

# Can integrative, complementary alternative medicine, and integrative and functional nutrition practices have a place in nutrition management?

Fatma Toygar<sup>1</sup>, Hande Bakırhan<sup>1,2</sup>

<sup>1</sup>Department of Nutrition and Dietetics, Graduate School of Health Sciences, Istanbul Medipol University, Istanbul, Turkey

<sup>2</sup>Department of Nutrition and Dietetics, Faculty of Health Sciences, Istanbul Medipol University, Istanbul, Turkey

## ABSTRACT

**Objectives:** This study aims to evaluate the attitudes of dietitians and dietitian candidates about integrative complementary and alternative medicine and integrative and functional nutrition.

**Methods:** This descriptive research was conducted with a self-reported online survey on dietitians and candidates (n = 390). Various questions were asked to evaluate the approach to functional medicine and nutrition, including the terms integrative and functional medicine nutrition therapy radial, medical history, and treatments used to treat chronic disease. The Attitude Towards Holistic Complementary and Alternative Medicine Scale evaluated participants' attitudes toward integrative complementary and alternative medicine.

**Results:** The majority of the participants know the terms functional medicine (95.4%) and integrative and functional nutrition (85.4%). The attitudes of dietitians towards complementary and alternative medicine were significantly more optimistic when compared to dietitian candidates (38.3±0.53 versus 34.5 ± 0.67, p = 0.002). When the application of the integrative and functional medicine nutrition therapy radial was examined, it was found that the majority of them always consider lifestyle (84.1%), allergens/intolerance (84.1%), negative thoughts and beliefs (80.0%), and system signs and symptoms (71.3%). Dietitians question digestive system health (94.9%), sleep and physical activity (94.4%), stress (93.4%), medication and supplement use (93.9%), and mood variability (86.9%) when taking the individual's anamnesis. The supplements that dietitians found beneficial were probiotic-prebiotic (91.4%), multivitamin-mineral (84.8%), and herbal (75.8%). Dietitian-approved diets were elimination diet (85.4%), FODMAP (80.8%), autoimmune protocol diet (72.2%), GAPS diet (70.7%), and ketogenic diet (69.2%), respectively.

**Conclusion:** It has been found that dietitians have positive attitudes toward integrative, complementary medicine, and functional nutrition.

**Keywords:** Integrative complementary alternative medicine, integrative and functional nutrition, functional nutrition practices, dietary approaches, dietitian

It is stated that chronic diseases are closely related to nutrition and lifestyle behaviors, and it is known that insufficient and unbalanced nutrition is associated with the development and prognosis of

various diseases.1 Unhealthy eating habits are at the root of many chronic non-communicable diseases. The integrative and functional nutrition approach emphasizes that some precautions should be taken before

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**Address for correspondence:** Hande Bakırhan. Department of Nutrition and Dietetics, Graduate School of Health Sciences, Istanbul Medipol University, Istanbul, Turkey. E-mail: handececici@hotmail.com

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disease reactions occur.<sup>1,2</sup> The integrative and functional approach to nutrition considers the interaction between genetic predispositions, microbiome, environmental factors, and lifestyle. It is recognized that this interaction leads to fundamental clinical imbalances and dysfunctions in physiological systems and the microbial ecosystem and may have a significant role in developing chronic diseases.<sup>2,3</sup> Evidence related to nutritional deficiencies, unhealthy eating behaviors, and chronic diseases highlights the importance of nutritional therapy management.<sup>2,3</sup> It is believed that along with focusing on the symptoms of the disease, adopting dietary interventions and approaches, which will positively affect health, will support being healthy by ensuring positive lifestyle development.

To standardize integrative and functional nutrition practices, medical nutrition therapy radial has been created to be used by health professionals for application in clinics.<sup>2,4</sup> Integrative and functional medical nutrition therapy radial was developed in 2011, updated in 2018, and is used by functional medicine dietitians registered with International Functional Medicine (IFM) to make individual evaluations and define integrative nutrition practices. Integrative and functional medical nutrition therapy focuses on five main areas: lifestyle, system signs and symptoms, biomarkers, metabolic pathways and networks, and core imbalances. It is interested in DNA helices and genetic variations that cause the development of radial disease, as well as pathogens, allergens, and environmental toxins.<sup>2,4</sup>

Integrative and functional medicine blends traditional medical care and complementary approaches by incorporating (mind-body) practices such as herbal supplements, yoga, chiropractic/osteopathic manipulation, and meditation.<sup>3</sup> Integrative medicine accepts the theory that the state of being healthy is more than the absence of disease. Functional and holistic approaches evaluate the individual as a whole. In particular, it is an approach that emphasizes the consideration of the individual as a whole through the evaluation of the body, mind, spirit, and the patient's support community as a complement to standard diagnostic evaluations.<sup>5,6</sup> This approach style adheres to a philosophy in which the individual has a role in the long-term goal of optimal health and healing.<sup>6</sup> In a study in which the orientation of dietitians to integrative medicine was examined, it was found that the vast majority of dietitians are still at the stage of adoption, awareness, and learning.<sup>6</sup> Whereas integrative complementary and alternative medicine and integrative

and functional nutrition issues are up-to-date in our country, there is no study evaluating the perspectives of dietitians and dietitian candidates on this issue. In addition, there is no information about the usage of integrative and functional medical nutrition therapy radial in the clinic. Besides, there is no data about the use of integrative and functional medical nutrition therapy radial in the clinic. This study was planned due to the lack of research evaluating the approach to integrative and functional nutrition and its use in the clinic. The study aims to evaluate the attitudes of dietitians and dietitian candidates about integrative complementary and alternative medicine and integrative and functional nutrition and their perspectives on using functional nutrition practices in application.

## METHODS

### *Sample Selection of the Research*

This observational and descriptive research was conducted with an online questionnaire on volunteer dietitians and candidates ( $n = 390$ ) aged between 18 and 64. The research population consists of dietitians who work as dietitians in universities, hospitals, or private clinics in different provinces in Türkiye and hold teaching positions in higher education institutions, as well as dietitian candidates who continue to study in the nutrition and dietetics departments of universities. The number of the study sample was calculated by the known sampling method. Since item scores are sequential variables and do not have a normal distribution, power analysis was performed in the Statistica 12 package program. According to the power analysis result ( $R = .08$ ,  $R_0 = .05$ , power = 80,  $\alpha = .05$ ), it has been decided that the data from 374 people is sufficient. The study was conducted with 198 dietitians and 192 dietitian candidates, with 390 participants. In order to be included in the study, it is necessary to be a volunteer dietitian and dietitian candidate (student) between the ages of 18-64 and to complete the data collection forms. Ethical approval of the study was obtained by decision No. 416 of the Non-Interventional Clinical Research Ethics Committee of Istanbul Medipol University dated 15.04.2021. The participants were informed about the study in detail and were included in the study by obtaining the consent of those who volunteered to participate. All procedures were carried out in accordance with ethical rules and the principles of the Declaration of Helsinki.

### *Data Collection and Evaluation*

The data were collected using an online survey technique based on self-reporting. The data collection process was conducted by sharing the online survey link (Google Forms) via social media and WhatsApp application groups of nutrition and dietetics students/dietitians. While collecting the data, the Google form's required questions feature was activated, and the survey could be approved and sent only after all the questions were answered.

### *Evaluation of functional medicine/approaches and clinical applications for integrative and functional nutrition*

For the purpose of evaluating functional medicine and integrative and functional nutrition approaches, various questions were asked consisting of the level of knowledge of functional and integrative medicine terms, the elements used when taking the individual's medical history (digestive system health, sleep, physical activity, stress, medication/supplement use, mood variability, sex life, environmental toxin exposure, Etc.) and the treatments used to treat chronic disease (use of supplementation, ketogenic diet, GAPS, elimination diet, autoimmune protocol diet, Etc.). In preparing survey questions, the works of Goodman *et al.* (2018) and Augustine *et al.* (2016) were used.<sup>3,7</sup>

### *Evaluation of the level of knowledge and application status for integrative and functional medicine nutrition therapy radial*

Integrative and functional medicine nutrition therapy radial has been developed as a conceptual framework to help integrative and functional medical nutrition therapy methods in practice. This radial was updated in 2018 by Kathie Swift, Diana Noland, and Elizabeth Redmond and is used by functional medicine dietitians in integrative nutrition practices to perform personal evaluations.<sup>2</sup> Survey questions related to this study were prepared according to the integrative and functional medicine nutrition therapy radial and the application situations, approaches, and application status of the participants were questioned.<sup>2</sup> This radial contains subcomponents such as lifestyle, nutrition, system signs/symptoms, physical signs/symptoms, metabolic pathways and networks, biomarkers, pathogens, allergens, intolerances, negative thoughts, and beliefs.<sup>2</sup>

### *Evaluation of the approach towards integrative complementary and alternative medicine*

The attitudes of the participants towards integrative complementary and alternative medicine were examined by the Attitude Towards Holistic Complementary and Alternative Medicine Scale that was developed in 2003 by Hyland *et al.* and whose reliability and Turkish validity were approved by Erci in 2007.<sup>8,9</sup> This scale aims to evaluate the knowledge level of health professionals about complementary medicine, the role of healing methods used in alternative treatment, spiritual beliefs and intuitions in the effectiveness of treatment. The scale consists of 11 items in total and is scored according to the 6-point Likert type (1 = I definitely agree, 6 = I definitely disagree). A minimum score of 11 and a maximum score of 66 can be obtained from the scale. Low scores indicate a positive attitude towards integrative complementary and alternative medicine.<sup>7,9</sup>

### **Statistical analysis of the data**

The analyses were performed in the SPSS 23.0 package program. Descriptive statistics of the study were evaluated by number, percentage, mean, and standard deviation. In statistical comparisons, bilateral comparisons were examined by the Student-t test or Wilcoxon, Mann Whitney-U tests according to parametric distribution conditions. Multiple comparisons were also examined according to the parametric distribution by ANOVA or Kruskal Wallis.

## **RESULTS**

Approaches of dietitians and dietitian candidates to functional medicine and integrative and functional nutrition are given in Table 1. The majority of the participants stated that they knew the terms functional medicine (95.4%) and integrative and functional nutrition (85.4%). It has been observed that dietitians have significantly more knowledge of functional medicine and integrative and functional nutrition terms than dietitians. (99.5% vs. 91.1%,  $p = 0.000$ ; 93.4% vs. 77.1%,  $p = 0.000$ , respectively).

The components that dietitians and dietitian candidates have questioned and will question when receiving the individual's medical history are given in Table 2. Dietitians often question the components of digestive system health (94.9%), sleep and physical activity (94.4%), stress (93.4%), medication and supplement use (93.9%), and mood variability (86.9%) when taking a medical history. Dietitian candidates expressed that they would question environmental

**Table 1. Approaches of dietitians and dietitian candidates to functional medicine, and integrative and functional nutrition**

Approaches to functional medicine, integrative and functional nutrition		Dietitian (n = 198)		Dietitian candidate (n = 192)		Total (n = 390)		P value
		n	%	n	%	n	%	
<i>Functional medicine term knowledge</i>	Yes	197	99.5	175	91.1	372	95.4	<b>0.000*</b>
	No	1	0.5	17	8.9	18	4.6	
<i>Integrative &amp; functional nutrition term knowledge</i>	Yes	185	93.4	148	77.1	333	85.4	<b>0.000*</b>
	No	13	6.6	44	22.9	57	14.6	
<i>The effectiveness of integrative &amp; functional nutrition and medicine techniques in chronic diseases</i>	Yes	158	79.8	139	72.4	297	76.2	0.217
	No	1	0.5	2	1.0	3	0.8	
	Indecisive	39	19.7	51	26.6	90	23.0	
<i>Integrative &amp; functional nutrition education</i>	Yes	72	36.4	22	11.5	94	24.1	<b>0.000*</b> 0.318
	No	126	63.6	170	88.5	296	75.9	
<i>Integrative &amp; functional medicine nutrition therapy radial consensus level</i>	Yes	85	42.9	88	45.8	173	44.4	0.524
	No	17	8.6	11	5.7	28	7.2	
	Indecisive	96	48.5	93	48.5	189	48.4	

toxin exposure, social support/relationships, sexual life, and bristol stool scale more when receiving a medical history than dietitians (71.4% vs. 48.5%,  $p = 0.000$ ; 81.8% vs. 72.7%,  $p = 0.033$ ; 40.1% vs. 23.2%,  $p = 0.000$ ; 83.3% vs. 68.2%,  $p = 0.000$ , respectively).

The attitudes of dietitians and dietitian candidates towards various dietary approaches are given in Table 3. The diets that dietitians consider applicable are elimination diet (85.4%), Fermentable Oligosaccharides, Disaccharides, Monosaccharides and Polyols (FODMAP) diet (80.8%), autoimmune protocol diet (72.2%), Gut and Psychology Syndrome (GAPS) diet (70.7%), ketogenic diet (69.2%), histamine intolerance diet (68.7%), low carbohydrate diet (65.2%) and mitochondrial nutrition (52.5%), respectively. When the applicability of detox therapies and aromatherapy is examined, dietitians prefer to apply them at a higher rate compared to dietitian candidates (40.9% vs. 36.5%,  $p = 0.021$ ; 66.7% vs. 48.4%,  $p = 0.000$ , respectively).

The attitudes of dietitians and dietitian candidates towards various supplementation and therapy methods are given in Table 4. The supplements that dietitians find applicable are probiotic-prebiotic use (91.4%), multivitamin-mineral (84.8%), herbal supplement (75.8%), and fatty acids supplement (73.7%),

respectively. The use of mind-body therapies, detox therapies, and aromatherapy (41.9% vs. 30.2%,  $p = 0.000$ ; 40.9% vs. 36.5%  $p = 0.021$ ; 66.7% vs. 48.4%,  $p = 0.000$ , respectively) is accepted at a higher level by dietitians.

The participants' attitudes towards using the integrative functional medical nutrition therapy radial when evaluating the nutritional status of the individuals are given in Table 5. The majority of the participants always intend to use lifestyle (84.1%), allergens and intolerances (84.1%), negative thoughts and beliefs (80.0%), system signs and symptoms (71.3%), and pathogens (59.5%) from the radial components of integrative and functional medical nutrition therapy when evaluating the nutritional status of individuals.

The usefulness ranking of integrative and functional medicine nutrition therapy radial components by dietitians and dietitian candidates is shown in Figure 1. Dietitians evaluated lifestyle (55.1%), systemic signs and symptoms (47.0%), core imbalances (35.4%), and metabolic pathways/networks (33.9%) as the first two components of integrative and functional medical nutrition therapy radial components when ranking usefulness.

The participants' attitudes towards integrative complementary and alternative medicine are given in

**Table 2. Components that dietitians and dietician candidates question while taking anamnesis**

Components of anamnesis		Dietitian (n = 198)		Dietitian candidate (n = 192)		Total (n = 390)		P value
		n	%	n	%	n	%	
<i>Sleep</i>	No	11	5.6	12	6.3	23	5.9	0.771
	Yes	187	94.4	180	93.8	367	94.1	
<i>Stress</i>	No	13	6.6	11	5.7	24	6.2	0.731
	Yes	185	93.4	181	94.3	366	93.8	
<i>Environmental toxin exposure</i>	No	102	51.5	55	28.6	157	40.3	<b>0.000*</b>
	Yes	96	48.5	137	71.4	233	59.7	
<i>Spirituality</i>	No	111	56.1	74	38.5	185	47.4	<b>0.001*</b>
	Yes	87	43.9	118	61.5	205	52.6	
<i>Social support/relationships</i>	No	54	27.3	35	18.2	89	22.8	<b>0.033*</b>
	Yes	144	72.7	157	81.8	301	77.2	
<i>Mood variability</i>	No	26	13.1	19	9.9	45	11.5	0.317
	Yes	172	86.9	173	90.1	345	88.5	
<i>Physical activity</i>	No	11	5.6	11	5.7	22	5.6	0.941
	Yes	187	94.4	181	94.3	368	94.4	
<i>Culture &amp; traditions</i>	No	42	21.2	27	14.1	69	17.7	0.064
	Yes	156	78.8	165	85.9	321	82.3	
<i>Sunbathing</i>	No	90	45.5	64	33.3	154	39.5	<b>0.014*</b>
	Yes	108	54.5	128	66.7	236	60.5	
<i>Sexual life</i>	No	152	76.8	115	59.9	267	68.5	<b>0.000*</b>
	Yes	46	23.2	77	40.1	123	31.5	
<i>Medication &amp; supplement use</i>	No	12	6.1	14	7.3	26	6.7	0.626
	Yes	186	93.9	178	92.7	364	93.3	
<i>Digestive system health</i>	No	10	5.1	12	6.3	22	5.6	0.608
	Yes	188	94.9	180	93.8	368	94.4	
<i>Bristol stool scale (stool physiology)</i>	No	63	31.8	32	16.7	95	24.4	<b>0.000*</b>
	Yes	135	68.2	160	83.3	295	75.6	

Table 6. The attitudes of dietitians towards integrative complementary and alternative medicine are significantly more optimistic when compared to dietitian candidates ( $38.3 \pm 0.53$  versus  $34.5 \pm 0.67$ ,  $p = 0.002$ ).

## DISCUSSION

With the developing technology and various approaches, health has become a subject that includes integrative practices together with modern medicine.<sup>10</sup> Traditional medicine, which is one of these practices, is the use of information to be obtained in the treatment of diseases based on beliefs that society has passed from generation to generation, values, and other elements of the culture.<sup>11</sup> It is often preferred by an extensive range of people due to its variety of applications and the fact that it has been used since old times.<sup>10</sup> Integrative and functional medical nutrition therapy, on the

other hand, is used to describe the practice of medical nutrition therapy, which includes both integrative and functional medicine principles and traditional nutrition practices.<sup>4</sup> Integrative medicine accepts the theory that health is dynamic and is more than just the presence or absence of disease.<sup>5</sup> Functional medicine, however, is an approach that focuses on the progression of a patient's symptoms and considers the patient's history, physiological condition, genetics, lifestyle, and environmental interaction network, which contributes to his physical and mental functional state.<sup>12</sup> With the idea that disease symptoms may be caused by organ functional impairment, functional medicine directs the detection and prevention of diseases by focusing on symptoms.<sup>13</sup> Health workers and patients have started to adopt various methods for the treatment of chronic diseases. Integrative medicine and functional nutrition practitioners interpret the patient's genetic and biochemical structure by assessing the patient's

**Table 3. Attitudes of dietitians and dietitian candidates towards various dietary approaches**

Dietary approaches		Dietitian (n = 198)		Dietitian candidate (n = 192)		Total (n = 390)		P value
		n	%	n	%	n	%	
<i>Elimination diet</i>	Unsuitable	16	8.1	9	4.7	25	6.4	<b>0.000*</b>
	Suitable	169	85.4	131	68.2	300	76.9	
	Indecisive	13	6.5	52	27.1	65	16.6	
<i>Low carbohydrate diet</i>	Unsuitable	61	30.8	70	36.5	131	33.6	0.250
	Suitable	129	65.2	96	50.0	225	57.7	
	Indecisive	8	4.0	26	13.5	34	8.7	
<i>Low FODMAP diet</i>	Unsuitable	22	11.1	24	12.5	46	11.8	<b>0.000*</b>
	Suitable	160	80.8	96	50.0	256	65.6	
	Indecisive	16	8.1	72	37.5	88	22.6	
<i>GAPS diet</i>	Unsuitable	34	17.2	20	10.4	54	13.8	<b>0.000*</b>
	Suitable	140	70.7	91	47.4	231	59.2	
	Indecisive	24	12.1	81	42.2	105	26.9	
<i>Ketogenic diet</i>	Unsuitable	54	27.3	42	21.9	96	24.6	<b>0.000*</b>
	Suitable	137	69.2	116	60.4	253	64.9	
	Indecisive	7	3.5	34	17.8	41	10.5	
<i>Autoimmune protocol diet</i>	Unsuitable	17	8.6	11	5.7	28	7.2	<b>0.000*</b>
	Suitable	143	72.2	101	52.6	244	62.6	
	Indecisive	38	19.2	80	41.6	118	30.2	
<i>Mitochondrial nutrition</i>	Unsuitable	40	20.2	19	9.9	59	15.1	<b>0.000*</b>
	Suitable	104	52.5	64	33.3	168	43.1	
	Indecisive	54	27.2	109	56.8	163	41.8	
<i>Histamine intolerance diet</i>	Unsuitable	19	9.6	13	6.8	32	8.2	<b>0.000*</b>
	Suitable	136	68.7	88	45.8	224	57.4	
	Indecisive	43	21.7	91	47.4	134	34.4	

health history for treatment effectiveness. In addition, the view that the imbalance of the patient's biological, psychological, social, and environmental conditions can affect the disease's development may have led to the practice of integrative and functional nutrition.<sup>14</sup> In the study conducted by Jong *et al.* on doctors (n = 276); 52.0% of the participants reported that they had heard of integrative medicine before, 44.0% considered integrative medicine as a new approach to health care to be very important, and 40.0% had an unbiased opinion about integrative medicine.<sup>15</sup> In this study, a large majority of the participants declared that they knew the terms functional medicine (95.4%) and integrative and functional nutrition (85.4%). It has been observed that dietitians have more knowledge of the terms related to functional medicine, integrative, and functional nutrition and have received more education than dietitian candidates about it. Dietitians may also be doing more research on these areas in order to be able to answer questions from their patients about functional and integrative medicine while they are actively working in the field. According to Flaherty *et*

*al.*, in their studies conducted with medical students (n = 308), they concluded that physicians with integrative medicine knowledge provide better services and physicians should inform patients about the usage of herbal methods.<sup>16</sup>

Integrative and functional medical nutrition therapy focuses on assisting dietitians in providing individualized nutritional care by addressing five areas that define a vital assessment in integrative and functional nutrition. Kohut *et al.* (2014) reported that in their study (n = 103) in which they evaluated the attitude of dietitians towards integrative and functional medical nutrition therapy radial, 47.0% of dietitians reported using radial in their professional practices, 39.8% reported using lifestyle area for evaluation, 36.8% reported using system signs and symptoms, 20.3% reported that they always use biomarkers and core imbalances. It has been reported that the usage of radial is more as the working time in the profession increases.<sup>4</sup> In this study, dietitians also evaluated lifestyle (55.1%), system signs and symptoms (47.0%), core imbalances (35.4%) from radial components of

**Table 4.** Attitudes of dietitians and dietician candidates towards various therapy methods and supplementation

Therapy methods & supplementation		Dietitian (n = 198)		Dietitian candidate (n = 192)		Total (n = 390)		P value
		n	%	n	%	n	%	
<i>Use of multivitamin-mineral</i>	Unsuitable	12	6.1	17	8.9	29	7.4	0.125
	Suitable	168	84.8	147	76.6	315	80.8	
	Indecisive	18	9.1	28	14.5	46	11.8	
<i>Use of probiotic-prebiotic</i>	Unsuitable	6	3.0	13	6.7	19	4.9	0.582
	Suitable	181	91.4	156	81.3	337	86.4	
	Indecisive	11	5.6	23	12.0	34	8.7	
<i>Use of fatty acids</i>	Unsuitable	24	12.1	18	9.4	42	10.8	<b>0.024*</b>
	Suitable	146	73.7	124	64.6	270	69.2	
	Indecisive	28	14.1	50	26.0	78	20.0	
<i>Use of amino acids</i>	Unsuitable	38	19.2	24	12.5	62	15.9	<b>0.001*</b>
	Suitable	132	66.7	111	57.8	243	62.3	
	Indecisive	28	14.1	57	29.7	85	21.8	
<i>Use of herbal supplements</i>	Unsuitable	34	17.2	12	6.3	46	11.8	<b>0.000*</b>
	Suitable	150	75.8	137	71.4	287	73.6	
	Indecisive	14	7.0	43.0	22.3	57	14.6	
<i>Use of digestive enzymes and stomach acid (betaine-HCl)</i>	Unsuitable	55	27.8	24	12.5	79	20.3	<b>0.000*</b>
	Suitable	103	52.0	79	41.1	182	46.7	
	Indecisive	40	20.2	89	46.4	129	33.0	
<i>Functional foods</i>	Unsuitable	7	3.5	11	5.7	18	4.6	0.877
	Suitable	176	88.9	156	81.3	332	85.1	
	Indecisive	15	7.6	25	13.0	40	10.3	
<i>Mind-body therapy</i>	Unsuitable	43	21.7	21	10.9	64	16.4	<b>0.000*</b>
	Suitable	83	41.9	58	30.2	141	36.2	
	Indecisive	72	36.4	113	58.8	185	47.4	
<i>Detox therapies</i>	Unsuitable	84	42.4	66	34.4	150	38.5	<b>0.021*</b>
	Suitable	81	40.9	70	36.5	151	38.7	
	Indecisive	33	16.7	56	29.1	99	22.8	
<i>Aromatherapy</i>	Unsuitable	27	13.6	25	13.0	52	13.3	<b>0.000*</b>
	Suitable	132	66.7	93	48.4	225	57.7	
	Indecisive	39	19.7	74	38.6	113	29.0	
<i>Breathing techniques therapy</i>	Unsuitable	174	87.9	182	94.8	356	91.3	<b>0.016*</b>
	Suitable	24	12.1	10	5.2	34	8.7	
<i>Meditation/yoga</i>	Unsuitable	175	88.4	177	92.2	352	90.3	0.205
	Suitable	23	11.6	15	7.8	38	9.7	

integrative and functional medical nutrition therapy as essential components in the usefulness ranking, and they always intend to use lifestyle (84.1%), allergens and intolerances (84.1%), negative thoughts and beliefs (80.0%) and system signs/symptoms (71.3%) among radial components when evaluating the nutritional status of individuals. The positive attitudes of dietitians towards integrative and functional nutrition practices, which are innovative approaches, may steer the nutrition strategies to be applied in the future. Nevertheless, conducting more comprehensive detailed

research in this area may encourage clinicians to be more effective in managing the disease with holistic assessment opportunities by addressing the imbalance of functional impairments and social/environmental conditions of biological, physiological, and psychological factors that may be disease factors.

Complementary medicine treatment practices usually contain acupuncture, physiotherapy, ayurveda, yoga, nutritional supplements, and nutrition practices.<sup>17</sup> Detoxification programs, herbal and homeopathic supplements, different dietary approaches (Mediterra-

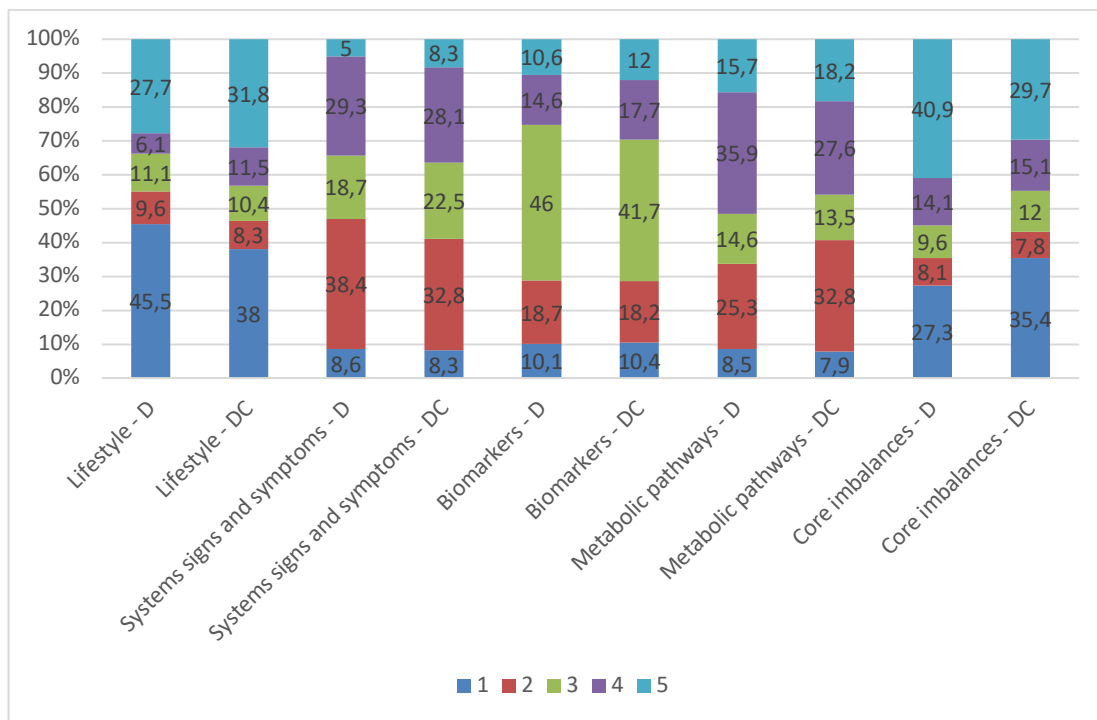
**Table 5. Approaches of dietitians and dietitian candidates to use integrative and functional medicine nutrition therapy radial while evaluating nutritional status**

Integrative functional medicine nutrition therapy radial	Dietitian (n = 198)		Dietitian candidate (n = 192)		Total (n = 390)		P value	
	n	%	n	%	n	%		
<i>Lifestyle</i>	Never	2	1.0	1	0.5	3	0.8	0.970
	Sometimes	20	10.1	29	15.1	49	12.6	
	Every time	175	88.4	153	79.7	328	84.1	
	No idea	1	0.5	9	4.7	10	2.5	
<i>System signs and symptoms</i>	Never	2	1.0	2	1.0	4	1.0	0.103
	Sometimes	45	22.7	37	19.3	82	21.0	
	Every time	144	72.7	134	69.8	278	71.3	
	No idea	7	3.6	19	9.9	26	6.7	
<i>Biomarkers</i>	Never	9	4.5	5	2.6	14	3.6	0.086
	Sometimes	74	37.4	60	31.3	134	34.4	
	Every time	93	47.0	96	50.0	189	48.5	
	No idea	22	11.1	31	16.1	53	13.5	
<i>Metabolic pathways/network</i>	Never	4	2.0	3	1.6	7	1.8	0.252
	Sometimes	57	28.8	56	29.2	113	29.0	
	Every time	104	52.5	90	46.9	194	49.7	
	No idea	33	16.7	43	22.3	76	19.5	
<i>Core imbalances</i>	Never	10	5.1	4	2.1	14	3.6	0.496
	Sometimes	73	36.9	54	28.1	127	32.6	
	Every time	86	43.4	95	49.5	181	46.4	
	No idea	29	14.6	39	20.3	68	17.4	
<i>Pathogens</i>	Never	7	3.5	6	3.1	13	3.3	0.065
	Sometimes	57	28.8	58	30.2	115	29.5	
	Every time	121	61.1	111	57.8	232	59.5	
	No idea	13	6.6	17	8.9	30	7.7	
<i>Negative thoughts and beliefs</i>	Never	1	0.5	4	2.1	5	1.3	0.811
	Sometimes	31	15.7	30	15.6	61	15.6	
	Every time	164	82.8	148	77.1	312	80.0	
	No idea	2	1.0	10	5.2	12	3.1	
<i>Allergens/intolerance</i>	Never	2	1.0	1	0.5	3	0.7	0.820
	Sometimes	20	10.1	29	15.1	49	12.6	
	Every time	175	88.4	153	79.7	328	84.1	
	No idea	1	0.5	9	4.7	10	2.6	

nean diet, DASH, Intervention for Neurodegenerative Delay Diet), and nutritional supplements are used in nutrition applications.<sup>18</sup> Integrative, complementary, and functional medicine draws particular attention to healthy eating habits, which are the basis of healthy lifestyle behaviors. It especially recommends reducing refined carbohydrates and increasing the intake of vegetables, fruits, and various functional nutrients rich in pulp and antioxidants.<sup>18</sup> The GAPS diet protocol, specially designed to heal the human body from the root, starting from the digestive system, has been used for twenty years to cure mental and physical

diseases. It is recommended that health practitioners and researchers use the GAPS nutrition protocol in their practices in order to prevent intestinal dysbiosis, which is shown to be the cause of mental and physical diseases.<sup>19</sup> In this research, the main diets that dietitians consider applicable are the elimination diet (85.4%), low FODMAP diet (80.8%), autoimmune protocol diet (72.2%), and GAPS diet (70.7%), and the supplements they find applicable are probiotic-prebiotic (91.4%), multivitamin-mineral (84.8%) and plant-based supplements (75.8%). Although there is an opinion that the low FODMAP diet, which aims





**Figure 1.** Ranking the usefulness of the radial components of integrative and functional medicine nutrition therapy. The numbers in the chart are ordered from the most useful to the least useful (from 1 to 5). It is given as an abbreviation “D: Dietitian, DC: Dietitian Candidate”

to find a balance between symptomatic improvements without potential negative effects on dietary restriction, can become applicable in primary care therapy, the clinical use of this diet is still limited.<sup>20,21</sup> Similarly, the application of elimination diets in the clinic is not very common, and the training of health professionals on the application of elimination diets is another phenomenon that guides future applications.<sup>22</sup> Despite the available data, such current dietary approaches are still considered very new and necessary applications for development and improvement. It will be useful to clarify dietary approaches with developments related to different areas such as pathophysiological aspects, clinical indications, and application strategies.<sup>21</sup>

In the management of current disease-specific dietary approaches, this relationship needs to be examined in detail to develop applicable models in the clinic.<sup>22</sup> The dietitian who will be an integrative, complementary, and functional nutrition practitioner must be trained and competent in the use of functional nutrients as well as other integrative treatment methods. It is essential to make the necessary improvements in this area, since the lack of knowledge, experience, financial support, and management support are the main obstacles to implementing complementary medicine activities. In order to improve the skills of healthcare providers to guide patients in the use of complementary medicine, these issues should be addressed in

**Table 6.** Attitudes of participants towards integrative complementary and alternative medicine

General characteristics		Attitude towards Holistic Complementary and Alternative Medicine Scale	P value
		(Mean ± SD)	
Current situation	Dietitian	38.3 ± 0.53	0.002*
	Dietitian Candidate	34.5 ± 0.67	
Professional Year	< 1	34.5 ± 0.65	0.001*
	1-5	37.4 ± 0.50	
	6-10	37.2 ± 0.50	
	> 10	38.7 ± 0.49	

future research.<sup>17</sup> Although more evidence is needed, it is thought that the inclusion of omics, which has emerged as an innovative holistic scope to provide a more comprehensive view of the molecular and physiological phenomena underlying diseases, in medical treatment, may be useful not only for disease risk prediction or early diagnosis but also to guide disease prognosis and develop specialized dietary therapies.<sup>23</sup>

In today's world, integrative complementary and alternative medicine is a new model formed by the integration of traditional Chinese medicine with classical medicine. There is increasing interest and increasing evidence that the integration of classical medicine with traditional, complementary, and alternative medicine can be helpful in the prevention and treatment of infectious and chronic diseases related to behavior and lifestyle.<sup>24,25</sup> The growing popularity of integrative medicine, which considers that true healing requires nourishment of the mind and soul in addition to a healthy body, is based on its effort to improve patient care and reduce pain. This approach to health care involves the patient's mind, spirituality and sense of community in the healing process.<sup>26</sup> The National Center for Complementary Integrative Health divides complementary and integrative approaches into three categories: mind and body practices (massage therapy, meditation, yoga, acupuncture, chiropractic/osteopathic manipulation, hypnotherapy, TaiChi, qi-gong, healing touch, and relaxation exercises); natural products (herbal remedies, botanicals, vitamins, minerals, probiotics, and other nutritional supplements); other complementary approaches (indigenous healing practices, Chinese medicine, Ayurvedic medicine, homeopathy, and naturopathy).<sup>18</sup> A large majority (88.0%) of the World Health Organization member states (170 countries) have officially adopted integrative complementary and alternative medicine by developing policies, laws, regulations, and programs.<sup>27,28</sup> The use of integrative complementary and alternative medicine practices varies significantly across Western countries, ranging from 0.3% to 86% in European countries.<sup>24</sup> In a study examining the attitudes of health care providers and health managers working in oncology (n = 159), 68.4% of the participants stated that their organizations practice complementary medicine in oncology or anticipate applying it, while about 86.8% of the participants declared that complementary medicine is an essential complement for oncological treatment.<sup>17</sup> With the increasing interest in integrative complementary and alternative medicine practices in Turkey, new regulations have started to

be made, thus paving the way for applications to be carried out by clinicians who have received the necessary training in health institutions.<sup>29</sup> It is emphasized that health professionals do not have sufficient knowledge about these practices, and health professionals are expected to have knowledge about integrative, complementary, and alternative medicine practices, understand their benefits and possible risks, and exhibit a positive attitude towards the practices.<sup>29</sup> There is not enough data in the literature on the attitudes of health workers.<sup>29</sup> When focusing on integrative medicine studies, in a study (n = 794) in which the attitudes of health professionals were examined, the Holistic Complementary and Alternative Health Questionnaire score of participants was found to be  $28.7 \pm 5.62$ .<sup>29</sup> A study conducted with Turkish physicians (n = 103) found that the average Holistic Complementary and Alternative Health Questionnaire score of participants was  $34.9 \pm 4.65$ , and their attitudes towards holistic complementary and alternative medicine were moderately positive.<sup>30</sup> Similarly, in this study, dietitians' attitudes towards integrative complementary and alternative medicine were moderately positive ( $38.3 \pm 0.53$  points). Displaying a positive attitude towards integrative complementary and alternative medicine may increase the number of clinicians being/ to be trained in this field in health institutions and may encourage clinicians to be more effective in disease management with holistic evaluation opportunities. Since there is no standardized national system for the certification of practitioners, most health professionals should be committed to pursuing the personal development of integrative medical knowledge and skills.<sup>6</sup>

### Limitations

This study has several limitations. The relatively limited number of samples may be a limitation. It is not possible to make precise inferences because it was based on the statements of the participants, and the evaluation of dietitians' use of these approaches in the clinic was not made observationally. Studies with a larger sample size and involving all health clinicians are needed.

### CONCLUSION

It has been found that dietitians and dietitian candidates have positive attitudes towards integrative and functional medicine. The majority of the participants consider using integrative and functional medicine

nutrition therapy radial components. It is thought that this positive attitude may guide clinical practices.

### *Conflict of Interest*

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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### *Ethical Approval*

The protocol of the study was approved by the Medical Ethics Committee of İstanbul Medipol University İstanbul, Turkey. (Decision number: 416, date: 15.04.2021).

### *Authors' Contribution*

Study Conception: HB, FT; Study Design: HB, FT; Supervision: HB; Funding: FT; Materials: FT; Data Collection and/or Processing: FT, HB; Analysis and/or Data Interpretation: HB; Literature Review: HB; Critical Review: HB, FT; Manuscript preparing: HB.

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