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Attitudes Towards Healthy Eating and Diet Satisfaction of Vegetarians: A Cross-sectional Study in Turkey

Vejetaryenlerin Sağlıklı Beslenmeye Yönelik Tutumları ve Diyet Memnuniyetleri: Türkiye'de Kesitsel Bir Çalışma

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Öz

Giriş ve Amaç: Bu çalışmada vejeteryan beslenmeyi tercih eden bireylerin yeterli ve dengeli beslenme hakkındaki tutumları ve diyet memnuniyetlerini ve yaşadıkları sorunları değerlendirmek amaçlanmıştır.
Gereç ve Yöntemler: Çalışma Türkiye'de yaşayan 18-60 yaş arasında, en az 2 yıldır vejetaryen beslenme şekillerinden herhangi birini tercih eden 405 birey ile gerçekleştirilmiştir. Katılımcılara Yeterli Ve Dengeli Beslenme Hakkında Tutum Ölçeği, Diyet Memnuniyet Ölçeği ve vejetaryen beslenmeyi sürdürürken yaşadıkları problemleri içeren 15 soru Google formlar aracılığı ile oluşturulan online anket formu ile uygulanmıştır. Verilerin istatistiksel değerlendirilmesinde SPSS 24.0 paket program kullanılmış olup Kolmogorov-Smirnov testi sonuçlarına göre normal dağılımın görülmediği anlaşılmıştır. Bu durumda iki grup arasındaki farklılıklar Mann Whitney-U testi, ikiden fazla grup arasındaki farklılıklar Kruskal-Wallis Varyans Analizi testi ile incelenmiştir.
Bulgular: Sonuçlar incelendiğinde vejetaryen bireylerin yeterli ve dengeli beslenme hakkında tutumlarının yüksek olduğu tespit edilmiştir. Kadınların erkeklere, lise ve üniversite mezunu olanların ilköğretim mezunlarına ve normal beden kütle indeksine (BKİ) sahip olanların hafif şişman ve obez bireylere göre yeterli ve dengeli beslenme hakkındaki tutum puanları daha yüksek bulunmuştur ($p<0,05$). Katılımcıların diyet memnuniyetlerinin yüksek olduğu görülürken üniversite mezunlarının lise mezunlarına göre diyet memnuniyetleri daha düşüktür ($p<0,05$). Vejetaryen bireylerin diyetlerini sürdürürken en sık yaşadıkları problem vejetaryen ürünlerin pahalı olması ve markette zor bulunması olarak belirlenmiştir.
Sonuç: Bu çalışmada vejetaryen beslenen bireylerin yeterli ve dengeli beslenme hakkındaki tutumlarının ve diyet memnuniyetlerinin iyi düzeyde olduğu fakat vejetaryen diyetleri uygularken çeşitli sorunlarla karşılaştığı belirlenmiştir. İlaveten bireylerin cinsiyet, eğitim durumu ve BKİ'lerinin de her iki ölçek skorunu anlamlı düzeyde etkilediği anlaşılmıştır. Sonuç olarak Türkiye'de vejetaryen diyetlerin sağlık ve sürdürülebilirlik açısından desteklenmesine ihtiyaç bulunmaktadır. Buna ilişkin toplum sağlığı merkezlerinde vejetaryen beslenme konusunda eğitim programları düzenlenmeli, vejetaryen ürünlerin erişilebilirliği artırılmalı ve bu ürünlerin maliyetlerini düşürmek için yerel ve ulusal teşvikler sağlanmalıdır.

Anahtar kelimeler: Vejetaryen diyet, sağlıklı beslenme, diyet memnuniyeti, sürdürülebilirlik

Abstract

Aim; The aim of this study was to evaluate the attitudes of individuals who prefer a vegetarian diet about adequate and balanced nutrition, their dietary satisfaction and the problems they experience.
Method; The study was conducted with 405 individuals between the ages of 18 and 60 living in Turkey who have preferred any of the vegetarian diets for at least 2 years. Participants were administered an online questionnaire including the Attitude Scale About Adequate and Balanced Nutrition, Diet Satisfaction Scale and 15 questions

about the problems they experienced while maintaining a vegetarian diet through Google forms. SPSS 24.0 package program was used in the statistical evaluation of the data and it was understood that the data did not show normal distribution according to the results of the Kolmogorov-Smirnov test. Therefore, differences between two groups were analyzed by Mann Whitney-U test and differences between more than two groups were analyzed by Kruskal-Wallis Analysis of Variance test.

Results; When the results were analyzed, it was found that vegetarian individuals had positive attitudes about adequate and balanced nutrition. In detailed analysis, it was found that females had higher attitudes towards adequate and balanced nutrition than males, high school and university graduates had higher attitudes than primary school graduates, and individuals with normal body mass index (BMI) had higher attitudes towards adequate and balanced nutrition than overweight and obese individuals ($p<0.05$). While the diet satisfaction of the participants was high, university graduates had lower diet satisfaction than high school graduates ($p<0.05$). The most common problem experienced by vegetarian individuals while maintaining their diets is that vegetarian products are expensive and difficult to find in the market.

Conclusion; In this study, it was determined that vegetarian individuals had good attitudes towards adequate and balanced nutrition and dietary satisfaction, but they encountered various problems while following vegetarian diets. Additionally, it has been determined that individuals' gender, educational status, and BMI significantly influence both scale scores. In conclusion, there is a need to support vegetarian diets in Turkey in terms of health and sustainability. In this regard, training programs on vegetarian nutrition should be organized in community health centers, accessibility of vegetarian products should be increased, and local and national incentives should be provided to reduce the costs of these products.

Keywords: Vegetarian diet, healthy eating, diet satisfaction, sustainability

1. Introduction

Contrary to popular belief, the origin of the word vegetarian comes from the word vegetus, which means full of life, healthy and alive, rather than vegetable [1]. There is no standard classification for the types of vegetarian diets, but they are divided into lacto, ovo, lacto ovo, pesco, polo and pesco-pollo, semi-vegetarian and vegan (fruvitarianism, ravist, zenmacrobiotic) according to the consumption of animal food types. [2,3]. Veganism, which is different from vegetarianism, is a philosophy and way of life that supports avoid the use of animals and aims to prevent any exploitation of animals. The vegan diet does not include any animal food [1]. A vegan is defined as a person who eliminates foods of animal origin from their diet and, in addition, refuses to use cosmetics, clothing and other products of animal origin [2,4].

Today, it is estimated that a total of 700 million people worldwide prefer vegetarian diets. According to 2020 data, approximately 500 million people in India (40% of the population), 9.7 million in the United States and 3.5 million in the United Kingdom (5% of the population) have adopted a vegetarian diet for religious reasons [5]. According to the Meat Atlas Report (2021), approximately 4.4% of the population in Germany, 3.7% in Austria and 2% in Portugal follow a vegetarian diet [6]. According to Euromonitor statistics for 2016-2017, Turkey is among the top 10 countries with the highest increase in vegetarianism [7]. The ratio of vegetarians and vegans to the total population in Turkey is below 5 percent [8]. Available information shows that vegetarianism has positive and negative health consequences. From a health perspective, it is known that a well-planned vegetarian diet can reduce the risk of diseases such as coronary heart disease, diabetes, some types of cancer and obesity [9,10]. However, many studies have shown that vegans and vegetarians do not have a balanced and adequate intake of nutrients such as iron, vitamin B12, vitamin D, zinc, calcium and protein, which are found in good levels in animal sources [11-13]. In addition, some studies have found that vegans have lower bone mineral density and a higher risk of fractures [13,14].

In addition to the health effects of vegetarian diets, accessibility, sustainability and compliance are also open to debate. One of the main problems with vegetarian diets is the high cost of alternative products or changing long-standing eating habits. When examined in detail, these barriers include deprivation of the pleasure of eating meat, essential nutrient deficiencies, difficulty in preparing plant foods, dislike of the taste of vegetables, the higher cost of some plant-based foods in the market and difficulties in obtaining information [15,16]. It is also stated that the number of accommodation and restaurant establishments offering services for vegetarian individuals is not sufficient and their promotion is insufficient [4]. In previous studies, the lack of menu variety and vegetarian menus in restaurants [17-19] the low level of knowledge and awareness of the serving staff about the menu content and this special type of diet and life are stated as a situation that pushes vegetarian individuals away from both traveling and eating out [15].

Turkey is one of the countries in the world with high levels of income inequality, which has led to

nutritional poverty, widespread obesity and difficulties in maintaining special diets [20]. Turkey is a country where food insecurity is prevalent due to various factors, including its geopolitical position, proximity to political instability and internal conflicts [21], as well as food inflation observed in recent years [22]. In addition, vegetarian diets, which have challenges in terms of both health and sustainability, are a new concept for Turkey and are characterized as a late emerging and developing type of nutrition [18]. In the literature, studies involving vegetarian individuals in Turkey are rare. At this point, vegetarian individuals should be examined in terms of both health and sustainability, and problems should be identified and revealed. This study aims to evaluate the attitudes of individuals who prefer vegetarian diets in Turkey about adequate and balanced nutrition and their dietary satisfaction. Thanks to the data obtained, the situation of vegetarian diets in Turkey will be revealed and solutions will be developed for the problems. This study is also the first to examine the challenges faced by vegetarian individuals in Turkey in maintaining their diets and to assess their dietary satisfaction.

2. Methods

2.1 Participants and Ethics

This descriptive cross-sectional study was conducted with 405 individuals between the ages of 18 and 60 living in Turkey who have been following a vegetarian diet for at least 2 years. The study data were collected between February and July 2022. " In determining the sample size, according to Coskun et ala minimum sample size of 384 is considered sufficient for population sizes of 1.000.000 and above. The convenience sampling method was used to determine the sample and, in this method, the process of finding subjects should be continued until the desired sample is reached [23]. The study was approved by the Ethics Committee of Ankara University (No: 01/03 Date:10/01/2022) and conducted in accordance with the World Medical Association Declaration of Helsinki Principles.

2.2 Questionnaires

Within the scope of the study, demographic data questions, attitude scale about adequate and balanced nutrition, diet satisfaction scale and questions about the problems they experience while maintaining a vegetarian diet were applied to the participants with an online survey form created through Google forms. The 15 questions used to identify the problems were determined by the researchers (Table 4). The survey form was shared on various social media platforms and participants were reached with posters with the QR code link of the study. Participants were informed about the purpose of the study and the use of data, and their informed consent was obtained before the online survey commenced.

2.3. Attitude Scale About Adequate and Balanced Nutrition

The relationship between vegan/vegetarian diet and healthy eating was determined with the attitude scale about adequate and balanced nutrition. The attitude scale about adequate and balanced nutrition adapted into Turkish by Okur Sahin is a 5-point Likert-type scale with 14 items consisting of 3 dimensions (knowledge-anxiety-interest). In the scale, questions 1-5 indicate knowledge, questions 6-10 indicate anxiety and questions 11-14 indicate interest. Positive items were scored as 5, 4, 3, 2, 2, 1 from the category "Strongly Agree" and negative items were scored as 1, 2, 3, 4, 5 from the category "Strongly Disagree". The lowest score that can be obtained from this scale is 14 and the highest score is 70. Although the scale does not have any cut-off point, it is stated that as the score obtained from the scale and its sub-dimensions (knowledge, anxiety, interest) increases, the attitude towards adequate and balanced nutrition and the behavior of the sub-dimension increases. The variance ratio of the scale is 9.305% for the 1st factor, 7.594% for the 2nd factor, 7.398% for the 3rd factor and all 3 factors explain 24.298% of the total variance. This variance value is at a good level for a 3-factor scale. While the Cronbach's Alpha coefficient was 0.658 in the original scale, this coefficient was found to be 0.573, 0.688 and 0.642 in the knowledge, anxiety and interest subscales respectively [24]. Although the internal consistency of the subdimensions was not within acceptable limits, this result may be attributed to cultural differences in the Turkish adaptation of the scale.

2.4. Diet Satisfaction Score (DSS)

The diet satisfaction scale assesses aspects that affect satisfaction with any diet, such as hunger, desire to eat, food preparation, enjoyment, ease of following the diet at home and away from home, food variety, affordability, contribution to physical health and continuity. The scale can be applied to individuals between the ages of 18-65. The Diet Satisfaction Scale adapted into Turkish by Eskici and Karahan Yılmaz consists of 9 items. The scale is a 5-point Likert-type scale and includes the answer options 1 "strongly disagree", 2 "disagree", 3 "undecided", 4 "agree" and 5 "strongly agree". A maximum of 45 points and a minimum of 9 points can be obtained from the scale. The scale has no cut-off point and diet satisfaction increases as the score increases. When the total variance table of the scale was examined, it was observed that there was only one factor with an eigenvalue greater than 1 in the 9-item scale and 57% of the trait measured by the single factor was measured. The Cronbach alpha coefficient of the nine-item scale was found to be 0.902 and a high reliability was obtained [25].

2.5. Anthropometric measurements

Participants were asked to go to the nearest health center in the morning on an empty stomach, wearing light clothes, and have their height and weight measured. For those who did not have this opportunity, a detailed explanation was given so that they could measure their height and weight themselves with an accurate weighing scale and meter. Body Mass Index (BMI) was calculated by questioning the height and body weight of the participants. BMI is a person's weight in kilograms divided by height in meters squared. According to BMI values, individuals were defined as <18.5= weak; 18.5-24.9= normal; 25.0-29.9= overweight; >30.0= obese [26].

2.6. Statistical analysis

The Statistical Package for Social Sciences (SPSS 26.0) package program was used in the analysis of the data obtained in the research. Descriptive statistics are presented with n, % for categorical variables, and Mean±Standard Deviation (Min-Max) and Median (Q1-Q3) values by examining the normality assumption of the data for continuous variables. Kolmogorov Smirnov test was used to examine the distribution assumptions of continuous variables. As a result of the analysis, it was seen that the data were not suitable for normal distribution. Accordingly, differences between two groups were analyzed by Mann Whitney-U test and differences between more than two groups were analyzed by Kruskal-Wallis Variance Analysis test. Kruskal-Wallis Variance Analysis Test was applied, differences between more than two groups were determined by multiple comparisons under the Kruskal-Wallis 1-way ANOVA (k samples) option. The statistical significance level was $p<0.05$ and the confidence interval was 95%.

3. Results

A total of 405 individuals, 140 (34.6%) males and 265 (65.4%) females, with a mean age of 26.7±8.3 years, participated in the study. The majority of the participants were married (73.8%) and university graduates (76.0%) and more than half of them were not employed (54.3%). When their income status was analyzed, it was found that 45.7% had an equal income-expense balance, 33.8% had more income than expenses and 20.5% had lower income (Table 1).

Table 1. ***General features of the participants***

Variable		**n (%)**
Gender	Male	140 (34.6)
	Female	265 (65.4)
Marital status	Single	80 (19.8)
	Married	299 (73.8)
	Other	26 (6.4)
Educational Status	Primary education	10 (2.4)
	High school	87 (21.5)
	University	308 (76.0)
Working Status	Working	185 (45.7)
	Not working	220 (54.3)
Income	Less than expenses	83 (20.5)
	Equals expense	185 (45.7)
	More thanexpenses	137 (33.8)

Table 2 shows the participants' nutritional supplement use and BMI averages. While 42.0% of the participants used nutritional supplements, the most used nutritional supplements were vitamin B12 (47.6%) and vitamin D (32.9%), respectively. The mean BMI value of the individuals was 22.5±4.0 kg/m2 and most of them were in the normal range (70.4%). The mean BMI values of women were significantly lower than those of men (21.1 kg/m2-23.4 kg/m2 $p<0.001$, respectively).

Table 2. ***Participants' BMI and nutritional supplement use***

Variable		**n (%)**
Nutritional Supplement Use	**Yes**	170 (42.0)
	No	235 (58.0)
Most Used Supplement	**Vitamin B_{12}**	81 (47.6)
	Vitamin D	56 (32.9)
	Multivitamin	53 (31.2)
	Omega-3	25 (14.7)
	Protein Powder	21 (12.3)
	Zinc	20 (11.8)
	Iron	8 (4.7)
	Folic Acid	8 (4.7)
	Other	35 (20.6)

Table 2. ***(continued) Participants' BMI and nutritional supplement use***

Variable		n (%)	
BMI Groups	**<18.5**	42 (10.4)	
	18.5-24.9	285 (70.4)	
	25.0-29.9	57 (14.1)	
	>30.0	25 (5.2)	
	Median (Q1-Q3)		
BMI (kg/m^2)[a]	**Female**	21.1* (15.8-36.6)	U / p
	Male	23.4* (15.9-44.4)	11752,5 / 0,000
	Total	21.7 (15.8-44.4)	

a. Mann Whitney U-test
** p<0.001*

In Table 3, the results of the attitude scale about adequate and balanced nutrition and diet satisfaction scale were analyzed according to various characteristics of the participants. Women had higher attitudes and knowledge scores about adequate and balanced nutrition ($p<0.05$). While women's dietary satisfaction scores were lower than those of men, the difference was not statistically significant ($p>0.05$). While the scale scores of the participants did not change according to their income status, it was found that there were significant changes according to their educational status. The attitudes and knowledge scores of high school and university graduates about adequate and balanced nutrition were higher than primary school graduates ($p<0.05$). The anxiety score about adequate and balanced nutrition was higher in university graduates compared to primary school graduates, while the diet satisfaction score was significantly lower in university graduates compared to high school graduates. Finally, according to BMI, the attitudes and anxiety scores of overweight and obese individuals about adequate and balanced nutrition were lower than those of normal weight individuals ($p<0.05$). In this case, it can be stated that individuals who are female, high school and university graduates and whose BMI is in the normal range have better attitudes (anxiety-knowledge) about adequate and balanced nutrition. On the other hand, individuals with higher levels of education had lower levels of diet satisfaction.

Within the scope of the study, possible problems experienced by the participants in terms of the sustainability of vegetarian nutrition were examined. More than half of the participants stated that vegetarian products are expensive and difficult to find in grocery stores and therefore they have problems in purchasing them (Questions 1-4). However, it was observed that more than half of the participants could access information on vegetarian products (questions 5-6) and were able to make their own food choices at home (questions 7-8). Although the individuals who participated in the study did not think that vegetarian diet led to weight gain and had negative effects on their social relationships (questions 9-11), they stated that their family and friends did not support them in their vegetarian diet (questions 12-13). In addition, individuals expressed awareness of barriers to maintaining a vegetarian diet (Question 13) (Table 4 and Figure 1).

4. Discussion

A healthy diet is adequate, balanced, diversified and applicable in all situations, taking into account the individual needs of each person [27]. Vegetarian diets, which have become widespread in recent years, have started to take their place in human culture with their benefits and risks and in the guidelines of organizations that are authorities on nutrition [28]. The American Dietetic Association and the Academy of Nutrition and Dietetics state that properly planned vegetarian diets are safe to follow and have positive effects on the prevention and prognosis of some chronic diseases [29]. However, vegetarian diets also have negative impacts on quality of life, economic and social status, and access to plant-based products [30]. In this study conducted in Turkey, one of the countries where vegetarian diets are rapidly spreading, the attitudes of individuals who follow vegetarian diets about adequate and balanced nutrition, their diet satisfaction and the problems they experience were examined.

When the results of the study were examined, it was seen that the mean BMI of 405 individuals participating in the study was 22.5±4.0 kg/m2 and accordingly 70.4% were normal and 10.4% were underweight (Table 2). Although Turkey ranks first in Europe and 18th in the world with an obesity prevalence of 32.1%, this result is remarkable [31]. In the literature, studies showing that individuals who follow vegetarian diets have lower BMI are frequently encountered [32-34] and this is like our study results. Although vegetarian diets have a positive effect on obesity, it has been found that vitamin B12 and vitamin D, omega 3 fatty acids, iron, calcium and zinc intake is insufficient in individuals following these diets [35,36]. Therefore, low vitamin B12 levels, increased cardiovascular diseases due to high blood homocysteine levels and decreased sex hormones can be seen in vegetarian diets [37]. It has been found that vegetarian individuals are generally aware of this issue and use nutritional supplements such as vitamin D, iron, multivitamins, especially vitamin B12 [2,38].

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Table 3. ***Scale scores according to the various characteristics of the participants***

	Knowledge Score		**Interest Score**		**Anxiety Score**		**Attitude Scale About Adequate and Balanced Nutrition Score**		**Diet Satisfaction Score**	
	Mean±SD (Min-Max)									
Total score	20.7±2.8 (8.0-25.0)		11.4±2.8 (4.0-20.0)		17.4±3.2 (7.0-25.0)		49.5±6.3 (29.0-67.0)		35.3±6.2 (15.0-45.0)	
Gender [a]	**Median (Q1-Q3)- U/χ^2 -p**									
Female	21.0* (8.0-25.0)	**U:15039,0 p:0,002**	12.0 (4.0-19.0)	U:17125,5 p:0,201	18.0 (7.0-25.0)	U:17208,0 p:0,229	51.0* (29.0-65.0)	**U:15745,5 p:0,012**	35.0 (15.0-45.0)	U:18462,0 0,937
Male	20.0* (9.0-25.0)		11.0 (4.0-20.0)		17.0 (8.0-25.0)		49.0* (33.0-67.0)		37.0 (18.0-43.0)	
Income [b]										
Less than expenses	21.0[a] (13.0-25.0)	χ^2:2,779 p:0,249	12.0[a] (4.0-18.0)	χ^2:0,719 p:0,698	18.0[a] (7.0-24.0)	χ^2:5,313 p:0,070	51.0[a] (29.0-63.0)	χ^2:5,440 p:0,066	36.0[a] (21.0-43.0)	χ^2:0,699 p:0,705
Equals expense	21.0[a] (8.0-25.0)		11.0[a] (4.0-20.0)		17.0[a] (9.0-23.0)		50.0[a] (33.0-66.0)		35.0[a] (15.0-43.0)	
More than expenses	21.0[a] (14.0-25.0)		12.0[a] (4.0-20.0)		18.0[a] (8.0-25.0)		51.0[a] (33.0-67.0)		36.0[a] (18.0-45.0)	
Educational Status [b]										
Primary education	17.0[a] (14.0-23.0)	**χ^2:12,108 p:0,002**	10.5[a] (7.0-14.0)	χ^2:1,150 p:0,563	15.5[a] (10.0-20.0)	**χ^2:6,340 p:0,042**	44.0[a] (37.0-51.0)	**χ^2:11,899 p:0,003**	36.5[a] (27.0-39.0)	**χ^2:8,831 p:0,012**
High school	21.0[b] (13.0-25.0)		11.0[a] (4.0-18.0)		17.0[ab] (9.0-24.0)		50.0[b] (33.0-61.0)		38.0[ab] (23.0-42.0)	
University	21.0[b] (8.0-25.0)		11.5[a] (4.0-20.0)		18.0[b] (7.0-25.0)		51.0[b] (29.0-67.0)		35.0[ac] (15.0-45.0)	

a. Mann Whitney U-test
b. Kruskal-Wallis Variance Analysis Test (Multiple comparisons were made under the Kruskal-Wallis one-way ANOVA (k samples) option)
** p<0.05 There are significant differences between groups containing different letters.*

Table 3. ***(continued) Scale scores according to the various characteristics of the participants***

	Knowledge Score		Interest Score		Anxiety Score		Attitude Scale About Adequate and Balanced Nutrition Score		Diet Satisfaction Score	
	Median (Q1-Q3)- U/χ^2 -p									
BMI Groups [b]										
<18.5	21.0[a] (15.0-24.0)		11.0[a] (7.0-16.0)		17.0[a] (7.0-23.0)		49.5[a] (29.0-61.0)		35.0[a] (23.0-42.0)	
18.5-24.9	21.0[ab] (9.0-25.0)	**χ^2:12,628 p:0,006**	11.0[a] (4.0-20.0)	χ^2:0,867 p:0,833	18.0[ab] (7.0-25.0)	**χ^2:10,735 p:0,013**	51.0[ab] (33.0-67.0)	**χ^2:10,634 p:0,014**	36.0[a] (15.0-45.0)	**χ^2:5,506 p:0,138**
25.0-29.9	20.0[ac] (12.0-25.0)		12.0[a] (7.0-20.0)		16.0[ac] (9.0-25.0)		48.0[ac] (35.0-64.0)		35.0[a] (19.0-43.0)	
>30.0	20.0[a] (8.0-25.0)		12.0[a] (4.0-18.0)		16.0[acd] (8.0-25.0)		46.0[acd] (33.0-62.0)		39.0[a] (23.0-43.0)	

b. Kruskal-Wallis Variance Analysis Test (Multiple comparisons were made under the Kruskal-Wallis one-way ANOVA (k samples) option)
** p<0.05 There are significant differences between groups containing different letters.*

Table 4. ***Problems while maintaining a vegetarian diet***

Questions	Disagree	Undecided	Agree
1. I think vegan/vegetarian products are expensive.	111 (27.4)	87 (21.5)	**207 (51.1)**
2. The high cost of vegan/vegetarian products negatively affects my purchase.	112 (27.7)	76 (18.8)	**217 (53.6)**
3. Vegan/vegetarian products are not easily accessible in markets.	112 (27.7)	60 (14.8)	**233 (57.5)**
4. The lack of widespread availability of vegan/vegetarian products has a negative impact on my purchase.	109 (26.9)	52 (12.8)	**244 (60.2)**
5. I think it is difficult to access information about vegan/vegetarian products.	**229 (56.5)**	67 (16.5)	109 (26.9)
6. Difficulty in accessing information about vegan/vegetarian products negatively affects my purchase.	**209 (51.6)**	72 (17.8)	124 (30.6)
7. I can't freely decide what I consume at home.	**301 (74.3)**	42 (10.4)	62 (15.3)
8. Not being able to freely decide what I consume at home negatively affects my purchase of vegan/vegetarian products.	**247 (61.0)**	73 (18.0)	85 (21.0)
9. I have been gaining weight since I started eating vegan/vegetarian.	**250 (61.7)**	96 (23.7)	59 (14.6)
10. Since I started eating a vegan/vegetarian diet. there have been negative changes in my social life due to my eating habits.	**232 (57.3)**	92 (22.7)	81 (20.0)
11. I can’t participate in social activities as I wish because of the food facilities.	**193 (47.7)**	91 (22.5)	121 (29.9)
12. My vegan/vegetarian eating habits negatively affect my relationships with friends and family.	**253 (62.5)**	86 (21.2)	66 (16.3)
13. My family supports my vegan/vegetarian diet.	**240 (59.3)**	108 (26.7)	57 (14.1)
14. My friends support my vegan/vegetarian diet.	**179 (44.2)**	141 (34.8)	85 (21.0)
15. I am aware of the barriers to maintaining a vegan/vegetarian diet.	59 (14.6)	88 (21.7)	**258 (63.7)**

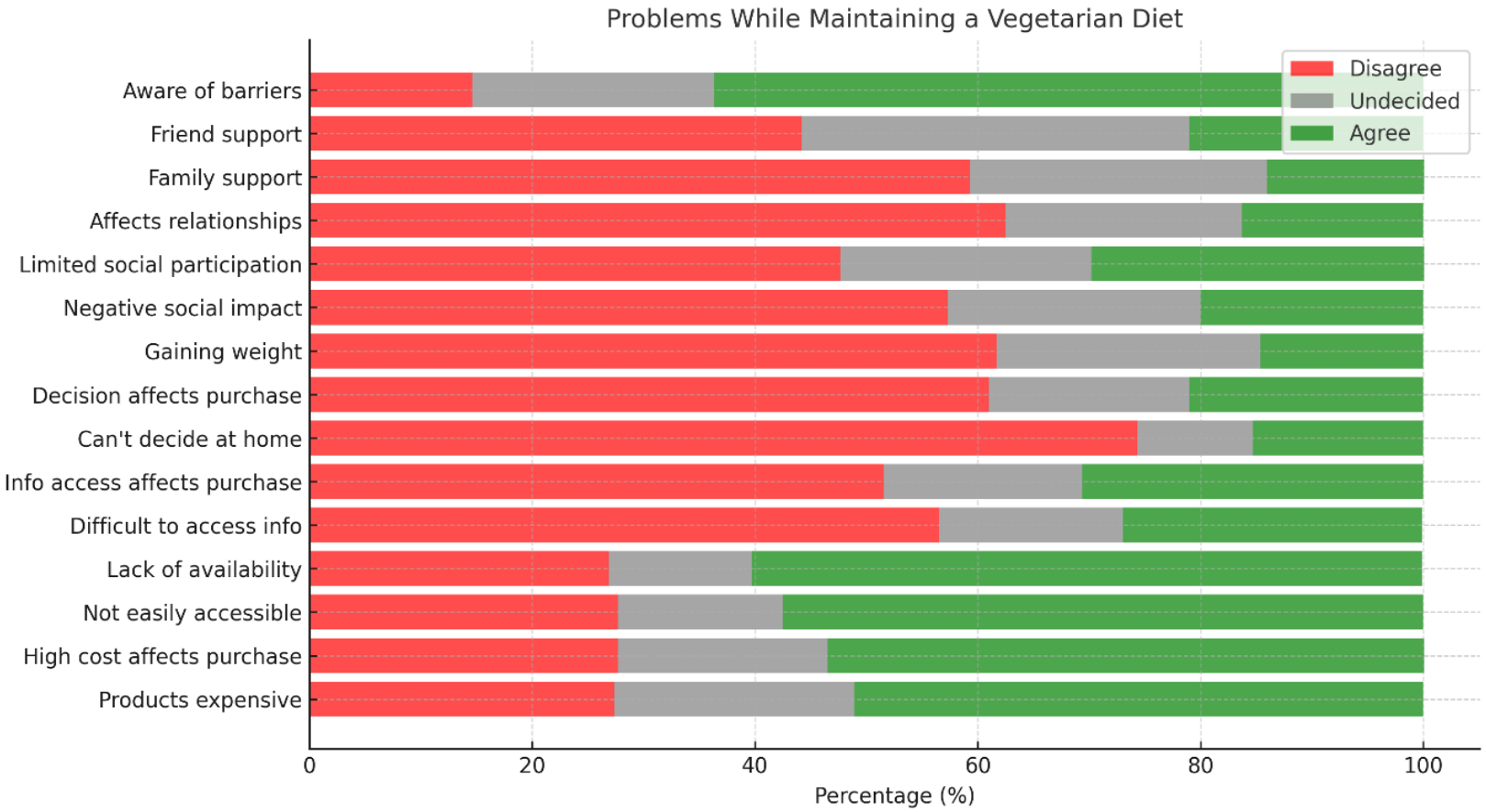

Figure 1. ***Problems while maintaining a vegetarian diet***

In this study, 42.0% of the participants used nutritional supplements and the most used nutritional supplements were vitamin B12 (47.6%), vitamin D (32.9%) and multivitamins (31.2%). In addition, omega-3, protein powders, zinc and iron supplements were also used (Table 2). As a result, vegetarian diets should be well planned and supplemented with necessary nutritional supplements. Otherwise, this type of diet, which has positive effects on diseases such as cardiovascular diseases, obesity, diabetes, arteriosclerosis and hypertension [39], may become risky in terms of health.

Within the scope of the study, the attitudes of vegetarian individuals about adequate and balanced nutrition and their diet satisfaction status were examined. According to the results of the scale, the mean attitude scale score of the participants about adequate and balanced nutrition was 49.5±6.3 (upper limit: 70 points) (Table 2). Accordingly, it can be concluded that vegetarian individuals have higher attitudes towards adequate and balanced nutrition. In addition, women had higher attitudes towards adequate and balanced nutrition than men, high school and university graduates had higher attitudes towards adequate and balanced nutrition than primary school graduates, and individuals with normal BMI had higher attitudes towards adequate and balanced nutrition than overweight and obese individuals ($p<0.05$). When the sub-dimensions of the scale were analyzed, it was determined that women and high school and university graduates had higher knowledge scores. Finally, it was determined that university graduates had higher anxiety scores than primary school graduates ($p<0.05$) (Table 3).

In the literature, it is known that women are more concerned about animal welfare, individual health related to meat consumption and weight control than men [40]. The fact that women generally have lower BMI values than men is also explained by the fact that women attach more importance to body image and nutrition [41]. In a study conducted in Norway, it was found that men were 52% more likely to be slightly obese/obese than women [42]. Similar to the literature, the results of the study showed that women had lower BMI values than men ($p<0.05$) (Table 2) and higher scores on adequate and balanced nutrition ($p<0.05$) (Table 3). It is also stated that as the level of education increases, individuals develop a sense of responsibility for their health [43]. At this point, the result that high school and university graduates have better attitudes about adequate and balanced nutrition is consistent with the literature. When the relationship between BMI and attitudes about adequate and balanced nutrition is examined, although it has been shown that individuals with normal BMI have better results in healthy eating behaviors and nutritional knowledge than obese individuals [41], there are studies where no relationship was found [44,45]. In this study, it was observed that the attitudes of vegetarian individuals towards adequate and balanced nutrition changed positively as the level of education increased (Table 3).

When the findings regarding the diet satisfaction of the participants and the problems they experienced while maintaining a vegetarian diet were analyzed, the mean of the diet satisfaction scale was 35.3±6.2 (upper limit: 45 points) (Table 2). According to this data, it can be concluded that the diet satisfaction of the participants was high. When diet satisfaction was analyzed according to various characteristics of the participants, it was found that university graduates had lower diet satisfaction than high school graduates ($p<0.05$) (Table 3). Although individuals with higher levels of education have higher attitude scores about adequate and balanced nutrition, their low diet satisfaction can be explained by the problems they experience while maintaining their diets. The most common problems experienced by the vegetarian individuals who participated in the study while maintaining their diets were that vegetarian products were expensive and difficult to find in the market. In addition, individuals stated that they could not get support from their family and friends (Table 4 and Figure 1). Similar to the studies conducted in Turkey, it was found that vegetarian individuals received negative reactions from family and friends and stated that vegetarian products were expensive [15,46]. In another study, it was determined that the participants had difficulty in accessing vegetarian products and found these products expensive. In addition, they received negative reactions from their family and friends [40]. In this case, it can be stated that it will take time for vegetarian diets to be adopted by the society in Turkey, to increase product diversity and to become economically viable.

5. Limitations of the study

The main limitation of the study is that the data were collected online. Therefore, food consumption records could not be obtained from the participants because it was not thought that food consumption records would be obtained accurately. Considering the heterogeneity of the target population and challenges in accessibility, the convenience sampling method was preferred. However, the generalizability of this method is limited. Participants were asked to take measurements from the nearest health center for BMI calculations. However, this is seen as a limitation since the measurement conditions are not known. In addition, it is thought that in future studies, it will be useful to collect data face-to-face and evaluate daily energy intake, macro and micronutrients, body fat mass and lean tissue mass. Finally, the cross-sectional design of the study makes it difficult to establish causal relationships, which is considered a limitation.

6. Conclusion

In this study examined the attitudes towards adequate and balanced nutrition, diet satisfaction, and the challenges faced in maintaining this dietary pattern among individuals in Turkey who prefer a vegetarian diet. The results indicate that vegetarian individuals generally have a positive attitude toward adequate and balanced nutrition and possess a high level of health

consciousness. However, it can be stated that those with characteristics such as being female, having a higher level of education, and a normal BMI are in a better position regarding attitudes toward adequate and balanced nutrition. It was observed that individuals with higher education levels had lower levels of diet satisfaction. The most common challenges in maintaining a vegetarian diet were identified as the high cost and limited availability of vegetarian products, as well as a lack of support from family and friends on this matter.

In light of these findings, it is recommended that health policymakers and nutrition experts create educational and support programs for individuals adopting vegetarian and vegan diets. These programs are essential, especially to provide information about nutritional supplements and to help these individuals maintain a balanced diet. Furthermore, it is necessary to increase awareness of vegetarian nutrition in the general population and to conduct more research to better understand the health effects of this dietary pattern. Additionally, incentives should be provided to offer vegetarian products at more affordable prices, and efforts should be made to strengthen logistics and distribution channels to increase the availability of vegetarian products. Finally, it is recommended to increase the availability of vegetarian options in restaurants and accommodation establishments and to promote such businesses.

Ethics

Ethics Committee Approval dated 10/01/2022 and decision number 01/03 was obtained from Ankara University Ethics Committee for the study.

Authorship Contributions

Study design: E.A, E.C., Data collection: E.A, E.C., Data analysis: E.C., Draft preparation: E.C, E.A., Critical review for content: E.C, E.A., Final approval of the version to be published: E.C, E.A.

Conflict of Interest

No conflict of interest was declared by the authors.

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