

# Indicators of Nutritional Status as Predictors of Postoperative Complications in Elderly Gastrointestinal Cancer Patients

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## Abstract

Nutritional issues in patients who are slated for surgery deteriorate during the perioperative period, which is frequently a risk factor for postoperative complications. The study's objective was to ascertain the association between older patients with stomach, pancreatic, and colon cancer's preoperative nutritional state and the frequency of postoperative problems as well as the length of hospital stay. 143 gastrointestinal cancer patients who were eligible for surgery and were 65 years to 68 years old were included in the study. Medical records, body mass index questionnaires, and the Mini Nutritional Assessment were also used. 9.8% of the respondents had malnutrition, and 53.5% had a risk of having it. Body mass index revealed that 28% of the patients were overweight and 14% were obese. All nutritional statuses were affected by complications, although those requiring intensive care unit treatment (36.8%), pancreatic and biliary fistulas (29.4%), and surgery site infections (58.2%) were the most frequent. Patients with gastric cancer who were at risk for malnutrition remained in the hospital longer. Overweight, obesity, malnutrition, and its risk all led to higher postoperative problems and longer hospital stays. Malnutrition and related risk, as well as overweight and obesity, are nutritional status disturbances that are associated with a higher frequency of postoperative complications and a lengthier hospital stay.

**Keywords** BMI • Nutritional status •

Postoperative complications

## Introduction

There has been a noticeable rise in the population of older individuals in recent years. Organ dysfunction brought on by ageing is one of the factors that contributes to the emergence of numerous diseases. About 75% of older adults have comorbid conditions, such as cancer, which frequently need for surgical treatment. The risk of postoperative problems is increased by immune system ageing, metabolic diseases, surgical trauma, and the patient's health after the cancer process. Nutritional abnormalities, such as risk or malnutrition, as well as overweight or obesity that co-exist with metabolic illnesses, may be another risk factor for complications. Obesity alters the course of several diseases and raises the risk of complications following surgery and anesthesia. Malnutrition also worsens or develops during hospitalization in patients who have undergone surgery, and it is a risk factor for postoperative complications, lengthens hospital stays, and raises treatment expenses. According to studies, malnutrition is most likely to affect cancer patients (30% to 90%), people with inflammatory bowel illnesses (80%), the elderly, and people who are receiving neurological treatment.

Due to the increased risk of complications, it's crucial to identify nutritional abnormalities early and start nutritional therapies as soon as feasible in patients who are candidates for surgery, especially the elderly.

In clinical practice, the risk of postoperative problems resulting from nutritional status issues linked to malnutrition is most frequently taken into consideration in the case of patients with gastrointestinal tract cancer. Scientific journals also choose to highlight the findings of investigations demonstrating malnutrition in patients with gastrointestinal cancer. Rarely are studies and reports available that analyze patients with a BMI above average and discuss the potential hazards that could arise from doing so. There are notably few studies examining the relationship between obesity and overweight and surgical problems. There are no investigations specifically of cancer patients, where malnutrition and related risk are most prevalent. The older population under study is also overweight and obese, which may have an impact on the patient's clinical status similar to problems linked to malnutrition. Thus, the desire to carry out and describe this study in the publication in order to advance our understanding of the subject. One of the most crucial aspects of preoperative planning should be the evaluation of the patient's nutritional state in order to identify risk factors for postoperative problems.

Utilizing nutritional evaluation techniques is crucial. The MNA scale is suggested for use in identifying malnourished patients and those who are at risk of malnutrition in elderly patients. The BMI, on the other hand, is the instrument that is most frequently used to identify and validate overweight and obesity.

The study's objectives were to evaluate preoperative nutritional state, as well as the association between older patients with stomach, pancreatic, and colorectal cancer's nutritional status and the frequency of postoperative problems and length of hospital stay.

## Discussion

The body's capacity for regeneration, immune system activity, and general health are all impacted by proper diet. It is very crucial for patients recovering from surgery, especially those who have cancer. The primary problem facing patients in a hospital setting is malnutrition. The body's ability to respond to external stress, including surgery, may be hampered by an imbalance between energy and nutritional requirements and actual consumption.

Elderly persons are at risk for nutritional diseases, including the danger of malnutrition, as these conditions are linked to physiological, metabolic, and functional alterations that can cause a variety of disorders of different organ systems as a whole.

These conditions are linked to higher death rates, longer hospital stays, decreased quality of life, and increased morbidity. Additionally, particularly in older patients, the surgery itself may have a deleterious effect on nutritional status.

Malnutrition is a danger for patients undergoing gastrointestinal oncological surgeries because of anorexia, dietary restrictions brought on by diagnosis and treatment, malabsorption, or diarrhea.

Poor nutritional status has been linked to worse perioperative outcomes because of an increased inflammatory response brought on by lower protein and energy levels following surgical trauma. Preoperative malnutrition has been linked in studies to an increased frequency of problems in individuals with gastrointestinal cancer undergoing major surgery. In the adult population, eating problems are a known risk factor for postoperative complications.

Data from the National Surgical Quality Improvement Program (NSQIP) show that one of the top ten preoperative risk factors for complications or higher mortality is malnutrition.

To improve patient outcomes, malnutrition must be detected and treated quickly. For these reasons, nutritional screening is advised even when a diagnosis does not specifically include a nutritional concern. However, it is still challenging to determine the international consensus regarding the best test methodology in clinical practice. The 2019 ESPEN (European Society of Clinical Nutrition and Metabolism) recommendation put forth GLIM (Global Leadership Initiative on Malnutrition) criteria that combine phenotypic factors (weight loss, lower BMI, and decreased muscle mass) and etiological factors (reduced food consumption/assimilation, disease burden, and inflammation). According to GLIM, it is advised that a combination of at least one phenotypic criterion and one etiological criterion be used to diagnose malnutrition. However, the GLIM malnutrition diagnosis protocol suggests using the NRS 2002, SGA, or MNA scale in the initial stage.

The purpose of my own research was to ascertain the association between postoperative problems and the preoperative nutritional state of older patients with colorectal, pancreatic, and stomach cancer. In this study, the MNA questionnaire was utilized as a suggested method to assess the nutritional state and identify factors impacting the nutritional condition of elderly patients with gastrointestinal cancer prior to surgery.

9.8% of the respondents in the study who completed the MNA questionnaire had malnutrition, including 17.8% with gastric cancer, 8.3% with pancreatic cancer, and 4.0% with colorectal cancer. The risk of malnutrition, on the other hand, was discovered in more than half of the respondents (53.5%), including patients with stomach cancer (48.9%), pancreatic cancer (62.5%), and colorectal cancer (50%) as well as those without cancer. It was also found comparable outcomes in individuals who underwent major gastrointestinal surgery. Over half (54%) of the respondents had abnormal nutritional status, with malnutrition diagnosed in 10% and the risk of malnutrition in 44% of patients, respectively. This included the group of individuals over 80 years old, where malnutrition was diagnosed in 16.70% of cases and the risk of malnutrition in 58.3%. Age and malnutrition were substantially associated ( $r = 0.03400$ ).

When evaluating the nutritional status with the same technique, somewhat higher rates of malnutrition was found. The authors found that preoperative malnutrition incidence and risk rates were about 87% and 25% of patients, respectively, were underweight. Based on the nutritional screening measures utilized, the study revealed that more than 80% of patients with a preoperative cancer diagnosis were categorized as moderately and severely malnourished.

The findings of research conducted by other authors support the prevalence of malnutrition in the group of elderly cancer patients identified using the MNA scale. Previous research conducted in a Krakow clinical hospital evaluated the usefulness of components of the perioperative risk model in patients over 65. Abnormal MNA test results were found in 39.2% of patients, compared to the group of patients without a cancer diagnosis (13.6%), with a  $p$  value of 0.002. These findings demonstrated the MNA test's potential value in identifying surgical problems in a group of cancer patients. Regarding the prevalence of malnutrition in the group of gastrointestinal cancer patients and other research studies where malnutrition was discovered in patients who underwent surgical treatment for gastrointestinal cancer.

In the research, the BMI was another factor that was considered when determining the nutritional condition. The idea was to try to link problems and BMI levels above and below normal.

According to BMI analysis, 14.0% of patients were categorized as obese, 28.0% as overweight, and 6.3% as underweight. Over 50% of the patients displayed a normal BMI. According to BMI, patients with pancreatic cancer had the highest percentage of underweight patients, those with gastric and colorectal cancer had the highest percentage of overweight patients, and those with gastric and pancreatic cancer had the highest percentage of obese patients.

Over 9000 esophageal cancer patients who underwent elective surgery were the subject of another study. The findings were mixed; 3% of patients had underweight diagnoses, 36% had overweight diagnoses, 29% had obesity diagnoses, and 32% had normal BMI values. In a prospective

multicenter study that included over 2500 patients with gastrointestinal diseases, 22.2% of the participants were obese, and in a study conducted in Mexico that included 1430 patients who had undergone inguinal hernia surgery, cholecystectomy, or appendectomy, 53% of the participants were obese or overweight.

The studies highlight the wide range of body mass index among the group of patients undergoing surgery. It is generally accepted that being underweight and the frequent malnutrition it is commonly accompanied by increase the risk of postoperative problems. However, there are few research comparing the incidence of surgical complications in obese and non-obese people. In contrast, obesity increases morbidity and mortality in the population. The examination of the connection between nutritional status and the development of problems during the postoperative period was then carried out. The study of the data revealed that complications—both in the danger of malnutrition and malnutrition as well as overweight and obesity—occur more frequently in patients with abnormal body weight. The most frequent problems among those with gastric cancer in our study required care in an intensive care unit (36.8%). Pancreatic and biliary fistulas (29.4%) were the most frequent complications in patients having surgery for pancreatic cancer, while surgical site infection (58.2%) was the most frequent complication of colorectal cancer (58.2%). In each form of cancer, problems occurred more frequently in the group of patients who were malnourished or at risk of malnutrition compared to patients with normal body weight, according to an analysis of nutritional status based on the MNA scale. Similarly, in the studies, it was found that on the third postoperative day, 31% of systemic complications were noted in well-nourished patients, 65.5% in those at risk of malnutrition, and 3.5% in malnourished patients. These complications were compared with the nutritional status determined before the surgery.

Malnourished patients had fewer complications on day 3 postoperatively but had a worse outcome six days after surgery, while well-nourished patients had complications mostly in the early observation period (3 days postoperatively) but recovered either partially or completely within 6 days postoperatively. According to a study, the geriatric nutritional risk index (98) was found to be significantly correlated with the severity of postoperative problems and a poor prognosis in patients under the age of 65 and after surgery. It has been discovered that calculating a geriatric nutritional risk index prior to surgery can be a valuable tool to pinpoint a group of senior patients who are at a high risk of morbidity and mortality. The findings of research are consistent with those reported in earlier studies done in Krakow. A study conducted in a group of patients with gastric cancer found that the incidence of complications was observed in 28.3% of patients, and the influence of nutritional status on the incidence of complications was also demonstrated. Both general and infectious complications were more common in the group of malnourished patients undergoing surgical treatment ( $p = 0.001$ ), and in another study conducted in a group of patients with gastric cancer.

Numerous other studies' findings support the notion that nutritional problems, particularly malnutrition in cancer patients, are linked to a higher incidence of various complications, such as hospitalization in an intensive care unit, and poor clinical outcomes, which are linked to longer hospital stays and higher mortality.

Malnutrition is another factor that may increase their development, and patients are exposed to it in the perioperative period. Abdominal surgeries involve a considerable risk of postoperative problems. The survival of individuals undergoing colorectal surgery or receiving treatment for upper gastrointestinal tract cancer is negatively impacted by preoperative weight loss. Numerous studies have supported the significance of the time leading up to surgical procedures in the form of pre-rehabilitation plans, i.e., the use of the ERAS protocol (Enhanced Recovery After Surgery Protocol), a crucial component of which is nutritional planning in perioperative hospital care, among others. It decreases the likelihood of early surgical treatment problems, shortens hospital stays, and increases the survival of cancer patients. The nutritional condition of cancer patients is maintained or improved through prompt and efficient monitoring and the application of nutritional assistance, which also enhances treatment results.

## Conclusion

An observational study of patients with gastric, pancreatic, and colon cancer's nutritional status before surgery found nutritional status changes in the form of a risk of malnutrition and malnutrition, as well as overweight and obesity. Overweight and obesity, as well as preoperative malnutrition, were linked to more common postoperative problems. The group of patients with stomach cancer experienced complications the most frequently.

Additionally, there was a tendency for patients who were overweight or obese and at risk for malnutrition from stomach cancer to stay in the hospital longer.

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