Teaching Nutrition Integration: MUST Screening in Cancer

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ABSTRACT

Rationale. Nutritional risk screening should be routine in order to select patients in need of nutrition care; this conduct change has to rely on education. In this project, radiotherapy department health professionals were trained on how to use the Malnutrition Universal Screening Tool (MUST), to foster its integration into cancer outpatient management; we also aimed to identify those more adherent to screening.

Methods. Research dieticians (the standard) conducted interactive sessions with all physicians, nurses, and radiotherapy (RT) technicians, who were closely supervised to facilitate routine MUST integration. There were two phases: after the first session, phase 1 assessed 200 patients over 4 months; after the second session, phase 2 screened 450 patients, always before RT. Validity was evaluated comparing results from the standard against all other health professionals, adjusted for number.

Results. RT technicians were most adherent to the MUST: 80% of patients in phase 1, increasing to 85% in phase 2. Nurses doubled their input, from 19% to 36%.

Physicians had poor MUST integration, yet they progressively incorporated percentage weight loss into patient records, increasing from 57% in phase 1 to 84% in phase 2, independently of diagnosis and stage. The highest concordance (κ coefficient) with dieticians was found with RT technicians' use of the MUST ($p < .002$) and percentage weight loss determination by physicians ($p < .001$).

Conclusions. We show that systematic screening in cancer is feasible by all professionals involved, once a proximity teaching project is put into practice. RT technicians, who daily treat patients, were highly adherent to integrate the MUST and might be in charge of selecting at-risk patients. Physicians are unlikely to use the MUST, but acknowledged nutrition value and changed their routine by integrating recent percentage weight loss into their approach to patients. Our structured methodology may be used as a model for the development of teaching adapted to different departments with other realities. *The Oncologist* 2011;16:239–245

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INTRODUCTION

Undernutrition in cancer increases treatment toxicity and morbidity, decreases response to treatment, decreases quality of life (QoL), and worsens prognosis [1–7]. However, despite recommendations of major international boards [8], undernutrition continues to be neither screened/diagnosed nor integrated in patient care in cancer patients [9]. Quality of nutrition care requires timely evaluation of nutritional risk integrated into routine practice [8, 10, 11], allowing for early referral of at-risk patients for an immediate individualized and comprehensive nutritional status diagnosis by a specialist [12–14]. In order to assure regular benchmark integration, nutritional risk evaluation has to involve a multidisciplinary approach; each health professional has specific tasks, yet all work in consonance [15].

Within this framework, our objectives were: (a) to train all health professionals from a radiotherapy (RT) department on how to use a simple, reliable nutritional risk screening method, the Malnutrition Universal Screening Tool (MUST) [16], in their routine practice and (b) to identify which professionals were more adherent to screening. These actions ultimately were aimed at fostering integration of the MUST into the routine of any health professional, thereby guiding the design and development of a realistic nutrition care protocol adapted to the department's reality, allowing for the delivery of timely adjuvant therapeutic nutrition according to patients' individual needs.

MATERIALS AND METHODS

This longitudinal study was approved by the University Hospital Ethics Committee and conducted in accordance with the Declaration of Helsinki, adopted by the World Medical Association in 1964, amended in 1975, revised in 1983, and updated in 2002.

Health Professionals

In January 2008, contact was made by dietitians in charge with all permanent health professionals working in the RT department to suggest their involvement in learning and implementing a nutritional risk tool, the MUST. Upon their unanimous interest, two interactive, introductory, and thoroughly explanatory sessions were organized and the various professional groups were assembled. The target audience comprised 12 physicians, 3 nurses, and 20 RT technicians.

Patient Population

From March 2008 to January 2009, all consecutive adult ambulatory cancer patients referred to the RT department were considered eligible; patients with rare tumors [16] and uncooperative patients unable to communicate or to be

weighed were excluded. Before RT planning, medical staff registered, for every patient, clinical variables and cancer location and stage according to tumor–node–metastasis classification [17], as determined by local and whole-body imaging methods. This study addressed 450 patients—269 men and 181 women—with a mean age of 62 ± 13 years (range, 18–95 years) with different types of cancers. Stage III and stage IV disease were found in 273 patients (61%); the most frequent types of cancer were breast ($n = 94$, 21%), prostate ($n = 86$, 19%), lung ($n = 73$, 16%), and colorectal ($n = 61$, 14%) (details shown elsewhere [18]). All patients provided written informed consent and data were recorded on individual protocol forms.

Study Design

Nutritional Risk Screening Instrument

There are multiple screening tools. Thus, we performed a meticulous analysis to choose the most adequate. For example, a screening tool that scores patients according to diagnosis would have, *ab initio*, bias because we only included cancer patients. It is thus more appropriate to choose an instrument that values patients' nutritional parameters and disease-related symptoms. Additionally, recent robust evidence indicates weight and appetite loss to be valid parameters to identify at-risk patients. We did not wish to detect undernourished or cachectic patients. Therefore, the nutritional risk method selected to be taught was the MUST [15], which addresses the following three parameters. (a) Current weight status using the body mass index (BMI) was scored 0 if $>20 \text{ kg/m}^2$, 1 if $18.5\text{--}20 \text{ kg/m}^2$, and 2 if $<18.5 \text{ kg/m}^2$. Height was measured in the standing position using a stadiometer and weight was determined with a calibrated SECA® (SECA, London, U.K.) floor scale. (b) Percentage weight loss over the previous 3–6 months was scored as 0 if $<5\%$, 1 if $5\text{--}10\%$, and 2 if $>10\%$. Percentage weight loss was calculated by comparison with the patient's reported usual weight prior to any symptomatic manifestation. (c) Acute disease effect was scored 2 if there had been or was likely to have been no nutritional intake for >5 days. The scores given to each component were summed and the total categorized patients as having a low, moderate, or high risk for undernutrition. This score was also used to guide risk reassessment and referral for a thorough nutritional evaluation and for nutritional intervention [15]. The MUST can be used by any health professional with proper training.

Nutritional Screening Teaching

A team of research dietitians with specialized training in oncology [1–7, 19–24] conducted interactive sessions with

12 physicians, three nurses, and 20 RT technicians on how to use the MUST according to British Association for Parenteral and Enteral Nutrition (BAPEN) guidelines [15]. Interactive sessions, with an average duration of 2 hours, conveyed: (a) information on the impact of undernutrition in cancer, (b) information on the impact of undernutrition in the course of treatment, (c) details on the benefits of timely nutritional risk screening and how it is mandatory for accurate referral of patients for nutrition counseling, and (d) evidence-based data on the importance of nutritional intervention and adjuvant nutrition therapy in cancer patients. This last aspect was always based on the studies that are today considered evidence and are part of the international guidelines for nutritional support in cancer [7, 21–24].

The most effective means of presenting details of the project was by interactive PowerPoint slide presentations, created purposely for this study in order to answer the specific needs of teaching and integration of nutritional risk screening for the health professionals involved. Two presentations were created, the first for session 1 and the second, with the appropriate adaptations, for session 2, as detailed below in the text.

Content and Timing of the Interactive Sessions

The presentations included: (a) detailed instructions on how to routinely use and integrate MUST screening into the routine of each professional (according to the best timing previously discussed with each professional group); (b) explanations on how to calculate BMI, percentage weight loss, and acute disease effect using the formula for each item, which facilitated comprehension and routine use; (c) conveyance of the outcome of the integration and patient screening. For example, professionals knew what the real benefit would be for patients and for the department's quality of care from their contribution and behavior change, by showing the action plan and the protocol that each patient would follow after screening according to each risk category. The outcome and sequence of events after nutritional screening were based on robust clinical results from several randomized, controlled trials on individualized nutritional counseling that demonstrated that patients do benefit from individualized nutrition care and have to be screened. Those patients categorized as higher risk have to be given higher priority for consultation with a specialized dietician, as the evidence shows [7, 21–24], and this was the practice and the information given to all professionals. Plus, this individualized nutrition consultation protocol was already ongoing in the department as a result of the implementation of the recommendations of the Council of Europe Report on nutrition care in hospitals [8, 25]. Hence, professionals were totally enlightened on the routine protocol of action

Figure 1. Interactive session dynamics.

Abbreviation: MUST, Malnutrition Universal Screening Tool.

that would follow their patient screening. Indeed, the integration of nutritional risk screening was the key aspect that was lacking. Additionally, in each session we also discussed all clinical signs of nutritional risk in cancer patients, and we performed practical exercises based on BAPEN guidelines for MUST completion. Interactive sessions aimed to actively and effectively train all professionals and clarify questions and doubts (Fig. 1).

For this project, a Portuguese version of the MUST was created by translating the original technical terms. Additionally, BMI and percentage weight loss formulae were included in each MUST form to facilitate calculations and reduce time of completion. In future publications, we will develop a simple device to automate calculations (percentage weight loss, BMI). The patient identification number and the category and name of the health professional who filled in the form were also included for later analysis, individual feedback, and adjustments as appropriate. The learning process was closely monitored, and professionals were regularly instructed by dieticians to facilitate MUST integration into their routine. The correct timing for the screening was established for and by each health professional group according to their activities and timetables. The MUST was used before RT treatment by dieticians, RT technicians, nurses, and physicians.

Outcome/Compliance Assessment After Interactive Sessions

The first interactive session was to initiate and discuss procedures, timing, and the aims of screening by each professional group. MUST screening was performed at two different time points: after the first interactive session (phase 1) and after the second interactive session (phase 2). First, we analyzed compliance by professionals by evaluating the number of patients assessed by every professional group. After that, we compared the results obtained by the professionals for each patient screening with the standard of evaluation, that is, the dieticians. In phase 1, 200 patients were assessed over 4 months; dieticians then analyzed all collected data as well as nutritional risk results. Then, the

Figure 2. Patients screened by the Malnutrition Universal Screening Tool (MUST) in phase 1 (100%, $n = 200$) and phase 2 (100%, $n = 450$).

Abbreviation: RT, radiotherapy.

second interactive session took place to present the results of phase 1, to optimize procedures on how to complete the MUST, and to revise instructions to maintain effective and sustained adherence and to reinforce the importance of screening for correct and timely referral of patients. In phase 2, MUST results were evaluated after a total of 450 patients had been screened. Their performance, adjusted for the number in each professional group, was again compared with the results obtained by dieticians (the standard).

Statistical Analysis

Statistical analyses were conducted using SPSS 16.0 (SPSS Inc., Chicago, IL). Descriptive statistics, expressed in numbers and percentages, were used for categorical variables (sex, BMI, MUST), the prevalence and frequency of which were further evaluated with χ^2 tests. Age was expressed as a mean $\pm$ standard deviation (limits). One-way analysis of variance was performed for multiple-group evaluations and two-tailed Spearman correlation was used to assess intervalidity. In the concordance analysis, the κ coefficient was calculated to measure agreement among MUST evaluations by the different health professionals. All between-group comparisons were adjusted for the number of professionals. Statistical significance was set at a p -value $< .05$.

RESULTS

The MUST evaluated by dieticians (the standard) disclosed that 31% ($n = 139$ of 450) of patients were at moderate or high risk for undernutrition.

Nutritional Screening Integration

Figure 2 shows the percentage of nutritional screening assessments performed by physicians, nurses, RT techni-

Figure 3. Risk category distribution according to different health professionals: □ low risk, ▨ moderate risk, ■ high risk. Abbreviation: RT, radiotherapy.

cians, and dieticians in phase 1 and phase 2 of the study. There was an obvious increase in adherence by all professionals from phase 1 to phase 2, although with distinct relative weights. Indeed, after the second interactive session, RT technicians continued to be the most effective in performing and integrating the MUST into their routine. RT technicians performed a correct and thorough completion of the MUST in 78% of patients in phase 1, increasing this to 85% ($n = 383$ of 450) of patients in phase 2 ($p < .02$). Nurses doubled their involvement, from 19% of patients in phase 1 to 36% ($n = 162$ of 450) of patients ($p < .009$). Physicians also improved compliance, from 10% to 12% ($n = 54$ of 450) of patients in phase 1 versus phase 2 ($p < .05$).

Risk for Undernutrition

In phase 2, the validity of screening results by all professionals was carefully analyzed by comparison with the assessment made by dieticians (the standard) (Fig. 3). Using a frequency analysis for the distribution of nutritional risk categories among the four groups, the prevalence of patients at high risk for undernutrition was identical and consistent when evaluated by the different groups ($p < .002$). Yet, the prevalence of patients at moderate risk for undernutrition was significantly different, ($p < .01$), and patients at low risk for undernutrition, when evaluated by the different groups, were statistically similar ($p < .03$) though discrepant. When comparing the distribution of risk categories as assessed by dieticians with those as assessed by the remaining professionals, RT technicians had the most concordant results ($\kappa = 0.92$; $p < .002$), followed by nurses ($\kappa = 0.55$; $p < .05$), and physicians ($\kappa = 0.54$; $p < .05$), who identified more patients at low risk.

Percentage Weight Loss

This parameter has the ability to detect mild to extreme nutritional changes and we recently confirmed its high sensi-

Figure 4. Percentage weight loss calculated in phase 1 (100%, $n = 200$) and phase 2 (100%, $n = 450$); □ no percentage weight loss calculated, ■ percentage weight loss calculated.

tivity and specificity in cancer [26]. In antagonism to previous practice, physicians naturally bonded to percentage weight loss as a clinical parameter, which thereafter almost became an integral part of their routine. This parameter was registered with increasing frequency from the start of the study; results were even more significant after phase 2 than after phase 1 ($p = .005$) (Fig. 4).

Physicians' performance was indeed unexpected: to weigh and calculate percentage weight loss became an incorporated practice, which reached 84% ($n = 377$ of 450) of patient records in phase 2, independent of diagnosis and stage. Moreover, there was a highly significant concordance between percentage weight loss results obtained by physicians and those obtained by dietitians ($\kappa = 0.93$; $p < .001$).

DISCUSSION

All three groups of professionals screened the same patients, who were new patients in our department, in order for us to have a comparison of results reached by the different groups. Physicians distinguished clinically significant weight loss because it contributes to treatment interruption, thus negatively influencing prognosis. RT technicians daily treat and interact with patients and are thus able to easily detect clinical signs of nutritional risk. Nurses are an active link with physicians and can perform direct referrals to dietitians. Integrating nutrition is challenging, but successful if carefully executed. Our meticulous methodology may be used as a model for the development of new protocols adapted to different departments with other realities.

Undernutrition continues to be underrecognized, underestimated, and undertreated, adversely affecting patients and health care [25, 27–29]. This emphasizes the pertinence of this study, in which professionals were trained to assess nutritional risk and integrate early screening, and those more effective at these tasks were identified. Our aim was

to foster a training program to integrate nutrition screening as a routine practice to be applied by any health professional who can effectively do it and integrate this practice into their routine. We have indeed shown that systematic screening in cancer is feasible once a proximity teaching project is put into practice. Adherence varied: there was outstanding performance by RT technicians, but curiously, performance was lower in nurses and physicians. The latter, however, spontaneously integrated percentage weight loss as a risk indicator [18].

Despite the numerous documents and actions devised by various international bodies to promote universal nutritional care [8, 27, 30], it is disturbing that the overall situation is still largely unchanged aside from dietitians' work. In practice, apart from odd examples, nurses and physicians are usually impermeable to nutritional teaching [31, 32]. However, a change in this bleak scenario is possible. In this study, motivation, practice, and integration were real. For that purpose, one has to be creative, attentive, and present.

Percentage weight loss and BMI, parameters of the MUST, were approved by the Council of Europe and recently presented to the European Parliament as essential parameters to be assessed. We started from the beginning: teach how to use the MUST. And teaching was done by dietitians, who were by and large accepted by other professionals [31] because they received specialized training in oncology [7, 21–24] to learn the required knowledge and skills. The process was closely supervised/monitored. This paper reports on the first two phases. The MUST was chosen because it is able to reflect subtle differences among cancer patients, is easy to use, is quick to fill in, and can be used by any health professional who is properly trained [15, 33]. We monitored and calculated the mean time spent by professionals to complete the MUST, and this was in the range of 50 seconds to 1 minute and 30 seconds. Although calculations require time, it is important to incorporate the meaning of MUST scores during training. In the future, calculations will be automated for integration. We included three different groups of professionals because nutritional risk screening should not be exclusively performed by dietitians or nutritionists. Screening was recommended by the Council of Europe and already presented to the European Parliament in 2010 as a priority for hospital health care [8, 25].

RT technicians assessed 80% of patients in phase 1, reaching 85% of patients in phase 2. Their daily contact with patients and concern with treatment success influenced their ability to naturally integrate a new valued task into routine. After update of the procedures and instructions, nurses doubled their participation from 19% to 36%. Their contact with patients is limited to intervention when

severe mucosal and/or dermatological RT toxicity occurs. At first, physicians seemed to underestimate the MUST, because they had the weakest results, similar in both phases. Though the MUST is user friendly, physicians found it time-consuming in an already overcharged routine. Nonetheless, a thorough analysis showed that physicians incorporated percentage weight loss and registered this in patient records regardless of diagnosis and stage: 57% in phase 1, increasing to 84% in phase 2. Percentage of recent weight loss is a parameter of nutritional risk, and weight changes are clinically relevant [7–10, 18]. We have demonstrated the high sensitivity and specificity of percentage weight loss compared with the Patient-Generated Subjective Global Assessment, the gold standard for nutritional status assessment in oncology [26].

Of note, all professionals pointed out the importance of the following key issues: (a) instructions on how to routinely use/integrate the MUST adequately presented to each professional and (b) knowledge of the outcome of the integration of patient screening and the fact that each professional knew what the real benefit would be for patients and for the department's quality of care from their contribution and behavior change. Thus, all professionals involved pointed out that performing MUST screening or percentage weight loss calculation alone enabled a close bond with patients and was considered an added value to therapy, and it also resulted in a tighter multiprofessional team approach. It is a key motivational aspect that all professionals know the outcome and the sequence that will follow the nutritional screening. Thus, in this project, professional training included presentation of the robust clinical results from several randomized, controlled trials of individualized nutritional counseling that demonstrated that patients do benefit from individualized nutrition care and have to be screened—those at higher risk have to be given higher priority for consultation with a specialized dietician [7, 8, 21–25].

To validate teaching results, concordance was analyzed between results from all professionals and the standard (dieticians): MUST evaluation by RT technicians was the most concordant, followed by nurses. Concordance of physicians' percentage weight loss results was almost perfect when compared with that of dieticians. Remarkably, patients at high risk were equally identified by all professionals.

Overall, identification of patients at risk was achieved, which is key for referral for specialized intervention and facilitating effective integration of nutrition protocols in multiprofessional patient care [11, 34]. Patient tolerance and response to treatment, QoL, and survival are directly and

positively influenced by timely and adequate nutrition [12, 13, 20, 21, 35]. Screening is an essential component because it enables the most effective type of intervention; that is, when patients will respond to adjuvant nutritional therapy, thereby improving nutritional status and probably prognosis. Patients with a severely depleted nutritional status or cachexia require a more in-depth type of intervention, which is also a priority but not our main focus in this study.

Screening must be connected to an important outcome: patients get meaningful nutritional therapy if identified as being at risk. This course of action will be integrated as a nutrition protocol that will be presented in future publications. Our first priority was to systematically teach and train professionals. Training is key to integrating “automatic” screening for patients to be effectively referred to dieticians with specialized training in oncology, who perform individualized nutritional counseling according to guidelines [7, 21–24]. This direct course of action is of high importance for screening to not be a disincentive for the professionals and patients involved—their effort will definitely bring stable and permanent added value.

All three groups of professionals screened the same patients, who were new patients in our department, in order for us to have a comparison of the results reached by each group. Physicians distinguished clinically significant weight loss because it contributes to treatment interruption, thus negatively influencing prognosis. RT technicians daily treat and interact with patients and are thus able to easily detect clinical signs of nutritional risk. Nurses are an active link with physicians and can perform direct referrals to dieticians. Integrating nutrition is challenging, but successful if carefully executed. Our meticulous methodology may be used as a model for the development of new protocols adapted to different departments with other realities.

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AUTHOR CONTRIBUTIONS

Conception/Design: Paula Ravasco, Maria Camilo, Isabel Monteiro-Grillo
Provision of study material or patients: Isabel Monteiro-Grillo
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Data analysis and interpretation: Paula Ravasco, Maria Camilo
Manuscript writing: Paula Ravasco, Maria Camilo
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