Implementation of malnutrition screening and assessment by dietitians: malnutrition exists in acute and rehabilitation settings

Eleanor Beck, Craig Patch, Marianna Milosavljevic, Shellie Mason, Corinne White, Mandy Carrie and Kelly Lambert

Abstract  The prevalence of malnutrition within hospital settings is a major concern to all health care workers. The recent development of a simple screening tool for use in such settings has increased the opportunity to identify at-risk patients in a reasonable time frame during their admission. This paper outlines the implementation of a routine nutrition screening and assessment, performed completely by dietitians, across both acute and rehabilitation settings. Dietitians were able to screen, on average, 72% of eligible patients, which ensured timely dietetic intervention. The routine malnutrition screening and assessment process highlighted differences (P < 0.01) in the rates of malnutrition between the acute wards (range 7 to 14%) and rehabilitation ward (49%). Significant differences between acute and rehabilitation patients were also found within the majority of individual diagnostic groups, including all surgery, fractures, cardiovascular incidents and respiratory illness (P < 0.01). The identification of rates of malnutrition between different wards, diagnoses and institutional settings provides dietetic managers with a sophisticated tool that can assist in the allocation of dietetic resources. This operational framework for routine screening of nutritionally at-risk patients in hospital, enables dietitians to develop patient outcomes and an effective nutrition care model. (Aust J Nutr Diet 2001;58:92–97)

Key words: malnutrition, nutrition assessment, screening, outcomes, rehabilitation

Introduction

Malnutrition is prevalent in all hospitals (1). Malnourished patients experience slower healing, increased rates of complication and increased mortality (2,3). They stay in hospital longer (4), cost more to treat and have higher readmission rates (5,6). Nutrition intervention has been shown to improve these outcome measures (7). Nutrition intervention can include nutrition counselling, review of dietary intake, supplementation (with high protein, high energy drinks), use of enteral formulas and parenteral nutrition. The critical step is to identify at-risk patients early in their hospital stay to implement appropriate treatment. The patients must then be followed throughout their stay, with further education and treatment after discharge as required.

Dietitians in our hospitals have traditionally seen only patients who are on a ‘special’ diet (e.g. for diabetes) or those who are referred. In this case, patients may not be referred to a dietitian until poor nutritional status impedes their recovery from surgery or illness. Ironically, research has shown that patients are just as likely to be malnourished whether on a special diet or not (8).

Ferguson et al. (9) noted the absence of information on implementation of malnutrition screening tools as a flaw in their use and development. This paper describes the implementation of routine malnutrition screening and assessment of patients in a hospital group with 310 acute and 50 rehabilitation beds. The aim of the implementation was to ensure timely identification of patients requiring dietetic intervention. The methodology varies from the first published use of the tool (10,11) in that a dietitian conducted the initial screening. This paper also outlines the diagnostic-related groups likely to suffer malnutrition.

Methods

Tools for screening and assessment

The study was conducted in the Department of Nutrition and Dietetics at Wollongong and Port Kembla Hospitals in the Illawarra Region of New South Wales. A tool recently developed by Australian dietitians was used for malnutrition screening (10). This tool, known as the FBBBC malnutrition screening tool, consists of two simple questions regarding recent weight loss without intent and dietary intake due to poor appetite. Patients who are at risk of malnutrition are identified. Once the risk is identified, a full nutritional assessment must be undertaken to identify the level of malnutrition, if any. Subjective global assessment (SGA) was chosen as the assessment tool for this study. SGA is a simple assessment that includes questions on weight maintenance or loss, dietary intake and gastrointestinal symptoms such as nausea (12,13). A simple physical examination to review subcutaneous fat and muscle wasting is also included. These subjective criteria are categorised and patients are scored as: A, well nourished; B, moderately malnourished or at risk of malnutrition; or C, severely malnourished.

Seven dietitians in the nutrition department attended a one-day training course on use of the FBBBC tool and SGA. The course was conducted by the authors of the FBBBC screening tool. Further training was then carried out within the hospital. Dietitians had the opportunity to perform nutrition screening (using FBBBC) and then assessment (using SGA) in pairs and small groups to

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ensure they were familiar with the tools used. Review in pairs ensured that clinical assessments were consistent within the group.

Policies were developed and the entire process was outlined in a flow chart to aid implementation. In-service education on the process of screening and assessment was conducted for ward nursing staff, nurse unit managers and medical interns. Senior dietetic staff performed a five-day audit using the FBBC tool to determine numbers of patients likely to require further assessment using SGA. This was used to measure the change in workload that might result from routine nutrition screening and assessment.

The hospitals’ medical administration was supportive of our contact with all patients. This initial work in introducing the process and collecting raw numbers of patients did not require approval of an ethics committee and was considered part of usual dietetic practice. In addition, interventions after diagnosis of malnutrition did not vary from standard hospital procedures.

Study population
Screening was implemented across the two hospital sites where the department of nutrition and dietetics provided services: a 310-bed acute care facility and a 50-bed rehabilitation unit. The children’s ward, pre- and post-natal wards, the oncology ward and the critical care units were excluded. In the case of the critical care unit, most patients could not communicate with a dietitian to answer the questions and nutrition intervention was already required in almost all patients regardless of screening. In the oncology wards, it was deemed inappropriate to screen terminally ill patients or those undergoing palliative treatments. The tool is not validated for use in children. Patients suffering dementia or other conditions where communication was not possible were not screened.

Implementation
Each morning, patients admitted on the previous day (or over the weekend if screening on a Monday) were identified via ward lists obtained from the hospital patient administration system. A dietitian identified newly admitted patients on special diets. This allowed for review of the admission diet when the patient was screened (rather than two separate visits to the patient). For screening, it is not necessary to read the patient’s medical notes but it is, of course, necessary prior to nutrition intervention. However, the medical notes were read before screening if the patient was already on a special diet, or if the diagnoses and age would make nutrition intervention seem likely (e.g. admissions for bowel surgery or fractured neck of femur). After screening, medical notes were examined for patients for whom SGA was required.

All malnourished patients received nutrition care throughout their admission and patients were offered follow-up in outpatient clinics or by home visit by a domiciliary care dietitian. Nutrition intervention included menu selection with nutrition staff (rather than general kitchen staff), provision of commercial and or domestic nutrition supplements, review of dietary intake in hospital by nutrition staff and investigation of the home situation by a dietitian. Education about appropriate intake was provided in all situations. Enteral feeds were supplied if this was deemed appropriate by the medical and nutrition care team. If required, discounted home supplements were supplied through the area health service home enteral nutrition assistance scheme.

Analysis of screening
The number of admissions and number of patients screened were documented on summary sheets. These sheets also were used to record whether or not an SGA was performed and the score received (A, B or C). The total number of malnourished patients was collated on a monthly basis. The diagnosis was recorded from the admission notes to allow review of at-risk groups.

Records from patients in rehabilitation wards and acute wards were collated separately. Rates of malnutrition were calculated by ward type and diagnosis. Analysis of means was used to examine differences in proportions of malnourished patients between the different wards with α-values less than 0.05 defined as significant. (Analysis of means examines how far the rate of malnutrition on a ward deviates from the mean rate of all patients and is more sensitive than a χ² test for detecting extreme deviations from the average) (14). Chi-square tests were used to analyse differences in the rates of malnutrition between acute and rehabilitation settings for each of the diagnoses, with α-values less than 0.05 defined as significant. Data were analysed using JMP statistical software (JMP, version 3.04, 1999, SAS Institute Inc, Cary, NC).

Results
Rates of screening and assessment
There were 7129 documented new admissions to wards where screening was in place in the 14 months between July 1998 (first data collection) and August 1999. Of these admissions, 5149 patients were screened. This represented approximately 72% of all patients eligible for screening in this period. Complete data relating to all wards were available for 11 months (September 1998 to July 1999) and relating to diagnosis types for eight months (January to August 1999). Reasons listed by dietitians on the summary forms for not screening patients included: patient discharged; patient receiving palliative care or not for resuscitation; dementia; and patient previously screened for this admission.

SGA and identification of malnourished patients
Twenty per cent (n = 1004) of the 5149 patients screened required further investigation using SGA. That is, they were classified as at risk of malnutrition using the FBBC screening tool. Twelve per cent (n = 634) of all patients screened (or three-fifths of those shown at risk) were identified as malnourished after investigation using SGA (Table 1).

Levels of detection of malnutrition varied in different wards. Results for eleven months (the period for which full data relating to wards were complete) are shown in Table 2. The highest rates of malnutrition were detected in rehabilitation wards. Analysis of means showed significant differences between wards, with rates in rehabilitation and oncology wards significantly higher than the other wards (P < 0.01). Although screening on
Malnutrition screening by dietitians

Table 1. Summary of malnutrition screening using FBBC tool and subjective global assessment (SGA)\(^{(12,13)}\). Results show numbers of patients for 14 months of implementation from July 1998 to August 1999

<table>
<thead>
<tr>
<th>Ward area</th>
<th>Total patients screened</th>
<th>Patients requiring SGA</th>
<th>Total patients with SGA score A</th>
<th>Total patients with SGA score B</th>
<th>Total patients with SGA score C</th>
<th>Patients with SGA score B or C</th>
<th>Patients requiring SGA score B or C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical</td>
<td>494</td>
<td>93 (19)</td>
<td>22</td>
<td>51</td>
<td>20</td>
<td>71 (14)</td>
<td></td>
</tr>
<tr>
<td>Renal, medical</td>
<td>493</td>
<td>116 (24)</td>
<td>50</td>
<td>45</td>
<td>21</td>
<td>66 (13)</td>
<td></td>
</tr>
<tr>
<td>Surgical</td>
<td>1437</td>
<td>203 (14)</td>
<td>66</td>
<td>85</td>
<td>52</td>
<td>137 (10)</td>
<td></td>
</tr>
<tr>
<td>Orthopaedic</td>
<td>611</td>
<td>69 (14)</td>
<td>17</td>
<td>33</td>
<td>19</td>
<td>52 (11)</td>
<td></td>
</tr>
<tr>
<td>Coronary care</td>
<td>494</td>
<td>48 (10)</td>
<td>15</td>
<td>21</td>
<td>12</td>
<td>33 (7)</td>
<td></td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>400</td>
<td>344 (86)</td>
<td>147</td>
<td>98</td>
<td>99</td>
<td>197 (49)**</td>
<td></td>
</tr>
<tr>
<td>Oncology(^{(c)})</td>
<td>76</td>
<td>54 (71)</td>
<td>20</td>
<td>21</td>
<td>13</td>
<td>34 (45)**</td>
<td></td>
</tr>
</tbody>
</table>

\(^{(a)}\) SGA: A, well nourished; B, moderately malnourished or at risk of malnutrition; C, severely malnourished.

\(^{(b)}\) SGA score B or C.

\(^{(c)}\) Sample results only from two months of screening.

\(^{**}\) Significantly higher rates than other wards using analysis of means (\(P < 0.01\)).

In the acute care facility, rates of malnutrition varied widely depending on the diagnosis as recorded by the dietitian. Although there was also variation in rehabilitation patients depending on diagnosis, the rates of malnutrition were uniformly high (with the exception of patients admitted for back pain). Table 3 shows these data for eight months from January 1999 to August 1999 (the period for which data relating to diagnosis were complete). The rates of malnutrition were statistically different between the settings in the following groups of patients: general surgery, fractures, cardiac, renal, gastro-intestinal surgery, elective orthopaedic procedures, fractured neck of femur, respiratory illness, cerebral vascular accident, and other medical (all \(P < 0.01\)) and significant for diagnosis of neurological disorders and confusion (both \(P < 0.05\)).

Discussion

Dietitians and the screening process

Malnutrition is often ignored and identification of these patients can be difficult due to the lack of a uniform measurement technique (15). Dietitians at both our hospitals are now aware of every new patient on their ward within a maximum of 24 hours post-admission (or 72 hours for patients admitted on Friday afternoon or the weekend). Nutrition intervention is therefore more timely. The screening process has been incorporated within existing staff establishment by a review of work practices. That is, treatment of malnourished patients is given priority over routine review of patients who have received previous dietary counselling for chronic conditions.

Other institutions in Australia and overseas have implemented various screening tools for malnutrition, but it has not always been dietitians who have performed the screening. Nursing, clerical and nutrition technical staff, have all been used (9–11,16). We believe that dietitians are ideally positioned to perform this role. They have advanced skills in complete nutritional assessment and in one visit can perform screening and assessment, and then initiate treatment if required. They can also perform routine review of pre-existing conditions requiring dietary monitoring (e.g. diabetes)—all in a single consultation. In addition, if a patient cannot be screened for a particular reason (for example, if the patient suffers from dementia), the dietitian has still identified an at-risk patient and can review him or her throughout the admission. This decision requires the clinical judgement and assessment of a dietitian. Nightingale and Reeves (17) showed dietitians to be more knowledgeable in assessment and management of undernutrition when compared to doctors, nursing staff and medical students.

Screening numbers

Ideally all patients should be screened for malnutrition. Our rate of 72% may be explained by the difficulty in accessing patients with a short length of stay. Although patients who were not screened have not been investigated in this study, it was assumed that patients suffering malnutrition are likely to have longer lengths of stay (5). A post-discharge study of people with a short length of stay, may be appropriate to outline their nutritional status clearly. Another reason patients were not screened was exclusion of patients inappropriate for screening. For example, patients with dementia were not screened (18) but were recorded initially as eligible patients as a dietitian needed to see them to discern that they were ineligible to participate in screening. However, the fact that dietitians did identify these patients...
through admission lists is positive. Patients with dementia could still receive appropriate nutrition care in hospital and have their home situation examined.

**Numbers of malnourished patients**

The overall rate of malnutrition found in this study (12%) is similar to other rates reported in the literature. In Canada, Azad et al. (18) found 15% of patients malnourished in a study of 152 patients assessed within 72 hours of admission to a tertiary care hospital. Ferguson et al. (10) sampled 408 patients in an Australian hospital and found a rate of malnutrition of 15%, which is similar to that in the Canadian patients and that found in this study. In contrast, Covinsky et al., using SGA (2), found higher rates of malnutrition with approximately 40% of patients moderately or severely malnourished. However, this group’s sample of 369 patients were all at least 70 years of age (mean 81 years). Unfortunately, age was not recorded in our study, but our population included all age groups, except paediatrics and post-natal, and is likely to be younger than that of Covinsky et al.

**Acute versus rehabilitation settings**

Although the overall rate of malnutrition is not high compared to some other studies, high rates on particular wards require further investigation. Comparing the overall percentage of malnutrition in acute and rehabilitation wards shows that, regardless of original diagnosis, patients in rehabilitation are far more likely to be malnourished. This is a critical area of investigation for subsequent work. Increased dietetic services and, perhaps, altered food service requirements should be directed to this area. Dietetic staffing cannot be based on bed numbers alone. Specifically, although a dietitian may care for a smaller number of hospital beds, the types of patients may necessitate much greater nutritional intervention. Similarly, significantly lower rates of malnutrition in certain wards (surgical, orthopaedic, and coronary care) may demonstrate that routine nutrition screening is of less benefit on these wards. Dietitians may have a substantial workload in other areas of nutrition intervention in these wards but nutrition support for undernutrition will likely be a small part of their role.

The high rate of malnutrition on rehabilitation wards also emphasises the need to investigate the admission status of these patients. Many rehabilitation patients transfer from acute wards and may or may not have received nutritional support in the acute setting before transfer. Other rehabilitation patients may have been admitted from home. Another reason for skewed results may be that the admitting diagnosis is not the reason the patient requires rehabilitation. Patients are categorised by diagnosis at admission by clerical staff but this diagnosis may change through admission lists is positive. Patients with dementia could still receive appropriate nutrition care in hospital and have their home situation examined.

**Table 3. Number of patients by diagnoses with malnutrition [using subjective global assessment, SGA (12,13)] in the acute setting (n = 2298) and rehabilitation setting (n = 316) from January to August 1999**

<table>
<thead>
<tr>
<th>Diagnosis at admission</th>
<th>Acute Patients screened (n)</th>
<th>Acute Patients with SGA score B or C((\text{a})) n (%)</th>
<th>Rehabilitation Patients screened (n)</th>
<th>Rehabilitation Patients with SGA score B or C((\text{a})) n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General surgery (including wound management)</td>
<td>398</td>
<td>19 (5)</td>
<td>9</td>
<td>7 (78)**</td>
</tr>
<tr>
<td>Fractures, excluding fractured neck of femur, vertebrae</td>
<td>353</td>
<td>13 (4)</td>
<td>15</td>
<td>12 (80)**</td>
</tr>
<tr>
<td>Cardiac</td>
<td>297</td>
<td>12 (4)</td>
<td>9</td>
<td>9 (100)**</td>
</tr>
<tr>
<td>Renal</td>
<td>223</td>
<td>32 (14)</td>
<td>7</td>
<td>6 (86)**</td>
</tr>
<tr>
<td>Gastrointestinal surgery</td>
<td>346</td>
<td>67 (20)</td>
<td>18</td>
<td>17 (94)**</td>
</tr>
<tr>
<td>Elective orthopaedic procedures, e.g. total knee replacement</td>
<td>111</td>
<td>2 (2)</td>
<td>10</td>
<td>3 (30)**</td>
</tr>
<tr>
<td>Fractured neck of femur</td>
<td>87</td>
<td>10 (12)</td>
<td>52</td>
<td>42 (81)**</td>
</tr>
<tr>
<td>Respiratory illness</td>
<td>75</td>
<td>9 (12)</td>
<td>5</td>
<td>5 (100)**</td>
</tr>
<tr>
<td>Back pain, back surgery or crushed vertebrae</td>
<td>53</td>
<td>1 (2)</td>
<td>9</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Cancer or haematological disorder</td>
<td>42</td>
<td>20 (48)</td>
<td>17</td>
<td>10 (59)</td>
</tr>
<tr>
<td>Cerebral vascular accident</td>
<td>41</td>
<td>0 (0)</td>
<td>44</td>
<td>23 (52)**</td>
</tr>
<tr>
<td>Neurological, including surgery</td>
<td>25</td>
<td>2 (8)</td>
<td>6</td>
<td>4 (67)**</td>
</tr>
<tr>
<td>Confusion</td>
<td>8</td>
<td>2 (25)</td>
<td>15</td>
<td>12 (80)**</td>
</tr>
<tr>
<td>Weight loss for investigation</td>
<td>7</td>
<td>5 (71)</td>
<td>2</td>
<td>2 (100)</td>
</tr>
<tr>
<td>Above or below knee amputations</td>
<td>6</td>
<td>5 (83)</td>
<td>14</td>
<td>9 (64)</td>
</tr>
<tr>
<td>Other medical((\text{b}))</td>
<td>153</td>
<td>10 (7)</td>
<td>61</td>
<td>21 (34)**</td>
</tr>
<tr>
<td>Unknown or not recorded</td>
<td>73</td>
<td>8 (11)</td>
<td>15</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Head or brain injury</td>
<td>--</td>
<td>--((\text{c}))</td>
<td>--</td>
<td>8 (50)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2298</td>
<td>217 (9)</td>
<td>316</td>
<td>186 (59)</td>
</tr>
</tbody>
</table>

* P < 0.05 significantly different from acute patients. ** P < 0.01 significantly different from acute patients.

(a) SGA score of B or C means the patient is malnourished.

(b) Other medical includes: viral illness, arthritis, diabetes for stabilisation, electrolyte imbalances of unknown origin, acopia, unconscious, urinary tract infections, psychiatric conditions including overdose, falls for investigation and pain management.

(c) --, not recorded in acute setting.
throughout admission. For example, a failed femoral popliteal bypass may require longer admission with treatment for infection, eventual amputation of limb and subsequent rehabilitation. The original diagnosis may not be the most appropriate diagnosis to identify groups at risk of malnutrition. Regardless of nutritional status at admission, it is important to track patients with long lengths of stay to indicate if there is a clear need for nutrition intervention if complications arise throughout the admission. Future studies will examine how this process may best be achieved.

**Diagnostic groups**

Our findings regarding the type of diagnosis for malnourished patients are consistent with other studies (4,5). Chima et al. (5) characterised patients according to broad diagnostic groups based on diagnosis on admission to medical wards. Patients with gastrointestinal disease were significantly more likely to be malnourished than the general sample. Patients with gastrointestinal disease in the acute setting (regardless of requirement for surgery) were more likely to be malnourished in our study also. High numbers of malnourished patients in the respiratory illness and cancer groups in our study also compare with the results of other studies (4).

**Improving patient outcomes**

Within our institutions, all patients identified as malnourished on admission are given appropriate counselling and care while in hospital, including provision of nutrition supplements. A previous study has shown the effectiveness of such nutrition intervention for in-patients presenting with numerous conditions, both medical and surgical (7). A primary goal in measuring outcomes of malnutrition interventions must be to show improvement in the nutritional status of the patient. A simple measurement of this could involve repeating the SGA after the intervention. Patients in hospital for long periods of time can have repeat SGAs performed at designated times and, as mentioned, all patients with a long length of stay who are not malnourished on admission could have screening after a given time.

The challenge will remain of how best to review patients in the community. Decreasing length of stay in an acute inpatient setting means poor nutritional status cannot be addressed fully in an inpatient setting and pre- and post-admission services may be required (5). Within our institution, uniformity of documentation of nutrition care, including documentation of education provided, patient goals and outcomes negotiated, and strategies to achieve these facilitates review and follow-up by fellow dietitians. At discharge, the ward dietitian offers outpatient follow-up to all malnourished patients. The domiciliary care dietitians have commenced approximately bi-monthly reviews of all malnourished patients who require home visits. However, there are logistical difficulties, which make 100% community follow-up impossible. These problems include dietitian numbers, patient refusal and contact difficulties. Future work is required in this area to ensure review of these patients and tracking of interventions in relation to nutritional status, readmission rates and other health outcomes.

The primary benefit of routine malnutrition screening is the improvement in individual patient health outcomes, but malnutrition screening can also be financially justified (9) under a diagnostic-related group funding system. Coding of malnutrition as a co-morbidity documents the requirement for nutrition intervention in patient care and hence dietetic positions can be justified, maintained and, perhaps, enhanced.

**Conclusion**

At our hospitals, dietetic work practices and hospital referral processes have been challenged and altered to ensure timely dietetic intervention in malnourished patients. Differences in levels of malnutrition between diagnostic groups do exist and identification of the specific groups most likely to require dietetic intervention means that resources can be diverted to areas of greatest need. Further investigation of differences between various acute and rehabilitation wards is essential. Finally, for future work, auditing of medical records of our patient groups will allow investigation of interventions and related outcomes.

**Acknowledgments**

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