Clinical Nutrition 28 (2009) 134–140

Contents lists available at ScienceDirect

Clinical Nutrition

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

Original Article

Use of 10-point analogue scales to estimate dietary intake: A prospective study in patients nutritionally at-risk☆

Ronan Thibault [a,b,c], Nadine Goujon [d], Estelle Le Gallic [d], Renaud Clairand [e], Véronique Sébille [f], Jenny Vibert [g], Stéphane M. Schneider [g], Dominique Darmaun [a,b,c,*]

[a] Department of Gastroenterology, Hepatology and Nutritional Support, CHU Nantes, Nantes, F-44093, France
[b] UMR 1280 Physiologie des Adaptations Nutritionnelles, INRA, Université de Nantes, Nantes, F-44093, France
[c] Centre de Recherche en Nutrition Humaine and Institut des Maladies de l'Appareil Digestif, Nantes, F-44093, France
[d] Department of Dietetics, CHU Nantes, Nantes, F-44093, France
[e] Department of Internal Medicine, CHU Nantes, Nantes, F-44093, France
[f] Department of Biostatistics, Faculté de Médecine et de Pharmacie, Université de Nantes, Nantes, F-44093, France
[g] Unité de Support Nutritionnel du Pôle Digestif, CHU Nice, Nice, F-06202, France

ARTICLE INFO

Article history:
Received 5 September 2008
Accepted 9 January 2009

Keywords:
Nutritional assessment
Assessment of energy intake
Undernutrition
Verbal and visual analogue scales
3-day dietary record

SUMMARY

Background & aims: Assessment of dietary intake using a 3-day dietary record may delay the management of undernutrition. Methods allowing a quick estimation of dietary intake are needed. We aimed to determine the feasibility of assessing dietary intake using two 10-point verbal (AVeS) and visual (AViS) analogue scales, to assess the correlations of both scales with energy intake, and to determine the accuracy of AVeS for assessing undernutrition.

Methods: We prospectively recruited 114 patients undernourished or nutritionally at-risk in two French University Hospitals. Undernutrition was defined as a Nutritional Risk Index <97.5. AVeS and AViS were performed by one interviewer and mean daily energy intake was calculated from 3-day dietary records by one dietician.

Results: The feasibility of AVeS and AViS was 98% and 96%, respectively. Both verbal and visual scales were statistically correlated with calculated energy intake ($\rho = 0.66$ and $\rho = 0.74$, $P < 0.0001$), especially in undernourished patients ($\rho = 0.82$, $P < 0.0001$, for AVeS). Sensitivity, specificity, positive and negative predictive values of an AVeS score less than 7 for assessing undernutrition were 57%, 81%, 86% and 46%, respectively.

Conclusion: AVeS and AViS could be used for a quick assessment of dietary intake in clinical practice, particularly in undernourished in-patients. Thus, both verbal and visual analogue scales could be particularly useful for the management of hospital undernutrition.

1. Introduction

Undernutrition affects 30–50% of adult patients admitted to hospitals in Western countries, and is associated with increased mortality, morbidity and length of stay.[1–3] It has long been demonstrated that undernutrition worsens during the hospital stay in the absence of nutritional therapy.[2] The European Society for Clinical Nutrition and Metabolism (ESPEN) and the American Society of Parenteral and Enteral Nutrition (ASPEN) therefore recommend an early and systematic screening for undernutrition for all hospitalized patients.[4,5] The assessment of energy intake is considered as a key part of the nutritional assessment.[6,7] Indeed, reduction of dietary intake, together with the increase of energy requirements, is the main cause of hospital undernutrition, and can contribute to its worsening. The subjective assessment of dietary intake by the patient himself/herself is included in several nutritional indexes, such as the Subjective Global Assessment,[8] the geriatric Mini

Non-standard abbreviations: AVeS, 10-point verbal analogue scale for dietary intake; AViS, 10-point visual analogue scale for dietary intake.

☆ Conference presentation: Part of this work was presented in abstract form at ESPEN meeting, Prague, September 10, 2007, and published in abstract form (Clin Nutr 2007;2,Suppl.2:118).

* Correspondence to: Dominique Darmaun, UMR 1280 Physiologie des Adaptations Nutritionnelles, CHU Hôtel Dieu, 1er étage aile nord, 1 place Alexis Ricordeau, 44093 Nantes, Cedex 01, France. Tel.: +33 2 40 08 42 75; fax: +33 2 40 08 31 54.
E-mail address: dominique.darmaun@chu-nantes.fr (D. Darmaun).

0261-5614/$ – see front matter © 2009 Elsevier Ltd and European Society for Clinical Nutrition and Metabolism. All rights reserved.
doi:10.1016/j.clnu.2009.01.003

Nutritional Assessment (MNA),[9] or the pediatric Nutritional Risk Score.[10] Moreover, in hospital patients, Forli et al. have previously validated a self-administered form for recording food intake.[11]

The 3–6 day dietary record is considered as the gold standard for the calculation of daily energy intake.[12,13] However, as this method is time-consuming and requires the intervention of a nurse and a dietician, it is not universally implemented in the hospital setting. Furthermore, waiting for the results of a dietary record can delay the treatment of undernutrition, and could therefore impair patient outcome. Indeed, delaying nutritional intervention by 48 h increased the length of hospital stay by 24 h in an earlier study.[14] Therefore, from a clinical point of view, the availability of methods allowing a quick assessment of daily energy intake would be of utmost interest.

Although the use of visual or verbal analogue scales has only been well validated for the assessment of pain,[15,16] anxiety,[17] or quality of life in perineology,[18] their use has expanded, and similar scales have been empirically used in several areas of health care. In the field of nutrition, visual analogue scales have also been used to assess appetite, hunger and satiety.[19] In addition, visual and verbal analogue scales were shown to be equally effective for the assessment of pain intensity.[20–22]

The aims of this prospective, pilot study therefore were: i) to evaluate the feasibility of assessing dietary intake using two 10-point analogue scales, i.e. verbal (AVeS) or visual (AViS) scales, in a population of patients with undernutrition or nutritionally at-risk, ii) to determine whether the estimates obtained with both scales correlated with calculated energy intake, and with each other, and iii) to determine whether AVeS could be a useful tool for assessing the risk of undernutrition.

2. Patients and methods

2.1. Patient selection

Patients were prospectively selected during a four-month period in 2006. Hospitalized patients were recruited within the departments of Gastroenterology and Internal Medicine of the University Hospital of Nantes, and the department of Gastroenterology of the University Hospital of Nice, France. Out-patients were recruited during a one-day hospital stay or during a clinic visit to the department of Gastroenterology of the University Hospital at Nantes. Patients were excluded if their age was below 18 or above 75, if they were pregnant or breastfeeding women, had anorexia nervosa, obesity or a past history of obesity surgery, were unable to be interviewed (coma, consciousness disorders, dementia,…), received enteral or parenteral nutrition or oral nutritional supplements, or when oral intake was suspended based on a physician's prescription.

According to the above exclusion criteria, we first selected 137 patients. Twenty-three patients were subsequently excluded for various reasons (Fig. 1). Our study population was then constituted of 114 patients, i.e., 46 in-patients or out-patients nutritionally at-risk and 68 undernourished patients, mainly in-patients. Patients were considered as undernourished if their Nutritional Risk Index (NRI)[23] was below 97.5. The 46 remaining were classified as nutritionally at-risk either because of their underlying disease (see infra), e.g. gastrointestinal cancer, inflammatory bowel diseases, liver cirrhosis, allogenic stem cell transplantation, which are frequently complicated by undernutrition, or due to the presence of an inflammatory syndrome in 29% of them.

2.2. Demographic and selected clinical characteristics of the study population

The study population consisted of 69 men and 45 women. The mean age was 56 ± 15 years (range 18–75). Seventy patients (61%) were in-patients. Ninety-eight patients (86%) suffered from a digestive disease: (i) thirty-nine patients, mainly out-patients, suffered from a digestive cancer; i.e. colorectal cancer ($n = 17$), pancreatic adenocarcinoma ($n = 6$), upper gastrointestinal tract cancer ($n = 5$), hepatocellular carcinoma ($n = 4$), cholangiocarcinoma ($n = 4$), and liver metastasis of unknown origin ($n = 3$); twenty of these patients were receiving chemotherapy, mainly for a metastasic disease; (ii) twenty-one patients had an inflammatory bowel disease, either Crohn's disease ($n = 14$) or ulcerative colitis ($n = 7$), half of them had an active disease; (iii) twenty patients were hospitalized for a complication of an alcoholic liver cirrhosis; (iv) four patients had alcoholic chronic pancreatitis; v) the additional fourteen patients had intestinal functional disorders ($n = 5$), gastro-oesophageal reflux disease complicated with a peptic stricture ($n = 2$), achalasia ($n = 1$), digestive bleeding of unknown origin ($n = 2$), infectious colitis ($n = 1$), psychosocial disorders caused by alcohol consumption ($n = 2$), and non-alcoholic steatohepatitis ($n = 1$). The sixteen remaining patients had: malignant hemopathy ($n = 7$), among whom three had recently received allogeneic stem cell transplantation, complications of either type 1 ($n = 2$) or 2 ($n = 4$) diabetes, hypopituitarism ($n = 1$), spondylitis ($n = 1$), or non-malignant adenopathies ($n = 1$).

2.3. Procedure used to obtain the 10-point verbal and visual analogue scales for dietary intake

Inquiries for the ten-point verbal and visual analogue scales for dietary intake were performed in the French language. To obtain AVeS, the following question was asked orally: "If you consider that, at times when you are in good health, you eat 10 out of 10, how much do you currently eat at this moment on a scale from 0 to 10?" For the AViS, patients had to move a cursor on the visual scale to answer the inquiry: "how much do you currently eat at this moment, ranging from "nothing at all" (far left side of the scale) to "as usual" (far right side of the scale)?" Analogue scales were performed by an interviewer who was unaware of the results of the 3-day dietary record. AVeS and AViS were performed just once, and were not administered at a specific time of the day, e.g. after a meal. In in-patients, they were performed during the 3-day period covered by the dietary record. In out-patients, they were performed less than ten days after the end of the 3-day dietary record. Verbal analogue scale was performed in all patients, and the visual analogue scale was performed in 48 patients only, all belonging to the sub-group of undernourished in-patients.

2.4. Three day dietary record

For in-patients, the standardized forms edited by the Departments of Dietetics of the University Hospital of Nantes and Nice were used and filled in by a nurse assistant at the end of each of the three daily meals or snacks, for three consecutive days. All the food items served at each meal in the hospital are listed on these forms. After each meal or snack, the nurse assistants had to specify, whether the totality, half, one-fourth, or none of each served food item had been consumed. The consumption of energy-containing beverages (milk, juice, lemonade,…) was taken into account as well.

Out-patients were instructed to fill in the dietary record themselves, by making note, as precisely as possible, of every food item ingested during three consecutive days at home. Before they returned home, patients were asked to weigh their foods, and taught by a single dietician about the best way to estimate the quantity of food eaten (number of spoons, weight, volume of drinks,…). During the following visit (less than 10 days later), patients were independently interviewed to assess their estimates with the verbal analogue scale and by the same dietician to obtain