Clinical Nutrition (2005) **24**, 913–919

ELSEVIER

Clinical Nutrition

http://intl.elsevierhealth.com/journals/clnu

ORIGINAL ARTICLE

Nutritional assessment and management in hospitalised patients: Implication for DRG-based reimbursement and health care quality

J. Ockenga*, M. Freudenreich, R. Zakonsky, K. Norman, M. Pirlich, H. Lochs

Department of Gastroenterology, Hepatology & Endocrinology, Charité, Universitätsmedizin Berlin, Schumannstrasse 20/21, 10117 Berlin, Germany

Received 8 April 2005; accepted 27 May 2005

KEYWORDS
Malnutrition;
Nutritional screening;
Nutritional assessment;
Reimbursement;
Diagnosis-related groups;
Casemix;
Health care quality

Summary
Introduction: Malnutrition is associated with a higher morbidity resulting in an increased need for medical resources and economic expenses. In order to ensure sufficient nutritional care it is mandatory to identify the effect of malnutrition and nutritional care on direct cost and reimbursement. The primary aim of this study was to evaluate the economic effect of a nutritional screening procedure on the identification and coding of malnutrition in the G-DRG system.
Methods: All G-DRG relevant parameters of 541 consecutive patients at a gastroenterology ward were documented. Moreover, all patients were screened for malnutrition by a dietician according to the subjective global assessment (SGA). Patients were then grouped into the appropriate G-DRG and the effective cost weight (CW) was calculated.
Results: Ninety-two of 541 patients (19%) were classified malnourished (SGA B or C). Recognition of malnutrition increase from 4% to 19%. Malnourished patients exhibited a significantly increased length of hospital stay (7.7 ± 7 to 11 ± 9, $P < 0.0001$). In 26/98 (27%) patients, the coding of malnutrition was considered relevant by grouping and resulted in a rise of DRG benefit. Mean case mix value and patients' complexity and comorbidity level (PCCL) increased after including malnutrition in the codification (CV 1.53 ± 2.9 to 1.65 ± 2.9, $P = 0.001$ and PCCL 2.69 ± 1.4 to 3.47 ± 0.82, $P < 0.0001$). The reimbursement increase by 360 €/malnourished patient or an additional reimbursement of 35280 € (8.3% of the total reimbursement for all patients of 423186 €).

Nutritional support in a subgroup of 50 randomly selected patients resulted in additional costs of 10268 €. Forty-four of these patients (86%) were classified

*Corresponding author. Tel.: +49 0 30 450 514 034; fax: +49 0 30 450 514 916.
E-mail address: johann.ockenga@charite.de (J. Ockenga).

0261-5614/$ - see front matter
doi:10.1016/j.clnu.2005.05.019

malnourished (32 SGA B and 12 SGA C). However, the subsequent reimbursement covered only approximately 75% of the expenses (7869 €), but did not include the potential financial benefits resulting from clinical interventions.
Conclusion: Malnourished patients can be detected with a structured assessment and documentation of nutritional status and this is partly reflected in the G-DRG/ICD 10 system. In addition to increasing direct health care reimbursement, nutritional screening and intervention has the potential to improve health care quality.

Introduction

Several studies have reported an association between malnutrition and an increased risk of subsequent in-hospital morbidity and mortality.[1–3] In a recent study at our institution up to 20% of gastroenterological patients were classified malnourished according to the subjective global assessment (SGA).[4] In this context malnutrition refers to undernutrition. Despite its high prevalence, malnutrition is often not recognised and not treated due to the lack of nutritional screening programs.[5] Malnutrition results in higher hospital costs as a result of requiring a higher intensive of care or services, as well as longer length of stay.[6–10] In addition, malnutrition increases health-care cost directly and indirectly and there is strong evidence that treating malnutrition is economically beneficial.[11]

In order to introduce nutritional screening followed by adequate nutritional intervention in clinical routine it seems useful to define the economic impact of this procedure. In almost all European countries Diagnosis-related Groups (DRG) have been introduced for calculating reimbursement (Scandinavia, Portugal, Spain, Italy) or planning of health care budgets (France, Great Britain, Ireland). In Germany, a version of the DRG system designed specifically for the German Health care system (G-DRG) was recently introduced for the calculation of hospital care reimbursement (for further information see: www.g-drg.de). In accordance with the previously introduced DRG systems in other countries like Australia or the United States , malnutrition is considered a comorbidity or a complicating condition in the G-DRG system. It can be coded, if it causes additional therapeutic, diagnostic or care efforts. The documentation of malnutrition has the potential to increase the case weight and, therefore, the reimbursement. Similar effects have been described more than 10 years ago after the introduction of the Australian national diagnosis-related group (AN-DRG) classification system [12] as well as after the introduction of the DRG system in the United states.[13] However, due to differences in the health care systems these data are not transferable to the European situation. Up to now no current data are available about the detailed impact of the reflection of malnutrition in the G-DRG system and the consecutive effect on the financial reimbursement for hospitals. Because the impact of malnutrition on reimbursement is not a German specific problem, these data are of interest for all those, who handle with DRGs.

This study was set out to evaluate the economic effect of a nutritional screening procedure on the identification and coding of malnutrition in medical patients (gastroenterology) in the G-DRG system.

Methods

Patients

Five hundred and forty-one patients consecutively admitted to a 30 bed gastroenterological ward were included between January 2004 and December 2004 at the University Hospital Charité, Campus Mitte, Berlin, FRG. Patients were considered eligible for entry if they were over the age of 18, were assumed to stay longer than 2 days, and were willing and able to give written informed consent. Patients admitted to day care units were excluded. The study protocol was approved by the Ethics Committee of the Charité.

SGA

Several score systems have been validated for the assessment of nutritional status. In the current study we used the SGA, which was established by Norman et al. [14] and relies primarily on physical signs of malnutrition (loss of subcutaneous fat or muscle mass, oedema, ascites) and the patient's history regarding weight loss, dietary intake, gastrointestinal symptoms, functional capacity, and the disease and its relation to nutritional requirements. Each patient was classified as either well nourished (SGA A), moderately or suspected of being malnourished (SGA B) and severely