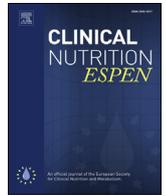




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Knowledge and practices of medical oncologists concerning nutrition therapy: A survey study

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SUMMARY

Background and aims: Despite the identification of malnutrition and administration of nutrition therapy being increasingly recognised as integral to the treatment of cancer patients, this is not always translated into routine clinical practice. The aim of this study was to determine medical oncologists' awareness of, and ability to assess, nutritional status and when to initiate nutrition therapy, to identify their educational status concerning clinical nutrition and their perceived barriers to the routine use of nutrition therapy in their patients through a survey study.

Methods: 155 medical oncologists were invited to complete a digital questionnaire. The questionnaire included information regarding the participants demographic and professional information, clinical nutrition education status, attitudes towards malnutrition and nutrition therapy, and barriers to using nutrition therapy. The questionnaire also included two case scenarios designed to assess ability to diagnose malnutrition/assess nutritional status and identify when nutrition therapy might be indicated.

Results: Of 109 medical oncologists who agreed to participate, 43.1% declared that they received clinical nutrition education and 33.9% declared that they followed the oncology sections in the European Society of Clinical Nutrition and Metabolism (ESPEN) Guidelines. The medical oncologists were divided into two groups according to their knowledge score (31 medical oncologists with a knowledge score of <3 and 78 medical oncologists with a knowledge score of ≥ 3). The rate of having nutrition education was significantly higher in those with a higher knowledge score (≥ 3) and the rate of medical oncologists having this education during medical and/or oncology education was also significantly higher. The rate of medical oncologists following the oncology sections in the ESPEN guidelines was higher in those with higher knowledge score.

Conclusions: Our results emphasize the association between clinical nutrition education and higher knowledge scores in medical oncologists, but reveal a mis-match between knowledge and awareness and what happens in clinical practice. Nutrition therapy might be used more frequently in routine practice when medical oncologists' lack of knowledge is resolved.

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1. Introduction

Malnutrition and cachexia are common in oncology patients due to both the disease itself and the applied treatments. Both malnutrition and cachexia, which is a complex syndrome, are indicators of poor prognosis [1]. In addition to the effects of cancer, loss of appetite, nausea, vomiting, diarrhoea, loss of taste, dry mouth, mucositis, dysphagia, early satiety, malabsorption, and

depression caused by surgery, chemotherapy, and radiotherapy lead patients to develop undernutrition. This is often accompanied by a catabolic state which further exacerbates a negative energy balance [2,3]. Weight loss is usually the presenting symptom of malnutrition in oncology patients [4–7] and has been reported in 30% to more than 80% of patients depending on the cancer type [1]. However, studies on body composition have revealed that skeletal muscle loss (with or without fat loss) in cancer-related malnutrition is a determinant of physical disability, postoperative complications, chemotherapy toxicity, and mortality risk [8].

In cancer patients, nutrition therapy aims to maintain or improve nutrient intake, mitigate metabolic derangements, maintain skeletal muscle mass and physical performance, reduce the

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risk of reductions or interruptions of scheduled anticancer treatments, and improve quality of life [8]. Therefore, the recognition of malnutrition and administration of nutrition therapy are integral parts of the treatment of cancer patients [9]. It has been reported that assessment of nutritional status in cancer patients should begin at diagnosis and be repeated at each visit [2]. Malnutrition is usually treated by modification of the patient's diet to meet needs of energy, protein and other nutrients. This can be achieved by the use of one or more nutrition therapies including dietary counseling, oral nutrition support and, when required, enteral and parenteral nutrition therapies. Pharmacological therapies may be used to counter the effects of malnutrition in some cancer patients, while the use of exercise training in conjunction with optimal nutritional care is recommended to maintain muscle strength and muscle mass [1–3,9].

Although the importance of nutrition in oncology patients is well established, malnutrition is frequently overlooked, screening techniques are not always standardised, and there is no satisfying consensus on malnutrition further assessment criteria [8,10]. Understanding the awareness of, and attitudes towards, malnutrition and nutrition therapies in oncologists may help to understand why the current evidence base is not translated into routine clinical practice. The present study aimed to determine medical oncologists' awareness of, and ability to assess, nutritional status along with when to initiate nutrition therapy. The study also aimed to identify their educational status concerning clinical nutrition and their perceived barriers to the routine use of nutrition therapy in their patients.

2. Materials and methods

A survey study was conducted among medical oncologists actively involved in the diagnosis, treatment and follow-up of cancer patients. According to the data obtained from the Turkish Society of Medical Oncology, the number of medical oncologists in Turkey is 500. Assuming that the awareness about nutrition therapy was 20% among oncologists, 107 participants were required within two-sided 95% confidence interval and with $\pm 8\%$ accuracy. With the assumption that 65% of the invited medical oncologists would accept to participate in the study, it was planned to invite 165 medical oncologists.

With reference to a case-scenario based questionnaire developed and validated by Spiro et al. 2006 [11], a questionnaire was designed and subsequently discussed and approved by 10 medical oncologists, recognized as experts in clinical nutrition in Turkey (experts from the Turkish Society of Clinical Enteral Parenteral Nutrition (KEPAN)). The questionnaire assessed the awareness and knowledge of medical oncologists about nutrition therapy. Medical oncologists were asked to complete the survey of their own accord and the information was designed to be collated anonymously. As such ethical approval was not sought for this survey.

Participating Medical oncologists completed the questionnaire electronically between March 2016 and June 2016. Each question in the questionnaire appeared after the previous question was answered. While the answers were directly transferred to the database, the names of the medical oncologists were not recorded.

In the questionnaire form, demographic and professional (faculty of graduation, hospital of employment, years of specialty, number of patients examined weekly) information of the medical oncologists was collected. The following three main topics were targeted in the questionnaire: 1) Clinical nutrition training status 2) Awareness of, and ability to assess, nutritional status and identify malnutrition and indications for nutrition therapy, and 3) Barriers to routine use of clinical nutrition.

Two case scenarios with gastrointestinal cancer were included in the questionnaire to ascertain ability to assess nutritional status, identify malnutrition and when to initiate nutrition therapy. The first case was about diagnosis of malnutrition and the second case was about indications for nutritional support (Table 1).

2.1. Statistical analyses

Data were analyzed using the Predictive Analytics Software (PASW) Statistics for Windows, version 18.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were expressed as number and percentage for categorical variables and as mean, standard deviation, median, the 25th percentile (the first quartile [Q1]), the 75th percentile (the third quartile [Q3]), and minimum and maximum for numerical variables. Normality of variables was analyzed using visual (histogram and probability graphics) and analytic methods (Kolmogorov–Smirnov and Shapiro–Wilk tests). For non-normally distributed numerical variables, Mann–Whitney U test was used for two group comparisons and Kruskal–Wallis test was used for multiple comparisons. Two- and multiple-group comparisons between categorical variables were performed by Chi-square test; if Chi-square test assumption was not met, Fisher's exact test was used. Subgroup analyses were performed using Mann–Whitney U test with Bonferroni correction. The results for which type-1 error was $<5\%$ was considered statistically.

3. Results

Among 165 medical oncologists planned to be enrolled in the present study, 155 (93.9%) were contacted (10 were unable to be contacted). Of these medical oncologists, 109 (70.3%) agreed to participate in the study. More than half of the participants (52.3%) had ≥ 5 years of specialty and 46.8% were working at university hospitals. The general characteristics of the medical oncologists are summarized in Table 2.

Of the medical oncologists, 43.1% reported that they received clinical nutrition education and 33.9% reported that they were following the oncology sections in the European Society of Clinical Nutrition and Metabolism (ESPEN) Guidelines [1,12]. Education-related features of the medical oncologists regarding nutrition therapy are presented in Table 3.

The answers given by medical oncologists to the questions concerning nutrition therapy are summarized in Table 4. Almost all of the medical oncologists were of the opinion that nutritional status affects the course of disease in oncology patients (94.5%) and all examined cancer patients should undergo nutritional screening (90.8%). Moreover, 92.7% of the medical oncologists reported that they were able to differentiate a patient with malnutrition.

An evaluation was undertaken of the responses to the case scenario questions which assessed the medical oncologists' ability to identify malnutrition and when to initiate nutrition therapy. The answers given to these questions by the medical oncologists were considered correct if they were in line with expert opinion. The medical oncologists were divided into two groups according to the median knowledge score (<3 or ≥ 3). There were 31 (28.4%) medical oncologists with a knowledge score of <3 and 78 medical oncologists (71.6%) with a knowledge score of ≥ 3 . The characteristics of these two groups are summarized in Table 5.

The number of medical oncologists who had undertaken some form of clinical nutrition education was significantly higher in those with a higher knowledge score (≥ 3) (39 (50.0%) vs. 8 (25.8%), $p = 0.021$) (Fig. 1) and the number of medical oncologists having this education during medical and/or oncology education was also significantly higher (31 (79.5%) vs. 3 (37.5%), $p = 0.028$). The number of medical oncologists following the oncology sections in

Table 1
Case scenarios in the questionnaire.

	Characteristics	Case-related Questions
Case Scenario 1	A 66-year-old male patient has a previous total gastrectomy for gastric tumor is admitted for adjuvant therapy Body weight: 51 kg Serum Albumin: 2.7 g/dL	Does the patient have malnutrition? What other information is required for diagnosis?
Case Scenario 2	A 58-year-old female patient Radiochemotherapy is initiated for advanced-stage pancreatic tumor Body weight: 60 kg Biochemical parameters are normal No concomitant diseases	How many kilograms does she need to lose in a month for starting nutrition therapy?

Table 2
General characteristics of the medical oncologists.

	n (%)	Median (Q1–Q3)
Age, years		38 (35–44)
Gender		
Female	33 (30.3)	
Male	76 (69.7)	
Years of specialty		5 (3–9)
According to the years of specialty		
<5 years	52 (47.7)	
≥5 years	57 (52.3)	
Institution		
University Hospital	51 (46.8)	
Training and Research Hospital	36 (33.0)	
Private Hospital	13 (11.9)	
State Hospital	9 (8.3)	
Other	9 (8.3)	
Number of patients examined weekly		120 (60–200)
<100	35 (32.1)	
≥100	74 (67.9)	

Table 3
Education-related features of the medical oncologists regarding nutrition therapy.

	n (%)
Having clinical nutrition education	
Yes	47 (43.1)
No	62 (56.9)
Number of education sessions attended	
1	16 (34)
2	11 (23.4)
3	8 (17.0)
4	5 (10.6)
5 and above	7 (14.9)
Having clinical nutrition education during	
Medical and/or oncology education	34 (72.3)
Other ^a	13 (27.7)
Following the oncology sections in the ESPEN guidelines	
Yes	37 (33.9)
No	72 (66.1)

ESPEN, European Society of Clinical Nutrition and Metabolism.

^a Congress, symposium, course, paper.

the ESPEN guidelines was significantly higher in those with a higher knowledge score (31 (39.7%) vs. 6 (19.4%), $p = 0.043$) (Fig. 1). However, there were no significant differences between the medical oncologists with a knowledge score of <3 and those with a knowledge score of ≥3 in terms of the following parameters: age, gender, years of specialty, institution, and number of patients examined weekly (Table 5).

The main barrier to the routine use of nutrition therapy in the treatment of cancer patients was identified as medical oncologists' lack of knowledge (78 (71.6%)). Responses to other barriers to the routine use of nutrition therapy included; lack of clear guidelines (51 (49.5%)), inadequate evidence in the literature (38 (34.9%)) and the fact that clinical nutrition does not change the prognosis in

cancer patients (17 (15.6%)). Moreover, the majority (66.1%) of medical oncologists only use nutrition support products in ≤30% of their patients.

4. Discussion

The present survey study performed on medical oncologists in Turkey investigated the medical oncologists' clinical nutrition training status, awareness of, and ability to assess, nutritional status and identify malnutrition and barriers to routine use of clinical nutrition in cancer patients.

4.1. Clinical nutrition training status

In the present study less than half of the respondents (43.1%) stated that they had received clinical nutrition education. A previous UK study of the views and practice of oncologists towards nutritional support in patients receiving chemotherapy showed a similar level of nutrition training at either post-graduate or undergraduate level (45%) [11] suggesting the results from our Turkish study are not unusual. Based on our findings strategies to improve access to clinical nutrition education at both undergraduate and postgraduate level should be investigated.

4.2. Awareness of, and ability to assess, nutritional status and identify malnutrition

The knowledge and awareness of physicians about clinical nutrition do not always correspond to their clinical practice. In a nation-based study conducted by Caccialanza et al. [13] in Italy, 97% of the oncologists reported nutritional status to be important in cancer patients. Spiro et al. [11] conducted a survey study among oncologists in the UK and determined that oncologists were aware of the importance of nutritional status, but they lacked confidence in being able to identify patients at risk of malnutrition. The present study also yielded similar outcomes. Of the oncologists participated in the present study, 90.8% were of the opinion that nutritional screening should be performed in all cancer patients and 94.5% thought that nutritional status had an impact on prognosis. Despite these high rates of awareness, the percentage of medical oncologists who answered that the presence of malnutrition in oncology patients at presentation was higher than 50% was just 14.8%. The results also revealed that, 92.7% of oncologists reported that they could recognize a patient with malnutrition whereas only 40.4% correctly answered the case scenario about establishing the diagnosis of malnutrition.

4.3. Opinions of medical oncologists about the effects of nutritional status on prognosis and knowledge of when to initiate nutrition therapy

In the study by Spiro et al. [11], the factors having significant impact on the prognosis of cancer patients were reported as disease

Table 4
Answers given by the medical oncologists to the questions concerning nutrition therapy.

	n (%)
Does nutritional status affect the course of disease in oncology patients?	
Yes	103 (94.5)
No	1 (0.9)
Don't know	5 (4.6)
Should all examined cancer patients undergo nutritional screening?	
Yes	99 (90.8)
No	2 (1.8)
Don't know	8 (7.3)
What do you think about the percentage of oncology patients having malnutrition (regardless of organ) at presentation?	
≤25%	27 (25.0)
26–50%	65 (60.2)
51–75%	16 (14.8)
Are you able to differentiate a patient with malnutrition?	
Yes	101 (92.7)
No	8 (7.3)
A 66-year-old male patient having a previous total gastrectomy due to gastric tumor is admitted for adjuvant therapy. Body weight: 51 kg, serum albumin: 2.7 g/dL. The patient has;	
Apparently malnutrition	41 (37.6)
Risk of malnutrition	24 (22.0)
The data given are inadequate to make an assessment for malnutrition	44 (40.4)
Additional information required to make an assessment for malnutrition in the above mentioned patient is	
Height	28 (63.6)
Body mass index	36 (81.8)
History of weight loss	37 (84.1)
A 58-year-old female patient with advanced stage pancreatic tumor initiated radiochemotherapy. She is now 60 kg with normal biochemical parameters and without concomitant disease. How much weight does she need to lose in a month for starting nutrition therapy?	
1–4%	26 (24.1)
5–9%	45 (41.7)
10–14%	30 (27.8)
15% and over	4 (3.7)
No need for nutrition therapy as she has advanced stage disease	3 (2.8)
What are the barriers to routine use of nutrition therapy in the treatment of cancer patients?	
Medical oncologists' lack of knowledge	78 (71.6)
Lack of guidelines with clear information	54 (49.5)
Inadequate literature evidence	38 (34.9)
The fact that clinical nutrition does not change the prognosis in cancer patients	17 (15.6)
In what percentage of patients do you use oral nutritional support products?	
≤10%	22 (20.2)
11–30%	50 (45.9)
31–50%	25 (22.9)
51–75%	11 (10.1)
>75%	1 (0.9)

stage by 96% of the physicians, performance status by 97% of the physicians, and nutritional status by 65% of the physicians. In the present study, the question “Does nutritional status affect the course of disease” was answered as “Yes” by 94.5% of the oncologists. On the other hand, only 69.5% of the oncologists appropriately answered the case scenario, which focused on indications for starting nutrition therapy. Moreover, 66.1% of the medical oncologists reported that the rate of using oral nutritional support products for their patients was less than 30%. On the basis of these findings, it would seem that medical oncologists are aware that nutrition has an impact on prognosis of patients; but, from our survey results, a large proportion were unable to correctly identify when to initiate nutrition therapy.

4.4. Barriers to routine use of nutrition therapy

Spiro et al. [11] reported the three main barriers to nutritional intervention for the physicians having medical oncology education as follows: lack of clear guidelines (69%), lack of knowledge (60%), and lack of time (56%). In the same study, 80% of those receiving oncology training identified the need for additional education. Caccialanza et al. [13] suggested that the lack of collaboration between oncologists and clinical nutritionists was a primary reason

for low interest in nutrition therapy among oncologists. In the present study, the reasons hindering the inclusion of routine nutrition therapy in the treatment of cancer patients were lack of knowledge (71.6%) and the lack of guidelines providing definite information (49.5%). According to the knowledge scores based on the correct answers in the questionnaire, the number of medical oncologists having clinical nutrition education was significantly higher among those with higher levels of knowledge. In addition, the number of medical oncologists having this education during medical and/or oncology education was also significantly higher for those with a higher knowledge score. Moreover, the number of medical oncologists following the oncology sections in the ESPEN guidelines was significantly higher among those with higher levels of knowledge.

Of the medical oncologists invited to the study, 29.7% did not participate in the survey. This may have led to bias as the sample may not be wholly representative. Nevertheless, the fact that 70.3% of the invited medical oncologists completed the survey can be considered as a good response rate. It is also worth noting that in designing a survey, stringent methods of validation and reliability testing are recommended. However, the current survey was developed using expert opinion, so this may also be a limitation of the study.

Table 5
Comparison of the medical oncologists according to their knowledge scores about nutrition therapy.

	Knowledge Score		p
	<3 (n = 31)	≥3 (n = 78)	
Age, year	36 (34–46)	39 (35–43)	0.572
Gender			
Female	9 (29.0)	24 (30.8)	0.859
Male	22 (71.0)	54 (69.2)	
Years of specialty	4 (2–9)	5 (3–10)	0.235
According to the years of specialty			
<5 years	18 (58.1)	34 (43.6)	0.172
≥5 years	13 (41.9)	44 (56.4)	
Institution			
University Hospital	19 (61.3)	32 (41.0)	0.114
Training and Research Hospital	9 (29.0)	27 (34.6)	
Private Hospital	3 (9.7)	10 (12.8)	
State Hospital	0 (0.0)	9 (11.5)	
Number of patients examined weekly	100 (40–175)	122.5 (75–200)	0.051
According to the number of patients examined weekly			
<100	14 (45.2)	21 (26.9)	0.066
≥100	17 (54.8)	57 (73.1)	
Having education for clinical nutrition	8 (25.8)	39 (50.0)	0.021
Having clinical nutrition education during			
Medical and/or oncology education	3 (37.5)	31 (79.5)	0.028
Other*	5 (62.5)	8 (20.5)	
Following oncology section in the ESPEN guidelines	6 (19.4)	31 (39.7)	0.043

ESPEN, European Society of Clinical Nutrition and Metabolism.

*Congress, symposium, course, paper.

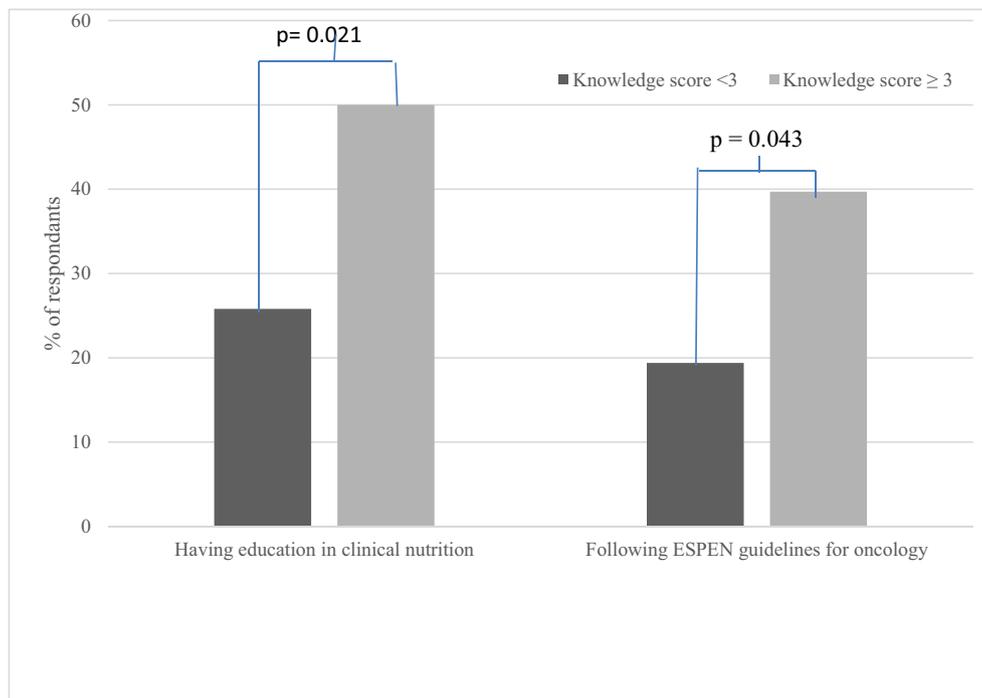


Fig. 1. Medical oncologists responses (%) to education parameters according to their knowledge scores.

In conclusion, the results of the present study emphasize the association between clinical nutrition education of medical oncologists and improved knowledge of assessing and treating malnutrition. Further work is required to determine if nutritional intervention would be used in routine clinical practice more frequently if the oncologists' lack of knowledge was resolved. In the field of clinical oncology, further research is required to fully determine the barriers to initiating nutrition therapy and to

understand the optimal content and delivery method of standardized education programmes, for medical oncologists.

Statement of authorship

All authors made substantial contributions to the conception and design of the review, acquisition of data, analysis and

interpretation of data, in drafting the article, revising it critically, and have approved the final version submitted.

Conflict of interest statement

Feza Kirbiyik and Emre Ozkan are employees of Nutricia Advanced Medical Nutrition Turkey.

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