Investing in patients' nutrition: nutrition risk screening in hospital

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KEY WORDS

Australia, evidence translation, hospitalisation, malnutrition screening, malnutrition, nursing.

ABSTRACT

Objective
This paper explores the current state of knowledge and evidence for investing in the nutrition screening of patients in hospital.

Setting
Hospitals

Subjects
Hospital patients; nursing care

Primary argument
Nutrition screening of hospital patients is widely supported in evidence-based guidelines because poor nutritional status has a negative impact, increasing patients' morbidity, mortality and length of hospital stay. Screening is often undertaken by nurses as part of the patient admission process and in conjunction with other health risk screening tools, although the extent of routine nutrition screening in Australian hospitals is unclear. Once a patient is screened and subsequently assessed and diagnosed with malnutrition and treatment is commenced, there is a lack of high quality evidence about the effect of this treatment on longer term patient outcomes. This has most likely restrained nursing decisions about investing nursing resources in routine nutrition screening of all targeted patients.

Conclusion
Routine screening of hospital patients for nutrition risk early in their admission is obligatory according to best evidence, though not universal in Australian hospitals. Further high quality research (eg., randomised trial) is warranted to determine the consequences of screening which appear to include positive impact of nutritional interventions upon undernourished/malnourished patients. If this data were available, administrators may recognise both economic and patient-centred benefits of investing in systematic nutrition screening.

INTRODUCTION

In 1859, Florence Nightingale noted cases of under-nutrition in soldiers who were hospitalised in the Crimea, also writing about the importance of nutrition to their overall wellbeing (Nightingale 1859). Over a century later, evidence of malnutrition in hospital patients is a focus of attention because, despite informed practices, malnutrition may still be the skeleton in the hospital cupboard (Weinsler et al 1979) and its treatment unresolved. In developed countries, malnutrition is known to afflict between 20-50% of adults in hospital (Sorensen et al 2008; Pirlich et al 2006; O'Flynn et al 2005; Stratton et al 2004; Middleton et al 2001; Waitzberg et al 2001) also co-existing with other disease processes. There are clear correlations between parameters reflecting poor nutrition such as low body mass index or decreased serum albumin and rate of in-hospital complications, readmissions and mortality (Correia and Waitzberg 2003). It is well recognised that malnourished patients recover more slowly from illness. They experience more complications such as poor wound healing or altered immune function (Covinsky et al 1999). Thus, undernutrition in hospital patients is a condition that demands serious examination.

Background

Malnutrition is characterised by a protein/energy depletion which results from too low an intake of food nutrients relative to an individual's requirements (Alberda et al 2006). Illness increases nutrient demand (Allison 2000). There is no universal definition of malnutrition although the Australian Government applies funding reimbursement to public hospitals under case-mix using the first definition in table 1.

Table 1: Definitions of malnutrition

Author	Definition
Australian Government: Diseases Tabular (AN-DRG 10) (NCCH 2008)	In adults, BMI < 18.5 kg/m^2 or unintentional loss of weight (5%) with evidence of suboptimal intake resulting in moderate loss of subcutaneous fat and/or moderate muscle wasting.
World Health Organization (WHO 1999)	Adults: classification of body mass index: < 18.49 kg/m^2 using reference charts for the relevant population.

No 'gold' standard or single quick measure can indicate presence of malnutrition (Kubrak and Jensen 2007). This demands a detailed patient assessment using physical examination and aspects of the medical history such as gastrointestinal symptoms and biochemistry. Assessment is usually carried out by a dietitian or a clinical nutrition nurse specialist who may use the Subjective Global Assessment tool (Detsky et al 1987) to establish presence or absence of malnutrition.

To facilitate practice, a number of screening tools have been developed to screen patients for risk of malnutrition and systematically identify those who may be undernourished and exclude those with low risk (Arrowsmith 2000). Each tool uses several indices associated with characteristics of under-nutrition. Some use objectively obtained criteria such as body weight, body mass index (BMI) or other anthropometric measures such as skin-folds or arm circumference and/or biochemical measures. Others use subjective criteria such as reported weight loss and reported appetite change (Anthony 2008). Three screening tools valid for use with hospital patients are given in table 2. These are the Malnutrition Screening Tool (MST) (Ferguson et al 1999), Malnutrition Universal Screening Tool (MUST) (BAPEN 2003) and Mini Nutritional Assessment (MNA) (Kyle et al 2006).

Table 2: Three validated tools for nutrition screening and their rating systems.

Tool	Measures used	Target population
Malnutrition Screening Tool (MST)	Rating of two parameters - weight and appetite: Recent unintended weight loss: yes=2; no=0 How much: 1-5kg=1; 6-10kg=2; 11-15kg=3; >15kg=4. Decreased appetite: yes=2, no=0. Summed score of ≥2 is positive for nutrition risk	Adult hospital patients, oncology chemotherapy and radiotherapy adults; adult renal patients
Malnutrition Universal Screening Tool (MUST)	Rating of three clinical parameters: BMI: >20kg/m^2=0; 18.5-20kg/m^2=1; <18.5kg/m^2=2; Weight loss: <5%=0; 5-10%=1; >10%=2; Acute disease: absent=0; if present=2. Overall risk of malnutrition based on total score: 0=low risk; 1=medium risk; 2=high risk.	All adults including community living adults
Mini Nutritional Assessment (MNA)	Rating of six indicators (lowest score=positive risk): Food intake decline: severe=0; moderate=1; none=2 Weight loss: >3kg=0; unsure=1; 1-3kg=2; none=3 Mobility: low=0; medium=1; independent=2 Acute disease: yes=0; no=2 Neuropsychological state: severe=0; mild=1; normal=2 Body Mass Index: <19kg/m^2=0; 19-<21kg/m^2=1; 21-<23kg/m^2=2; ≥23kg/m^2=2. MNA score of 0-11 points indicates possible malnutrition; 12-14=no risk.	Older adults

The MST identifies adults who are at risk of malnutrition using subjective data and has been the focus of evaluation studies in Australia (Frew et al 2010; Isenring et al 2009; Porter et al 2009; Banks et al 2007; Beck et al 2001; Ferguson et al 1999) and overseas (Anthony 2008; van Venrooij et al 2007). It has a sensitivity of 93% in identifying patients with a score of two as being at nutrition risk, with specificity of 93% (Ferguson et al 1999) and is recommended as an easy to use tool for the screening of adult hospital patients (van Venrooij et al 2007). As it does not require a patient to be weighed it can be completed by a patient, carer, nurse or other health professional. Alternatively, the MUST has been extensively evaluated in various international populations and also found valid and feasible for use with adult patients (Stratton et al 2006; Kyle et al 2006). Other nutrition screening tools valid for hospital patients according to a recent Australian guideline by Watterson et al (2009) are the Simplified Nutritional Assessment Questionnaire (SNAQ©) (van Venrooij et al 2007) and the Nutritional Risk Screening (NRS-2002) form (Kondrup et al 2003).

However, in the absence of screening tools, body mass (weight) can be used alone as an indicator to trigger a patient's further assessment. The World Health Organization defines individuals with malnutrition as having a body mass index (BMI) of < 18.5 and getting thinner (BMI=body weight kg/height m^2) for example (table 1).

It is contended that nutrition screening, or classifying patients to identify those at risk of malnutrition is important to enable systematic identification of hospital patients who are at risk of malnutrition. This allows early nutritional assessment and if necessary, commencement of treatment to arrest nutritional decline and improve patient outcomes (BAPEN 2009).

DISCUSSION

Intention to screen patients concurs with evidence-based best practice guidelines in Australia (Watterson et al 2009) and in the UK (National Collaborating Centre for Acute Care 2006). In

the absence of screening programs in hospital, however, many cases of malnutrition are missed (Elia et al 2005). This situation is thought to be due to competing demands on hospital nursing staff (Raja et al 2008), increased complexity of patient management in hospitals, increasing age of patients and shorter lengths of in-hospital stay (Frew et al 2010a). Since physicians and nurses assess patients on admission to hospital, it is suggested they are in an ideal situation to conduct nutrition screening as part of that assessment (Green and Watson 2005).

Malnutrition risk rate in Australia

A nutrition risk screening process is a precursor to more detailed patient examination that is needed to make a diagnosis of malnutrition. The malnutrition risk rate in a study of 5,149 Australian hospital patients amounted to 20% in 2001 (Beck et al 2001) and in 2008, 24% of 3,033 patients (Frew et al 2010a). There is a lack of consistency in published data about screening outcomes nationally due to use of various tools and definitions. Some studies of malnutrition risk conducted in Australia are summarised in table 3.

Table 3: Studies of malnutrition risk in Australian hospital patients

Study	Target population	Malnutrition risk rate (%) n	Instrument
Frew et al (2010a)	Adult medical and surgical hospital patients (N=3,033)	24% (n=703)	MST
Bauer et al (2007)	Patients who had fallen whilst in hospital (N=49)	41% (n=20)	MST
Isenring et al (2006)	Oncology outpatients receiving chemotherapy (N=50)	32% (n=16)	MST
Stolz et al (2002)	Out-patients attending Fall and Injury Assessment Clinic (N=90)	12%(n=11) undernourished 45%(n=41) high nutrition risk due to other factors	ANSI: Australian Nutrition Screening Initiative tool
Beck et al (2001)	Hospital patients (N=5,149)	20% (n=1,029)	FBBC screening tool
Ferguson et al (1999)	Hospital patients (N=408)	21% (n=88)	MST

NOTE: 'malnutrition risk' refers to screening that correlates with actual diagnosis of malnutrition (a diagnosis made after further assessment): 20-50% of hospital patients have malnutrition (Sorenson et al 2008)

These results are comparable to a study of 5,089 patients in hospitals in the United Kingdom in 2008 that reported a risk rate of 28% (BAPEN 2009). It should be noted that studies commonly select medical and surgical patient populations and omit others such as maternity and critical (intensive) care patients. The results suggest, however, that with more than one in every five screened patients being found at risk of malnutrition, there are large implications for hospital resources to enable both the screening of all newly admitted patients and also necessary treatments.

Barriers to screening?

Unlike the UK (BAPEN 2009) there is no universal screening standard nor routine screening for malnutrition in most Australian hospitals (Renkema et al 2007). Furthermore, there is evidence that competent screening practice is lacking. Raja et al (2008) found low rates of compliance in nurses' screening using both MST and MUST in several wards of three Melbourne hospitals: audit rates were 2% to 61%. After nurse education and staff support over four months, compliance improved to 41%-70%. Nurses found that use of the MST took 'just a few seconds' and the MUST longer- as patients were weighed (p 31). Factors reported to limit the time nurses gave to screening include competing patient care tasks, nurses' skill in use of the tool and acceptance of evidence-based practice. Porter et al (2009) also reported low screening compliance of 17% and 62% in a survey of 46 admitted patients in two Australian hospitals. They found nurses' use of MUST was limited by task priorities and their self-perceptions of skill, and uncertainty about

screening protocols. Alternatively, a recent study of screening of randomly selected acute care hospital patients (n=275) in a tertiary Australian hospital showed that malnutrition was poorly documented. Only 15% of malnourished patients were identified and correctly documented by dietitians as being malnourished in the medical history (Gout et al 2009). Such a system if correctly implemented can have a positive impact on the funding of acute care public hospitals via re-imbursements (Gout et al 2009; Ockenga et al 2005; Raja et al 2004; Ferguson et al 1997). These issues suggest that improvements are needed in managing nutrition- related protocols.

Evidence for improving patient outcomes via screening

There is some supportive evidence for nutrition screening as a technique with potential for positively influencing patients' healthcare outcomes. A large study of over 5,000 randomly selected hospital patients in 12 European countries found that screened at-risk patient status was significantly associated with higher mortality and also longer hospital stay and more complications (Sorensen et al 2008). A natural corollary is, therefore, that focused interventions might be expected to reverse this negative trend. In a randomised trial of early screening upon hospital admission, the screening process was shown to be cost effective and to have an impact on clinical outcome (Kruizenga et al 2005). The process of screening has been shown to improve identification of at-risk hospital patients (Ockenga et al 2005) and to facilitate timely referral for further nutrition management (Kruizenga et al 2005). Although studies suggest that individuals in all age groups are at risk of underweight and consequent malnutrition (Banks et al 2007; Frew et al 2010), risk increases with advancing age. Banks et al (2007) found in a study of 2,208 hospital patients in Queensland that the odds risk for malnutrition increased from OR 1.4 (95% CI,1.2-1.6, p<.001) at age 61-80 years, to odds risk of 1.7 (95% CI,1.5-2.0, p<.001) at age >81 years compared to under 40-year olds. Given that 70-90 year old patients account for most hospital multi-day admissions in the state of Victoria (AIHW 2009) nurses should be alert to the increased nutritional risk of this age group and ensure all are screened for nutrition risk.

All these preliminary data confirm the useful potential of screening. However, the question that needs to be to be answered is: How effective are patient treatments that are implemented upon diagnosis of malnutrition to reverse nutritional depletion? If these treatments are effective then the investment of nursing time and other resources in the screening process will be worthwhile?

Treatment

Published evidence-based guidelines for management of malnutrition describe overall patient management (Watterson et al 2009; National Collaborating Centre for Acute Care 2006). The choices available for treatment are: nutrition support via oral, enteral or parenteral routes, with or without food and nutrition advice (National Collaborating Centre for Acute Care 2006). Some small studies internationally have demonstrated that some treatment outcomes are positive. Studies of use of enteral feeding and oral protein/energy nutrient supplementation (in the form of energy-dense liquids) have shown improvements in the global nutritional status of patients (O'Flynn et al 2005; Kruizenga et al 2005). An Australian study of home-based interventions by dietitians that included dietary advice was effective in decreasing nutrition risk (Leggo et al 2008). However, strong evidence of patients' dietary behavioural change to arrest their decline is elusive. A systematic review of the efficacy of dietary advice in changing illness-related malnourished patients' eating behaviour found the research evidence to date was inadequate with which to properly evaluate the intervention effect (Baldwin et al 2007). High quality trials with representative samples (eg., randomized trial) are still required to assess these outcomes. One barrier, however, is how to conduct research which might deny patients in a control group a nutritional treatment. Another barrier is the extended time period patients must be followed to determine physiological outcomes. A literature review by Weekes et al (2009) of the efficacy of interventions that might result in improvements in nutritional and clinical outcomes and costs for

patients with malnutrition reports a serious lack of evidence to support interventions designed to improve nutritional care of malnourished patients. Thus, information we need is not yet available.

RECOMMENDATIONS

The factors canvassed in this paper and found under-reported appear to result from an overall lack of research in the field. Research is desperately needed to show how to improve patient outcomes and to demonstrate the best intervention strategies to use to replete malnourished patients. In short, to warrant the time nurses may be required to devote to collecting the evidence during nutrition risk screening. Nurses should become skilled and expert in rapid nutrition risk screening of patients. In the absence of screening, however, nurses can assist data collection by use of simple measures. These include: recording the weight and height of patients on admission and any factors that impede nutrition- such as chewing or swallowing difficulties, and lower cognitive function. Each of these is a risk factor for development of malnutrition (Felblim et al 2007).

CONCLUSION

Evidence of malnutrition risk is an important antecedent to longer, more complicated hospital admissions for patients. Medical alerts can be raised by use of easily applied nutrition screening tools. Evidence shows that nutrition screening is obligatory as best practice and that it can benefit undernourished patients through early identification of their nutrition problems at hospital admission and hence can facilitate nutritional treatment. There is a lack of data about patients' response to nutritional interventions, however, and further high quality research is warranted to determine consequences of screening; to demonstrate the effect of nutritional treatments upon nutritional repletion, patient outcomes, and cost. One way to facilitate this research is for nurses to embrace nutrition screening and to undertake research studies in this field. If this data were available, administrators may recognise both economic and patient-centred benefits of investing in systematic nutrition screening.

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