NUTRITIONAL ASSESSMENT: IDENTIFYING PATIENTS' NEEDS

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In 1854 Florence Nightingale recognised the role that good nutrition played in improving the outcome of soldiers injured during the Crimean War. Almost 200 years later, undernutrition is still common among hospital patients. The *King's Fund Centre Report* of 1992[1] suggested that up to 50% of patients admitted to hospital were malnourished on admission, and that this poor nutritional state often grew worse during their hospital stay. Later studies have continued to confirm the high prevalence of malnutrition and have highlighted the need for better education in clinical nutrition of nursing and medical staff.[2]

The evidence overwhelmingly shows that disease-related malnutrition leads to increased morbidity, reduced quality of life and impairment of a number of essential body functions. Complication and mortality rates are increased by malnutrition with huge resource implications.[1] The questions that beg answers are: why is malnutrition so common among hospital patients; and why, despite huge technical advances in artificial nutritional support, does their nutritional status continue to decline during their hospital stay.

Doctors and nurses frequently fail to recognise signs of malnutrition, partly because they are not trained to look for it and partly because the assessment of nutritional status is not easy (see Table 1 for definitions of nutritional terms). It is therefore vital to develop strategies to identify malnutrition easily at an early stage, and to introduce successful treatment plans to ensure that patients' nutritional requirements are being met.

TABLE 1
Nutritional definitions.

Malnutrition[3] – a state of nutrition in which a deficiency, excess or imbalance of energy, protein and other nutrients causes adverse effects on body form, function and clinical outcome.

Nutritional status – the state of the body resulting from the consumption and utilisation of nutrients.

Nutritional assessment – a comprehensive evaluation of the nutritional state of an individual using, where possible, quantitative methods.

Nutritional screening – a simple and rapid method of identifying patients at risk of malnutrition, or who need dietetic referral for more detailed assessment.

NUTRITIONAL STATUS

To determine if a patient is malnourished, or at risk of malnutrition, it is necessary to assess their nutritional status. This is not always as easy as it might first appear as many changes occur in the body in the presence of malnutrition, and a multitude of tests have been described which attempt to quantify them. An ideal clinical marker of nutritional status should be widely available, easy to determine, highly specific to the nutritional state and sensitive to its modification. Unfortunately no such single marker exists that when taken in isolation, can be used to measure nutritional status. Abnormal results can occur for many reasons, of which undernutrition is only one potential cause.

A basic clinical examination, or simply 'eye-balling' the patient, can detect obvious cahexia, but this alone is unlikely to identify malnourished patients of normal or near-normal weight, or those suffering from subclinical deficiencies. Measuring patients' weights and heights, and calculating the body mass index (BMI)[4] is a simple and more robust measurement of nutritional status (see Table 2). Body mass index can be calculated using the following equation:

$$\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m)}^2}$$

TABLE 2
How to interpret BMI. Adapted from Garrow, 1981.[4]

BMI	Interpretation
>40	Morbid obesity
31–40	Moderate – severe obesity
26–30	Mild obesity
20–25	Normal range
16–19	Underweight
<16	Severely underweight

The BMI may be unreliable in the presence of confounding factors such as oedema or ascites, and taken as a measure on its own, rather than as part of a 'weight history', may fail to identify some individuals suffering from unintentional weight loss. C-reactive protein and albumin have been considered useful nutritional markers, but in reality they are more useful as an indicator of the severity of disease.[5–7] For example, patients suffering from gross weight loss and severe malnutrition as a result of anorexia nervosa often present with normal albumin and CRP levels. In contrast, a well-nourished patient suffering from an

acute urinary tract infection may present with a markedly elevated CRP, and albumin levels well below normal, but will not require nutritional support.

It is apparent therefore that no individual marker exclusively defines nutritional status. A combination of test results and other clinical information must be taken together to form a nutritional picture. The process is akin to a jigsaw puzzle: one or two pieces will not form much of an image. The more pieces of information gathered, the bigger and clearer the picture will be, with some pieces of information being more important than others.

An appropriate nutritional assessment should include elements such as a detailed diet history, weight history, BMI and an understanding of how the particular disease process from which the patient is suffering is likely to affect intake and absorption of nutrients.

Not all patients admitted to hospital or in the community need detailed nutritional assessment with its requirement for time and specialist training. For this reason, simple nutritional screening tools have been developed which can be carried out on most patients and require minimal staff training.

NUTRITION SCREENING TOOLS

Nutritional screening

A nutritional screening tool can help to recognise or select patients with malnutrition or those who are at risk of developing malnutrition. This should be easily accessible to those without formal training in nutrition and easy to use. Many screening tools have been developed but it is important to use one that has been designed and validated for the target population group.

The Malnutrition Advisory Group (MAG) of the British Association of Parenteral and Enteral Nutrition has developed such a screening tool for adults at risk of malnutrition.[8] This is based on BMI and a history of unintentional weight loss with supplemental questions relating to changes in appetite, and psychological and physical disabilities likely to result in weight loss. An updated version of the MAG screening tool, to be called MUST (Malnutrition Universal Screening Tool), is currently being validated for use in both hospitals and the community. When a patient has been scored using a screening tool, a nutrition plan has to be developed.

Those at low risk of developing malnutrition require little or no action and may simply require the nutritional screening to be repeated after a given time. Patients at medium risk may require special diets or extra snacks, and may also require sip feeds to supplement their oral intake. Patients with a high-risk score require more detailed assessment and should be referred to a State Registered Dietitian for specialist advice.

Assessing nutritional requirements

When a patient is referred to a dietitian for nutritional support, a more detailed assessment will be performed and their precise nutritional requirements established. Nutritional requirements are dependent on many factors such as age, sex, weight and activity. The presence of disease can also modify requirements further. This is particularly true for energy and nitrogen requirements as well as other nutrients. A petite, elderly ,bed-bound woman suffering from a stroke will have lower nutritional requirements than a young, muscular, active man with multiple fractures following a road traffic accident.

Energy requirements are usually estimated at the bedside using a prediction formula such as that of Schofield.[9] The basal metabolic rate is estimated using the age, weight and sex of the patient. A metabolic stress factor dependent on the patient's disease or symptom status is then added. A further addition is made to include diet-induced thermogenesis and the patient's activity level. Finally, a range of calories may be added or subtracted to the sum depending on the patient's energy stores.

Nitrogen requirements can be estimated using a formula devised by Elia,[10] based on the patient's weight and taking into consideration the metabolic stress factor. Research continues into the requirements for vitamins, minerals and trace elements. Dietary Reference Values[11] are a good starting point but higher amounts are required in certain disease states, as well as in patients with dietary deficiencies.

For example, patients with more than 15% body-surface-area burns are likely to have increased micronutrient and trace element requirements.[12] It should be noted, however, that over-supplementation of certain nutrients may interfere with the absorption of others, e.g. copper/zinc interactions. The Parenteral and Enteral Nutrition Group's (British Dietetic Association) *A Pocket Guide to Clinical Nutrition*[12] includes a section on suggested requirements for vitamins, minerals and trace elements.

Once the nutritional requirements have been calculated, it is vital to ensure that the nutrients are given to the patient in the most appropriate form. Patients with normal or partially functioning gastrointestinal tracts can usually meet their needs using the enteral route. Only a very small proportion of patients have completely non-functional or inaccessible GI tracts, and their requirements then need to be met through the parenteral route. Parenteral nutrition is expensive, highly technical, has potentially dangerous complications and should only be carried out in centres with suitable expertise, and ideally under the care of a specialist nutrition support team.[13]

Ideally all patients would be able to eat reasonable portions of normal hospital food. Those suffering from dysphagia, painful mouths, poor dentition or upper gastrointestinal strictures, however, may require a soft or pureed diet. Alteration of texture results in a decrease in food choice and often, in the case of pureed or liquidised food, the appearance of the food may deter the patient from eating it. For food to be successfully liquidised, large volumes of fluid such as water, stock or milk needs to be added. This increases the total volume of the meal, which can overwhelm the patient, and dilutes the nutrient content of the food. As a result, patients can often manage only small volumes of nutrient-poor food. This reduces their intake and further compromises their nutritional status.

Patients suffering from dysphagia, e.g. after a stroke, are often fasted for several days until it is confirmed that their swallow is safe for oral intake. They are often commenced on a pureed diet and only in small amounts, e.g. four to five teaspoons at each meal, making it unlikely that they will meet their nutritional needs.

It is often forgotten that patients require not only food but also fluids. Failure to meet this need leads to dehydration and increased risk of conditions such as urinary tract infections. Patients with dysphagia may find it difficult to swallow fluids. This can be overcome by thickening the fluid with a proprietary agent. Thickened fluids are often presented to patients one teaspoon at a time, and can be unpalatable, particularly when hot. The fact that they are often taken by spoon rather than by cup means that patients struggle to consume even their basic fluid requirements. A patient would need to swallow 200 spoonfuls to consume one litre of fluid, a daunting prospect for both patient and carers.

MONITORING

Once the nutritional goals have been established, it is important to determine that patients are meeting their requirements. A number of different methods can be used to record food and fluid intake. These include dietary recall, food diaries, and food and fluid intake charts, the latter being most commonly used in the hospital setting. Obviously, the accuracy of the assessment depends on how conscientiously the forms are filled in. A dietitian can then calculate the patient's actual nutrient and fluid intake, and compare it with the patient's requirements. If the patient fails to meet their requirements over a prolonged period of time, further intervention will be required. The sicker and more malnourished the patient is, the shorter the time available to remedy the situation before severe complications from malnutrition may occur.

ENTERAL TUBE FEEDING

Patients who cannot meet their requirements, and who have sufficient gastrointestinal function, may be considered for enteral tube feeding. Patients can now be fed via a number of routes including nasogastric, nasojejunal and nasoduodenal tubes and by percutaneous gastrostomies and jejunostomies. An extensive range of nutritionally complete liquid enteral feeds are available, and an appropriate feeding regimen should be prescribed by a dietitian. Enteral tube feeding can be given both in hospital and at home, and the number of patients artificially nutritionally supported at home has increased dramatically over the past few years.[14]

Patients with chronic conditions can be resistant to the idea of being fed artificially. Food has important social and psychological functions: we usually consume food in company with other people at specific times of the day, and eating is one of the first independent actions we perform as children. A patient on artificial feeding, however, may not go to the table, may feed continuously and usually requires help with their feeding: it is therefore not surprising that they may feel socially isolated. The introduction of such feeding must therefore be considered carefully by doctors, nurses, dietitians, patients and carers. The benefits and possible consequences must be clearly explained and discussed.

Nutrition is unusual in that it has several connotations: it is a fundamental human need, a therapy and an important social interaction, and occurs throughout the patient's journey of care. Good nutritional assessment is, therefore, more than simply a sum of individual nutrients, but should embody a holistic approach and recognise that a patient's needs change during the course of their illness and rehabilitation.

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