

Assessment of Knowledge and Attitudes of Physicians and Pharmacists on Probiotics: A Cross-Sectional Survey

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ABSTRACT

Objectives: Probiotics have been gaining increased attention by public recently which originates concerns on its rationale use among healthcare professionals. Although there is evidence on efficacy and safety of probiotics in certain gastrointestinal disorders, it is important to identify healthcare professionals' opinions on probiotics. This study was aimed to identify opinions of pharmacists and physicians on the use of probiotics.

Materials and Methods: This cross-sectional study conducted between November 2017 and August 2018 among pharmacists and physicians practicing in Ankara, Türkiye. An electronic survey was designed and sent to the participants via e-mails.

Results: A total of 361 pharmacists (74.5% female) and 356 physicians (42.4% female) participated in the study. About two-thirds of pharmacists and physicians indicated to be familiar with the mechanism of action and indications of probiotics. A majority of pharmacists and physicians recommended probiotics to be used in gastrointestinal system disorders (99.7% and 97.7%) and however pharmacists were more likely to suggest for genitourinary system (29.3%) but physicians for dermatological symptoms (15.1%). Considering patient advice regarding the probiotics, pharmacists (63.3%) seemed to receive more requests compared to the physicians (30.9%); and in regards to probiotic recommendation, 70.7% and 38.2% of pharmacists and physicians indicated that they have no concerns, but 61% of physicians have concerns on reimbursement policy when prescribe.

Conclusion: Pharmacists and physicians are the healthcare providers commonly being asked about probiotics by the patients. Therefore, is important to address healthcare professionals' concerns and to increase their knowledge on the use of probiotics for different health conditions. Given the fact that probiotics products can be purchased without a prescription, healthcare professionals at primary care settings should be more vigilant for the rational use of probiotics.

Keywords: probiotics, pharmacist, physician, community

Introduction:

A healthy immune system is provided by the balance between the amount and types of microorganisms in the human gastrointestinal tract. Any deficiency or dysfunction in the immune system can lead to infections, necessitating the use of antibiotics in the population. Gut flora is responsible for 80% of immune system and has to be reinforced through healthy nutrition in order to maintain balance within the gastrointestinal system, however inappropriate use of antibiotics damages the flora [1]. According to the researches, bacterial diversity has been found to be high in people who have not been exposed to antibiotics before, and it has also been shown that malnutrition causes microorganism loss in urban life. Therefore, it is recommended to physically strengthen the human body with supplementary food, nutritional support or probiotics to prevent unintentional loss of microorganisms.

An intestinal microbiota is a unique structure and is associated with various diseases ranging from allergy to inflammatory bowel disease. While a causal relationship has not been fully defined and has been investigated for safety issues in certain populations (such as in immunocompromised patients), the use of probiotics is considered as a dietary supplement in the treatment of disease. Use of probiotic is recommended in the treatment of many diseases, such as inflammatory bowel disease, short bowel syndrome, antibiotic-associated and acute diarrhoea,

Clostridium difficile and *Helicobacter pylori* infections, urogenital infections, food sensitivity and allergies [2]. In the paediatric population, they are also used in the treatment of diarrhoea, atopic dermatitis and colitis [3]. Probiotics were defined by the World Health Organization in 2002 [4] as 'live microorganisms which, when administered in adequate amounts, confer a health benefit on the host'; and the most commonly used microorganisms are *Lactobacillus (rhamnosus, casei, casei shirota, acidophilus, johnsonii, plantarum, bulgaricus and reuteri)*, *Bifidobacterium (breve, bifidum, infantis and animalis)* genera, and the fungus *Saccharomyces boulardii* [5,6]. Probiotic products that can be easily purchased from supermarkets or community pharmacies; are formulated as yoghurt, capsule, powder or tablet [7]. The use of commercially available products is increasing in the general population, both in the community and in other healthcare settings. Therefore, clinicians should evaluate evidence of efficacy and safety for probiotics in specific indications that meet the needs of the individual patient.

Primary healthcare professionals are often the first contact person in the community for healthcare advice, especially in the context of self-care. Therefore, before making any recommendations for probiotics it is important for healthcare professionals for a particular patient to know the probiotic's dosage form, content (especially the genera, not the strain), total dose and duration of use [8]. Furthermore, any potential interactions with concurrently used antibiotics and antifungals may result in loss of efficacy in probiotic treatment. The use of probiotics in immunosuppressive patients, patients with central venous catheters, and individuals with hypersensitivity to milk / lactose, or certain patient groups such as severe pancreatitis may also be problematic [7].

There are not many studies that have investigated the attitudes and practices of healthcare professionals towards probiotic use and have addressed the demands of patients and the public regarding probiotic consumption in health issues [2,8-10]. The aim of this study is to determine the knowledge and attitudes of physicians and pharmacists regarding the use of probiotics in general practice.

Materials and Methods:

This cross-sectional study was conducted between November 2017 and August 2018 through an electronic survey among pharmacists and physicians in Ankara. The structured questions specific to the research were developed by the researchers through comprehensive literature review and the final version of the questionnaires for both pharmacists and physicians were developed separately using a survey platform (Google doc). Each survey was consisted of two sections; the first part questioned demographics of participants (8 questions for pharmacist and 11 questions for physicians) and the second part focused on the knowledge and attitudes of participants (12 multiple choice questions for pharmacist and 10 questions for physicians) on probiotic use. The study protocol conforms to the ethical guidelines of the Helsinki Declaration and was approved by the Ethics Committee (Zekai Tahir Burak Maternity Hospital Ethics Board, No:23/2018).

The survey was delivered to a convenient sample of physicians and pharmacists working in Ankara and they were invited to participate in the survey via professional e-mail groups. The participants responded to online survey if they were volunteered to participate in the study and an informed consent was obtained via the survey link.

The data were analysed as descriptive statistics (mean and percentages) by using the IBM SPSS version 22 (IBM SPSS Inc., Chicago, USA) after a normalization test was performed. Comparison of the responses between pharmacists and physicians were analysed using Student t-test. A statistical significance was expressed as $p < 0.05$.

Results:

A total of 361 pharmacists and 356 physicians participated in the study. Among them 88.1% of pharmacists and 84.8% of physician were practicing in the community settings. A majority of physicians were aged over 40 years and had more than 10 years of experience in the profession (Table 1). The participated physicians were slightly older and had a longer duration of experience in the profession compared to the pharmacists ($p < 0.05$). The specialties of the physicians were internal medicine in 227 (63.8%), basic medical science in 114 (32%) and surgical medicine in 15 (4.2%) participants and no difference was found in terms of their attitudes towards probiotic usage ($p > 0.05$).

Unfortunately, 60.4% of physicians and 72.2% of pharmacists have indicated not to follow any national or international literature in regards to general information sources on drugs and/or diseases; but almost half of the participants (50.6% and 54.3% of physicians and pharmacists respectively) were influenced by information given by medical representatives of pharmaceutical industry. In particular to probiotics, a majority of physicians 89.6% and pharmacists (85.3%) stated that they were first informed about probiotics more than 2 years ago through congress/symposium/workshop/meeting (75.7% and 54.2%, respectively), medical representatives (46.3% and 31.2%, respectively) and by literature (33.7% and 26.4%, respectively). Interestingly, 9.3% of physicians and 32.4% of pharmacists were introduced with probiotics by a pharmacist.

Healthcare professionals were also evaluated for their personal use and suggestions for using probiotics to their families and / or friends when necessary; 79.2% of physicians and 88.3% of pharmacists stated that they used probiotics, 90.7% of physicians and 97.2% of pharmacists stated that they recommended probiotics to their family members. Although 62.5% of pharmacists and 59% of physicians stated that they have sufficient knowledge (or more familiar with) about the mechanism of action and indications of probiotics, their attitudes towards probiotic use differed (Table 2).

Opinions of healthcare professionals on the attitudes of their colleagues revealed that 62.2% of pharmacists and 55.6% of physicians believed their colleagues do not have sufficient knowledge on probiotics and 9.5% of pharmacists and 14.3% of physicians believed their colleagues have prejudices.

Discussion

Probiotics have been recognized as useful options in the treatment of a variety of gastrointestinal disorders, but it should be noted that their efficacy depends on the species, dose, disease and duration of treatment [7,11,12]. A study conducted in China was shown that 65% of physicians prescribe antibiotics, whereas 57% prescribe probiotics in the treatment of acute diarrhoea during hospitalization [13]. On the other hand, 53% of surgeons and 81% of gastroenterologists in the UK recommended or prescribed probiotics for the treatment of irritable bowel syndrome (IBS) (71%) and functional diarrhoea (48%) for > 12 months [14]. The practice of gastroenterologists in the USA is similar to their UK counterparts; 98% of them believed probiotics had a role in treatment of gastrointestinal symptoms, and 93% of them reported that patients they examined took probiotics for IBS and *C. difficile* associated diarrhoea [15]. Similar to the findings in these studies, pharmacists (99.7%) and physicians (97.7%) suggested the use of probiotics mainly for gastrointestinal diseases in this study.

Probiotics are perceived as natural and safe products by public which can easily be purchased from supermarkets or obtained from pharmacies without prescription or any prior medical consultation. According to the study conducted in Australia, 72% of population had used complementary medicine (CM) in the last year and 17% had used probiotics; moreover, pharmacy customers indicated that they want to have information from a pharmacist on safety, interactions and effectiveness of CMs [16]. The most commonly used CM products by paediatric patients (or caregivers) with gastrointestinal disorders in gastroenterology outpatient clinics in Canada were indicated as multivitamins (65%), calcium (35%), probiotics (14%) and fish oil-omega-3 fatty acids (13%); and 76% of respondents reported that they would like to discuss issues with physician on the use of CM concurrently with prescribed medicines and 52% indicated to seek advice from a pharmacist [17]. In this study, 30.9% of physicians and 63.6% of pharmacist stated that their patients requested information about probiotics. These percentages may reflect the fact that the purchasing of those products is not required a prescription, therefore people can easily obtain at the pharmacies. In addition, 62.9% of physicians and 70.3% of pharmacists stated that they had received positive feedback from patients on probiotic usage and 43.5% of physicians indicated to recommend probiotics to the patients who were also prescribed antibiotics. These findings have highlighted the role of primary care health professionals in community perception on the use of probiotics.

A study on the knowledge and attitudes of physicians on infantile colic revealed that only 2.2% reported that parents have used probiotics and 4.5% of paediatricians considered using probiotics in cases of infantile colic. Although paediatricians acknowledge the relationship between colic symptoms and adjunctive remedies, they were less likely to counsel parents on probiotic use, and therefore probiotics were used in only 4.5% of cases [18]. Similar issues emerged in this study in which physicians and pharmacists had different perspectives on probiotic advice ($p < 0.00001$); 59.6% and 97.7% of the physicians stated that they recommended probiotics for 0-18 age group and gastrointestinal diseases, respectively. However, pharmacists reported to recommend probiotics for people both aged 0-18 years (54.6%) and 18-40 years (54%).

While it is known that probiotics are commonly recommended and purchased at primary care, 80% of pharmacists working in intensive care units (ICU) indicated that they would never consider recommending probiotics for the prevention of ventilator-associated pneumonia because of not being sure of safety (43%) and efficacy (47%) of probiotics. However, they were more likely to recommend probiotics for the prevention of *C. difficile* diarrhoea in ICU. They further indicated to get information on probiotics by communication with their colleagues (78%), scientific journals (67%), media (15%) and medical representatives (7%) [19]. In regards to the sources of information, healthcare professionals in Europe indicated to acquire knowledge on probiotics from books (53.3%), websites (34.9%), at work (28%), from pharmacies (25%) and radio/television (9.7%) [2].

The study by Marupuru et al.[9] has shown that probiotics was used by 53% of pharmacists (mainly for general health and wellness but also for to treat stomach and intestinal illness) and 89% of pharmacists would recommend probiotics to patients, friends and relatives. In the study where the participants were all healthcare professionals from Europe stated that 92% of pharmacists and allied health professionals and more than 84% of physicians and dentists had already used probiotics, and in general 87.5% of health professionals advised people (such as patients, friends and relatives) [2], whereas it was found in this study that 88.3% of pharmacists had used probiotics and 97.2% recommended it for relatives and friends.

Research conducted in community care settings in Canada revealed that the majority of community pharmacists (66%) recommend natural products, including probiotics, to patients, most frequently concurrently with other

drugs (69%) [20]. In a study conducted in South Africa, 78% of pharmacists reported to be slightly to very familiar with probiotics [8]. Another study included all healthcare professionals from different parts of Europe reported that pharmacists' self-evaluated (on 5-point Likert scale) knowledge on probiotics (rated as 'good') were significantly higher than the physicians (rated as 'medium') [2]. Just over one third of pharmacists in this study indicated to have sufficient knowledge on probiotics, whereas 23.2% believed that physicians in general have sufficient knowledge and recommend probiotics to the patients. In regards with having concerns before giving advice on probiotics, 70.7% of pharmacists reported to have no concerns, whereas 60.9% of physicians stated that they have concerns on prescribing because of probiotics having no reimbursement. In the study conducted among pharmacists, it was reported that 15% of pharmacists had negative attitudes that complementary medicine products (including probiotics) interfered with standard medical care [8]. The findings from Pakistan revealed that only 15.1% of healthcare professionals (including pharmacists and physicians) had good knowledge regarding the use of probiotics; and lack of knowledge about the clinical use of probiotics (57%) and high cost of probiotics (35.4%) were the most common reason for not recommending [10]. These concerns can be overcome by globally accepted experts' recommendations. A guidance for probiotics use was issued [21,22], which indicated that by knowing the correct definition of probiotics, making the correct choice among mono-strain or multi-strains products, being sure about the safety and clinical efficacy of the strains, avoiding antibiotic resistance genes, choosing probiotic strains resistant to gastrointestinal environment will help to maintain rational use of probiotics.

Study limitations:

According to the health statistics report by the Turkish Ministry of Health [23], there are approximately 28,000 pharmacists and 145,000 physicians practicing in different settings in Turkey. In particular with Ankara province, 2278 general practitioners and 2297 pharmacists were registered in the year of 2016. Therefore, reaching approximately 15% of the targeted population can be expressed as one of the main limitations of this study. In addition, pharmacists and physicians unfamiliar with probiotics may not have responded to the survey, which may have caused sampling bias. The participants of this study were mainly from metropolitan cities and the findings may not reflect the practice norms in nationwide, however it will help to provide comparative views for further studies to be conducted in developed and/or developing countries.

Conclusion

A discrepancy in knowledge, attitudes and practices among healthcare professionals are still existed at local settings which may affect the public perception and health behaviour on probiotic use. The aggregated data from local exploratory studies would indicate practice patterns for probiotic use and identify further needs of patients as well as healthcare professionals in different health settings. Due to having increasing number of licensed probiotic products, insufficient knowledge of practitioners and influence of medical representatives on practitioners, it is important to have scientific and updated information sources available for healthcare practitioners.

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Table 1. Demographics of participants

	n (%)		
	pharmacists (n=361)	physicians (n=356)	p*
Female	269 (74.5)	151 (42.4)	
Male	92 (25.5)	205 (57.6)	
Age, years			
20-29	126 (34.9)	37 (10.4)	<0.00001
30-39	86 (23.8)	77 (21.6)	
≥40	149 (41.3)	242 (68)	
Years in profession			
<5	120 (33.2)	40 (11.2)	<0.00001
5-10	44 (12.2)	47 (13.2)	
>10	197 (54.6)	269 (75.6)	

*Chi-square test

Table 2. Attitudes of healthcare professionals on the use of probiotics

	n = number of respondents (%)		
	pharmacists	physicians	p value*
age group frequently suggested to be used;	326 (100)	356 (100)	<0.00001
0-18 years	178 (54.6)	212 (59.6)	
18-40 years	176 (54)	67 (18.8)	
40-64 years	111 (34)	45 (12.6)	
≥65 years	64 (19.6)	32 (9)	
diseases frequently suggested to be used;	338 (100)	344 (100)	<0.00001
gastrointestinal system	337 (99.7)	336 (97.7)	
genitourinary system	99 (29.3)	28 (8.1)	
endocrine system	32 (9.5)	38 (11)	
cardiovascular system	10 (3)	16 (4.7)	
neurological system	31 (9.2)	31 (9)	
dermatological	89 (26.3)	52 (15.1)	
requests of advice from patients regarding probiotics	338 (100)	349 (100)	
yes, received	215 (63.6)	108 (30.9)	
receive feedbacks from patients regarding probiotic usage;	337 (100)	356 (100)	0.05
none	99 (29.4)	127 (35.7)	
positive	237 (70.3)	224 (62.9)	
negative	1 (0.3)	5 (1.4)	
concerns on suggesting probiotics;	328 (100)	356 (100)	<0.00001
no concerns	232 (70.7)	136 (38.2)	
recently developed drug	19 (5.8)	23 (6.5)	
same effect can be achieved by non-medical way	25 (7.6)	48 (13.5)	
not have sufficient knowledge on mechanism	48 (14.6)	50 (14)	
no reimbursement when prescribed	N/A	217 (61)	
others	16 (4.9)	5 (1.4)	
allocated a space for probiotics at the pharmacy;	331 (100)	N/A	
yes, it is allocated	215 (63.6)		
suggested to a patient who is also prescribed by an antibiotic by myself	N/A	356 (100)	
		155 (43.5)	

* Chi-square test, N/A: Not Applicable