

# Implementation of a case-based approach workshop for clinical dietitians

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## ABSTRACT

**Objective:** Case-based learning is recognized as an effective teaching approach; however, the implementation of case-based approach has not been well researched among graduate dietitians. The present study aims to implement a case-based approach in dietitians.

**Methods:** The study was carried out with 24 dietitians from 15 different centres. At first, the topic of clinical nutritional disorders was presented to all the participants, and then case-based learning program was implemented. A questionnaire was used to attain the participants' opinions of the workshop and a nutritional knowledge test was used to assess end-of-workshop performance.

**Results:** All the participants experienced case-based learning for the first time. The nutritional knowledge level of the dietitians increased statistically significantly in the post-intervention compared to the pre-intervention ( $p < 0.001$ ). In the survey, most dietitians reported positive feedback on the implementation of the case-based approach workshop.

**Conclusions:** This study shows that case-based approach can be an effective method in dietitian education and provides an alternative format for the implementation.

**Keywords:** case-based approach, dietitians, nutrition, education

## INTRODUCTION

The medical nutrition therapy process is a standardized process rather than standardized care because it emphasizes the relationship between the patient and the dietetic professional by using evidence-based dietetic practice. The medical nutrition therapy process consists of four steps: nutritional assessment, nutritional diagnosis, nutrition intervention, and nutrition monitoring. This process integrates scientific evidence and aims to move professionals from experience-based practice to evidence-based practice.<sup>1</sup> In this process, qualifications such as

knowledge of nutrition and dietetics, critical thinking, collaboration, skills and competencies, and evidence-based practices represent essential qualifications in dietetics professionals.<sup>2</sup> For optimal nutritional therapy to be achieved, in particular post-graduate training, should integrate dietitians' professional theories into clinical practice to develop their skills and competencies.

Case-based learning is an active learning strategy that consists of small-group teaching sessions in which the educator teaches the course content, presents a case, and then the group engages in open discussion of the

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case.<sup>3,4</sup> Active-learning approaches are gaining more and more popularity in medical education. The case-based approach provides a useful and effective method of training undergraduate students<sup>5,6</sup> and postgraduate health professionals, including physicians<sup>7</sup> and nurses<sup>8</sup> to improve their ability of critical thinking, and clinical problem-solving skills. This approach has been shown to promote the development of learning skills, and critical thinking in undergraduate nutrition education.<sup>9,10</sup> Considering the complexity of the field of nutrition and dietetics can benefit from learning methods integrated into clinical practice to improve the ability of dietitians in clinical settings to solve complex problems.

Although the effectiveness of case-based learning in health professional education has been confirmed in literature<sup>11</sup>, no studies have looked at its use in postgraduate nutrition and dietetics professionals. The present study addressed this gap, with the aim of investigating the case-based approach in educations of dietitians.

## METHOD

Dietitians working in clinical settings in six cities in the region were invited to the workshop. Dietitians were informed about the workshop a month in advance, and a reminder was sent out a few days before the workshop. The one-day weekend workshop was performed in March 2022 with a total of 24 clinical dietitians from 15 different centres. None of the participants had been exposed to the case-based learning method before.

### Content of the Workshop

The workshop design was planned according to the case-based learning literature<sup>12,13</sup> and the clinical and academic experience of the research team. The first session started with an introduction to the content of the workshop and the learning objectives, then the pre-test was applied. A brief introduction to nutritional disorders was then given to all participants by a physician in the hospital nutrition support team. In the second session, the participants were divided into three case-based approach groups

according to their clinical experience and the hospitals where they worked, and each case-based approach group was managed by a dietitian. Clinical cases were based on real patient cases from University Hospital. Case scenario examples included critically ill trauma patient, oncology patient, and geriatric patient (Figure 1). Each participant was given a file containing the tools and scoring that they could use to diagnose nutritional disorders of the cases. In the second session, the educational dietitian presented the case in stages, and after each stage, the participants discussed their approach to the case. The educational dietitian avoided intervening in the discussion of the participants' patient approaches. After the case sessions were over, the trainer in each group gradually analysed the dietitian's case and discussed approaches with the participants. After the cases were solved, the post-test was administered. Participants were given evaluation sheets and feedback forms to complete anonymously at the end of the workshop.

### Data Collection

The level of nutritional knowledge was measured using a 25-question test prepared by the research team. The questions were created with reference to the ESPEN (European Society for Clinical Nutrition and Metabolism) clinical guidelines, including the stages in the three case scenarios.<sup>14-20</sup> At the end of the workshop, the participants' feedback on the workshop was questioned on a seven-item 5-point Likert scale: 1= strongly disagree; 2=disagree; 3= neither agree nor disagree; 4=agree and 5= strongly agree. In addition, the participants were asked to evaluate the workshop out of 100 points. The primary outcome was the total clinical nutrition knowledge score. The second questionnaire assessed dietitians' perceptions and satisfaction with the case-based approach workshop using a five-point scale.

### Statistical Analyses

Statistical analyses were performed using SPSS (version 21; IBM) and GraphPad Prism (version 9). Normality was assessed by using the Shapiro-Wilk test and confirmed with visual inspection of the histogram. A paired t-test was used to compare pre- and post-tests. Significance was considered to be  $p < 0.05$ .

## RESULTS

The majority of the participants (83.4%) were female with a mean age of  $34.6 \pm 5.5$  years. Participants reported  $7.3 \pm 6.1$  years of clinical practice experience as dietitians. Test scores in the post-interventions group ( $62.8 \pm 10.7$ ) were significantly higher than in the pre-intervention group ( $51.8 \pm 13.2$ ), and the difference was statistically significant ( $p < 0.001$ ), as shown in Figure 2. All participants reported that they were satisfied with the organization and that they would recommend a case-based approach workshop

### Main Points

- There is limited data on the use and effectiveness of active learning strategies in undergraduate and postgraduate nutrition and dietetics education.
- This study highlights that education using case-based learning strategies is an effective and applicable method in nutrition and dietetics education.
- Future studies should focus on evaluating the effects of case-based learning approaches on different skills and abilities of dietitians.

	Case 1 Critically ill trauma patients	Case 2 Patients with cancer	Case 3 Patients with geriatric patients
STEP 1	A 58-year-old male patient was admitted to the emergency department for severe trauma with multiple vertebral fractures. A postoperative, mechanically ventilated critically ill patient was admitted to ICU.	A 47-year-old man. There was a pancreatic neuroendocrine tumor, and he underwent surgery 8 years ago. He was admitted to the hospital with hypoglycemic attacks, nausea and severe reduction in food intake.	A 67-year-old woman. The patient, who had an ischemic cerebrovascular event one year ago, had COVID-19 infection two months ago and was admitted to the ICU with respiratory distress. The patient, whose general condition improved, was admitted to the palliative care unit.
	Presentation of disease severity scores, neurologic and physiological assessment, nutrition-focused physical examination (anthropometric measurements, subcutaneous adipose tissue and muscle examination, edema and fluid balance).	Presentation of medical history, neurologic and physiological assessment, nutrition-focused physical examination (anthropometric measurements, subcutaneous adipose tissue and muscle examination, handgrip strength, edema or ascites, patient's general appearance, physical activity status).	Presentation of medical history, neurologic and physiological assessment, nutrition-focused physical examination (anthropometric measurements, subcutaneous adipose tissue and muscle examination, edema or ascites, physical activity status).
TASK	Assess the nutrition status of the case. Consider what further testing and findings are needed.	Assess the nutrition status of the case. Consider what further testing and findings are needed.	Assess the nutrition status of the case. Consider what further testing and findings are needed.
STEP 2	Pre-ICU nutritional history, biochemical tests and pharmacological treatments were presented.	Pre-hospital nutritional history, inspection of the patient for clinical symptoms of vitamin and mineral deficiencies, biochemical tests and medications were presented.	Pre-admission nutritional history, clinical evaluation of swallowing function, inspection of the patient for clinical symptoms of vitamin and mineral deficiencies, biochemical tests and medications were presented.
TASK	Consider of the suspected case. Plan the nutritional therapy of the case.	Consider of the suspected case. Plan the nutritional therapy of the case.	Consider of the suspected case. Plan the nutritional therapy of the case.
STEP 3	Approximately 50% of the planned nutritional therapy is given in the case evaluated on the 9th day in the ICU.	Approximately 30% of the planned nutritional therapy is given in the case evaluated on the 6th day in the hospital, and the patient refuses the use of oral nutrition supplement.	Wound infection developed in the patient on the 14th day in the palliative care unit.
	Presentation of disease severity scores, nutrition-focused physical examination finding, biochemical and physiological examination, pharmacological treatments.	Presentation of disease findings, nutrition-focused physical examination, biochemical and physiological examination and medications.	Presentation of disease findings, nutrition-focused physical examination, biochemical and physiological examination and medications.
TASK	Consider and revise the nutritional therapy of the case.	Consider and revise the nutritional therapy of the case.	Consider and revise the nutritional therapy of the case.

Figure 1. Outline of the scenario for each case

to dietitians in the future (Table 1). The participants' rating of the workshop was 91.2±7.9 out of 100 points. Table 2 presents the results of the feedback from the dietitians. The majority of the responses in the workshop were overwhelmingly positive.

## DISCUSSION

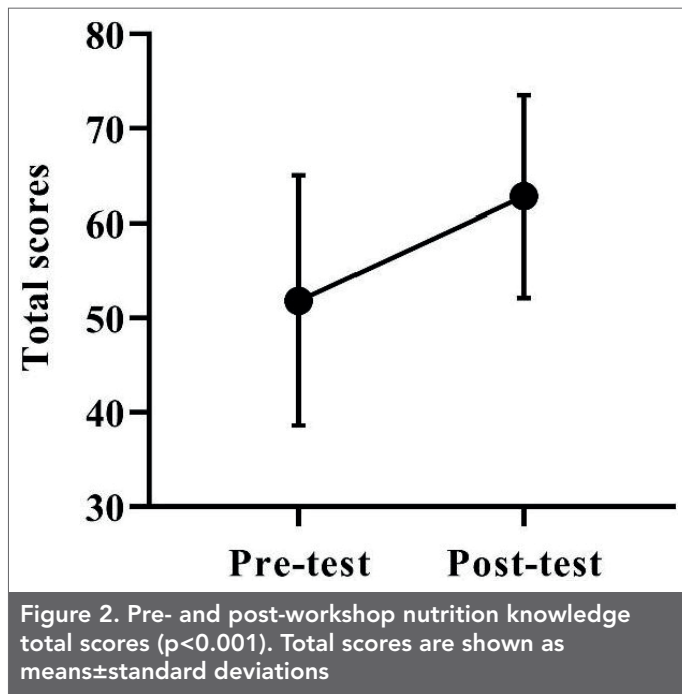
The present study investigated the implementation of the case-based approach in dietitians. To our knowledge, this

approach has not been studied in graduate dietitians. This study shows that the case-based approach is applicable to dietitians, has a positive effect on improving the nutrition knowledge level, and that dietitians are satisfied with the workshop.

Dietitians is specialized, in-depth field of nutritional science, research, and education, which distinguishes it from other disciplines. Recently, there has been an emphasis on the importance of alternative learning

	Case 1 Critically ill trauma patients	Case 2 Patients with cancer	Case 3 Patients with geriatric patients
STEP 4	Acute intestinal failure developed in the patient who was in ICU on the 40th day.	The patient, who complied with nutritional therapy, had upper gastrointestinal bleeding on the 29th day.	On the 25th day in the palliative care unit, the patient has decreased bowel movements and distension, and gastric residual volume is >650 ml. Acute mesenteric ischemia was confirmed and the patient's nutritional therapy was stopped for two days.
	Presentation of disease severity scores, nutrition-focused physical examination finding, biochemical and physiological examination, pharmacological treatments.	Presentation of nutrition-focused physical examination finding, biochemical and physiological examination, medications.	Presentation of nutrition-focused physical examination finding, biochemical and physiological examination, medications.
TASK	Assess the nutrition therapy of the case. Consider what further testing and findings are needed.	Assess the nutrition therapy of the case. Consider what further testing and findings are needed.	Consideration of suspected case. Revise the nutritional therapy of the case.
STEP 5	Presentation of disease findings, additional test results.	Presentation of disease findings, additional test results (endoscopy tests).	
TASK	Consideration of the suspected case. Revise the nutritional therapy of the case.	Consider of the suspected case. Revise the nutritional therapy of the case.	
STEP 6	On the 174th day in ICU, the spontaneously breathing patient will be discharged.	The patient, who had undergone gastrojejunostomy surgery ten days ago for a mass invading the pancreas, will be discharged.	The patient whose mesenteric ischemia has improved and has no infection will be discharged.
	Presentation of disease severity scores, nutrition-focused physical examination finding (anthropometric and muscle measurements, functional status), evaluation of swallowing function, biochemical and physiological examination, frailty status.	Presentation of nutrition-focused physical examination finding (anthropometric measurements, subcutaneous adipose tissue and muscle examination, handgrip strength, edema or ascites, patient's general appearance), frailty status.	Presentation of nutrition-focused physical examination finding (anthropometric measurements, subcutaneous adipose tissue and muscle examination, handgrip strength, edema or ascites, patient's general appearance), frailty status.
TASK	Consider of the suspected case. Consider what further testing and findings are needed.	Consider of the suspected case. Consider what further testing and findings are needed.	Consideration of the suspected case. Consider what further testing and findings are needed.
STEP 7	Presentation of food diary for the last three days and nutrition related problems.	Presentation of food diary for the last three days and nutrition and gastrointestinal related problems.	Presentation of energy, macro, and micronutrient intake for the last three days and nutrition and gastrointestinal related problems.
TASK	Consider nutritional therapy in discharge and discuss how often to assess the patient. Consider post-ICU follow-up procedures.	Consider nutritional therapy in discharge and discuss how often to assess the patient. Consider discharge follow-up procedures.	Consider nutritional therapy in discharge and discuss how often to assess the patient. Consider discharge follow-up procedures.

Figure 1. Continued



approaches that focus on increasing the effectiveness of dietetics students and post-graduate dietitians.<sup>21,22</sup> The case-based approach links theory to practice, through the application of knowledge to cases, and promotes the desired outcomes of optimal medical nutrition therapy process.<sup>9</sup> The results of the dietitians’ pre-and post-tests showed an improvement in their knowledge levels. These results were consistent with the findings from previous case-based learning studies of post-graduate health professionals<sup>23,24</sup> which showed that the case-based approach improved professionals’ knowledge levels.

We chose critically ill, oncology and geriatric patients as the topic in our study for two reasons. Firstly, as none of the participants had experience of the case-based learning method, we aimed to attract more attention from dietitians by preferring these complex cases which are often encountered in clinical practice. Secondly, as there is limited data on the case-based approach in graduate dietitians, we did not prefer to limit the cases in the workshop to a specific disease. Also, each case within the scope of our study consists of cases involving many

**Table 1. Survey questionnaire given to the dietitian after the workshop**

	Strongly agree	Agree
The workshop was generally well organized.	14 (58.3)	10 (41.7)
The topics and cases in the workshop were appropriate and sufficient.	7 (29.2)	17 (70.8)
The workshop provided new information that I can use in my daily clinical practice.	19 (79.2)	5 (20.8)
The course improved my theoretical knowledge.	12 (50.0)	12 (50.0)
The workshop achieved its objectives and learning objectives.	21 (87.5)	3 (12.5)
I was satisfied with the workshop organization.	23 (95.8)	1 (4.2)
I recommend this workshop to dietitians.	23 (95.8)	1 (4.2)

\* There is no participant who stated strongly disagree, disagree, and neither agree nor disagree.

**Table 2. Dietitian’s feedback on the workshop**

<i>‘Well first of all, I think the workshop was positive in all aspects. I hope that through these activities we can increase the effectiveness of nutritional therapy in many hospitals.’</i>
<i>‘Everything was very good in the training process; I hope it will be repeated.’</i>
<i>‘I think that repeating this workshop with different cases will be a good way to improve our patient approach.’</i>
<i>‘A comprehensive presentation with information about these diseases can be made before the case-based approach sessions.’</i>
<i>‘I would love to have this workshop held at regular intervals to improve our complex patient approaches and update our knowledge.’</i>
<i>‘More cases could be included in the workshop and the duration could be longer.’</i>
<i>‘It was very useful for me; I would love to have it again.’</i>

diseases/clinical conditions rather than covering a single disorder, as we may encounter in the clinic.

Similar to our findings, previous studies have shown that various health professionals have positive opinions of the case-based approach.<sup>25,26</sup> This positive feedback from the participants should encourage to educators to consider using the case-based approach in nutrition and dietetic subjects, as it is an alternative and effective way to improve the knowledge level of clinical dietitians. Although the majority of the feedback was positive, it was stated that a presentation with detailed information about the disease could be given before the case sessions. However, this negative feedback may have been given by a participant with inadequate theoretical knowledge, as no one had encountered this patient group in their care setting. Although the case-based approach is widely used in undergraduate health education and encourages the use of active-learning techniques, little research has been conducted on the implementation of case-based learning in the field of nutrition and dietetics.<sup>9</sup>

This study has several limitations to this study. Firstly, the short duration of the training and assessment of only short-term outcomes may have some influence on the research results. Another limitation is that the study evaluated the outcomes of workshop's using only quantitative methods. Both qualitative and quantitative methods are suggested to explore the effects of the data in depth and on a case-based approach. Thirdly, although the workshop content was prepared in the same format for the three groups, differences between teachers in communication and interpersonal skills may have influenced the results. Despite these limitations, this research was conducted with participants from various hospitals and is significant due to the limited data on a case-based approach in the area of graduate dietetic education.

## CONCLUSION

The case-based approach provides a viable approach to the organization of dietetic education. Future studies are needed to examine the effectiveness of the case-based approach in improving clinical dietitians' problem-solving abilities, clinical decision-making, and nutritional science knowledge and approaches.

**Ethical approval:** The study was approved by the Ethics Committee of Karadeniz Technical University (Number: 23618724-109).

**Informed consent:** Written informed consent was obtained from all patients who participated in this study.

**Author contributions:** Concept – H.U., M.K.; Design – H.U., M.K.; Supervision – H.U.; Resources – H.U.; Materials – H.U., M.K., U.B.; Data Collection and/or Processing – M.K., U.B., S.K.; Analysis and/or Interpretation – M.K., U.B.; Literature Search – M.K.; Writing Manuscript – H.U., M.K.; Critical Review – H.U., U.B., S.K.

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