Assessment Of The Nutritional Status Of Adult In-Patients In A Tertiary Public Hospital In Malaysia: A Single-Day Point Prevalence Study

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Abstract

Malnutrition is a major problem that is encountered in day-to-day clinical practice and is associated with increased risk of morbidity and mortality. Unfortunately, malnutrition is often undetected unless the patient is on the extreme ends of the malnutrition spectrum. Public hospitals in Malaysia have yet to have a standardized protocol for nutrition screening and consensus concerning methods to assess nutritional status is lacking. This cross sectional study endeavours to utilise a simple but yet clinically relevant technique (Body-Mass Index) to perform a one-day survey on the nutritional status of all adult patients admitted to a tertiary public hospital as an initial tool in the diagnosis of malnutrition.

INTRODUCTION

Malnutrition is a major determinant in the management outcome of patients. While most health care professionals are aware of that fact, we tend to take nutritional assessment for granted and is seemingly in the bottom of the clinician's management list, and sometimes not at all. Nutritional assessment tools, although being part of the academic curriculum taught in medical school, is typically out of practice in our day-to-day clinical work. This is especially true in the hospitalized patient population. Hence an attempt was made in Hospital Kuala Lumpur (HKL) to perform a single-day, cross sectional study of the nutritional status of all admitted adult patients. A total of 914 adult in-patients were included in the study from various disciplines employing the simple technique of Body-Mass Index (BMI). The objective is to identify the nutritional status as well as to study the prevalence of malnutrition of the adult in-patient population in a public hospital.

METHODS

This is a cross-sectional study employing Body-Mass Index (BMI) measurement across all adult patients from all disciplines admitted to Hospital Kuala Lumpur, a national tertiary public hospital which has a capacity of 2,400 beds. The height and weight of all the hospitalised patients were measured in the ward using standardised hospital weighing scales and the BMI calculated from the data and was carried out all on the same day on the 5th of June 2012, covering every adult ward in this hospital. The BMI is defined as the weight in kilograms divided by the square of the height in metres (kg/m2).

We had anticipated several technical difficulties during data collection. In patients who were non-ambulatory as in the case of those in the intensive care unit (ICU), height was measured while placing the patient supine and completely horizontal while the head-to-heel length was taken. The weight was recorded on computerised beds and BMI calculated. In other non-ambulatory patients where weight-measuring beds were not available for example in orthopaedic patients with lower limb trauma, these patients were excluded. Other patients with heavy prostheses attached and pregnant women were also excluded.

Data was analysed using the SPSS version 19.0 and descriptive statistics, cross tabulations and the Pearson’s Chi Square test were performed. The obtained results were then divided accordingly to normal, underweight, overweight and obese, matching them against gender, ethnicity and the admission discipline. The WHO International Classification of adult underweight, overweight and obesity criteria is

used1.

RESULTS

A total of 914 patients were recruited for the study. However 50 patients did not have standard measurements of either height or weight and were excluded from analysis. The patients were divided according to the WHO BMI classification. Out of the total patients analysed (n=864), normal weight patients (BMI 18.5-24.9) constituted 380 (44%), underweight (BMI less than 18.5) was 129 (14.9%), overweight (BMI 25-29.9) was 209 (24.2%) and obese (BMI more than 30) was 146 (16.9%). Hence it was noted that the patients who are overweight and obese (41.1%) almost equate those within normal range (44%). Less than 20% of hospital admissions were underweight. On the overall, 56% of all admitted patients had malnutrition.

The data was also analysed according to ethnicity where it is essential to identify the nutritional status of different communities in order to recognise the risk of malnutrition attributed to each ethnic group. It was noted that 55.5% (n=479) of total admissions were Malays, 19.9% (n=172) Chinese, 19.1% (n=165) Indians and 5.5% (n=48) were others. This ethnic distribution closely approximates the population composition in Malaysia. It was noted that Malay and Indian ethnic patients were proportionally more overweight (25.5%, 21.2%) and obese (19.8%, 19.4%) whereas Chinese patients were the most underweight (21.5%).The BMI classification tabulated against ethnicity is summarised in the table below (Table 1).

Table 1

BMI classification matched against ethic distribution. Percentage given is based on the value within each sub-group.

	BMI < 18.5	BMI 18.5-24.9	BMI 25-29.9	BMI > 30
Malay	58 (12.1%)	204 (42.6%)	122 (25.5%)	95 (19.8%)
Chinese	37 (21.5%)	80 (46.5%)	42 (24.4%)	13 (7.6%)
Indians	28 (17%)	70 (42.4%)	35 (21.2%)	32 (19.4%)
Others	6 (12.5%)	26 (54.2%)	10 (20.8%)	6 (12.5%)

The data was also analysed according to gender distribution. The total number of males (n=456) and females (n=408) was closely matched at 53% and 47% respectively. Male patients were proportionately more underweight and female patients were more overweight and obese. The details and breakdown of the nutritional status are summarised in Table 2.

Table 2

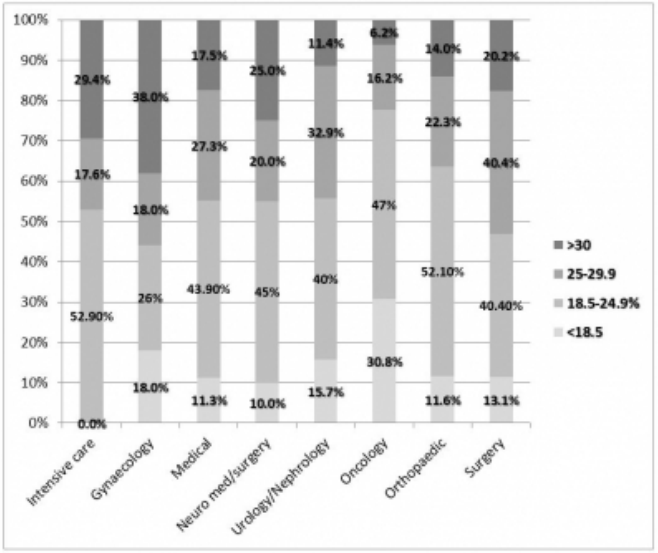
BMI classification matched against gender distribution. Percentage given is based on the value within each sub-group.

	BMI < 18.5	BMI 18.5-24.9	BMI 25-29.9	BMI > 30
Male	77 (16.9%)	227 (49.8%)	96 (21.1%)	56 (12.2%)
Female	52 (12.7%)	153 (37.5%)	113 (27.7%)	90 (22.1%)

The patients were grouped according to the major discipline and to the wards to which they belonged to. Most of the patients were recruited from the medical wards totalling a figure of 337 (39%) and the least came from the intensive care unit of 17 (2%). Oncology ward understandably had the most proportionately underweight patients (30.8%) whereas the intensive care unit patients did not fall into the underweight category presumably because of water retention or oedema. Gynaecology patients were proportionately the most obese at 38%. The statistical analyses are summarised in Chart 1.

Chart 1

BMI group distribution among major disciplines and wards. Percentage given is based on the value within each sub-group.



Our study also showed that an astounding 95.1% of in-patients did not have either their weight or height or both measured upon admission. The wards with the highest compliance of measurements taken were the intensive care

unit and the oncology wards. The latter is compliant probably because anthropometric quantifications are required in dosage calculation of chemotherapeutic agents.

DISCUSSION

Although the Body-Mass Index (BMI) or Quételet Index, was first coined in 1974 by Ancel Key, it was the brainchild of Aldophe Quételet (1796-1874) a Belgian mathematician, astronomer and statistician, who, in a series of pioneering cross sectional studies of human growth, noted that "the weight increases as the square of the height" to which he submitted his idea and work to the Belgian Royal Academy2, 3. The BMI has gone a long way from then and it still remains relevant in clinical practice today.

Malnutrition exists in all communities and this fact is especially pertinent, in hospitalised patients. The term malnutrition not only refers to a state of emaciation, sarcopenia or cachexia, but it also refers to persons who are overweight and obese. It has been suggested by Peter Soeters et al as "a subacute or chronic state of nutrition in which a combination of varying degrees of over- or undernutrition and inflammatory activity have led to a change in body composition and diminished function''4. In a study involving 1707 in-patient, both reduced lean tissue as well as high fat mass may be independent nutritional risk factors resulting in increased length of hospital stay5. Hence realising and detecting malnutrition should be one of the key aspects of clinical practice and management as part of a more holistic approach to health.

BMI as a screening tool remains relevant as it has been shown in one of the largest series of BMI measurement involving 63,646 ICU patients, where BMI <20 were noted in 12.4%, BMI 30-40 was 19% and BMI> 40 was detected in 5.7% of patients6. A similar study involving 1052 patients was conducted in French hospitals assessed the sensitivity of the BMI in detecting the prevalence of severe malnutrition7. In a study involving 552 geriatric patients, low BMI score appeared to be an independent predictor in the 1 year mortality8.

Undernourished in-patients were discovered to be as high as 40% in some UK hospitals9 and up to 60% in patients with gastro-intestinal tract diseases were undernourished at time of surgery10. In a study conducted on 129 patients in the intensive care unit (ICU), 43% of the patients were underweight and had statistically significant higher complications and were less likely to leave the ICU11.

Undernourished patients undergoing surgery were also noted to have higher rates of morbidity and mortality as well as longer hospital stays compared with adequately nourished patients12, 13.

On the other end of the spectrum of malnutrition, obese patients were also found to have higher complication rates and mortality14, increase length of hospital stay, poorer outcome in surgery, hypertension, cardiovascular dysfunction, respiratory insufficiency like sleep apnoea syndrome, diabetes and poor glycaemic control, hyperlipidaemia, sexual hormone dysfunction, and even certain carcinomas 15. All these factors can be extrapolated to a difficult and complicated management of the patient.

As it has been shown, the low measurement rate of height and weight in the hospital is a cause for grave concern. We believe that other public hospitals in Malaysia have a similar problem because of the absence of protocols in nutrition screening. However BMI has its limitations especially in patients with retained body fluids like ascites and oedema, and thus potentially underdiagnosing the prevalence of malnutrition. In a recent study, it has been noted that BMI is less discriminating of abnormal nutritional status than Fat Free Mass Index (FFMI) or Fat Mass Index (FMI)5.

Undoubtedly other more advanced nutrition assessment tools are more superior in terms of sensitivity and specificity rates as compared to the BMI, but these tools require training and would take up more time and effort to conduct. Nonetheless the best way to realise ideal nutrition support is by utilising these more advanced tools like the Nutrition Risk Screening (NRS 2002)16, Subjective Global Assessment17, Mini Nutrition Assessment for the elderly18 or the British Malnutrition Universal Screening Tool19.

In conclusion, the BMI is being used as an initial screening tool that helps to determine if the patient is at risk of malnutrition. This is followed by a more detailed evaluation of the patient's nutritional status. BMI is used as an initial screening tool in the hospital because of its simplicity and medical professionals are capable of using it with ease, be it manually or directly incorporated into a computer programme which helps to improve nutrition support delivery in the hospital20. BMI can be part of the admission protocol and used to screen through patients who are at risk of malnutrition. In addition, BMI is employed as part of comprehensive nutrition assessment tools like the NRS 200216 as well as the MUST score19. Hence we recommend

that the BMI should at least be performed routinely for all patients upon admission. Such an effort would lead to better nutrition support and eventually result in amore positive outcome in our day-to-day clinical practice.

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