Evaluation of change in nutritional status of patients in surgical ward after prolonged stay

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Abstract

Background: Undernourishment is common in patients admitted for surgery, which is often unrecognized and worsens during hospitalization. So, prevalence of malnutrition also increases in the hospitalized patients.

Objective: To assess the change in nourishment of prolonged hospitalized patients. For that the nutritional status of patients at the time of admission and discharge was assessed.

Materials and Methods: All patients admitted in the surgery ward for more than 7 days were included in the study. The data of patients were recorded at the time of admission and at the time of discharge. The data recorded were demographic data, daily dietary intake, and anthropometric parameters such as height, weight, mid-arm circumference, body mass index (BMI), hemoglobin level, albumin level, and albumin/globulin ratio.

Result: There was a significant decrease in mean weight (from 50.24 ± 9.73 to 47.86 ± 9.90 kg), mean BMI (from 19.89 ± 3.59 to 18.92 ± 3.60 kg/m^2), triceps skinfold (from 7.26 ± 2.02 to 6.00 ± 2.07 mm), and mean albumin level (from 3.47 ± 0.38 to 2.99 ± 0.44 g/dL) of the patients after a prolonged hospital stay.

Conclusion: After a prolonged stay of the patients in the surgical ward, changes occurred in their nutritional status. It is important to closely monitor the nutritional status of the patients during hospitalization and to correct it accordingly to prevent the consequences of malnutrition.

KEY WORDS: Surgical patients, prolonged hospital stay, nutritional status

Introduction

A nutritional assessment is an in-depth evaluation of both objective and subjective data related to an individual's food and nutrient intake, lifestyle, and medical history. The nutritional assessment is required to prevent the risk of malnutrition in patients. The impact of nutritional status on various clinical and economical outcomes of hospitalized patients can be assessed by observing the changes produced in the nutritional status of the hospitalized patients.[1]

Since early 1970, the prevalence of malnutrition in hospitalized patients has been documented very widely.[2,3] It has been found that patients who are malnourished have more complications, poorer outcome, and longer hospital stays, which also generate more hospital burden.[4,5] It is culture to provide adequate nutrition to hospitalized patients to prevent the malnutrition since 1960. However, prevention of malnutrition is not uncommon.[6–8]

Undernourishment is common in patients admitted for surgery, which is often unrecognized and worsens during hospitalization. So, prevalence of malnutrition also increases in hospitalized patients. Patients who are healthy and well nourished respond well and their recovery from illness and surgical outcome is better than that of the patients who are undernourished. On admission to hospital, 30%–40%

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patients show evidence of poor nutrition and also normal and suboptimal nutritional status, which further deteriorates during hospitalization.

Undernourishment is a widespread problem in the developing countries such as India. Most of the hospitals in India now have department of nutrition and hospital mess that take care of the patient's nutritional requirements. Many studies have documented about the nutritional status of the hospitalized patients outside India.[3,6–8] However, the data from the developing countries such as India are very scarce. So, the objective of this study was to know the changes in the nourishment status of the prolonged hospitalized patients. For that the nutritional status of the patients at the time of admission and discharge was assessed.

Materials and Methods

This was a prospective observational study conducted at the surgical wards of GMERS Medical College and Hospital, Dharpur, Patan, Gujarat, India. Permission from the human research ethics committee was taken before starting this study. Patients admitted in surgery ward were included in this study. A total of 85 patients of all ages and both sexes were interviewed and counseled for participation in the study. Written informed consent was taken from all the participants before their enrollment in the study. Of that only 57 patients could be included in the study. However, contact with 28 patients was lost and data after their hospitalization could not be collected. So, a total of 57 participants were included in the analysis. Patients who were critically ill and those who could not give consent were excluded from the study.

The team of investigators took the written informed consent form from the inpatients of the surgical wards or their relatives if he or she could not give consent before enrollment in the study. After enrollment, the demographic data of participants, which included participant's name, age, sex, height, weight, educational level, were noted in the record form. They were also interviewed about their employment history, that is, type of work, working hours, and smoking and alcohol habits.

They were inquired about daily dietary intake and their anthropometric parameters such as height, weight, and mid-arm circumference were measured. The body mass index (BMI) was calculated for all the patients. Blood was collected for the laboratory analysis of hemoglobin (Hb) level, albumin level, and albumin/globulin (A/G) ratio.

The enrolled patients were followed up and the information about their daily diet consumption was collected till the time of their discharge. Also, the same anthropometric parameters and laboratory tests were repeated at the time of their discharge.

Confidentiality of all participating subjects was maintained at all levels.

The data were analyzed using SPSS (trial version) software. Mean, standard deviation (SD), and coefficient of variance were measured for all parameters. The paired data were tested for paired test.

Result

During 3 months of the study period, a total of 85 patients were admitted in the male and female surgical ward of GMERS Medical College and Hospital. Of those, only 57 patients could be included in the study according to the inclusion and exclusion criteria, and all those who stayed for at least 7 days in the hospital were also included. Of all the 57 patients, 34 (59.6%) had undergone different surgical procedures, whereas the others were given conservative treatment.

If we see the demographic distribution of the 57 patients, 16 (28%) were female patients whereas 41 (72%) were male patients. The age-wise distribution of the patients is as seen in Figure 1. Majority of the patients were from the age group of 31–60 years whereas minimum were from the age group of above 70 years. As seen in Figure 2, the distribution of patients according to their occupation shows that the majority of patients were laborers (20, 35.09%), nonworkers (15, 26.32%), farmers (12, 21.05%), and other minor groups.

The comparison between different parameters before and after treatment is done and is given in Table 1. As seen in the table, the mean Hb level significantly reduced after the hospital stay. At the time of admission, in the surgical ward, mean Hb of patients was 12.16 g% (SD ± 1.79) whereas at the time of discharge their Hb level was 11.57 g% (SD ± 1.60) ($P < 0.019$). This suggests that after prolonged hospitalization Hb level decreases because of surgical stress and patients become malnourished.

The mean value of weight at the time of admission was 50.24 kg (SD ± 9.73) and at the time of discharge was 47.86 kg (SD ± 9.90) with $P < 0$, which shows that there is a significant weight loss after prolonged stay in the hospital. Mean value of BMI at the time of admission was 19.89 ± 3.59 kg/m^2 and at the time of discharge was 18.92 ± 3.60 kg/m^2 ($P < 0$). The difference is also significant. As seen in Table 1, the difference of triceps skinfold, at the time of admission and at the time of discharge was also significant.

In the laboratory parameters, only Hb and serum albumin levels decreased significantly, whereas all other parameters were not affected much. The mean Hb level at the time of admission was 12.16 g% (±1.79), which decreased to 11.57 g% (±1.60) at the time of discharge, which was significant ($P < 0.001$). The serum albumin level also decreased significantly from 3.47 g (±0.38) at the time of admission to 2.99 g (±0.44) at the time of discharge. Other parameters, such as total lymphocyte count, serum Na$^+$, serum K$^+$, A/G ratio, did not decrease significantly.
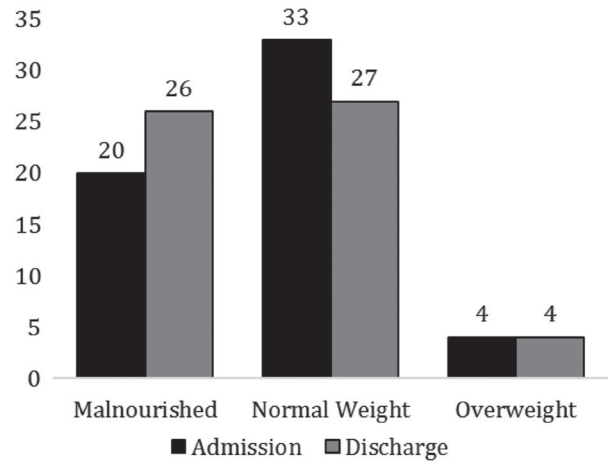
Table 1: Comparison of means of different parameters of all patients at the time of admission and discharge

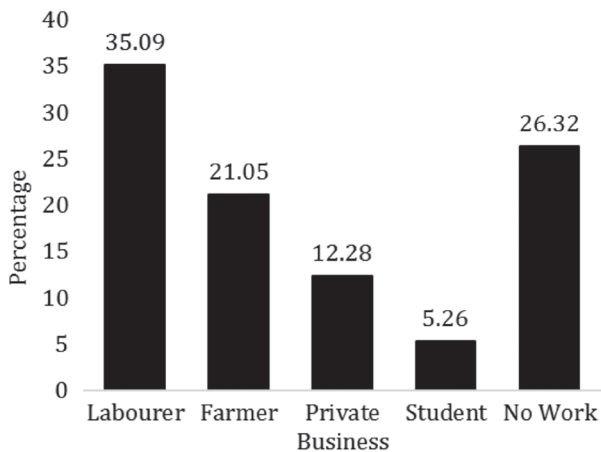| Parameters	Prehospitalization	After discharge	Mean difference	*t*-Value	Significance (*P*) (two-tailed)
Hemoglobin	12.16 ± 1.74	11.57 ± 1.60	0.59	2.59	0.014
TLC	9171.08 ± 2808. 41	9111.08 ± 1921.83	60.00	0.11	0.910
Lymphocytes	23.22 ± 8.00	22.16 ± 8.99	1.06	0.98	0.332
Serum albumin	3.47 ± 0.38	2.99 ± 0.44	0.48	8.04	0.000
A/G ratio	1.45 ± 0.34	1.44 ± 0.31	0.01	0.25	0.803
Serum Na$^+$	133.54 ± 6.00	135.86 ± 3.41	−2.32	−2.77	0.009
Serum K$^+$	3.68 ± 0.70	3.73 ± 0.73	-0.05	−0.61	0.544
Weight	50.24 ± 9.73	47.86 ± 9.90	2.38	12.19	0.000
BMI	19.89 ± 3.59	18.92 ± 3.60	0.97	11.75	0.000
Triceps skinfold	7.26 ± 2.02	6.00 ± 2.07	1.26	9.94	0.000

A/G, albumin/globulin; BMI, body mass index; TLC,.
P < 0.05 = significant difference.
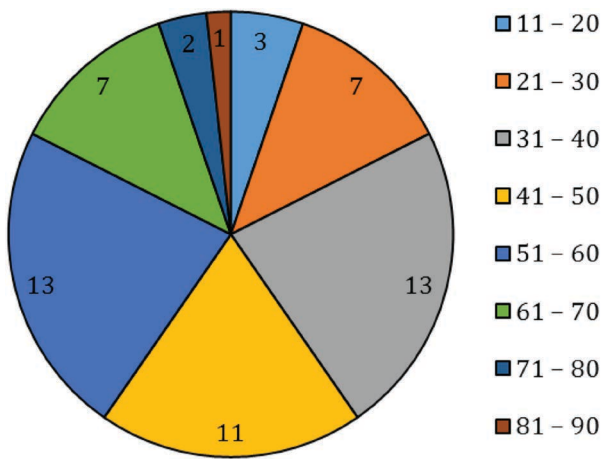
Figure 1: Age-wise distribution of the patients.

Figure 2: Occupation-wise distribution of patients.

Figure 3: Distribution of patients according to nourishment at the time of admission and discharge.

Discussion

Nutrition can be considered to be the foundation of good health and freedom from disease. Undernourishment is common in patients admitted for surgery and is often unrecognized, and worsens during their stay in hospital. As a result, prevalence of malnutrition is also increased in hospitalized patient. Patients who are healthy and well nourished respond well and their recovery from illness and surgical outcome are better than of the patients who are undernourished. According to the value of BMI, the nourishment level in the patients can be classified into three categories: (1) normal (18.5–24 kg/m²), (2) malnourished (≤18.4 kg/m²), and (3) overweight (≥25 kg/m²). The distribution of patients according to their BMI is shown in Figure 3, which shows that at the time of admission 33 patients (57.9%) had normal BMI whereas at the time of discharge only 27 patients (47.4%) had normal BMI, which

indicates that the nourishment of patients deteriorated after the hospital stay. McWhirter and Pennington also described in their study that 30%–40% of patients showed evidence of poor nutrition on admission to hospital and that normal and suboptimal nutritional status further deteriorates during hospitalization.[7] Similar result was also seen in the study by Junior Sundresh et al.[9] The reason is that a patient is under stress because of admission and the disease state also leads to anorexia, which is again aggravated by infectious state and toxemia. The prevalence of undernutrition in hospitalized patients is very high in India and other developing countries. It might be due to government hospitals that are not in a condition to provide adequate protein and calories in diet as per the requirements of the patients.

According to this study, Hb level is decreased during hospitalization (mean value at the time of admission was 12.16 ± 1.79 g(%) and 11.57 ± 1.60 (%) at the time of discharge, $P \le 0.019$) because of the blood loss from wounds, infections, and also possibly because of deficiency of micronutrients such as iron, folic acid, vitamin B12. In some cases, blood loss is also due to melena.

Serum albumin was also decreased (at the time of admission it was 3.47 ± 0.38 g and at the time of discharge it was 2.99 ± 0.44 g) because of loss of the serum proteins from the wounds, as well as less intake of high-protein diet, and so on. Triceps skinfold was decreased (at the time of admission, it was 7.26 ± 2.02 mm and at the time of discharge, it was 6 ± 2.07 mm)—it suggests that there is a loss of subcutaneous fat, which is due to inadequate calorie intake that is not sufficient to maintain the need of metabolic requirement during stress. So, body fat is used to provide energy (metabolic need) to the body and thus, triceps skinfold is decreased.

This study gives feedback and may help to develop a guideline to the nutrition department of the hospital to provide quality and quantity of nutrition to the admitted stressful patients. Providing proper nutrition helps to maintain the optimum nutritional level; thereby, it decreases morbidity and mortality and increases fruitful outcome. Thus, hospital burden is decreased and early discharge from the hospital can be possible, which leads to early resumption of duty/service resulting in cost-effective treatment.

Strength

As there was no such study yet found in this part of the country, it may provide basic data for further study.

Limitation

Sample size was less because of time constraint as it was a part of ICMR studentship program.

Conclusion

After a prolonged stay of the patients in the surgical ward, changes occur in their nutritional status. At the time of admission and at the time of discharge, there were major changes in different anthropometric, laboratory, and clinical parameters, which suggest that nutritional status worsens during hospitalization. Overall nutritional assessment is a very important aspect to correct malnourishment in hospitalized patients and to improve surgical outcome with less complications, morbidity, or mortality. It is important to closely monitor the nutritional status of the patients during hospitalization and to correct it accordingly for the prevention of consequences of malnutrition. It is preferable to start providing adequate calories and protein diet to the patients from the day of admission.

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