

Ethical considerations in dietary supplement consumption behaviors

Consideraciones éticas en los comportamientos de consumo de suplementos dietéticos

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Abstract

Objective: This study examines the dietary supplement consumption behaviors and ethical attitudes aiming to contribute to a more conscientious and ethical consumption culture within the health industry. **Methods:** A descriptive cross-sectional study was conducted from October to December 2019 with a sample size of 384 individuals aged 20-65 in Turkey. Analysis was performed using the Statistical Package for the Social Sciences 22.0, including exploratory factor analysis and statistical tests. **Results:** About 55.5% of participants used dietary supplements, with Vitamin D, Vitamin B, Omega-3, and multivitamin complexes being common. Ethical concerns included inadequate label information, price discrepancies, and legal oversight issues. Statistically significant differences were observed in gender regarding the dimensions of meeting needs and promotion, in age regarding the legal dimension, and in the reasons for visiting a dietitian in the other four dimensions, except for the legal dimension ($p < 0.05$). **Conclusions:** This study revealed that factors such as gender, age, and dietary preferences influence individuals' supplement choices. Men were found to be more inclined toward the meeting needs and promotion aspects of dietary supplement purchases than women. In addition, age group and dietary preferences were found to affect the sensitivity of individuals in their supplement choices.

Keywords: Dietary supplements. Consumer behavior. Health ethics. Supplement regulation.

Resumen

Objetivo: Examinar los comportamientos de consumo de suplementos dietéticos y las actitudes éticas con el objetivo de contribuir a una cultura de consumo más consciente y ética dentro de la industria de la salud. **Métodos:** Se realizó un estudio descriptivo transversal de octubre a diciembre de 2019 con un tamaño de muestra de 384 individuos de entre 20 y 65 años, en Turquía. El análisis se realizó utilizando SPSS 22.0, incluido el análisis factorial exploratorio y las pruebas estadísticas. **Resultados:** El 55.5% de los participantes utilizaron suplementos dietéticos, siendo comunes la vitamina D, la vitamina B, los ácidos grasos omega-3 y los complejos multivitamínicos. Las preocupaciones éticas incluían información inadecuada en las etiquetas, discrepancias en los precios y problemas de supervisión legal. Se observaron diferencias estadísticamente significativas en el sexo en relación con las dimensiones de satisfacción de las necesidades y promoción, en la edad en relación con la dimensión legal, y en los motivos para acudir al dietista en las otras cuatro dimensiones, excepto en la dimensión legal ($p < 0.05$). **Conclusiones:** Este estudio reveló que factores como el sexo, la edad y las preferencias dietéticas influyen en la elección de suplementos por parte de los individuos. Se observó que los hombres se inclinaban más que las mujeres por los aspectos de satisfacción de las necesidades y promoción de la compra de suplementos dietéticos. Además, se encontró que el grupo de edad y las preferencias dietéticas influían en la sensibilidad de los individuos en el momento de elegir suplementos.

Palabras clave: Suplementos dietéticos. Comportamiento del consumidor. Ética de la salud. Regulación de suplementos.

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Introduction

Today, people in pursuit of healthy living and longevity are turning to various food supplements to support their diets. Food supplements are generally defined as products containing nutrients such as vitamins, minerals, amino acids, herbs, or herbal dietary ingredients. The use of these products has increased due to successful sales strategies, advertisements, and the widespread use of the internet.¹ However, the ethical use of food supplements is an important issue in terms of public health and safety. One area of particular focus for ethical questions about food supplements is their impact on intake behavior. Factors such as consumers' reasons for using food supplements, their level of trust in these products, and their reactions to health claims are important factors shaping consumer purchasing behavior. Therefore, ethically evaluating the purchasing behavior of food supplements is an important step that can affect both the health and well-being of individuals and the overall health of society. In this context, food safety and ethical principles should be active at every stage of agriculture and food systems.²

Based on this idea, the aim of this study was to determine the intake behaviors of individuals taking food supplements and to examine their ethical attitudes in this field. The results of this study aim to contribute to the creation of a more conscious and ethical consumption culture in the health industry by shedding light on the ethical evaluations of consumers regarding the use of food supplements. In addition, the results of this research will be a valuable source of information for health policy makers and marketing experts.

Conceptual framework

Food supplement use in other countries

Food supplements are carbohydrates, protein, fat, minerals, vitamins, herbs, and nectars. Many studies have shown that the characteristics of people who use food supplements are that they tend to be older, have a low body mass index, exercise, do not smoke, and have a high level of education.³⁻⁹ and are more preferred by those who strongly believe in the importance of treating certain diseases and athletes.¹⁰⁻¹²

In the last 30 years, there has been a great increase in the types and sales of food supplements. The Ministry of Food, Agriculture, and Livestock is the main

regulator in Turkey, and the total sales of food supplements in 2020 are estimated to be 885 million TL. The National Health and Nutrition Examination Survey began to investigate motivations for the use of food supplements for the first time in 2007. The purpose of this analysis was to examine the types of food used as well as the motivations for food supplement use by adults.¹³ A search of the Web of Science database with the keyword "Dietary Supplements" yielded 2,666 publications. The distribution of these publications by country is shown in the figure below.

Figure 1 shows that 1,320 of the 2,666 studies on dietary supplements were published in the USA. This is followed by the UK with 154 publications, Germany with 111 publications, Australia with 107 publications, and Italy with 98 publications.

As a result of the search of the Web of Science database on food supplements, the top 10 most cited studies were analyzed. Among these studies, the study "Standard methods for the determination of antioxidant capacity and phenolics in foods and dietary supplements" by Prior et al. in 2005 ranks first with 2579 citations. This is followed by "Cellular antioxidant activity assay for evaluating antioxidants, foods and dietary supplements" by Wolfe and Liu in 2007, with 571 citations, and "Adverse cardiovascular and central nervous system events associated with dietary supplements containing ephedra alkaloids" by Haller and Benowitz in 2000, with 557 citations.

In Turkey, in a study conducted by Çoşkun and Turan in Istanbul on 1000 people representing four different sociocultural groups, 34.6% reported using dietary supplements. In 2017, in the study on the use of food supplements published by the Food Supplement and Nutrition Association (GTBD) and Ipsos Social Research Institute, the rate of use of food supplements was reported as 13% after a survey of 1750 people over the age of 18 with telephone support in 81 provinces. In 2019, in the study titled "Evaluation of Food Supplement Intake Behaviors and Related Factors of Individuals Between the Ages of 18-65 Applying to the Family Health Center" conducted by Karadağ, 32.3% of the participants reported that they took supplements.

Ethical dimension of food supplements use behaviors

Ethics are principles, values, and standards that define how individuals behave correctly toward other

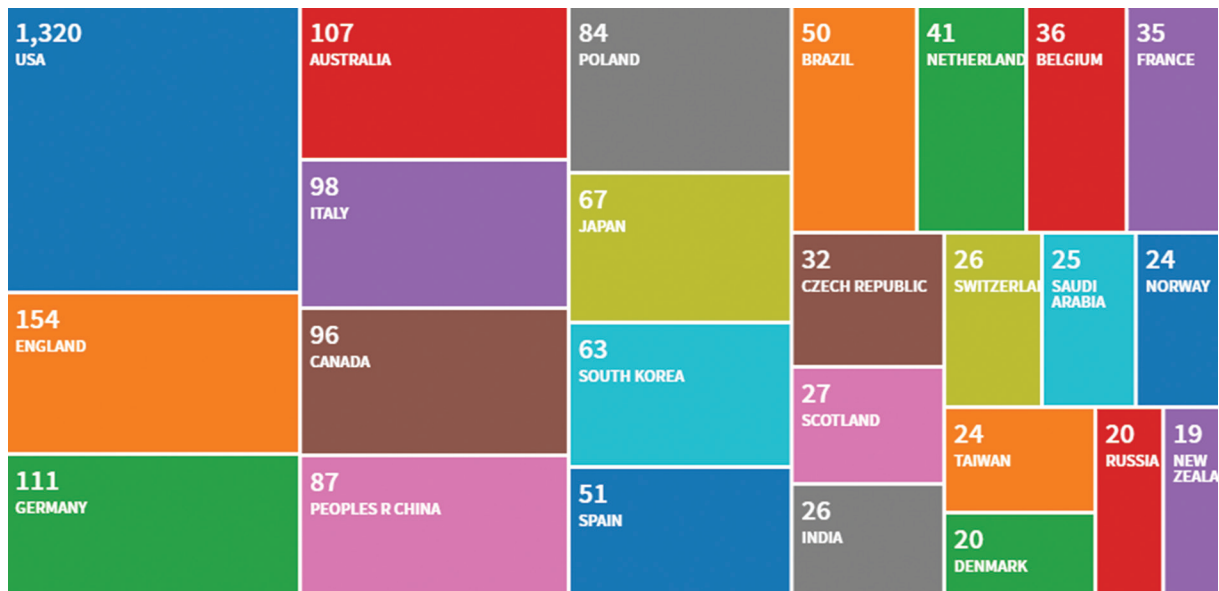


Figure 1. Number of studies on dietary supplements by countries.

beings¹⁴ Professional ethics, which is a sub-branch of ethics, can be expressed as the sum of ethical principles and standards that guide behaviors in professional life and guide what to do and what not to do. Businesses feel the need to behave ethically and make decisions in order to increase their reputation and thus gain profit in the medium and long term, and it is beneficial to see the expenditures made for this purpose as one of the most valuable asset items of the business.¹⁵

Related to this issue, Torok and Murray in their 2008 study “Using the sword of professional ethics against misleading dietary supplements,” tried to understand how dietary supplements are currently regulated for scientists who want to take a more prominent role in protecting the integrity of the interests of science and society. In general, the Food and Drug Administration (FDA) oversees safety, manufacturing, labeling, and product literature for drugs and medical devices, while the Federal Trade Commission (FTC) regulates how products are marketed. Mannatech Inc. is a publicly traded multinational multi-level marketing company founded in 1993 by Samuel Caster that markets dietary supplements and personal care products.¹⁶ Due to consumer complaints filed with the FDA and unethical use of credit advertising, Mannatech’s sales declined by 50% after 2006. Scientists should provide informational materials to consumers to prevent misuse and unethical production. The FTC and agencies such as the FDA and the Office of Dietary

Supplements should have supplement manufacturers and contact information on their websites, and consumers should be able to check whether a supplement has been tested for safety and efficacy through the government.

Proactive steps are needed to prevent public mistrust of food supplements. One such measure could be to develop educational materials and training activities that can be used by medical schools and professional associations, such as the American Medical Association, to ensure that doctors and medical students are effective in countering suspicious claims. Doing so would not only address the lack of reliable information on dietary supplements available to the public, but would also give the science community a level of respectability to other professionals. In establishing standards for the proper labeling and manufacture of food supplements, the FDA has been confronted with the lack of information on the efficacy of some supplements and the lack of data to determine adequate dosage for children. Children are not just small adults in terms of dosage; untested mold supplements pose the potential for harm when administered to children. Moreover, it is clear that even benign substances such as vitamins taken in excessive amounts can be harmful.¹⁷

Methods

In this section of the study, the purpose and importance of the study, the data collection tool, and the analysis of the data will be discussed.

Purpose and hypothesis of the study

The aim of this study is to determine the intake behaviors of individuals taking food supplements to examine their ethical attitudes in this field. For this purpose, the following hypotheses were tested to determine the ethical dimension of dietary supplement use behaviors in the areas of needs satisfaction, ethics, monitoring, promotion, and legal areas.

- Hypothesis 1. Gender differs according to (a) Meeting needs (b) Ethical dimension (c) Monitoring dimension (d) Promotion dimension (e) Legal dimension of individuals' food supplement use behaviors
- Hypothesis 2. Age differs according to (a) Meeting needs (b) Ethical dimension (c) Monitoring dimension (d) Promotion dimension (e) Legal dimension of individuals' food supplement use behaviors
- Hypothesis 3. Dietitian Visiting Status differs according to (a) Meeting needs (b) Ethical dimension (c) Monitoring dimension (d) Promotion dimension (e) Legal dimension of individuals' food supplement use behaviors.

Population and sample of the study

The descriptive and cross-sectional study was conducted in October 2019 and December 2019. The research population consisted of individuals between the ages of 20 and 65 residing in Turkey. At the end of 2017, the population between the ages of 20 and 65 in Turkey was 48,355,065 (TÜİK, 2017); the sample size that can represent the research population was determined as 384 people with a 95% confidence interval. Convenience sampling method was used among the sampling methods.

Data collection tool of the study

While collecting the research data, the “Knowledge, attitude and usage behavior about food supplements” scale taken from the thesis of Karadağ, 2019, was used. After interviewing with medical representatives and pharmacies within the scope of expert opinion, the scale was answered as “I think ethical values are observed in food supplement information, I think ethical values are observed in pricing policies, I think ethical values are observed when obtaining legal permissions of food supplements, I think ethical values

are observed when determining the amount of use, I think that there is not enough supervision in the production and distribution processes of food supplements, I am hesitant that the prices on the internet and pharmacy prices are not the same, and I do not find it right to advertise food supplements in print and visual media” were added and the question “Food supplements are supervised by the Ministry of Food, Agriculture and Livestock” was removed.

After the questions to be asked in the questionnaire were determined, it was determined whether the questions in the draft questionnaire were compatible with the application, the aims, and assumptions of the application. Then, the questionnaire was tested by 10 pharmacists and 3 medical representatives before it was applied to the individuals and the questions that caused misunderstandings were rearranged. The questionnaire form can be classified as follows; in the first 24 questions of the questionnaire, it is aimed to obtain information about the general health status of individuals, such as gender, body mass index, sleep levels, chronic disease status, and quality of life.

Questions 24-30 of the questionnaire aimed to find out which supplements individuals who use food supplements take, the reasons for taking supplements, where they obtain supplements, and how much they spend on supplements in a year. Finally, in the 31st question, a 3-point Likert-type scale was used to determine the behaviors and attitudes of individuals toward food supplements. The answering scale for each statement of the 31st question in the scale is a 3-point Likert; 1 = No Idea, 2 = No, 3 = Yes.

Information was collected from social media and social media platforms (LinkedIn, Facebook, etc.) through the Google form. The survey method was chosen due to its ability to collect a wide range of information, speed, and cost advantages, while the face-to-face and social media survey method was chosen due to its high response rates and the ability to eliminate misunderstandings. A total of 474 questionnaire forms were collected.

Data analysis

The data obtained at the end of the research were analyzed with the Statistical Package for the Social Sciences 22.0 package program. First, frequencies and percentages were given according to the individual and demographic characteristics of the participants. Exploratory factor analysis was applied to the scale. At this stage, the Independent Samples t-test

Table 1. Factor analysis table

Ethical	Meeting needs	Ethics	Monitoring	Promotion	Legal
I believe ethical values are observed when obtaining legal permissions for dietary supplements	0.839				
I believe ethical values are observed in pricing policies.	0.748				
I believe ethical values are considered when determining the usage amount.	0.684				
I believe ethical values are observed in dietary supplement information.	0.675				
Since I started using dietary supplements, I feel healthier.		0.814			
I am aware of which dietary supplements I need for my health.		0.788			
Dietary supplements can meet all nutritional needs.		0.543			
The information on the labels of dietary supplements is sufficient.		0.445			
I am concerned about the side effects of dietary supplements.			0.781		
Dietary supplements should be prescribed and monitored by a physician.			0.597		
Taking dietary supplements along with prescribed medications can cause drug interactions.			0.591		
Vitamin and mineral levels should be regularly monitored with laboratory tests.			0.799		
I believe there is not enough supervision in the production and distribution processes of dietary supplements.				0.818	
I do not approve of dietary supplement advertisements in print and visual media.				0.720	
The fact that internet prices and pharmacy prices are not the same makes me skeptical.				0.565	
Dietary supplements are regulated by the Ministry of Health.					0.751
Physicians should have more information about dietary supplements.					0.632
Dietary supplements should be covered by health insurance.					0.557

and One-way analysis of variance (ANOVA) test were applied since the data were normally distributed and the variances were homogeneous. After conducting the ANOVA analysis, *post hoc* tests (Tukey) were utilized to determine between which groups the differences originated.

Validity and reliability of the research scale

In the study, factor analysis with varimax rotation was applied to 18 statements to reveal the construct validity of the ethical scale of dietary supplement intake behaviors. As a result of the analysis, five dimensions were reached as meeting needs, ethical dimension, monitoring dimension, promotion dimension, and life dimension. The rate of explaining the total variance of the five factors obtained was 69.543%,

the Kaiser-Meyer-Olkin value was 0.810, and the Bartlett Sphericity test value was 1240.994 and was significant ($p < 0.05$). The distribution table of the factor analysis according to the dimensions is given in table 1.

There are many methods to measure the reliability of scales. Cronbach's Alpha coefficient, which is one of them, is a method frequently used in reliability calculations of scales based on total score, such as Likert-type scales.¹⁸ The Cronbach's Alpha value used for the research was found to be quite reliable, with 0.73.

Findings

A total of 474 people participated in this study conducted on individuals living in Turkey. Of the 474

participants, 49.6% were female, and 50.4% were male. 47.6% of the individuals participating in the study were between the ages of 21 and 30. 62% of the participants are married, and 60.3% of them live with their spouse and children. When the participants are analyzed in terms of education and occupational groups, 41.6% are university graduates, 34% are public sector employees, and 32.9% are private sector employees. 53% of the participants are Social Security Institution (SSI/SSK) members, and 37.1% of them have an income level between 2000 and 4000, 27.4% between 4000 and 6000.

When the healthy living behaviors of the individuals participating in the study were evaluated, 47.26% were normal weight, and 37.97% were slightly overweight. While 38.80% of the participants do not exercise, 38.60% do mild exercise, and 46.60% do not go to general health check-ups. The proportion of the participants who consulted a nutrition and diet specialist was 26.2%, and 56.6% of them went to lose weight. When the nutritional status of the participants is analyzed; 51.70% of them apply equal weight from carbohydrates. 36.50% of the participants consume 1-15 L of water/day, 26.60% sleep between 7 and 8 h. In addition, 67.9% do not smoke, and 84% do not consume alcohol. Only 26.2% of the participants reported having a chronic disease. The most common diseases were hypertension and migraine, with 18%, followed by asthma with 14%. Among the participants with chronic diseases, 41.9% used medication when necessary, while 39.5% reported that they used medication every day. 55.5% of the participants reported taking food supplements. Among these, 57.8% use them every day. 41.8% spend 200 TL or less on food supplements in a year, while 38.8% spend between 200 and 500 TL. 70.7% of the participants obtain food supplements from pharmacies.

Table 2 shows that 15.8% of the participants take vitamin D, 12.8% vitamin B, 11.3% Omega 3, and 9.30% multivitamin complex.

When the reasons for using food supplements are analyzed in table 3, 17.60% of the participants use food supplements to "Increase body performance and energy during the day," 16.50% to "Promote general health," 16.20% to "Treat specific health problems," and 14.70% to "Increase immune power." Weight gain (0.40%) and weight loss (0.10%) are the least preferred reasons for use.

In table 4, when the participants' food supplement purchasing behaviors were examined in terms of ethics, 78.7% stated that physicians should have

Table 2. Distribution of food supplements used by the participants

Supplements	n	%	Supplements	n	%
Vitamin D	126	15.80	Coenzyme Q10	23	2.90
Vitamin B	102	12.80	Sports drinks and foods	18	2.30
Omega-3	90	11.30	Calcium	15	1.90
Multivitamin/ multimineral complex	74	9.30	Selenium	14	1.80
Vitamin C	53	6.60	Alpha lipoic acid	9	1.10
Iron	53	6.60	Melatonin	9	1.10
Herbal supplements	52	6.50	Glucosamine	8	1.00
Probiotic	41	5.10	Protein Bar	5	0.60
Magnesium	39	4.90	Other*	4	0.50
Vitamin K	33	4.10	Amino Acid	3	0.40
Zinc	26	3.30	Protein Powder	2	0.30

*Indicates statistically significant difference (p < 0.05).

Table 3. Distribution of reasons for use of food supplements by participants

Reasons for use	n	%
To enhance daytime physical performance and energy	121	17.60
To promote general health	113	16.50
To treat specific health issues	111	16.20
To boost immunity	101	14.70
As recommended by a doctor	81	11.80
To improve nutrition	62	9.00
As recommended by a nutrition and diet specialist	25	3.60
To reduce stress	20	2.90
As recommended by a pharmacist	14	2.00
As recommended by a life/sports coach	14	2.00
Based on family, friends, and community recommendations	13	1.90
After seeing on social media (TV/radio/internet/phone/ads)	7	1.00
To gain weight	3	0.40
To lose weight	1	0.10

more information about food supplements, 76.8% stated that vitamin and mineral levels should be regularly monitored with laboratory tests, 72.6%

Table 4. Results of the ethical analysis of participants' food supplement intake behavior scale

Variables	n	%	n	%	n	%
Food supplements should be prescribed and monitored by a doctor.	176	66.9	62	23.6	25	9.5
Doctors should have more knowledge about food supplements.	207	78.7	34	12.9	22	8.4
Food supplements should be covered by health insurance.	191	72.6	46	17.5	26	9.9
Vitamin and mineral levels should be regularly monitored with laboratory tests.	202	76.8	39	14.8	22	8.4
Food supplements are regulated by the Ministry of Health.	128	48.7	76	28.9	59	22.4
I am concerned about the side effects of food supplements.	151	57.4	77	29.3	35	13.3
The information on the labels of food supplements is sufficient.	75	28.5	149	56.7	39	14.8
Food supplements may cause drug interactions when taken with prescribed medications.	141	53.6	42	16	80	30.4
I am aware of which food supplements I need for my health.	172	65.4	51	19.4	40	15.2
I feel healthier since I started using food supplements.	171	65	54	20.5	38	14.4
All nutritional needs can be met with food supplements.	57	21.7	166	63.1	40	15.2
I believe ethical values are considered in the information provided about food supplements.	81	30.8	115	43.7	67	25.5
I believe ethical values are considered in pricing policies.	58	22.1	136	51.7	69	26.2
I believe ethical values are considered when obtaining legal permits for food supplements.	77	29.3	104	39.5	82	31.2
I believe ethical values are considered when determining the dosage.	96	36.5	91	34.6	76	28.9
I believe there is not enough control in the production and distribution processes of food supplements.	127	48.5	74	28.2	61	23.3
The discrepancy between internet and pharmacy prices makes me hesitant.	189	71.9	50	19	24	9.1
I do not think it is correct to advertise food supplements in print and visual media.	142	54	89	33.8	32	12.2

stated that food supplements should be covered by health insurance, and 71.9% stated that they were hesitant about the fact that internet prices and pharmacy prices were not the same. 63.1% of the participants think that food supplements do not meet all nutritional needs, 56.7% think that the information written on the labels of food supplements is insufficient, and 51.7% think that ethical values are not observed in pricing policies.

According to this table, statistically significant differences were not found between the sub-dimensions of the scale. According to table 5, Hypotheses 1a, 1d, 2e, 3a, 3b, 3c, and 3d are accepted while the other hypotheses are rejected.

Discussion

The purpose of this study is to determine the purchasing behaviors of individuals who take dietary supplements to examine their ethical attitudes in this field. The finding that men pay more attention to the meeting

needs and promotion processes when buying dietary supplements than women is supported by various literature studies. This difference reflects differences in men's and women's behaviors and motivations for supplement use. First, women generally use supplements at higher rates than men. According to a study conducted in the USA, 63.8% of women used any food supplement in the past 30 days, compared to 50.8% of men.¹⁹ Although women have a higher propensity to use food supplements, men generally use supplements more strategically for specific health goals (e.g., increasing muscle mass or preventing a specific disease). Men generally appear to be more motivated to use supplements to achieve specific health goals. In this context, men are more careful in their choice of supplements to meet their needs and to ensure continuity of use. For example, men place more emphasis on muscle health and performance-enhancing supplements, whereas women generally prefer supplements that focus on general health and bone health.²⁰ Furthermore, among the factors that increase men's motivation

Table 5. Hypothesis test results

Category	Meeting needs (a)	Ethical dimension (b)	Monitoring dimension (c)	Promotion dimension (d)	Legal dimension (e)
Women Avg	2.30	1.96	2.50	2.37	2.53
Women SD	0.40	0.58	0.44	0.59	0.45
Men Avg	2.31	2.10	2.46	2.51	2.53
Men SD	0.52	0.58	0.47	0.51	0.51
T	-0.283	-1.938	0.695	-2.105	0.142
p	0.000*	0.623	0.089	0.047*	0.267
Hypothesis accepted	1a Accepted	1d Accepted			
20-30 Avg (1)	2.25	1.94	2.50	2.38	2.59
20-30 SD	0.49	0.57	0.44	0.60	0.47
31-40 Avg (2)	2.33	2.00	2.47	2.38	2.60
31-40 SD	0.43	0.58	0.43	0.53	0.38
41-50 Avg (3)	2.39	2.17	2.48	2.54	2.42
41-50 SD	0.44	0.70	0.58	0.47	0.51
51-65 Avg (4)	2.30	2.09	2.46	2.55	2.36
51-65 SD	0.43	0.46	0.41	0.54	0.52
F	1.092	1.875	0.065	1.727	3.866
p	0.35	0.13	0.98	0.16	0.010*
<i>Post hoc</i> test					1-4 p = 0.03 2-4 p = 0.04
Hypothesis accepted	2e Accepted				
Weight loss Avg (1)	2.38	2.05	2.50	2.54	2.41
Weight loss SD	0.37	0.55	0.37	0.48	0.53
Weight gain Avg (2)	1.86	1.48	1.93	1.94	2.33
Weight gain SD	0.55	0.39	0.57	0.70	0.47
Healthy eating Avg (3)	2.28	2.19	2.42	2.31	2.56
Healthy eating SD	0.45	0.50	0.49	0.48	0.38
Doctor's recommendation Avg (4)	2.44	1.84	2.28	2.00	2.71
Doctor's recommendation SD	0.42	0.63	0.49	0.69	0.28
F	4.83	5.25	5.16	5.8	1.64
p	0.000*	0.000*	0.000*	0.000*	0.19
<i>Post hoc</i> test	1-2 p = 0.002 2-3 p = 0.029 2-4 p = 0.021	1-2 p = 0.008 2-3 p = 0.001	1-2 p = 0.001 2-3 p = 0.013	1-2 p = 0.004 1-4 p = 0.037	
Hypothesis accepted	3a Accepted	3b Accepted	3c Accepted	3d Accepted	

*Indicates statistically significant difference ($p < 0.05$)

Avg: average; SD: standard deviation.

and commitment to supplement use, scientific evidence and the desire to be informed about the efficacy of products play an important role. Men often conduct extensive research on the health effects and scientific basis of a particular supplement before choosing it.²¹ This attitude increases their tendency to use supplements regularly and consistently.

Another result of this study shows that individuals aged 31-40 years are more concerned about the legal regulations of dietary supplements than other age groups. This age group may focus on legal concerns. Individuals in this age group are generally more conscious about protecting their health and improving their quality of life. This awareness is coupled with a desire to learn more about the safety and efficacy of the food supplements consumed.²² People in the 31-40 age group are aware that legal regulations are important to ensure the quality and safety of supplements.

The study found that individuals who go on a diet to gain weight are more sensitive to the meeting of needs, ethical standards, monitoring processes, and promotion methods when choosing dietary supplements. These individuals place greater importance on these factors, which play a decisive role in their diet choices. The literature supports this finding. The study by Cialdini and Trost emphasizes the important role of social norms and the meeting of individual needs in people's diet choices.²³ Individuals who start a diet to gain weight place more importance on the meeting of their needs because it increases their motivation and adherence to the diet. The study by Puhl and Brownell shows that ethical standards play a significant role in individuals' attitudes toward diet programs and dietary supplements. Wing and Phelan highlight the importance of monitoring processes in the success of diet programs. Individuals participating in weight gain programs are more sensitive to regular monitoring and feedback processes because these processes ensure healthy and sustainable weight gain.²⁴ Jeffrey and Wing demonstrate that incentive methods increase individuals' adherence to diet programs. The weight gain group is more sensitive to incentive methods because they increase their motivation and strengthen their adherence to the diet.²⁵

In addition, the most frequently used food supplements in the study were Vitamin D, Vitamin B, Omega 3, and multivitamin complex. A study by Bailey et al. found that multivitamin-mineral products and fish oils were the most commonly reported food supplements.¹³ Supplement use was also found to be related to more appropriate health and lifestyle choices, and less than a quarter of supplements were recommended by a

doctor or dietitian. For this reason, it is recommended that food supplements should be used consciously in line with the recommendation of a doctor or dietitian. Similarly, Çoşkun and Turhan argued that if individuals do not have sufficient knowledge about vitamins, they should act by getting information from experts.²⁶

In the information on food supplements, pricing and obtaining legal permissions, not observing ethical values, pharmacy prices not being the same as internet prices, being sold without a prescription, and insufficient information written on it are the results reached within the scope of this study and are not ethically appropriate. Acting in line with ethical principles in this regard will prevent both individual and social damages that may occur.

Conclusions

This study revealed that factors such as gender, age, and dietary preferences influence individuals' supplement choices. Men were found to be more inclined toward the meeting needs and promotion aspects of dietary supplement purchases than women. In addition, factors such as age group and dietary preferences were found to affect the sensitivity of individuals in their supplement choices. It was found that individuals between the ages of 31-40 gave more importance to legal regulations, and those who were trying to gain weight were more sensitive to need fulfillment, ethical standards, monitoring, and promotion processes. In conclusion, a conscious and ethical use of dietary supplements should be encouraged. This can help adopt a credible approach to improving individuals' health and quality of life. The findings may also contribute to health management practices by supporting consumer awareness, ethical marketing strategies, and regulatory policy development regarding dietary supplements.

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Conflicts of interest

The authors declare no conflicts of interest.

Ethical considerations

Protection of human and animal subjects. The authors declare that no experiments involving humans or animals were conducted for this research.

Confidentiality, Informed Consent, and Ethical Approval. The study does not involve patient personal data nor requires ethical approval. The SAGER guidelines do not apply.

Use of artificial intelligence for generating text. The authors declare that no generative artificial intelligence was used in the writing of this manuscript.

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