



EVALUATION OF KNOWLEDGE, ATTITUDES, AND PRACTICES OF COMMUNITY PHARMACISTS TOWARD CELIAC DISEASE

*SERBEST ECZACILARIN ÇÖLYAK HASTALIĞINA YÖNELİK BİLGİ, TUTUM VE
UYGULAMALARININ DEĞERLENDİRİLMESİ*

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ABSTRACT

Objective: *The knowledge and attitude of pharmacists play an essential role in the patient counseling services of pharmacists. Celiac disease is one of the diseases in which patient follow-up and counseling are essential, and the number of studies dealing with the roles of pharmacists in this disease is very limited. This study aims to fill this gap and contribute to public health by evaluating community pharmacists' knowledge, attitudes, and practices for celiac disease.*

Material and Method: *Based on the literature, a measurement tool including the knowledge, attitudes, and practices of community pharmacists for celiac disease has been developed. The measurement tool was applied online to community pharmacists in Türkiye in 2021. The obtained data were subjected to explanatory factor analysis (EFA).*

Result and Discussion: *The number of pharmacists participating in this study is 408. A four-factor structure was obtained: knowledge of celiac disease, attitude towards celiac disease, counseling practices for celiac patients, and professional development practices. The Cronbach's alpha values of the factors were calculated between 0.794 and 0.935, which shows high reliability. These factors explained 70.343% of the total variance. The community pharmacists had positive attitudes toward counseling for celiac disease. Still, there were some deficiencies in terms of knowledge and practice. It is thought that the knowledge and awareness of pharmacists on celiac diseases can be increased by including issues related to celiac disease in both undergraduate education and vocational training programs.*

Keywords: *Attitude, celiac disease, community pharmacist, knowledge, practice*

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ÖZ

Amaç: Eczacıların bilgi ve tutumları, eczacıların hasta danışmanlığı hizmetlerinde önemli bir rol oynamaktadır. Çölyak hastalığı, hasta takibi ve danışmanlığının gerekli olduğu hastalıklardan biridir ve bu hastalıkta eczacıların rollerini ele alan çalışma sayısı oldukça sınırlıdır. Bu çalışma, serbest eczacıların çölyak hastalığı konusundaki bilgi, tutum ve uygulamalarını değerlendirerek bu boşluğu doldurmayı ve halk sağlığına katkıda bulunmayı amaçlamaktadır.

Gereç ve Yöntem: Literatüre dayalı olarak serbest eczacıların çölyak hastalığına yönelik bilgi, tutum ve uygulamalarını içeren bir ölçüm aracı geliştirilmiştir. Ölçme aracı 2021 yılında Türkiye'deki serbest eczacılara online olarak uygulanmıştır. Elde edilen veriler açıklayıcı faktör analizine (EFA) tabi tutulmuştur.

Sonuç ve Tartışma: Çalışmaya katılan eczacı sayısı 408'dir. Çölyak hastalığı bilgisi, çölyak hastalığına yönelik tutum, çölyak hastalarına yönelik danışmanlık uygulamaları ve mesleki gelişim uygulamaları olmak üzere dört faktörlü bir yapı elde edilmiştir. Faktörlerin Cronbach alfa değerleri 0.794 ile 0.935 arasında hesaplanmıştır ve bu yüksek güvenilirlik göstermektedir. Bu faktörler toplam varyansın %70.343'ünü açıklamaktadır. Serbest eczacılar, çölyak hastalığı danışmanlığına karşı olumlu tutumlara sahiptir. Yine de bilgi ve uygulama açısından bazı eksiklikler bulunmaktadır. Hem lisans eğitiminde hem de mesleki eğitim programlarında çölyak hastalığı ile ilgili konulara yer verilerek eczacıların çölyak hastalıkları konusundaki bilgi ve farkındalıklarının artırılacağı düşünülmektedir.

Anahtar Kelimeler: Bilgi birikimi, çölyak hastalığı, serbest eczacı, tutum, uygulama

INTRODUCTION

Celiac disease, defined by the Anatolian physician Aretaus in the second century, is known as wheat allergy and gluten sensitivity [1]. The incidence of celiac disease in adults is 0.1%, which is a disease that generally presents with findings such as urticaria, angioedema, nausea, and abdominal pain in children and gastrointestinal symptoms in adults [2]. It can also be described as an autoimmune disease that causes damage and inflammation in the small intestine in individuals with hypersensitivity to gluten [3]. Celiac disease can be congenital, or it can be seen especially in the 30s and 40s, depending on the individual's diet [4]. Gottlieb et al. mentioned new treatment approaches with drugs being developed recently, although a gluten-free diet is the only known and effective treatment for celiac disease [5].

According to Rajput and Molder et al., the worldwide prevalence of celiac is nearly 1 %, but the number of undiagnosed patients cannot be ignored [6,7]. Similarly, the incidence of celiac disease in Turkey ranges from 0.003 to 0.01, according to the findings of the Ministry of Health of the Republic of Türkiye. As Lerner et al. mentioned, it is necessary to increase awareness of primary care sectors like physicians and dietitians to improve the detection rate of celiac disease and patient compliance [8]. In this regard, accurately informing and accurately directing individuals with celiac disease is also closely related to pharmacists, who are accepted as the closest and most accessible healthcare providers, and awareness of the disease's signs and symptoms. Therefore, pharmacists are expected to primarily provide healthy life support related to gluten-free nutrition, drugs, and nutritional supplements [9]. It is known that long-term vitamin and mineral supplements are recommended for celiac patients. Patients should be carefully monitored to determine whether existing nutritional deficiencies are being resolved and whether new deficiencies do not develop. Pharmacists should be able to cooperate with nutritionists in selecting the gluten-free nutritional supplements needed [10]. A study on pharmaceutical companies concluded that five out of 100 companies have a policy that provides gluten-free status for their drugs and that most companies believe their products are gluten-free [11].

Community pharmacists must know about drug absorption and gluten content of pharmaceutical products, especially in celiac patients, and provide consultancy services to patients on these issues and increase their quality of life. In the literature, the number of studies dealing with pharmacists' knowledge, attitude, and practices in celiac disease is quite limited. Some studies discuss other health professionals' knowledge and awareness levels. Assiri et al., Dembinski et al., and Riznik et al. determined that the knowledge level of young physicians about celiac disease was higher than seniors

[12-14]. In contrast, Bargezar et al. revealed that the experience positively affects healthcare providers' knowledge about the diagnosis and treatment of celiac [15]. Thus, it can be seen that the physicians' knowledge level was not satisfactory. Jingga et al. surveyed physicians' ability to define celiac disease and their attitudes and suggested that more efforts should be made to increase awareness of celiac disease among physicians in medical specialties [16]. Karaoğlu aimed to examine the awareness level of physicians about celiac disease and the contribution of education to the awareness level. A statistically significant difference was found in the 90% confidence interval between the pre-training and post-training tests. Thus, it has been concluded that celiac education given in the first steps of education will increase the correct diagnosis rate of this disease [17]. According to Avena-Woods et al., only 27% of pharmacists could define celiac disease as both autoimmune and chronic. The majority of respondents (60%) correctly state that there is no regulation requiring manufacturers to specify drugs as gluten-free, with 20% saying that they recommend dietary changes to people suspected of having celiac disease before diagnosis [18].

This study's motivation comes from evaluating community pharmacists' knowledge, attitudes, and practices toward celiac disease to close the gap in the literature and contribute to public health. A measurement tool containing community pharmacists' knowledge, attitude, and practices has been developed in line with this aim. Then, the validity and reliability of the measurement tool were evaluated.

MATERIAL AND METHOD

Measurement Tool

Within the scope of the study, a measurement tool was designed to determine the knowledge, attitudes, and practices of community pharmacists in Türkiye toward celiac disease by adhering to the KAP (Knowledge-Attitude-Practice) survey structure. KAP survey style is frequently preferred due to its advantages, such as providing measurable data, straightforward design and interpretation, and ease of application [19]. Such surveys provide systematic data about what is known, exhibited, and done about a particular subject, enabling individuals to identify knowledge gaps, cultural beliefs, or behavioral patterns [20]. Items of the tool were adapted from Mehralian et al., Bastani et al., and Avena-Woods et al. in which the importance of demonstrating the pharmacist's knowledge of celiac disease, as well as their attitude toward helping these patients, to optimize care for celiac patients was emphasized [18,21,22].

While preparing the measurement tool, an item pool consisting of 40 statements was first created. A 5-point Likert-type scale was used in the evaluation of the items. Out of 40 items, 13 are knowledge (1 (Very little) - 5 (Very good)), 10 are attitude ((1) Strongly disagree-(5) Strongly agree, and 17 are practice ((1) Never - (5) Always) statements. It is aimed to determine community pharmacists' knowledge of celiac disease with the knowledge expressions in the measurement tool. The attitudes of community pharmacists towards celiac disease have been tried to be discussed with the attitude statements. In the last part, it was tried to determine the practices of community pharmacists for celiac patients and the frequency of their practices for their professional development. Finally, questions that will determine the demographic characteristics of the participants in light of the relevant literature were added to the questionnaire to be applied. Before applying the questionnaire to the target audience, a pilot application was conducted based on the assumption that a spelling, expression, or form problem might be related to the items in the measurement tool. As a result of the pilot application conducted on a group of 14 people with similar characteristics to the target population, it was determined that 3 of the statements related to attitude and 1 of the statements on practice were not fully understood. Therefore, these items were removed from the measurement tool, and 36 statements were included.

Sample Size and Data Collection

The population of this study consists of nearly 25000 pharmacists working as community pharmacists in Türkiye. The sample size of this study was calculated using the acceptable error level method under the assumption that the sample statistics are normally distributed. The sample size was calculated as 379 by taking 0.05 confidence level, $z=1.96$, d (sensitivity)=0.05, and p and q values as

0.50. The questionnaires were applied online because of the Coronavirus pandemic via Google Forms between 20 November 2020 - 15 March 2021. The questionnaire links were first shared with managers of local pharmacists' chambers, and the managers shared the link with their members working as community pharmacists. To increase the reliability of the results obtained from the study, it aimed to reach the maximum number of people, and the participation of 410 community pharmacists was ensured. The data obtained from two participants were eliminated due to the detected errors and deficiencies. The analyzes were continued with the data from 408 participants.

Data Analysis

The data obtained from the measurement tool were first subjected to descriptive statistical analysis with the help of the IBM SPSS Statistics 22.0 package program, and then explanatory factor analysis (EFA) was applied using the principal component analysis technique.

RESULT AND DISCUSSION

The demographic characteristics of the participants (n=408) are presented in Table 1.

Table 1. Demographic characteristics of the participants

Characteristics of the Participants	Frequency (%)
Gender	
Female	55.9
Male	44.1
Ages	
Under 25	5.0
26-50	82.0
Older 50	13.0
Working Year	
<10 years	33.0
10-20 years	52.0
>20 years	15.0
Number of celiac patients per year	
<5	47.0
6-19	25.0
>20	28.0

According to Table 1, it is seen that the pharmacists participating in the study are generally experienced, and more than half of them fill more than five celiac patient prescriptions in a year. Additionally, participants were asked whether they paid attention to product ingredients when presenting prescribed and non-prescribed medicines to a celiac patient. When the answers to this question were examined, it was determined that 39 pharmacists checked whether they contained gluten. In addition, it was determined that 156 participants looked for wheat, 150 for starch, 117 for rice flour, 78 for oats, 96 for rye, 46 for barley, and 16 for malt.

Kaiser-Meyer-Olkin (KMO) and Bartlett sphericity tests were used to determine the suitability of the obtained data for EFA, and the KMO value was calculated as 0.898. This value above 0.8 indicates that the sample size is sufficient for EFA [23]. With the Bartlett test of sphericity, the hypothesis that the correlation matrix equals the unit matrix for $p < 0.05$ was rejected. As a result of Varimax rotation, 13 items in the measurement tool were excluded from the analysis because they were not included in any factor or had low factor loadings (less than 0.50), and it was determined that the remaining 23 items were grouped under four factors. This four-factor structure explained 70.343% of the total variance, which denotes a strong factor structure [24,25]. The four factors were labeled as (i) knowledge about celiac disease (K), (ii) attitude towards celiac disease (A), (iii) counseling practices for celiac patients (CP), and (iv) professional development practices for celiac disease (PDP). Details of the EFA results are given in Table 2.

Table 2. EFA results

Factors and items	Mean	Factor Loadings			
	(\bar{x})	K	A	CP	PDP
Knowledge about celiac disease (K)					
I have knowledge of the symptoms of celiac disease	3.076	0.880			
I have general knowledge of celiac disease	3.172	0.878			
I have information about what celiac patients should pay attention to	3.194	0.869			
I have general knowledge of gluten sensitivity	3.226	0.837			
I have knowledge about a gluten-free diet	3.289	0.819			
I know about gluten-free products	3.167	0.780			
Attitude towards celiac disease (A)					
Pharmacist and patient communication increases success in the treatment of celiac disease	3.654		0.842		
	3.412		0.800		
Pharmacists play an essential role in the treatment of celiac disease	3.256		0.793		
Pharmacists should review the ingredients of non-pharmaceutical products used by celiac patients	3.772		0.784		
	3.098		0.772		
Pharmacist and doctor communication increases success in the treatment of celiac disease	3.564		0.744		
	3.012		0.744		
Pharmacies must have particular areas where gluten-free products are served					
Pharmacists play an essential role in the follow-up of celiac disease					
Gluten-free products should only be sold in pharmacies					
Counseling practices for celiac patients (CP)					
I follow the food supplement intake of my patients with celiac disease	2.042			0.855	
I follow the life habits of my patients with celiac disease	2.032			0.843	
I follow the vitamin intake of patients with celiac disease	2.137			0.836	
I follow the nutritional habits of my patients with celiac disease	2.083			0.830	
I examine whether non-drug products contain gluten.	2.483			0.601	
I follow the drugs used by my patients with celiac disease	2.576			0.569	
Professional development practices for celiac disease (PDP)					
I attend training on celiac disease	2.120				0.831
I ensure that my pharmacy staff attend training for celiac disease	1.958				0.764
I follow current developments in the treatment of celiac disease	2.767				0.600
I inform my pharmacy staff about celiac disease	2.512				0.497
Variance Explained (%)		21.724	19.588	18.744	10.287
Cumulative Variance Explained (%)		21.724	41.312	60.056	70.343
Cronbach's alpha (α)		0.935	0.904	0.902	0.794

For the validation and reliability of the measurement tool, factor loadings and Cronbach's alpha (α) values were used [26]. According to Table 2, factor loadings are over 0.70 in general, and it is considered sufficient if this value is above 0.40 [27]. In addition to the factors' Cronbach's alpha values, the overall Cronbach's alpha reliability coefficient of the measurement tool was calculated as 0.894. Therefore, it is seen that the reliability level of the factors obtained and the measurement tool is high.

Counseling services regarding pharmacological and non-pharmacological (diet, lifestyle, etc. change) treatments to be offered to celiac patients positively affect their treatment processes and quality of life. Counseling services provided by pharmacists to celiac patients are of great importance since the closest health institutions where patients can access information about drugs and treatment are community pharmacies. The delivery of these services is affected by factors such as the knowledge and attitude of pharmacists, as stated in many psychometric theories. This study aimed to evaluate community pharmacists' knowledge, attitudes, and practices toward celiac disease. For this purpose, a measurement tool was designed for pharmacists' knowledge, attitudes, and practices toward celiac disease by considering the studies in the relevant literature in detail. The data obtained from the measurement tool were subjected to EFA, and a 4-factor structure was obtained. Cronbach's alpha coefficients of these factors were found to be high, so the reliability of the measurement tool was ensured. In this context, it is possible to say that this measurement tool will fill the literature gap in measuring pharmacists' knowledge, attitudes, and practices toward celiac disease. This paper has clearly shown that the developed measurement tool is a reliable guide in filling the deficiency in the literature

and revealing pharmacists' views on celiac disease. To the best of the authors' knowledge, this is the first study that deals with celiac disease from the perspective of community pharmacists.

It has been revealed that most of the pharmacists participating in the study have provided services to individuals with celiac disease, and more than half have provided services to 6 or more celiac patients until now. In the study conducted by Karaoğlu to determine physicians' awareness of celiac disease, it was determined that more than 70% of the physicians served patients previously diagnosed with celiac disease. Additionally, it was observed that 39 pharmacists looked at the gluten content of the products [17]. Mangione and Patel emphasized that celiac patients who adhere to a gluten-free diet for life should avoid wheat, barley, rye, and derivatives of these products in pharmaceutical products [10]. Shah et al. stated that wheat, rye, and barley starch should be considered in pharmaceutical products because it contains gluten [28]. When the average of the responses given to the statements related to the information statements in the measurement tool is considered, it is seen that this value is generally above 3 (minimum 1 - maximum 5). This situation indicates that pharmacists have a moderate level of knowledge about celiac disease.

Similarly, Jinga et al. evaluated physicians' attitudes and perceptions toward celiac disease and found their awareness about it poor [16]. Riznik et al. determined that the knowledge level of healthcare professionals about celiac disease is not satisfactory [14]. Avena-Woods et al. revealed that community pharmacists serving in chain pharmacies in New Jersey and New York have knowledge about celiac disease, but their knowledge level is insufficient [18]. Mangione and Petal emphasized the importance of community pharmacists' knowledge of celiac disease and stated they could increase their quality of life by providing counseling services to patients [10].

Mercan stated that the cooperation of pharmacists and physicians in preventive health services would have positive health outcomes [29]. Narmansoy explained that pharmacists' communication with physicians during patient follow-up also undertakes teaching to convey drug information to patients. Similarly, this study stated pharmacists had a positive attitude toward communicating with the doctors of celiac patients [30]. Another critical and addressed point in the counseling services pharmacists offer is pharmacist-patient communication. Effective communication that can be established between the pharmacist and the patient is an element that affects the patient's compliance with the treatment and recovery process [31-33]. In studies dealing with gluten-free diets and treatment compliance of celiac patients, it has been revealed that patients with high knowledge and awareness of celiac disease and their relatives have higher compliance [15,34].

For this reason, pharmacists' counseling on gluten-free nutrition, drugs, vitamins, and nutritional supplements to celiac patients and their relatives, apart from clinical outcomes, plays a vital role in guiding and informing patients correctly [9,29]. It is thought that patients' desire to get information from pharmacists on this subject will also increase with activities such as preparing brochures and presenting seminars to raise awareness about celiac disease from a social point of view. In this context, the high average of the answers given by pharmacists to the statements about pharmacist counseling within the factor of attitude towards celiac disease shows that pharmacies are a sociologically important place for communication and that community pharmacists have an attitude towards taking on the task as healthcare providers.

Contrary to the positive attitude of the participant pharmacists in the study, the fact that the average responses given in the statements about nutrition and life follow-up of the medication, vitamin, and food supplement intake of the patients considered in the CP factor is around 2, which reveals that the pharmacists are deficient in the point of application. Studies by Green and Cellier, Akkelle and Ertem, and Mangione and Patel discussed the importance of vitamin and mineral follow-up in these patients [10,35-36]. Haines et al., See and Murray, and Avena-Wood mentioned the importance of monitoring the nutritional habits of celiac patients [18,37-38]. The practices of pharmacists regarding celiac disease were also discussed regarding the possibility of nutritional complications such as iron deficiency anemia, lactose intolerance, and osteoporosis. Considering this possibility, approximately half of the participants referred the patients to the doctor. As stated in many studies in the literature [39-42], nutritional complications are among the factors to be considered in terms of celiac disease. Pharmacists' responses to the practices specified in the CP factor also indicate their awareness of this situation.

Within the scope of this study, the practices of pharmacists for celiac disease are discussed not only in terms of the consultancy services they provide but also in terms of professional development. It is seen that the averages of the expressions under this factor are generally around 2. In the literature, many studies deal with the fact that the training received by healthcare professionals in providing counseling services for chronic diseases improves their knowledge and practices. Karaoğlu researched to determine the awareness of physicians about celiac disease, and a statistically significant difference was found in the awareness level of celiac disease with the pre-and post-training questionnaire about celiac disease ($p < 0.001$) [17].

Additionally, under the PDP factor, the rate of pharmacists following current developments in the treatment of celiac disease was also discussed, and it was determined that this rate was low. Different treatment approaches are discussed in various studies in the literature, and it is important to follow current developments and to have information about alternative treatment methods for celiac disease. In this context, it is thought that by integrating current treatment approaches with systems such as electronic drug information resources, which are frequently used in pharmacies, it will be easier for pharmacists to access this information and the frequency of counseling practices related to celiac disease can be increased.

As a result of the study, it has been seen that most community pharmacists providing service throughout Türkiye think that pharmacists play an essential role in managing celiac disease. It has been determined that the participants have a positive attitude toward counseling in celiac disease, but there are some deficiencies in knowledge and practice. Therefore, pharmacists for celiac disease can be supported and developed to take an active role by providing regular on-the-job training and increasing communication with other health professionals. In addition, it is thought that giving more space to autoimmune diseases such as celiac and counseling services for these diseases in the curriculum of pharmacy faculties will contribute to eliminating these deficiencies.

Limitation

There may be some possible limitations in this study. Although the coincident of the survey implementation process with the Covid-19 pandemic process reduced the chance of conducting a face-to-face survey, causing the participation rate to be below the expected level, the smallest sample targeted could be reached. In addition, only community pharmacists were included in the study. For this reason, in order to ensure that the subject is evaluated from a broader perspective, validity, and reliability studies should be carried out in different groups of health professionals who are involved in celiac diseases, such as hospital pharmacists, dietitians, nurses, endocrinologists, and internal medicine specialists working in the public and pharmaceutical industry by expanding the topics covered in the study and celiac disease. Additionally, the authors want to state their future research plan on modeling the practices of pharmacists regarding celiac disease from a psychometric point of view.

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AUTHOR CONTRIBUTIONS

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CONFLICT OF INTEREST

The authors declare that there is no real, potential, or perceived conflict of interest for this article.

ETHICS COMMITTEE APPROVAL

This study was performed strictly following good research practices and approved by the Van Yüzüncü Yıl University Ethical Committee decision dated 16/10/2020 and numbered 2020/07-03.

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