ARAŞTIRMA MAKALESİ / *RESEARCH ARTICLE*

Evaluation of Knowledge Levels of Probiotics and Consumption Status of Probiotics and Prebiotics in Patients Applicant to the Gastroenterology Outpatient Clinic

Gastroenteroloji Polikliniğine Başvuran Hastalarda Probiyotik Bilgi Düzeylerinin ve Probiyotik ve Prebiyotik Tüketim Durumlarının Değerlendirilmesi

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ABSTRACT

Aim: *This study aims to evaluate the probiotic knowledge level and consumption status of patients who apply to gastroenterology outpatient clinics.*

Material and Methods: *The study was conducted at the gastroenterology outpatient clinic of Sakarya Training and Research Hospital between October 2020 and January 2021. The researcher filled out an interview form for patients who agreed to participate in the study. The interview included questions about patients' demographic data, probiotic knowledge, and consumption habits.*

Results: *66.52% (n: 230) of patients participating in the study were female, and the average age was 44.42 years. While 12 (5.22%) were illiterate, 106 (46.09%) were primary school graduates, 74 (32.17%) were secondary school graduates, 74 (14.78%) were university graduates, and 4 (1.74%) were post-graduates. Seventy-four (32.17%) of patients had at least one chronic disease, and 87 (37.82%) smoked an average of 15 cigarettes a day. When asked, "What is a probiotic? Do you know?" 161 (70.00%) of patients stated that they did not know this concept. Only 51 (22.17%) of patients were using probiotics. Patients obtained information about probiotics from 12 (17.39%) specialist doctors, 7 (10.14%) from friends and family, 28 (40.57%) from advertisements, 8 (11.59%) from training seminars, 11 (15.94%) from pharmacies, and 38 (55.07%) from the internet and social media. The probiotic foods consumed were kefir (n: 36, 70.58%), probiotic yoghurt. (n: 29, 56.86%), respectively. probiotic cheese (n: 11, 21.56%) and probiotic milk (n: 7, 13.72%). Ten (19.60%) of patients were using probiotic powder/tablets*

Conclusions: *In our study, we observed that the probiotic knowledge levels and consumption habits of the patients who applied to the gastroenterology outpatient clinic were low. Probiotics are important microorganisms for intestinal health and maintaining a healthy microbiota. Lack of information in patients causes low consumption of these beneficial microorganisms. Further studies are needed to improve the level of knowledge and consumption habits.*

Key words: *probiotic; knowledge level; consumption status; patient; gastroenterology outpatient clinic*

ÖZET

Amaç: *Bu çalışmanın amacı gastroenteroloji polikliniğine başvuran hastaların probiyotik bilgi düzeyi ve tüketim durumlarını değerlendirmektir.*

Gereç ve Yöntem: *Çalışma, 1 Ekim 2020–1 Ocak 2021 tarihleri arasında Sakarya Eğitim ve Araştırma Hastanesi gastroenteroloji polikliniğinde gerçekleştirildi. Çalışmaya başlamadan önce Sakarya Üniversitesi Tıp Fakültesi Etik Kurulu'ndan etik kurul onayı alındı. Çalışmaya katılmayı kabul eden hastalara araştırmacı tarafından görüşme formu dolduruldu. Görüşme formu, demografik veriler ile probiyotik bilgi ve tüketim alışkanlıklarına ilişkin bilgileri içeren sorulardan oluştu.*

Bulgular: *Çalışmaya katılan hastaların %66,52'si (n: 230) kadındı ve yaş ortalaması 44,42 yıldı. On ikisi (%5,22) okuryazar değilken; 106'sı (%46,09) ilköğretim, 74'ü (%32,17) ortaöğretim, 74'ü (%14,78) üniversite ve dördü (%1,74) yüksek lisans mezunuydu. Hastaların 74'ünün (%32,17) en az bir kronik hastalığı vardı ve 87'si (%37,82) günde ortalama 15 adet sigara içiyordu. "Probiyotik nedir? Biliyor musunuz?" diye sorulduğunda hastaların 161'i (%70,00) bu kavramı bilmediğini ve ilk kez duyduğunu bildirdi. Hastaların sadece 51'i (%22,17) probiyotik kullanıyordu. Hastalar probiyotikler ile ilgili bilgiyi, 12'si (%17,39) uzman doktordan, yedisi (%10,14) arkadaş ve aile bireylerinden, 28'i (%40,57) reklamlardan, sekizi (%11,59) eğitim-seminerlerden, 11'i (%15,94) eczanelerden ve 38'i (%55,07) internet ve sosyal medya aracılığıyla edinmişti. Tüketilen probiyotikli besinler sırasıyla, kefir (n: 36; %70,58), probiyotik yoğurt (n: 29, %56,86), probiyotikli peynir (n: 11, %21,56) ve probiyotikli süt (n: 7, %13,72) idi. Hastaların 10'u (%19,60) probiyotik toz/tablet kullanmaktaydı.*

Sonuç: *Çalışmamızda gastroenteroloji polikliniğine başvuran hastaların probiyotik bilgi düzeylerinin ve tüketim alışkanlıklarının düşük olduğu görüldü. Probiyotikler, bağırsak sağlığı ve sağlıklı bir mikrobiyotanın korunması için önemli mikroorganizmalardır. Hastalarda bilgi eksikliği bu faydalı mikroorganizmaların az tüketilmesine neden olmaktadır. Bilgi düzeyinin ve tüketim alışkanlıklarının iyileştirilmesi için daha fazla çalışmalara ihtiyaç vardır.*

Anahtar kelimeler: *probiyotik; bilgi düzeyi; tüketim durumu; hasta; gastroenteroloji polikliniği*

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Introduction

Gastrointestinal tract (GIS) health is directly related to the gut microbiota, which has an intact microbial ecosystem. The human gut microbiota includes indigenous gut microbiota that participate in various functions that improve host health[1]. Health maintenance depends on the gut microbiota, and microbial alterations can increase disease-causing pathogenic microorganisms[2]. Probiotic microorganisms are biotherapeutic products that maintain human health and reduce the risk of other metabolic disorders. FAO/WHO defines probiotics as "live microorganisms that provide health benefits to the host when administered in sufficient quantities"[3]. Probiotics primarily target the modulation of the intestinal microbiota to benefit the host's health[1].

Lactobacillus spp. and *Bifidobacterium spp., Saccharomyces spp., Bacillus spp., Escherichia coli, Enterococci* and *Weissella spp.* were reported to be the probiotic microorganisms used commercially in research and industry[4]. A global analysis of clinical studies with probiotics reported that the most studied probiotic strains were *Lactobacillus rhamnosus* GG (LGG) and *Bifidobacterium animalis ssp. lactis* BB12[5]. Many clinical studies have investigated probiotic bacteria (mainly lactobacillaceae and bifidobacteria) targeting various diseases and conditions[6]. Several species of the genera *Bifidobacterium* and *Lactobacillus* have been suggested to be beneficial to the gut microbiota by creating a favorable healthy environment in the gut. In high-quality meta-analyses, probiotics are effective against infectious diarrhea, antibiotic-associated diarrhea, traveler's diarrhea, slow bowel transit, irritable bowel syndrome, abdominal pain and bloating and ulcerative colitis[7,8].

Prebiotics are selectively fermented short-chain carbohydrates that stimulate the growth and activity of beneficial microbes colonizing the gut. Gibson and Roberfroid defined prebiotics as "a non-digestible food component that beneficially affects the host by selectively stimulating the growth and/or activity of one or a limited number of bacteria in the colon, thereby improving host health"[9]. Prebiotics contribute positively to the well-being and health of the individual by affecting the composition and activity of GI microorganisms[10].

Despite the availability of evidence and facilities supporting the use and health benefits of probiotics and prebiotics, there is still confusion surrounding these concepts[11]. Given that preventing dysbiosis and maintaining intestinal microbiota health is directly linked to overall health, patients seeking treatment at gastroenterology outpatient clinics must possess adequate knowledge about probiotics and prebiotics[12,13]. These substances play a significant role in safeguarding and enhancing intestinal microbiota health.

This study evaluated the probiotic knowledge level and consumption status of patients who applied to gastroenterology outpatient clinics.

Material and Methods

Place and time

The study, planned as a descriptive, was conducted at the gastroenterology outpatient clinic of Sakarya Training and Research Hospital (SEAH) between October 1, 2020 and January 1, 2021

Population and sample of the research

The study population consisted of patients who applied to the SEAH gastroenterology outpatient clinic between October 1, 2020, and January 1, 2021. The research used the convenience sampling technique. The sample consisted of 230 patients who agreed to participate.

Data collection tools

The researchers created the interview form by scanning the literature. It consists of two sections and 27 questions: sociodemographic information, level of knowledge about probiotics and prebiotics, and consumption habits.

Participant approval

The researcher informed patients who applied to the outpatient clinic about the study. Patients who agreed to participate in the study were included after filling out the informed consent form.

Collection of data

The researchers collected study data through face-to-face interviews. The interview form was filled out by the researchers for the patients who agreed to participate in the study, and each patient's interview lasted approximately 8 minutes.

Ethics committee approval

Before starting the study, ethics committee permission was obtained from the Sakarya University Faculty of Medicine Ethics Committee (dated 11.09.2020; number E-71522473-050.01.04-516).

Evaluation of Data

Data analysis was performed using Statistical Package for Social Sciences (SPSS) program version 22 for Windows (IBM Corp., Armonk, NY, USA). The study data are displayed as Frequency distributions (number, percentage) for categorical variables and descriptive statistics (mean, standard deviation, median, interquartile range) for numerical variables.

Results

Demographic data

Of the 230 study participants, 153 (66.52%) were female, 77 (33.48%) were male, and the average age was 44.42±14.10 years. Data regarding the sociodemographic information of the patients are shown in Table 1. 74 (32.17%) of the patients had at least one chronic disease, and 31 (13.47%) were constantly using medications due to these diseases. When patients' smoking habits were questioned, 87 (37.82%) of them had been smoking an average of 15 cigarettes a day for 20 years. When the distribution of patients is evaluated according to body mass index (BKI), 13 (5.65%) of the patients were underweight, 82 (35.65%) were normal, 79 (34.34%) were overweight, 51 (22.17%) were obese, and 5 (2%) were obese. 17) were severely morbidly obese (Table 1).

Data on probiotic information

When the findings regarding probiotic knowledge are evaluated, "What is probiotic? Do you know?" When the question was asked, 161 (70.00%) of the patients stated that they did not know and heard this concept for the first time, and 69 (42.85%) stated that they did not know what probiotic microorganisms were. Patients who knew about probiotics (30.00%) reported that probiotic microorganisms included yeast (27.53%), mold (24.63%) and lactobacilli (1.44%). While expressing that he knows, none of the patients stated that they knew about bifidobacter and streptococcus. When the sources of information about probiotic foods were evaluated, 12 (11.53%) of the patients obtained information from specialist doctors or dieticians, 7 (6.73%) from friends, relatives, family etc., 28 (26.92%) from advertisements, 8 (7.69%) from training, conferences and scientific meetings, 11 (10.57%) from pharmacies and sales points and 38 (36.53%) from the internet-social media (Table 2). Of the patients who knew about probiotics, 63 (91.30%) thought that probiotic foods positively affected health.

Information on Probiotic Consumption

When probiotic consumption habits were evaluated, it was found that only 51 (22.17%) of the patients consumed probiotics. The patients' reasons for consuming or not consuming probiotics and other information regarding probiotic consumption are presented in Table 2. The probiotic foods consumed by the patients were, respectively, kefir (n: 36; 70.58%), probiotic yoghurt (n: 29, 56.86%), probiotic cheese (n: 11, 21.56%) and probiotic milk (n: 7, 13.72%) (Figure 1). Ten (19.60%) of the patients were using probiotic powder/tablets. Patients reported that probiotic foods caused constipation (n: 28, 54.90%), diarrhea (n: 11, 21.56%), irritable bowel syndrome (n: 5, 9.80%), lactose intolerance (n: 3, 5%) inflammatory bowel diseases (n: 3, 5.88%), high cholesterol (n: 3, 5.88%), urogenital infections (n: 1, 1.96%), Helicobacter pylori infection (n: 1, 1.96%) stated that it was good for their diseases and 17 (33.33%) stated that it was good for the digestive system. Fifty-one (100%) of the patients using probiotics reported that they would recommend them to their close circle to consume probiotics. The answers given by the patients regarding the consumption of prebiotic and probiotic foods are shown in Figure 2.

Discussion

Our study evaluated the probiotic and prebiotic knowledge level and consumption status of patients who are applicants to the gastroenterology outpatient clinic. In our study, it was found that the level of knowledge of probiotics among patients was 30%. In the study conducted by Koray in our country to investigate the use and knowledge levels of probiotics in gastroenterology polyclinics and clinical patients, it was determined that 42% of the patients knew the concept of probiotics[14]. The study conducted by Ozdemir in the gastroenterology polyclinic of Sanko University Sani Konukoğlu Practice and Research Hospital reported that the rate of gastroenterology patients knowing the concept of probiotics correctly was 42.7%[15]. In a study conducted in the United Arab Emirates, it was

Table 1. *Sociodemographic characteristics of the patients*

Features		N (%) / Arithmetic mean ± standard deviation (minimum value-maximum value)
Age		44.4 ± 14.1 (18.0-78.0)
Gender	Female	153 (66.5)
	Male	77 (33.4)
Education status	illiterate	12 (5.2)
	Primary education	106 (46.0)
	Secondary education	74 (32.1)
	University	34 (14.7)
	Master degree	4 (1.7)
Job	Housewife	104 (45.2)
	Employee	60 (26.0)
	Retired	30 (13.0)
	Public employee	10 (4.3)
	Not working	10 (4.3)
Income status	Monthly income (TL)	3250.7 ± 948.9 (750-10.000)
Presence of chronic disease	Yes	74 (32.1)
	No	156 (67.8)
Distribution of chronic diseases	Hypertension	31 (33.3)
	Cardiovascular disease	7 (7.5)
	Diabetes mellitus	23 (24.7)
	Chronic obstructive pulmonary disease (COPD)	4 (4.3)
	Asthma	14 (15.0)
	Hypothyroidism	5 (5.3)
	Kidney failure	2 (2.1)
	Neurological diseases	4 (4.3)
	Hematological diseases	2 (2.1)
	Rheumatic diseases	1 (1.0)
Continuous drug use	Yes	31 (13.4)
	No	199 (86.5)
Distribution of drugs used	Antidiabetic	5 (10.8)
	Antihypertensive	8 (17.3)
	Proton Pump Inhibitor (PPPI)	7 (15.2)
	Antidepressant (SSRI)	4 (8.7)
	Antihistamine	2 (4.3)
	Antithyroid	2 (4.3)
	Anticoagulant	3 (6.5)
	Antiepileptic	2 (4.3)
	Laxative	2 (4.3)
	Anti-inflammatory	3 (6.5)
	Alphablockers	1 (2.1)
	Steroid	1 (2.1)
	Monoclonol antibody	1 (2.1)
	Antacid	1 (2.1)
	Bronchodilator	1 (2.1)
	Antispasmolytic	1 (2.1)
	Vitamin B12	1 (2.1)
	Iron	1 (2.1)
Body mass index (BMI) km/m^2 distribution	<18.5 underweight	13 (5.6)
	18.5-24.9 is normal	82 (35.6)
	25-29.9 overweight	79 (34.3)
	30-39.9 obese	51 (22.1)
	>40 severely morbidly obese	5 (2.1)
Smoking	Yes	87 (37.8)
	No	143 (62.1)
	Pieces (day)	14.9±6.7 (2.0-40.0)
	Duration (year)	20.5±11.6 (1.0-50.0)

Table 2. *Information on patients' probiotic knowledge and consumption habits*

Features		N (%)
Knowing probiotics	Yes	69 (30.0)
	No	161 (70.0)
Knowing the types of probiotic bacteria*	*Lactobacillus* species	1
	Bifidobacterium species	0
	Streptococcus species	0
	Yeasts	19
	Molds	17
	I don't know any of them - I haven't heard of them	161
Reasons to consume probiotic foods*	I saw its benefits for my digestive system.	40 (78.4)
	Because it regulates the gastrointestinal system	37 (72.5)
	I think it protects against cancer	7 (13.7)
	I find it delicious	7 (13.7)
	Strengthens the immune system	16 (31.3)
Reasons for not consuming probiotic foods	I do not know what it is	161 (89.9)
	I don't find it natural	0
	I don't need	11 (6.1)
	I find it expensive	0
	I find it tasteless	3 (1.6)
Where did you hear about probiotic foods?*	Specialist (Doctor or Dietician)	12 (23.5)
	Friend, acquaintance, family, etc.	7 (13.7)
	Advertisements (Newspaper, magazine, television)	28 (54.9)
	Education, conference, scientific meeting	8 (15.6)
	Pharmacies and sales points	11 (21.5)
	Internet-social media	38 (74.5)
What health benefits have you seen from probiotic foods?*	It was good for my cardiovascular diseases (high blood pressure, palpitations, etc.)	4 (7.8)
	Good for Digestive System Problems (constipation, diarrhea, etc.)	45 (88.2)
	It contributed to strengthening my immune system	21 (41.1)
	Depression, anxiety etc. It was good for my problems like	3 (5.8)
	It was good for my infectious diseases (cold, flu, etc.)	5 (9.8)
How TV, radio, newspapers and advertisements affect your probiotic food consumption*	Positive	35 (68.6)
	Negative	0
	Does not affect	16 (31.3)
Criteria you pay attention to when purchasing probiotic food*	Price	7 (13.7)
	Brand	22 (43.1)
	Nutrition label, content	38 (74.5)
	Appearance	1 (1.9)
Probiotic product consumption frequency*	1 time per day	22 (43.1)
	2-3 times a day	7 (13.7)
	1 time per week	14 (27.4)
	1-3 times a month	8 (15.6)
The amount of probiotic food you consume at a time*	½ (half) glass of water	5 (9.8)
	1 cup	46 (90.1)
Use of products containing probiotic powder or tablets*	Yes	10 (19.6)
	No	41 (80.4)
Have you benefited from probiotic foods?*	Yes	45 (88.2)
	No	6 (11.7)
Which diseases did consuming probiotic foods help you with?*	Constipation	28 (54.9)
	Diarrhea	11 (21.5)
	Allergy	0
	Lactose intolerance	3 (5.8)
	Inflammatory bowel diseases	3 (5.8)
	High cholesterol	3 (5.8)
	Urogenital infections	1 (1.9)
	Irritable bowel syndrome	5 (9.8)
	Helicobacter pylori infection	1 (1.9)
	Acute pancreatitis	0
	It was good for the digestive system	17 (33.3)
Would you recommend your friends to consume probiotic foods?*	Yes	51 (100)
	No	0

*Individuals who consume probiotics (n:51) and Patients answered these questions by selecting multiple options.

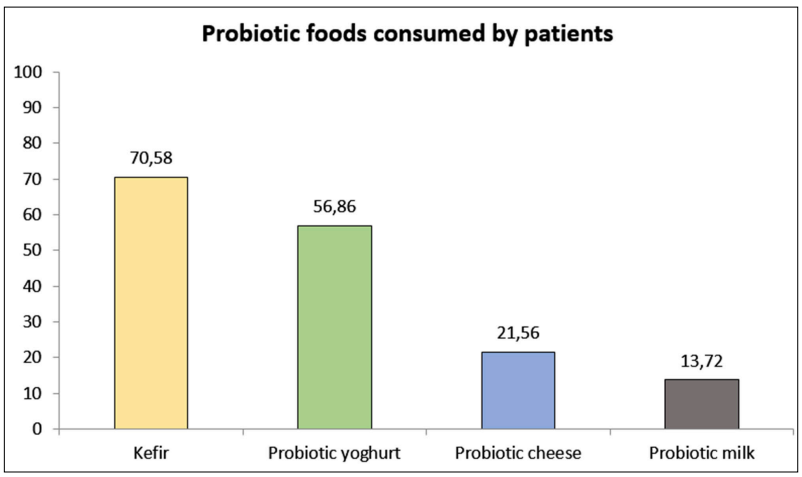

Figure 1. *Probiotic foods consumed by patients.*

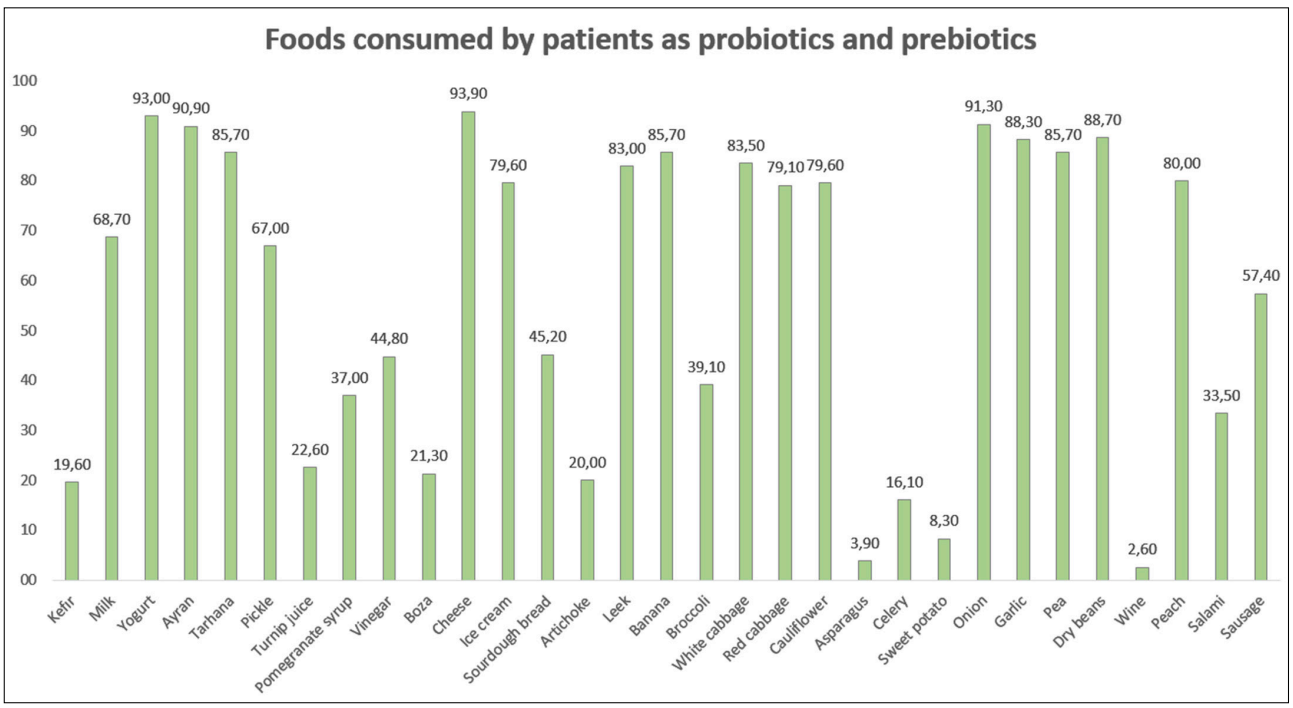

Figure 2. *Information on patients' consumption of prebiotic and probiotic foods.*

reported that 38.8% (n=64) of individuals could identify probiotics[16]. A study conducted with people living in Afyonkarahisar province stated that 46.8% of individuals knew about probiotics[17]. The study conducted by Şengün et al. in Izmir/Bornova showed that 49% of consumers knew the concepts of probiotic and prebiotic[18]. In the study conducted by Kağan et al., it was reported that 64.5% of adults knew the concept of probiotics[19]. In Aslantürk's study with individuals applying to the nutrition and diet clinic, it was found that 85% of the participants knew the term probiotic[20]. In a study conducted by face-to-face interview method with 25 participants to determine the knowledge level and consumption status of individuals in working life about probiotic foods, it was reported that 96% of the participants knew the term probiotic[21]. A study conducted with university students stated that 49.5% of the students knew about probiotics[22]. It has been observed that gastroenterology patients' knowledge of probiotics is low compared to the literature.

In our study, 27.53% of the patients knew yeast, 24.63% knew mold, and 1.44% knew lactobacilli. It was observed that none of the patients knew about bifidobacter and streptococcus. In the study conducted

by Aslantürk, 8.0% of the individuals knew about yeasts and 72% about probiotic bacteria[20]. In the study conducted by Ozgül, it was stated that 60% of the participants knew yeasts, 60% knew *Lactobacillus* species, 44% knew *Escherichia* species, 44% knew molds, and 8% knew *Bifidobacterium* species[21]. A study found that 69.4% of consumers did not know any probiotic microorganisms; the most known microorganism was Streptococcus spp. It was found to be (8.2%)[18]. Our study observed that knowledge about probiotic microorganisms was low, and this result was compatible with the literature.

It was determined that the probiotic consumption status of patients applying to the gastroenterology outpatient clinic was 22.60%[23]. A study conducted at the Columbia University Irving Medical Center Endoscopy unit found that 27% of gastroenterology patients used probiotics. A study conducted at a tertiary medical center in California found that 55% of patients had recently used probiotics. In the same study, it was reported that women were more likely to consume probiotics than men (odds ratio (OR): 1.99; 95% confidence interval (CI): 1.2–3.4)[24]. A study conducted to examine the knowledge and consumption levels of probiotics in patients who applied to the gastroenterology outpatient clinic at a university hospital in our country reported that 46.3% of the patients were careful to use probiotics. Still, only 7% of them used probiotic supplements[15]. The study conducted to determine the consumption habits of probiotic products reported that the rate of consumers consuming probiotic products was 26.0%[17]. Kağan et al. reported the probiotic consumption status of adult individuals as 73.6%[20]. In the study conducted to determine the knowledge level and consumption status of adult individuals about probiotic foods, it was reported that the probiotic food consumption status of individuals was 97.0%, the probiotic supplemented food consumption status was 44%, and the probiotic nutritional supplement usage status was 11%[21]. In the study conducted at Pamukkale University, 73.5% of the students were found to consume probiotic foods, and in the study conducted at Gümüşhane University, 82.4% of the students consumed probiotic foods[25,26]. A study conducted at Sakarya University Faculty of Engineering reported that 32.16% of Food Engineering Department students and 12.18% of chemistry students consumed probiotic food[27]. Another study investigating probiotic food consumption status reported that 56.3% of university students consumed probiotic foods[28].

Our study determined that the patients consumed probiotics mostly because they were beneficial to the digestive system and regulated the stomach-intestinal system. In their study, Lynch et al. reported that gastroenterology patients consumed probiotics because they improved general health and longevity and improved gastrointestinal symptoms[18]. In a study conducted with patients who applied to the gastroenterology outpatient clinic in our country, the patients stated that they used probiotics because they positively affected their intestines and liked their taste[15]. In the study conducted by Aslantürk, it was reported that the most common reasons adults consume probiotics are because they are beneficial to the digestive system (70.1%) and strengthen the immune system (48.5%)[21]. Another study conducted with adults found that 42% of individuals consumed probiotics for advice, 28.4% for health problems, 12.3% for the effect of advertisements, and 17.3% for other reasons[20]. In the study conducted with consumers, it was stated that 63.9% of the consumers thought that probiotics were beneficial to the digestive system, 19.5% thought that they were protective against cancer, 49.1% found them delicious, 49.1% thought that they strengthened the immune system, and 13% consumed probiotics due to the influence of advertisements[19]. In the study conducted by Zemzemoğlu et al. with university students, it was determined that 51.6% of the students consumed probiotics upon recommendation, 24.6% due to health problems and 11.8% due to the influence of advertisements[26]. The results of our study are compatible with the literature, and it has been observed that the most common reason for probiotic consumption is that it is beneficial to the digestive system.

When the reasons for not using probiotics were evaluated, it was determined that most gastroenterology patients in our study (89%) did not know what probiotics were. Fewer did not consume probiotics because they did not need them (6%) and found them tasteless (1%). In the study conducted by Ozdemir with patients who applied to the gastroenterology outpatient clinic, the reasons why the participants did not consume probiotics were as follows: they did not know what probiotics were (51%), they did not need them (25%), they found them expensive (18%), they did not believe they were effective (3%), and they did not taste them. It has been reported that people do not consume probiotics because they do not like them (1%)[15]. Another study conducted with adults reported that individuals did not consume probiotics because they did not know

what they were and found them tasteless[21]. In the study conducted by Ozgül et al. with individuals in working life, it was shown that individuals did not consume probiotics because they were not natural (50%) and did not need them[22]. According to the research results, the most common reason for not consuming probiotics is not knowing what probiotics are. The results of our study support the literature.

It was observed that the probiotic foods consumed by the patients were kefir, probiotic yoghurt, probiotic cheese and probiotic milk, respectively. Ten (19%) patients were using probiotic powder/tablets. As for natural probiotic foods, it was observed that the patients mostly consumed yoghurt, cheese and ayran. In the study conducted by Lync et al. with general gastroenterology patients, 33 of the patients consuming probiotics preferred prescribed probiotics, 9 preferred yoghurt, 7 preferred multiple probiotic products, 2 preferred kombucha, and 1 preferred a named bacteria; 78 of the patients reported that they were not sure about the type of probiotic they used[18]. In a study conducted in our country, when the consumption frequency of natural probiotic foods in gastroenterology patients was examined, it was determined that the food consumed at the highest rate every day was cheese, and the second most consumed food was pickled olives[15]. In the study conducted by Tenekeci, in which the use of probiotics and their knowledge levels were investigated in gastroenterology outpatient clinic and clinic patients, 134 of the patients consumed yoghurt, 75 consumed pickles, 38 consumed sourdough dough, 33 consumed fermented milk drinks such as kefir and probiotic drinks, and 9 consumed fermented milk drinks such as kefir and probiotic drinks. It was determined that 100 people used boza, 6 used probiotic food supplements and 21 used other probiotic products[14]. In the study conducted with consumers, it was determined that the most probiotic consumption distribution of consumers was kefir (51%), probiotic yoghurt (49.5%) and probiotic cheese (12.2%), respectively[19]. In the study conducted by Celik et al., the main products consumed by consumers most frequently were cheese, yoghurt, buttermilk, apple cider vinegar, cucumber/sauerkraut, respectively, while probiotic supplements, boza, and kombucha were determined to be the least consumed products[29]. In the study conducted by Ozgül et al., 20% of individuals in working life who use probiotic powders, capsules, pills, etc., have been reported to use[22]. When the literature was evaluated, it was seen that the most consumed probiotic product was yoghurt, and our study results are compatible with the literature.

When the probiotic information sources of the patients were evaluated, 12 (23.52%) of the patients came from specialist doctors, 7 (13.72%) from friends and family acquaintances, 28 (54.90%) from advertisements, 8 (15.68%) from advertisements obtained information about probiotics from training-seminars, 11 (21.56%) from pharmacies, and 38 (74.50%) from the internet-social media. A study reported that 20 patients had sources of probiotic information from TV, 3 from the internet, 15 from a dietician/doctor, 2 from newspapers/magazines, 9 from family/friends and 7 from other information sources[14]. In another study, gastroenterology patients' sources of information about probiotics were 16.3% TV commercials, 13.3% dietitians, 12.3% internet/social media, 7.3% doctors, 6.7% neighbor/friend, and 5.6%. It was reported that 3.7% were nutrition books, 3.7% were pharmacists, and 3.3% were other information sources[15]. In the research conducted on adult individuals' knowledge and consumption of probiotic foods, probiotics were consumed by advertisements (32.4%), friends-family-acquaintances (27.0%), specialist-dietitians-doctor (21.6%), and conferences, respectively. It was reported that he heard about it from scientific meetings and pharmacy sales points (9.5%)[20].

Our study determined that probiotic food consumption was mostly beneficial for health problems such as constipation (54.90%) and diarrhea (21.56%) in the patients. The study conducted with consumers found that it was good for constipation in 68.6% of the consumers, diarrhea in 42.3%, allergies in 16.7%, and the rate of being good for lactose intolerance was 12.2%[29]. In a study conducted with individuals in working life, probiotics were reported to be good for problems to reduce constipation (84%), diarrhea (60%), bloating and indigestion (52%), inflammatory bowel disease (36%), allergy and immune system (28%), and high cholesterol (4%)[22]. When the literature was examined, it was concluded that probiotics were mostly good for digestive system problems such as constipation and diarrhea. The results of our study are compatible with the literature.

The study's limitations include being conducted in a single city and a single center, and the majority of the patients participating in the study are female. When the literature is examined, it is seen that there are few studies on gastroenterology patients and probiotic consumption. Our study is original research that will

contribute to the literature in this respect and shed light on future studies.

Conclusion

Although studies on the benefits of probiotics are still ongoing, it is stated that the results for human health are positive. With the discovery of new probiotics and the use of probiotic strains in diseases, it will be possible to protect human health, treat diseases or prevent diseases. In our study, it was observed that gastroenterology patients had a low level of knowledge about probiotics and probiotic consumption. Considering gastroenterological diseases and their benefits to the digestive system and immune level, it is noteworthy that gastroenterology patients have low probiotic knowledge and low probiotic consumption. Activities such as training, projects, panels and seminars should be organized to increase the knowledge level and awareness of patients and their consumption habits and to explain probiotics and their beneficial effects that encourage healthy nutrition. Patients should be informed about probiotic consumption by being advised to apply to the outpatient clinic. Although studies in the field of gastroenterology regarding the knowledge and consumption levels of probiotics are limited, contributing to the literature by conducting clinical and descriptive studies in this field will shed light on future research. A limited number of studies have been conducted on this subject; more detailed studies are needed.

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Ethics Committee Approval

The research received ethics committee approval from the Sakarya University Faculty of Medicine Ethics Committee (dated 11.09.2020; number E-71522473-050.01.04-516).

Participant approval

The researcher informed patients who applied to the outpatient clinic about the study. Patients who agreed to participate in the study were included after filling out the informed consent form.

Peer Review

Externally peer-reviewed.

Author Contributions

Conception/Design of Study– GK, CK, ŞT; Data Acquisition– GK and CK; Data Analysis/Interpretation– GK and ŞT; Drafting Manuscript– GK and ŞT; Critical Revision of Manuscript– GK, ŞT, CK; Final Approval and Accountability– GK, ŞT and CK; Material and Technical Support– GK and CK; Supervision– GK and ŞT.

Conflict of Interest

The authors have no conflict of interest to declare.

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