

Assessment of nutritional status in hospital in-patients

S.E. CAMPBELL, A. AVENELL and A.E. WALKER for the TEMPEST group

From the Health Services Research Unit, University of Aberdeen, Polwarth Building, Foresterhill, Aberdeen, UK

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Summary

Background: The King's Fund and British Association of Parenteral and Enteral Nutrition recommend that all hospital patients should have height and weight recorded, to detect the need for nutritional support. Systematic review evidence also suggests that protein and energy supplementation of adults in hospital with a wide range of conditions improves outcome.

Aim: To assess the recording of weight and height in hospitals.

Design: Survey (random sample).

Methods: As part of a survey on the provision of deep venous thrombosis prophylaxis, we collected information on height and weight recording from medical and nursing notes. We randomly selected

five medical, five surgical, five orthopaedic, and five obstetrics and gynaecology directorates from across Scotland. Six hundred case notes were requested, and 88% were available for data extraction. Some 67% of hospital episodes provided information about weight, and 41% on both height and weight. General medicine directorates had the lowest recording of weight, and in medical and surgical directorates, both weight and height were rarely recorded in comparison with the other two directorates ($p < 0.001$).

Discussion: Our survey suggests that recommendations to assess nutritional risk are not being followed, and that many patients at risk of malnutrition are not being detected or treated.

Introduction

In 1992 the King's Fund estimated that providing nutritional support for under-nourished patients could save the National Health Service £266m annually, by improving recovery and reducing the length of hospital stay.¹

Experimental studies in humans have demonstrated that under-nutrition leads to mental apathy, reduced muscle power, impaired cardiac function and impaired immunity to infection.² These deficits will increase the tendency to develop complications and hinder recovery, if people are malnourished when ill. Large surveys of people of all ages admitted to hospital in the UK have demonstrated that over 20% are under-nourished,^{3,4} and that the most malnourished people have poorer food intakes whilst in hospital.^{5,6} Malnutrition in hospital has been associated with greater mortality, delayed recovery and higher rates of nursing home use.^{5,7}

Both the King's Fund and the British Association of Parenteral and Enteral Nutrition have recommended that all in-patients should have weight and height recorded to provide information on the need for nutritional advice, and to monitor progress.^{1,8} In a survey on the provision of deep venous thrombosis prophylaxis in hospitals in Scotland,⁹ we routinely collected information on weight and height recording. The design of our survey allowed us to assess the frequency of height and weight recording from a large, random sample across hospitals in Scotland.

Methods

Random samples of patient episodes from one of eight tracer conditions (see below) were selected

from routine hospital information systems in Scotland. All NHS trusts, which included acute hospitals with at least 100 beds and one or more of the relevant clinical directorates, were identified from the current *Health Services Yearbook*¹⁰ and the *Directory of Hospitals and NHS Trusts*.¹¹ A random sample (chosen by a statistician not involved with data collection or analysis) of 20 clinical directorates was selected to include five general medicine directorates, five general surgery directorates, five orthopaedic directorates and five obstetrics and gynaecology directorates. The sample was stratified to include both teaching and district general hospital trusts in the ratio of 1:4, reflecting the relative proportion of these trusts in Scotland.

Two tracer conditions or procedures that increased the risk of deep venous thrombosis were identified from each directorate. The tracer conditions were acute heart failure, acute stroke, cholecystectomy (laparoscopic or open), major bowel surgery, elective hysterectomy (vaginal or abdominal), pelvic floor repair, elective hip replacement and elective knee replacement. From the Information and Statistics Division of the NHS in Scotland, the codes associated with these conditions¹² and procedures¹³ were identified and used to identify relevant in-patient episodes between 30 June 1996 and 1 July 1997. Thirty episodes per directorate were selected using random numbers generated by SPSS (Statistics Package for the Social Sciences, v. 8), again by a statistician who was not involved with data collection or analysis.

Ethics committee approval was obtained from the National Multicentre Research Ethics Committee and Local Research Ethics Committees for each Trust. Permission to use patient identifiable routine data in Scotland was obtained from the National Privacy Advisory Committee. Permission to access case notes was obtained from the relevant clinical directors and consultants.

Patient's weight, height and age were included in the risk factors for deep venous thrombosis, which were extracted from medical and nursing notes for each admission. If weight was recorded at any time during the admission episode this was recorded as being obtained. A patient's height was recorded as being obtained if recorded in the case notes at any time, not necessarily during the index admission. We also calculated the percentage of admissions where the patient was below the cut-offs for body weight of 56 kg in men and 47 kg in women, and body mass indices (BMI) [weight/(height)²] of 20 kg/m² and 18.5 kg/m² for both sexes. The British Association for Parenteral and Enteral Nutrition have instituted a widely-used screening tool, where BMI <20 kg/m² suggests

possible undernutrition and BMI <18.5 kg/m² suggests probable undernutrition.¹⁴ The cut-off weights of 56 kg in men and 47 kg in women were chosen to reflect a BMI of 20 kg/m² based on average heights in this predominantly older age group.¹⁵

All data were collected in a Microsoft Access database, and results were analysed using SPSS 8. The proportions of patients by directorate with reported weight and height measures were compared using the χ^2 test.

Results

Six hundred case-notes were requested from the 20 directorates, and 528 (88%) were available for data extraction. Information was extracted from 526 episodes of care (two did not relate to the tracer conditions). Overall, 67% of episodes had data on weight, and 41% on weight and height (Table 1).

General medicine directorates had the lowest recording of weight at 47% (61 episodes). In general medical and surgical directorates, both weight and height were recorded less often than in the other directorates ($\chi^2 = 90.16$, 3 degrees of freedom, $p < 0.001$).

Calculated BMIs for the available data showed that general medicine and surgical directorates appeared to have the greatest prevalence of patients with BMI <20 kg/m², with 14% and 20%, respectively. Generally, using a cut-off of BMI <20 kg/m² for malnutrition gave a similar percentage to using the cut-offs for weight of 56 kg for men and 47 kg for women, with the exception of surgical directorates.

Discussion

There is suggestive evidence from a systematic review and meta-analysis of randomized controlled trials that protein and energy supplementation in adults with many medical and surgical illnesses may improve outcome.¹⁶ However, patients who are already malnourished, or those who are at risk of becoming so, need to be identified. Although there are many different nutrition screening tools in hospital, weight and height are common to several. Without recording weight and height, it would be difficult to monitor the patient's response to nutritional interventions.

This survey of height and weight recording represents one of the largest such surveys in the UK. It reflects practice common across hospitals; the results are not specific to one hospital alone.

Table 1 Percentage of episodes with weight and height records by clinical directorate and condition

Directorate (n) Conditions (n)	Mean (SD), age (years)	Female, % (n)	Weight recorded, % (n)	Weight and height recorded, % (n)	Weight <47 kg, <56 kg (men) or <47 kg, (women), % (n)*	BMI <20 kg/m ² , % (n)**	BMI <18.5 kg/m ² , % (n)**
General medicine (129)	72 (11.6)	53% (69)	47% (61)	17% (22) [†]	16% (10)	14% (3)	5% (1)
Heart failure (65)	75 (10.8)	49% (32)	58% (38)	17% (11)	13% (5)	0% (0)	0% (0)
Stroke (64)	71 (12.6)	61% (39)	37% (24)	17% (11)	21% (5)	27% (3)	9% (1)
General surgery (137)	59 (16.5)	72% (98)	61% (83)	26% (35) [†]	2% (2)	20% (7)	3% (1)
Cholecystectomy (70)	51 (16.3)	81% (57)	64% (45)	27% (19)	2% (1)	16% (3)	0% (0)
Colorectal surgery (67)	65 (15.7)	61% (41)	57% (38)	24% (16)	3% (1)	25% (4)	6% (1)
Obstetrics and gynaecology (128)	52 (10.5)	100% (128)	85% (109)	59% (75)	2% (2)	7% (5)	1% (1)
Pelvic floor repair (67)	58 (10.6)	100% (67)	84% (56)	51% (34)	0% (0)	9% (3)	0% (0)
Hysterectomy (61)	44 (7.1)	100% (61)	87% (53)	67% (41)	4% (2)	5% (2)	2% (1)
Orthopaedics (132)	70 (11.9)	70% (92)	73% (97)	64% (85)	4% (4)	5% (4)	2% (2)
Knee replacement (62)	71 (7.5)	68% (42)	69% (43)	60% (37)	2% (1)	3% (1)	0% (0)
Hip replacement (70)	68 (12.0)	71% (50)	77% (54)	69% (48)	6% (3)	6% (3)	4% (2)
Overall (526)	63 (15.2)	74% (389)	67% (350)	41% (217)	5% (18)	9% (19)	2% (5)

*Where weight recorded. **Where weight and height both recorded. [†]In both general medicine and surgical directorates, weight and height were less often recorded. ($\chi^2 = 90.16$, 3 df, $p < 0.001$). BMI, body mass index.

A particular strength of the design was that patient episodes were not excluded from the study, when previous studies have sometimes been unable to include all patients because of the severity of their illnesses.^{3,17}

We have presumed that weight and height were recorded as part of the patient's nutritional assessment. We have also presumed that patients were actually measured, rather than estimated. Frequency distribution plots indicated that weights were more likely to be reported in whole kilograms, but there was no clustering around particular weights, suggesting weights were not often estimated.

Weight may have been recorded coincidentally to assess fluid balance or drug dosage, rather than to assess nutritional status. We also have no information to indicate whether weight or weight and height were used to influence management in those patients where measurements were made.

However, the failure to record any weight data at any time during the 33% of episodes of care in patients here does suggest that nutritional status was not assessed for these people. This study compares with the single-centre, Scottish hospital study of McWhirter and Pennington,⁴ who found no nutritional information of any kind in the case notes of 52% of undernourished patients. McWhirter and Pennington also found that 36% of all patients admitted to hospital under five different directorates, including orthopaedics, general medicine and general surgery, had a BMI <20 kg/m². Gariballa *et al.*¹⁸ found that 31% of patients hospitalized with acute stroke (one of two tracer conditions for medicine in our survey) had a BMI <20 kg/m². As the percentages with BMI <20 kg/m² in our directorates ranged from 5% to 20%, this could suggest that under-nourished patients were also not having their heights and weights recorded.

As our tracer conditions were acute stroke and acute heart failure, this failure to record weight and height was possibly because of immobility. However, these patients are likely to be at greater risk of malnutrition than elective surgical admissions. Height can also be estimated in an immobile patient from arm-span or knee height.^{19,20} Although it may not be possible to weigh all patients on admission because of severe illness and immobility, this usually becomes possible at some time during the admission. Patients undergoing surgery may have been more likely to have their weight and height recorded as part of routine pre-operative work-ups. It can also be suggested that these patients are more likely to have their weight and height checked because they are fitter and

younger. However, they are less likely to be malnourished.

Some of the conditions could also be associated with weight loss before hospital admission. For example, patients who are suffering from cholecystitis are often given a low-fat diet, or those who are obese encouraged to lose weight before surgery. However, it would be unlikely that patients would be advised to go under the cut-off points for weight which we used.

Kennedy²¹ has shown that creating the post of a Nutrition Management Nurse can lead to improved rates of nutritional assessment in hospital. One hospital, which has had a hospital policy of recording weight in patients for the last 8 years, has been able to demonstrate that 86% of patients were weighed within the first 48 h of admission.²²

It is clear from our survey of a sample of Scottish hospitals that little has changed since McWhirter and Pennington's survey of 1994.⁴ It would appear that the situation is unlikely to change unless institutions as a whole make it a policy to perform nutritional assessment and provide additional support for staff to encourage such a policy.

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