

Effect of Nutritional Status in Postoperative Recovery among Surgical patients

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ABSTRACT

Aim: To draw a comparison between the frequencies of postoperative complications between malnourished and well-nourished patients and to determine the impact of pre-operative nutritional-status on the postoperative recovery among surgical patients.

Place and duration of study: This was a cross sectional comparative observational study by design which was conducted in the Department of Surgery, Shaikh Zayed Hospital Lahore Pakistan from June 2014 to December 2014.

Study Design: Cross sectional comparative study.

Methodology: Four hundred volunteer individuals were taken in the study. Written, informed consent was taken from all the included individuals. All the included individuals were weighed by a digital scale and their heights were measured using the height scale, and thus their Body Mass Index was calculated according to the following formula, before the surgery; BMI less than 18 or more than 25 and was considered as Malnutrition. Also Hemoglobin, TLC (Total Lymphocyte count = % Lymphocytes X WBC/ 100), serum albumin was measured and if found impaired, patient was considered to have under-nutrition. Now after surgery the patients were followed for 5 days postoperatively and any complication was noted. Occurrence of any single complication was treated as presence of complication. Total number of days stayed at hospital postoperatively were also calculated. Data was analyzed using SPSS 20.

Results: There was significant difference with respect to major complications and side effects between well-nourished and malnourished cases. More number of cases developed infection in the malnourished groups as compared to other group.

Conclusion: Patients must be kept under observation for their nutritional status postoperatively for a specific duration so that morbidities could be reduced and patients can get back to work earlier.

Keywords: Malnourish, Surgical Patients, Nutritional Assessment, BMI

INTRODUCTION

According to World Health Organization malnutrition is considered as the utmost single threat to the Global public health. Undeniably, the in-hospital prevalence of undernourished patients on admission sorts up to 50%. In recent years study shows that nutritional screening and surgical therapy & procedures are important interrelated factors in modern surgical care as some recent estimates shows that 40% of patients are at dietetic risk preoperatively and for decreasing the risk parental nutrition is the most important factor. Malnutrition earlier to surgery is caused by reduced oral food consumption^{1,2}. Furthermore, low socioeconomic status, as frequently seen in handicapped and elderly patients, characterizes a supplementary risk factor³.

Reduced food intake results in loss of fat, muscle, skin, and ultimately bone and viscera, with subsequent weight loss, and expansion of the extracellular fluid compartment. Person's nutritional requirement is also according to the body mass of the body. However, when body mass decreases nutritional requirement of the person also decreases which indicates reduction of work capacity especially at cellular level⁴. Stress related to surgery aggravate hyper-metabolic state and escalate the energy and protein requirement. Macronutrient transfer from skeletal and fat tissue to metabolically active tissues to compensate and neutralize the effect.⁵ However, the combination of decreased tissue mass and reduced work capacity impedes normal homeostatic responses to stressors such as surgery or critical illness. This response can lead to the onset of protein calorie malnutrition (defined as a negative balance of 100g of nitrogen and 10,000 kcal) within a few days⁵. Malnutrition is a common problem of under-developed and developing countries like Pakistan. The people lack the opportunity to avail the balanced nutritive diets and are more prone to develop the malnutrition. Nutrition plays a vital role and often overlooked in the care of patients on a surgical floor. Between 30% and 50% of hospitalized

patients are malnourished and malnutrition is clearly associated with increased morbidity and mortality in surgical patients⁶.

Low serum level at 5th day of surgery indicates short-term post-operative complications. Patients who developed post-operative complications, up to 55% of the patients developed complications related to wounds. Studies have proved that, malnourished patients had higher risk of post-operative wound complications^{7,8}. Malnourished patients have significantly higher chances of post-operative complications as compared to well-nourished patients. Inadequate food intake escalates the chances of poor organ function including heart, kidney and lungs. International recommended guidelines suggested that, good/adequate oral intake should be initiated prior 7-14 days of surgery for better surgical outcomes and to avoid any surgical complications^{9,10}.

The objective of the study was to draw a comparison between the frequencies of postoperative complications between malnourished and well-nourished patients and to determine the impact of pre-operative nutritional-status on the postoperative recovery among surgical patients.

MATERIALS AND METHODS

All the adult patients of age 20-70 years undergoing any elective surgery were included in the study. Two hundred malnourished patients of BMI less than 18 or BMI more than 25 were included while two hundred well-nourished patients of BMI 18 to 25 were included. After permission from Hospital Ethical Committee, an informed consent was taken before the enrollment of the patient in this study. Patients who are having any history of chronic disease which may cause increase chances of postoperative complication were excluded from the study, like: Diabetes Mellitus (BSF200mg/dl), Tuberculosis on X ray, Chronic Renal Failure (creatinine >3), chronic liver disease or patients on corticosteroid. BMI less than 18 or more than 25 and were considered as Malnutrition. Also Hemoglobin, TLC (Total Lymphocyte count = % Lymphocytes X WBC/ 100), serum albumin were measured and if found impaired, patient were considered to have under-nutrition.

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Now after surgery the patients were followed for 5 days postoperatively and any complication were noted. Occurrence of any single complication was treated as presence of complication. Total number of days stayed at hospital postoperatively was also calculated. Data was entered using software SPSS version 20. Descriptive statistics was used to calculate mean and standard deviation for age, height, weight, BMI and number of days of hospital stay postoperatively. Frequencies (Percentages) were calculated for gender and the presence of any complication in the two groups. Chi-square test was applied to compare frequencies of genders and presence of complication in the two groups

RESULTS

There were total 400 cases that were selected preoperatively and where randomized into two groups each carries 200 cases who were later on subjected to surgery. The mean age of the patients was 48±15.31. There were total 229(57.3%) were male while 171(42.8%) were female cases. When they were asked about residence 218(54.5%) were from villiage while 182(45.5%) were from city. All the females were housewives 164(41%) and second majority 99(24.8%) were business man, 7(1.8%) did not have a profession, 28(7.8%) were teacher, 54(13.5%) were farmer, 18(4.5%) were student and 30(7.5%) were student. As per status of job is concern 142(35.5%) were private job holder, 36(8.8%) retired, 18(4.5%) were student, ad 164(41%) were housewives. As per financial status is concerned majority belongs to middle class 218(54%) and poor 149(37.3%) while minor were upper middle class 16(4%), very poor 17(4.3%). Mean BMI was 21.06±4.7 (Table 1).

When cases were followed up for postoperative outcomes it was noted that wound infection was present in 266(66%) of cases, early ambulation in 207(51%), respiratory infection in 208(52%), myocardial infarction in 20(5%), anastomotic leakage in 15(3.8%), wound dehiscence in 129(32.3%), urinary tract infection in 106(26.5%), septicemia in 23(5.8%), abdominal abscess in 20(5%) of cases. Mean time to hospitalization of all the cases was 11.22±7.42. When the patients of both groups were compared for different reasons for postoperative delay in hospitalization there was significant difference found with many factors. There was non-significant difference with respect to gender in both groups as 102(44.5%) were male in well-nourished and 127 (55.5%) mal nourished while 98 (57%) were female in well-nourished group and 73(42%) female were mal-nourished (p0.15). There were more cases with wound infection in mal nourished 157(59%) as compared to well-nourished 109(41%) and this difference was statistically significant (p0.001). Early ambulation was noted in 136(65.7%) in mal nourished and 71(34.3%) in well nourished(p0.001). It was also noted that respiratory infection was most common in male nourished 135(64%) of cases while 73 (35%) in well-nourished and this difference was statistically significant p0.001 (Table 2).

Table 1: Baseline demographic information of all the study participants

	Mean±SD	Frequency (%)
Age	48.0±15.31	
Gender		M=229 (57%), F= 171 (42%)
Resident		Rural= 218 (54%) Urban= 182 (46%)
Status of Job		Govt= 41 (10%) Private= 142 (35%) Retired= 35 (8%) Student= 18 (4.5%) Housewives= 164 (41%)
Socio-economic status		Very poor= 17 (4.3%) Poor= 149 (37%) Middle= 218 (54%) Rich= 16 (4%)
Body Mass index	21.60±4.78	

Table 2: Post-operative outcome in we nourished versus malnourished patients

Study variable	Occurrence	Nutritional status		P value
		Well Nourished	Mal Nourished	
Wound infection	Yes	109 (41%)	157 (59%)	0.001
	No	91 (67.9%)	43 (32.1%)	
Early Ambulation	Yes	136 (65%)	71 (34.3%)	0.001
	No	64 (33.2%)	129 (66.8%)	
Respiratory infection	Yes	73 (35%)	135 (65%)	0.001
	No	127 (66%)	65 (34%)	

DISCUSSION

Millions of deaths are annually caused due to various surgical procedures and also the main causative agent of stress and fear in patients related to surgery¹¹. A national study conducted at USA highlighted that, incidence of surgical deaths varied across different institutions. This indicates that some institutions manage disease outcome more efficiently than others^{12,13}. Starke et al (2011) determined the risk factors associated with different surgical procedures and their overall impact on well-being and recovery of the patient. This study indicates that patients who had higher intake of energy enriched food and proteins recovers more quickly as compared to other patients¹⁴. They also developed few complications, lower hospital stay and improvement in overall wellbeing. Few other studies investigated the outcome of nutritional requirement and its impact on the health of patient who under-went surgery. Patients who were taking nutritional supplements managed to reduce their surgery complications. Muscle strength, quality of life and grip strength were also greater and significantly better in nutritional supplement patients in contrast to other group^{15,16}. These studies proved that hand grip strength can also be employed in determining the nutritional requirement of the patient. Most of the physicians find it cumbersome to estimate the nutritional status of the patient. However, in reality it will give dramatic benefits if properly and timely used to assess the over-all wellbeing of the patients.

Several studies concluded that post-operative complications and pre-operative mal-nourishment are directly correlates with each other^{19,20}. Majority of the patients who developed complications and longer hospital stays had poor food inadequate. Severe complications are also observed in malnourished patients. Patients who were undergone numerous surgeries including head and neck surgery, GI-tract surgery, cardiac surgery and other malignancies showed that healthy balanced intake of diet reduced the chances of infections, associated complications, and longer hospital stays. Arginine administration pre-operatively also showed positive effect on the health of the patient.²¹ Although associations and relationships were already observed with poor nutritional intake and surgical complications. But no significant relation was determined that highlight the impact of poor nutritional intake and mortality. Studies demonstrated that malnourishment is a frequent determinant of postoperative complications. It also badly influence wound infection and recovery rate^{22,23}.

CONCLUSION

Patients must be kept under observation for their nutritional status postoperatively for a specific duration so that morbidities could be reduces and patients can get back to work earlier.

Declaration:

1. That the manuscript or parts of the manuscript has not been published elsewhere previously
2. That all the authors have read and approved the manuscript.

Authorship and contribution declaration: Each author of this article fulfilled following Criteria of Authorship:

1. Conception and design of or acquisition of data or analysis and interpretation of data.
2. Drafting the manuscript or revising it critically for important intellectual content.

3. Final approval of the version for publication.
All authors agree to be responsible for all aspects of their research work.

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