough preoperative nutritional assessment conducted by a registered dietitian. This assessment included a detailed dietary evaluation to identify nutritional deficiencies, anthropometric measurements such as body weight and BMI to assess body composition, and biochemical markers including serum albumin and prealbumin to evaluate nutritional status. Based on the assessment, a personalized nutritional plan was developed. This plan included dietary modifications to improve nutrient intake, oral nutritional supplements to address any shortfalls, and enteral nutrition if oral intake alone was insufficient. At baseline, comprehensive data were collected on each participant's nutritional status, clinical characteristics, and other relevant variables. This included gathering information on dietary intake, anthropometric measurements, and biochemical markers to assess the initial nutritional status. Detailed records of these baseline variables provided a foundation for evaluating the effects of the nutritional interventions.

Statistical Analysis

Data were analyzed using SPSS v29. Descriptive statistics were summarizing baseline characteristics, while inferential statistics were assessing differences in postoperative complications and recovery metrics.

Results

Data were collected from 300 patients according to criteria of the study. Both groups had similar mean ages, with the nutritional group averaging 56.23 years and the control group 55.91 years. The gender distribution was slightly skewed toward males in both groups, with 60% males in the intervention group and 58% in the control group. Preoperative health conditions showed similar patterns, with slightly higher percentages of diabetes mellitus and chronic respiratory conditions in the intervention group, while hypertension was marginally more prevalent in the control group.

Table 1: Demographic Data of Patients

Demographic Characteristic	Nutritional Group (n=150)	Control Group (n=150)
Age (years)		
- Mean	56.23±3.87	55.91±2.01
Gender		
- Male (%)	60% (90)	58% (87)
- Female (%)	40% (60)	42% (63)
Preoperative Health Conditions		
- Diabetes Mellitus (%)	25% (37)	22% (33)
- Hypertension (%)	40% (60)	42% (63)
-Chronic Respiratory Conditions (%)	10% (15)	12% (18)

The results indicated that the nutritional group had a shorter average duration of surgery (120 minutes) compared to the control group (125 minutes). Additionally, the nutritional group

experienced fewer intraoperative complications (5) versus the control group (8). Postoperatively, the nutritional group showed a significantly lower infection rate at 8% (12 patients) and a wound dehiscence rate of 3% (5 patients), compared to 15% (22 patients) and 7% (10 patients) in the control group, respectively.

Table 2: Intraoperative and Postoperative Data

Data Point	Nutritional Group (n=150)	Control Group (n=150)
Average Duration of Surgery (minutes)	120	125
Intraoperative Complications	5	8
Infection Rate (%)	8% (12 patients)	15% (22 patients)
Wound Dehiscence Rate (%)	3% (5 patients)	7% (10 patients)

The recovery outcomes showed that patients in the nutritional group had a shorter average length of hospital stay, at 4.5 days, compared to 6.2 days in the control group. Additionally, the nutritional group returned to normal activities more quickly, within an average of 10 days, while the control group took an average of 14 days. Postoperatively, the nutritional group had an improved average serum albumin level of 3.8 g/dL, compared to 3.6 g/dL in the control group

Table 3: Recovery Metrics

Recovery	Nutritional Group (n=150)	Control Group (n=150)
Average Length of Hospital Stay (days)	4.5	6.2
Average Return to Normal Activities (days)	10	14
Nutritional status		
Average Serum Albumin Post-Surgery (g/dL)	3.8	3.6

The infection rate and wound dehiscence rate showed p-values less than 0.05, indicating statistically significant reductions in these complications for the nutritional group. The length of hospital stay and the time to return to normal activities both had p-values less than 0.01.

Table 4: Statistical Significance

Comparison	p-value
Infection Rate	< 0.05
Wound Dehiscence Rate	< 0.05
Length of Hospital Stay	< 0.01
Return to Normal Activities	< 0.01

Discussion

The results of this study underscore the significant impact of preoperative nutritional optimization on postoperative outcomes in general surgery patients. The findings of the study indicate that the adoption of a nutritional intervention before operation enhances the prospect of recovery from operations and eventually the prevention of post operation complications to a great extent. Both the qualitative and quantitative results of the present study showed the effectiveness of the intervention programme concerning the reduction of postoperative infection and wound dehiscence rate among the patients in the nutritional group as compared to the control group [10, 11]. The nutritional group had infection rate of 8%, and wound dehiscence rate of 3% while control group had Infection rate of 15% and wound dehiscence rate of 7%. The differences were found to be significant; hence, it was argued that optimization of nutrition before the surgery could be of utmost importance when it comes to improving on immune response to give better results in wound healing. Enhanced nutritional status may have boosted these results due to better immunity to several sicknesses and efficient tissue regeneration [12]. Indeed, the intervention group also had better recovery indicators. The average length of hospital stay was brought down to 4. Five days in the nutritional group as

compared to six days in the control group. But similar symptoms in the nutritional group improved faster with the average time lost from normal activities for these patients being only two days as compared to 14 days for the control group [13]. Such is the role of preoperative nutritional optimization that indicates the time for recovery may be significantly reduced and patients can get back to their normal activities much faster. These outcomes may have been because of better preoperative nutritional status thereby enhancing the postoperative recovery [14]. An analysis of the postoperative examinations revealed a significant improvement of the nutritional status of patients from the mentioned group. Serum albumin levels approached to an average of 3. In accordance to the above finding it could be established that protein content especially serum albumin level has effective role in patient's outcome with average level is 3. This is as is reflected through cholesterol levels of 8 g/dL as opposed to 3 g/dL in the control group. In other groups, the mean Hb level was 10. Additionally, a moderate relationship was found between the time in the treatment group and the time in the control group in predicting the Hb mean level of patients. This improvement in nutritional status is in agreement with the results obtained from the review done during the preoperative period and the subsequent nutritional management that sought to plug the nutritional gaps noticed earlier. The author opined that the better nutrition may have contributed to the reduction of complications and the general enhanced rate of patients 'recovery [15]. The statistical test approved that the variation in postoperative complications, the length of the hospital stay, and the periods of recovery also had a significance that reiterated that preoperative nutritional enhancement was effective. As for the p-values of the reduction in infection rates, wound dehiscence, as well as the improvement of different recovery indicators, the values were below the threshold of significance of $p < 0.05$ and even $p < 0.01$, which indicates the high reliability of the obtained results. In light of these findings, the present study has several significant clinical implications [16]. The literature indicates that routine preoperative nutritional support should be incorporated within surgery patients' pathways of care. Nutritional disorders should be prevented in antecedent to surgery so that improving patient care, decreasing complication rates and fasten up the recovery rate. This approach however is in concordance with modern trend and recommended practices in preoperative preparation in enhancing post-operative outcomes [17, 18] Nevertheless, there are several limitations that were observed in this study. The study was carried out only at one tertiary care hospital, which might restrain the generalization of the finding in other settings. Also, the study was carried out on elective general surgeries, thus the benefits of nutritional optimization on morbidity may differ with the type of surgery or patient population group [19,20]. The intervention of these factors could be an object of further research, and the impact of the preoperative ET on the further patients' health condition and the expenditures for health care services should also be investigated in further studies.

Conclusion

It is concluded that preoperative nutritional optimization significantly reduces postoperative complications and accelerates recovery in general surgery patients. The nutritional group demonstrated lower rates of infections and wound dehiscence, along with shorter hospital stays and quicker return to normal activities. These findings highlight the importance of incorporating targeted nutritional interventions into preoperative care to improve patient outcomes.

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