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Original article

Prevalence of undernutrition in Dutch hospital outpatients

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ABSTRACT

Background: The prevalence of undernutrition in hospital inpatients is high. Earlier detection and treatment in the hospital outpatient clinic may help to reduce these numbers. The purpose of this study was to assess the prevalence of undernutrition in hospital outpatients in the Netherlands, to determine high risk departments, and to determine the percentage of patients receiving dietetic treatment.
Methods: This cross-sectional multicenter study was conducted in nine hospitals. Patients who visited the outpatient clinic on one of the screening days in the period March–May 2008 received a short questionnaire and were weighed. Patients were classified as severely undernourished, moderately undernourished or not undernourished.
Results: 2288 patients were included in the study, of which 5% were severely undernourished and 2% were moderately undernourished. The prevalence of severe undernutrition was highest in the outpatient departments of oral maxillofacial surgery (17%), oncology (10%), rehabilitation (8%), gastroenterology (7%) and pulmonology (7%). Only 17% of all severely undernourished and 4% of all moderately undernourished patients reported to receive dietetic treatment.
Conclusion: The prevalence of undernutrition in hospital outpatients is generally low but largely undertreated. Future screening should focus on high risk departments.

1. Introduction

Undernutrition is an extensive problem in health care. The prevalence of disease related undernutrition varies from 25–40% in hospital inpatients to 20–25% in nursing homes and 15–25% in homecare units [1–7]. Undernutrition can be defined as a state of nutrition in which a deficiency or imbalance of energy, protein and other nutrients causes measurable adverse effects on tissue or body form (body shape, size, and composition), function, and clinical outcome [8]. Several studies show that undernutrition is associated with decreased body function [5,6,9–13], higher care complexity [10], increased mortality, length of hospital stay and extra costs in health care [5,6,10,14–17]. Early recognition and treatment is important in order to reduce these consequences.

In the hospital setting, there is growing awareness that undernutrition plays an important role in the course of treatment of patients [3]. However, the prevalence of undernutrition at hospital admission has only slightly decreased over the last few years [7]. This indicates that undernutrition has to be recognized and treated in an earlier stage, such as in general practices or at the outpatient clinic. In these settings generally no structural screening on malnutrition takes place.

To determine how screening and treatment in the outpatient clinic can be optimalized, prevalence rates, high risk departments and bottlenecks need to be identified. However, only limited data is available for this setting. Wilson et al. [18] studied the prevalence of undernutrition in non-cancer hospital outpatients and identified undernutrition in 11% of patients of 65 years and older, and 7% in patients younger than 65 [18]. A study carried out on the preoperative outpatient department [19] and yet unpublished data collected at the general outpatient departments of our hospital revealed prevalence data ranging from 6% to 7%. While these studies provide an indication of the prevalence of outpatient undernutrition, their results cannot be extrapolated to outpatient departments in general.

The aim of this study was to determine the prevalence of undernutrition in outpatient departments of nine different hospitals in the Netherlands, to identify high risk departments, and to determine the percentage of patients receiving dietetic treatment.

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2. Materials and methods

2.1. Patients

This cross-sectional multicenter study was carried out in nine hospitals in The Netherlands, participating in the implementation project "Early recognition and optimal treatment of malnutrition in Dutch hospitals". Participating hospitals were either general (Gelderse Vallei Hospital, Ede ($n=116$); Maasstad Hospital, Rotterdam ($n=508$)), teaching (Amphia Hospital, Breda/Oosterhout ($n=322$); Catharina Hospital, Eindhoven ($n=446$); Canisius Wilhelmina Hospital, Nijmegen ($n=348$); Haga Hospital, The Hague ($n=192$); Martini Hospital, Groningen ($n=124$); Máxima Medical Center, Veldhoven ($n=160$)) or university hospitals (VU University Medical Center, Amsterdam ($n=72$)).

All patients who visited the outpatient clinic of these hospitals on one of the screening days in the period March until May 2008 entered the study. The number of outpatient departments participating in the study varied per hospital (1–18).

Patients were not included in the study when they were <18 years of age, pregnant or had been pregnant in the last six months. A total of 2584 patients filled out the questionnaire. Of these, 296 patients (11%) were excluded because nutritional status could not be defined due to missing data on height and/or weight, leaving 2288 patients in the analytic sample.

Multicenter approval was given by the ethical review board of the VU University Medical Center. Because of the low subject burden and the fact that data were collected, handled and stored anonymously, informed consent was not considered necessary by the ethical review board.

2.2. Methods

Administrative personnel of the outpatient departments and research assistants handed out a questionnaire to all patients who registered at the participating outpatient clinic. Research assistants were nurses, dieticians and medical or dietetic students who were instructed by the coordinating dietician of the hospital. The questionnaire consisted of questions about age, gender, height, recent weight loss (one and six months), (reason for) current dietetic treatment, reason for visiting the outpatient clinic and whether patients had cancer, a gastrointestinal disease, a chronic lung disease or were elective for surgery, which are high risk groups in the hospital setting and are thought to be high risk groups for the outpatient clinic as well [1,3,6,19,20]. Because of the confronting character, the last three questions were used by only five of the nine hospitals (gastrointestinal disease $n=1231$; chronic lung disease $n=1226$; and elective for surgery $n=1229$). The question about cancer was used by only four hospitals for the same reason ($n=1065$).

After completing the questionnaire, trained research assistants measured the patients' actual weight on a calibrated scale. Patients were weighed wearing indoor clothing without shoes. An adjustment for clothing was made by deducting 1.77 kg for men and 1.13 kg for women from their weight [21]. An additional correction of 0.40 kg for men and 0.28 kg for women was made when a patient was unable to take off his shoes [21].

Height was asked for and when patients did not know their actual height, research assistants measured the patients' lower leg length (knee height) with a flexible measure tape from the top of the patella with knee flexed at 90 ° while the patient was sitting ($n=92$). Body height was estimated based on patients' lower leg length, adjusted for age and gender [22]. In four of the nine hospitals, patients' actual height was measured with a stadiometer ($n=858$).

2.3. Nutritional status

Nutritional status was defined by involuntary weight loss and body mass index (BMI). BMI was calculated as measured body weight (kg)/height $(m)^2$. Patients were characterized as severely undernourished when one or more of the following conditions were present: a BMI < 18.5 kg/m^2 and/or unintentional weight loss of more than 5% in the last month or more than 10% in the last six months [8,23]. Patients with a BMI ≥ 18.5 kg/m^2, but with 5–10% unintentional weight loss in the last six months were characterized as moderately undernourished [8,23].

2.4. Statistics

The study population was categorized into three groups based on nutritional status (severely undernourished, moderately undernourished, not undernourished) and prevalence was calculated for different outpatient departments and type of disease. Descriptive statistics were used to express means, standard deviations, percentages and frequencies. ANOVA and chi-square tests were used to test the relationship of outpatient characteristics with nutritional status and receiving dietetic treatment. Logistic regression analysis was used to test the relationship of department and disease with nutritional status (undernutrition versus no undernutrition). Results were expressed as odd ratios (OR) and 95% confidence intervals (95% CI). For the relation between type of hospital and nutritional status, the university hospital was left out, since this hospital participated with only one outpatient department. Differences were considered statistically significant at $p<0.05$. Statistical analyses were performed in SPSS 15.0 for Windows (SPSS Inc. Chicago IL., USA).

3. Results

A total of 2288 patients (47.5% male, 52.5% female) were included in the study. Mean age was 56.5 (± 16.3) years and varied from 18 to 94 years. The mean age was not different between patients who were included (age = 56.5) and those excluded because of missing weight and height (age = 57.9; $p=0.19$). There was a tendency that those who were included were more likely to be male (47.5% versus 42.5%; $p=0.07$).

Table 1 shows the characteristics of the patients who participated in the study. Of all patients, 117 patients (5%) were severely undernourished, 46 patients (2%) were moderately undernourished and 2125 patients (93%) were not undernourished. In the group with no undernutrition, 823 patients (39%) were overweight and 435 patients (21%) were obese. Patients were classified as severely undernourished based on either BMI < 18.5 kg/m^2 (38%), unintentional weight loss (57%)

Table 1
Characteristics of outpatients divided by nutritional status ($n=2288$).

	Severely undernourished[a]	Moderately undernourished[b]	Not undernourished[c]	p Value (ANOVA/ chi-square)
n (%)	117 (5.1%)	46 (2.0%)	2125 (92.9%)	–
Female (%)	51.3%	65.2%	52.3%	0.215
Age (y) ± SD	56.5 ± 20.3	58.5 ± 16.0	56.5 ± 16.0	0.707
Age ≥ 60 years (%)	52.1%	54.3%	46.2%	0.263
BMI (kg/m^2) ± SD	21.0 ± 4.2	24.3 ± 3.9	26.8 ± 4.9	<0.001
BMI < 18.5 kg/m^2 n (%)	50 (42.7%)	–	–	
BMI 18.5–25 kg/m2 n (%)	50 (42.7%)	28 (60.9%)	867 (40.8%)	
BMI 25–30 kg/m2 n (%)	11 (9.4%)	13 (28.3%)	823 (38.7%)	
BMI > 30 kg/m^2 n (%)	6 (5.1%)	5 (10.9%)	435 (20.5%)	
Nutritional treatment n (%)	20 (17.1%)	2 (4.3%)	189 (8.9%)[d]	0.006

[a] BMI < 18.5 kg/m^2 and/or (unintentional weight loss of > 5% in the last month or > 10% in the last six months).
[b] BMI ≥ 18.5 kg/m^2 and 5–10% unintentional weight loss in the last six months.
[c] BMI ≥ 18.5 kg/m^2 and <5% unintentional weight loss in the last six months.
[d] $n=2116$.