The Relevance Of Simple Anthropometric Parameter Of Body Mass Index (BMI) In Assessing Nutritional Status Of Surgical Patients

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ABSTRACT

The study has shown that malnutrition is known to increase morbidity and mortality in surgical patients. Another study reported the superiority of the anthropometric measurement of Body Mass Index (BMI) over other methods used in assessing nutritional status. The aim of this study is to highlight the significance of the use of simple anthropometric parameter of Body Mass Index (BMI) in the assessment of nutritional status of surgical patients relating such to nature of surgical procedures in terms of invasiveness and duration of hospital stay. Patients presenting for minor, intermediate and major surgeries (n=60) at Parklane Specialist Hospital, Enugu were selected for the study; after informed consent obtained. The age range of study population varied from 10 to 80 years and the M:F ratio given as 1:2:4. the weight and height of individual patients were measured at admission and body mass index (kg/m^2) computed. Baseline investigations including haemogram, leucocyte count and urinalysis were done. The pre-operative course and post-operative outcome were monitored till discharge. At discharge, patients were re-assessed and findings documented. Data obtained was statistically analyzed. Pre-operatively, 29.4% of patients were malnourished (BMI < $20kg/m^2$) and increased significantly to 41.8% post-operatively at discharge. On admission, 58.83% were well nourished (BMI = 20-25kg/m^2) while at discharge this declined to 47.1%. About 11.76% presented pre-operatively as overweight (BMI = 25-30kg/m^2). None of the patients was found to be morbidly obese (BMI > $40kg/m^2$). 52.9% underwent intermediate surgery while 35.3% and 11.8% presented for minor and major surgeries respectively. The mean BMI of patients presenting for minor surgery is given as 23.2kg/m^2 declining only slightly to 23.12kg/m^2 post-operatively. Mean BMI of 20.85kg/m^2 at discharge. In patients undergoing major surgery, mean BMI pre-operatively is 20.11kg/m^2 as compared to 18.93kg/m^2 at discharge. Post-operative complication noted as wound infection manifested only in 5.9%. No mortality was recorded. In conclusion, nutritional assessment using simple anthropometric parameter of Body Mass Index (BMI) is recommended for all surgical patients in order to hasten recovery and reduce post-operative morbidity.

Keywords: Anthropometry, Body Mass Index (BMI), Nutrition, Surgery.

Study has reported that malnutrition is known to increase morbidity and mortality in surgical patients; (Rolandelli and Ullrich 1994). It has been established that Protein Energy Malnutrition (PEM) in surgical patients is associated with post-operative morbidity due to immuno-compromise, impaired phagocytosis, poor inflammatory response, delayed wound healing and increased sepsis.

Study by Forse and Shizgal (1980), has shown the superiority of anthropometric measurement of Body Mass Index (BMI) over other methods of assessing nutritional status.

A study carried out by Elebute (1969) reported an increase in nitrogen excretion following surgery in Nigerians.

The aim of this study is to highlight the significance of the use of simple anthropometric parameter of Body Mass Index (BMI) in the assessment of nutritional status in surgical patients relating such to nature of surgical procedures in terms of invasiveness and duration of hospital stay.

MATERIALS AND METHODS

Patients presenting for minor, intermediate and major surgical procedures (n=60) at Parklane Specialist Hospital, Enugu were selected for the study; after informed consent was obtained. The age range of study population varied from 10 to 80 years and the M:F ratio given as 1:2:4.

The weight and height of individual patients were measured at admission and body mass index (kgm^{-2}) computed. Baseline investigations including haemogram, leucocyte

count and urinalysis were done. The pre-operative outcomes were monitored till discharge. At discharge, patients were re-assessed and findings documented. Data obtained was statistically analyzed and presented in tabular form.

RESULTS

As shown in Table 1, 29.4% of patients were malnourished, (BMI < 20kgm^{-2}) pre-operatively and increased significantly to 41.8% post-operatively at discharge. On admission, 58.84% were well-nourished (BMI = 20-25kgm^{-2}) while at discharge this declined to well-nourished (BMI = 20-25kgm^{-2}) while at discharge this declined to 47.1%. Only about 11.76% presented pre-operatively as overweight (BMI = 25-30kgm^{-2}) declining slightly to 11.1% post-operatively. None of the patients was found to be morbidly obese (BMI > 40kgm^{-2})

Table II, the mean BMI of patients presenting for minor surgery given as 23.21kgm^{-2} declining only slightly to 23.12kgm^{-2}) post-operatively. Mean BMI of 20.85kgm^{-2} pre-operatively in the intermediate group declined to 19.69kgm^{-2} at discharge. In patients who underwent major surgery, mean BMI pre-operatively is 20.11kgm^{-2} decreasing to 18.93kgm^{-2} at discharge.

Mean hospital stay is given as 13.7± 1.2 days in patients who underwent major surgery. This is as compared to 6.9± 1.2 days and 3.2± 1.2 days in patients who underwent intermediate and minor surgeries respectively.

Post-operative complication noted as wound infection manifested only in 5.9% of surgical patients involved in the study. No case of mortality was recorded.

Table 1: Distribution Of Body Mass Index (BMI) Pre And Post-operatively In Surgical Patients

	Malnourished BMI<20kgm^{-2}	Well-nourished BMI=20-25 kgm^{-2}	Overweight BMI=25-30kgm^{-2}	Morbidly Obese BMI>40kgm^{-2}	Total (%)
Pre-op	29.4%	48.84%	11.76%	0%	100%
Post-op	41.8%	47.1%	11.1%	0%	100%

Table 2: Nature Of Surgery In Relation To Mean Hospital Stay And Mean BMI Both Pre And Post-Operatively

Nature of surgery	Mean hospital stay (days)	Mean body mass index (KGM^{-2})	
		Pre-op.	Post-op.
Minor	3.2 ± 1.2	23.20	23.12
Intermediate	6.9 ±1.2	20.85	19.69
Major	13.7 ± 1.2	20.11	18.93

DISCUSSION

This study revealed that 29.4% of the 60 patients involved were malnourished pre-operatively, having (BMI < 20kgm^{-2}). This corroborates the findings in the study carried out by Akpan et al. (2002), which reported 29.7%. However, this contrasts with earlier study by Aoun et al. (1995), which reported 53% as malnourished pre-operatively.

There was noted a decline in mean BMI post-operatively in the surgical patients, being more drastic in patients undergoing major surgery and minimal in patients for minor surgery. This is explained by increased neuro-endocrine response and metabolic energy expenditure following major surgical procedures.

The post-operative complication noted as wound infection manifested only in 5.9% of the study population; and this was noted solely in patients who underwent major surgery. A report by Law et al. (1973), noted that malnutrition and compromised immuno-status predispose patients to infection and ultimately complicate surgical outcome.

It was also noted that mean hospital stay

in patients who underwent major surgery was 13.7± 1.2 days as compared to 3.2± 1.2 days and 6.9± 1.2 days in the minor and intermediate category respectively. This is in line with a study by Wyszynski (1998), who reported that prolonged hospital stay following surgery is associated with deterioration in body mass index.

In conclusion, nutritional assessment using simple anthropometric parameter of Body Mass Index (BMI) is recommended for all surgical patients in order to hasten recovery and reduce post-operative morbidity.

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