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Original article

Nutritional status and dietary intake of acute care patients: Results from the Nutrition Care Day Survey 2010

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SUMMARY

Background & aims: One aim of the Australasian Nutrition Care Day Survey was to determine the nutritional status and dietary intake of acute care hospital patients.
Methods: Dietitians from 56 hospitals in Australia and New Zealand completed a 24-h survey of nutritional status and dietary intake of adult hospitalised patients. Nutritional risk was evaluated using the Malnutrition Screening Tool. Participants 'at risk' underwent nutritional assessment using Subjective Global Assessment. Based on the International Classification of Diseases (Australian modification), participants were also deemed malnourished if their body mass index was $<$18.5 kg/m^2. Dietitians recorded participants' dietary intake at each main meal and snacks as 0%, 25%, 50%, 75%, or 100% of that offered.
Results: 3122 patients (mean age: 64.6 $\pm$ 18 years) participated in the study. Forty-one percent of the participants were "at risk" of malnutrition. Overall malnutrition prevalence was 32%. Fifty-five percent of malnourished participants and 35% of well-nourished participants consumed $\leq$50% of the food during the 24-h audit. "Not hungry" was the most common reason for not consuming everything offered during the audit.
Conclusion: Malnutrition and sub-optimal food intake is prevalent in acute care patients across hospitals in Australia and New Zealand and warrants appropriate interventions.

1. Introduction

In recent published literature, several international studies report hospital malnutrition prevalence ranging from 20 to 50%.[1] A weighted mean of studies from Europe and USA indicated that 31% of hospital patients are either malnourished or at nutritional risk.[2] In the last decade results from malnutrition prevalence studies emerging from four Australian and one New Zealand hospital report malnutrition prevalence ranging from 11 to 47%.[2–6] Variation in sample size and the use of a variety of techniques to evaluate nutritional status (including anthropometric measurements, nutritional screening and assessment tools) are factors that prevent generalisation of the prevalence of malnutrition in the Australian and New Zealand acute care setting. The largest multicentre malnutrition study conducted by Banks et al. ($n = >2200$) reported 30% malnutrition prevalence in the acute care setting, however its results were limited to public hospitals in the state of Queensland only.[2]

One of the many factors implicated in the aetiology of malnutrition is sub-optimal food intake during hospitalisation.[7–10] Although optimal nutritional intake forms an essential part of therapeutic treatment of malnutrition, only two Australian studies were identified describing the food intake trends of acute care patients. One study audited the nutritional intake at main meals of acute care patients and reported that on average, the energy consumption of over one-third of their participants was less than 50% of that provided in a standard hospital diet.[11] However, this study did not capture information on the nutritional status of the participants. In a recent study, Bauer et al. (2011) found on average nearly 50% of patients reported eating half or less of their meal and these patients were found to be up to four times more likely to be malnourished compared to those who ate more than half of their meal.[12] The European NutritionDay Study captured information on the body mass index of acute care patients and audited their

Abbreviations: ANCDS, Australasian Nutrition Care Day Survey; ANOVA, one-way analysis of variance; AuSPEN, Australasian society of parenteral and enteral nutrition; BMI, body mass index; ICD-10-AM, international statistical classification of disease and related health problems; LOS, length of stay; MST, malnutrition screening tool; NBM, nil by mouth; ONS, oral nutritional supplements; SGA, subjective global assessment; TPN, total parenteral nutrition.

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one-day food intake.[8] The study found that fewer than half the participants finished the meals offered during the one-day audit.[8] The strength of the European NutritionDay Study was its large sample size of 16000 participants (from 256 hospitals across Europe) and the involvement of a variety of people (such as doctors, nurses, catering and food service staff, administrative staff, patients themselves and/or their family members and friends) to assist with data collection.[8] The striking results provided the Australasian Society of Parenteral and Enteral Nutrition (AuSPEN) an impetus to conduct a similar study in Australian and New Zealand hospitals. Senior staff within hospitals in this region felt that perhaps only dietitians could be enthused to assist with data collection and there was also a strong desire to conduct nutritional assessment of participants using a validated tool. With these factors in mind and to improve nutrition care practices in Australasian hospitals, the Australasian Nutrition Care Day Survey (ANCDS) was designed. The aim of this paper is to:

- provide point prevalence data for malnutrition;
- determine food consumption of acute care patients; and
- evaluate the differences in food intake of well-nourished and malnourished patients in hospitals across Australia and New Zealand.

2. Materials and methods

The ANCDS was a multisite cross-sectional study. In an effort to solicit participation from as many acute care hospitals across Australia and New Zealand, members of the Australasian Society of Australia and New Zealand (AuSPEN), and Dietitians Association of Australia (DAA) Interest Groups were invited to a webinar in March 2010 where details of the study aims, methodology, and sample size requirements were provided.

Ethical approval was provided by the Medical Research Ethics Committee of The University of Queensland. Approval was also obtained from local Human Research Ethics Committees of participating Australian and New Zealand hospitals.

Sites were requested to recruit a minimum of 60 participants from acute care wards that were representative of their hospital's acute care population. Patients could voluntarily participate in the study if they were $\geq$18 years of age and had provided written informed consent to partake in the study. The exclusion criteria for types of wards and participants were as follows:

- Admissions or discharges within the 24-h data collection period;
- Patients undergoing day surgery within the 24-h data collection period;
- Patients with dementia who do not have an authorised carer or next of kin to provide consent and data for the survey;
- Outpatients;
- Patients with eating disorders;
- Terminally-ill patients;
- Patients undergoing end-of-life palliative care;
- Wards to be excluded – Maternity and Obstetric, Paediatric, Mental Health, Intensive Care Units, Emergency Departments, High Dependency Units, Rehabilitation and Sub-Acute wards.

After nominating eligible acute care wards, the sites provided the Project Coordinator with a list of bed numbers for each ward. To help prevent recruitment bias associated with the potential recruitment of patients more familiar to the ward dietitian, and to provide all eligible patients an equal opportunity to participate in the study, the Project Coordinator randomised the order of bed numbers (using software package PASW Statistics Gradpack 18 (SPSS Inc., USA)) for data collection. By recruiting patients on a random basis, dietitians also had the opportunity to screen and therefore identify malnutrition/malnutrition risk in patients who may have not been previously reviewed by the ward dietitian.

Participating sites collected data over a 24-h period (starting at 2pm on day 1 and ending at 2 pm on day 2) in June and July 2010. A majority of sites collected data over one 24-h period. Due to limited staff capacity four sites (Australia-3, New Zealand-1) collected data over two 24-h periods. Two sites (Australia-1, New Zealand-1) collected data over three 24-h periods. Those sites collecting data over more than one 24-h period recruited different wards and patients each time to prevent over-representation.

Data from eligible participants from non-English speaking backgrounds were recorded through authorised carers, family members, or hospital-appointed interpreters who could provide translated responses.

Standardised training for data collection was provided by the Project Coordinator through five webinars.

2.1. Data collection

The following information was collected:

1. *Demographic* – date of birth, date of admission, gender, ethnic background, height, and weight. Height and weight data were used to calculate participants' Body Mass Index (BMI). Participants were grouped into the following categories: Underweight (BMI $<$ 18.5 kg/m^2), Normal Weight (BMI 18.5–24.9 kg/m^2) and Overweight (BMI 25–29.9 kg/m^2) and Obese (BMI $>$ 30 kg/m^2).[13] The number of days between date of admission and day one of the survey determined number of days spent in the hospital prior to the survey (Pre-survey length of stay (LOS));
2. Type of diet prescribed on day of survey: Diets were described as follows:
   a. *Standard diets* – diets that do not demand a dietary modification to manage a patient's medical condition;
   b. *Special (normal texture) diets* – diets prescribed for medical conditions e.g. carbohydrate-modified, fat-modified, fibre-modified, lactose-free, gluten-free, low-residue, and elimination diets;
   c. *High energy – high protein diets* – diets prescribed to meet the increased nutritional demands of malnourished or catabolic patients;
   d. *Texture modified diets* – prescribed for dysphagia or difficulty with chewing and swallowing and included pureed/vitamised, minced, mashed, soft, cut-up diets. Thickened fluids were integrated into this category;
   e. *Oral Nutritional Supplements (ONS)* – non-commercial and commercially prepared drinks and food items, high in energy and/or protein, to provide increased nutritional intake.
3. Nutritional Status:
   a. *Nutritional Screening* – was performed with the Malnutrition Screening Tool (MST).[14] The MST has been recommended for use in the acute care setting with high inter-rater reliability ($>$90%), specificity (93%) and sensitivity (93%).[15] The MST is a two-question screening tool (appetite and recent unintentional weight loss) and provides a score between zero and five. Patients are considered at nutritional risk if they score $\geq$2.[14]
   b. *Nutritional Assessment* – was performed with the Subjective Global Assessment (SGA) tool[16] for those patients who had an MST score of $\geq$2. The SGA is a valid and reliable nutrition assessment tool and includes two components: Medical