

## RESEARCH

### Oral Care and Maintenance Habits Among Pharmacy Students

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**Objective.** This study aimed to identify and evaluate oral care habits, awareness, and knowledge of oral dental health among a group of pharmacy students.

**Methods.** An e-questionnaire on oral care habits, awareness, and knowledge was completed by students in a university pharmacy.

**Results.** A total of 484 students with a mean (SD) age of 21.4 (1.6) years participated. Of all participants, 9.3% were not regularly brushing their teeth. The percentage of regular fluoridated toothpaste usage was 44.8%. Three in 5 (64.5%) participants had visited a dentist for a complaint. When answering questions on the possible effects of dental plaque accumulation on teeth, the causative factors for dental decay and signs of periodontal disease, the percentages of students who indicated they “did not know” were 16.3%, 4.8%, and 43.2%, respectively. Among participants, 38.7% were unaware of the cariogenic or erosive effects of pediatric syrups or suspensions. Of all the pharmacy students, 32% stated they have been consulted about some issue related to oral health.

**Conclusion.** The oral care habits, awareness, and oral health knowledge of pharmacy students in one program needs to be improved. Improvement of these measures is a multi-layered issue, not limited only to the quality of life but also to increased awareness associated with public health-related issues related to dental care.

**Keywords:** pharmacy education, oral health, knowledge, attitude, habits

## INTRODUCTION

Oral health maintenance is an essential component of practicing care for one’s overall physical wellness. Oral diseases are among the most prevalent chronic diseases, affecting 3.9 billion people globally.<sup>1</sup> Although most oral health-related conditions are not life-threatening, the consequences of poor oral health impose a substantial economic burden on individuals, health care systems, and societies. This has a substantially negative impact on quality of life for many more than the individuals who suffer from oral health complications themselves.<sup>2,3</sup> Further, low-income and resource-limited individuals and communities are most affected by the costly burden of dental treatments that can often develop due to a lack of preventive care.<sup>4</sup>

Increasing oral health awareness is the most cost-effective method for preventing the unnecessary toll of

many common oral diseases. Preventive care and treatment for minor concerns are key to avoiding severe and taxing complications, both financially and holistically.<sup>5</sup> In addition to dentists, health care professionals, such as pharmacists, can aid in increasing awareness of the importance of oral health awareness for individuals by taking an active role in educating them on appropriate oral health knowledge and care.<sup>6</sup>

Pharmacy as a profession occupies a vital role in health care by employing a multidisciplinary approach in diverse settings as providers.<sup>7</sup> The merged roles of pharmacists are more broadly described by the World Health Organization and the International Pharmaceutical Federation; pharmacists are caregivers, communicators, decision-makers, leaders, managers, lifelong learners, and teachers.<sup>8-10</sup> This concept has expanded over time and evolved into the “nine-star pharmacist,” with the undertaking of additional roles as entrepreneurs and researchers.<sup>11</sup>

By occupying a distinctly versatile and multifaceted profession as health care providers, pharmacists are uniquely positioned to understand the needs of people in their communities, given the frequency and setting of their

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interactions with patients.<sup>2,12,13</sup> They are often the first point of contact for those seeking medical counsel, including information and guidance on oral health-related conditions.<sup>14,15</sup> It has been reported that pharmacists are consulted at least once per week about oral health, most frequently for toothaches and mouth ulcers.<sup>13,16,17</sup> Pharmacies now widely carry over-the-counter drugs, making them more accessible to patients for treating oral conditions, such as toothache.<sup>13,17,18</sup> As evidenced by the level of trust and availability pharmacists provide to patients, they may play a critical role in promoting oral health and hygienic practices. As future pharmacists, pharmacy students should learn how they can improve the oral health of their communities.

To achieve this, pharmacists should have a basic knowledge of oral health and hygiene, awareness of the most common oral and dental health conditions, and sound judgment when referring the patient to a dentist when necessary. They should also have sufficient knowledge to advise patients on the appropriate use of oral health products. Determining pharmacy students' level of knowledge about oral health will help identify their educational needs at the undergraduate level. However, only a few studies have been conducted regarding this issue, with a small number of pharmacy students reporting inadequate oral health knowledge and the need for further education.<sup>19-21</sup> Therefore, in this study, we aimed to evaluate and reveal pharmacy students' oral care habits, awareness, and basic knowledge of oral health and hygiene.

## METHODS

This cross-sectional study was conducted among undergraduate pharmacy students in Ankura, Turkey. Ethical approval was obtained from the Institutional Ethical Committee of Hacettepe University. The data were gathered from students of the pharmacy program at Hacettepe University, in March and April 2021. The inclusion criteria for the study included current standing as a pharmacy student of Hacettepe University's pharmacy program and written, informed consent, obtained prior to participating, to volunteer as a participant. All students of the program from the first to the fifth year were invited to participate (N=700). Written informed consent was obtained prior to participation.

An online, anonymous questionnaire with 31 questions was developed using Surveyey (Kokteyl, Inc.). The questionnaire was pretested on a group of pharmacy students (n=15) from other universities in the same city and modified according to participants' feedback. Distance education was ongoing due to the COVID-19 pandemic. An invitation link was sent to students via their

smartphones, which was also used as a link to the questionnaire. Students were then redirected to a page that outlined the study's objectives, after which students were given the choice to accept or decline participation in the study. The questionnaire took approximately 10-12 minutes to complete.

The questionnaire had 4 sections: demographic information including age, gender, and year; students' habits relevant to oral health, including questions about frequency and method of toothbrushing and the use of other oral hygiene products; basic knowledge of oral health, causes of dental caries, possible effects of dental plaque accumulation on the teeth, signs of periodontal diseases, preventive dentistry, and the oral effects of some medicines; and the oral health issues that people most often consulted them on and their self-confidence about their knowledge of these issues. The responses for the knowledge statements and self-confidence levels when giving advice were assessed using a 5-point Likert scale of definitely agree, agree, indecisive, not agree, definitely not agree, to correspond with definitely confident, confident, indecisive, not confident, definitely not confident, respectively. For the analyses, the participants' knowledge answers were divided into 3 categories: *true* for responses of "definitely agree" and "agree," *wrong* for responses of "not agree" and "definitely not agree," and *indecisive* for corresponding responses. For the statistical tests, participants' self-confidence level was evaluated in 2 categories: "no idea/does not have confidence" for the responses of "indecisive, not confident and not definitely confident" and "has confidence" for the responses of "confident and definitely confident" for advising someone who had consulted them about oral health problems, conditions, or treatments. The causes of dental caries, possible effects of dental plaque accumulation on the teeth, and the signs of periodontal diseases were asked separately. For each question, students could choose more than one answer or, alternatively, choose "have no idea/don't know." The basic knowledge statements used in this study were: Oral dental health affects general health; smoking affects oral health; humans have 2-type dentition (primary and permanent); antibiotics are not used to relieve toothache; in case of tooth loss/missing tooth, prosthetic rehabilitation is performed; it is among the duties of pharmacists to provide basic and correct information about preventive oral and dental health to the patient.

An Excel sheet was automatically generated from the answers to the questionnaire and the data transferred to a program for performing the statistical analyses. The data were analyzed using SPSS Statistics, version 20.0 (IBM Corp). The study used numbers, percentages, means, medians, standard deviations, and quartiles as descriptive

statistics. Statistical significance was set at  $p < .05$ . The Pearson's chi-square and Fisher's exact test were used to test the difference between the categorized independent variables and the student year in the program and the categories of answers for knowledge statements and self-confidence levels of the students with prior oral health education status.

## RESULTS

A total of 484 pharmacy students 19-28 years of age (mean [SD]=21.4 [1.6]) participated in the study. The response rate was detected as 69.1%. Three of 4 (76.0%; n=368) participants were female. The participation percentages of the students from the first year to fourth year were similar, with a range of 20.7%-24.0%. There were only 9.9% of students in the fifth year who participated in the study (Table 1).

Most of the students had a manual toothbrush (n=426). Of these, 39.9% stated they replaced their toothbrush every 4 to 6 months. Of the participants, 9.3% did not regularly brush their teeth. More than half (56.2%) of the students brushed their teeth twice per day, and almost all (98.6%) used toothpaste. Fluoridated toothpaste usage was found among 44.8% of the students, while 27.5% were unaware of their toothpaste ingredients (Table 1). The criteria that participants used to select toothbrushes included bristle structure (soft/medium/hard) (88.0%), price (55.0%), brand (53.0%), brush head design (40.0%), size (34.0%), tongue cleaner availability (31.0%), and color (29.0%). The percentage of participants who used oral care products other than a toothbrush and toothpaste was 62.2%. Among those participants, mouthwash (44.2%) and dental floss (32.6%) were the most used products. The dental history questions revealed that 64.5% of participants had visited a dentist only in the case of a complaint. Of all students, 71.7% stated that they had no prior oral dental health education.

Among those with prior training in oral health, 16.5% stated that they had learned about oral health in high school or earlier school years, and 11.4% had learned about it from dentists. The survey also included questions about the possible effects of dental plaque accumulation on teeth, causative factors of dental caries, and the signs of periodontal disease. Among these questions, the answers with the highest percentage answered correctly were with respect to causative factors of dental caries (88.8% indicated inadequate/ineffective toothbrushing, and 85.1% indicated consumption of sugary food/beverages).

The knowledge statement answers were true for "Oral dental health affects general health," true for "Humans have 2-type dentition (primary and permanent)," wrong

Table 1. Descriptive Characteristics and Oral Dental Care Habits of Pharmacy Students at a University in Turkey (N=484)

Characteristics <sup>a</sup>	No. %
Year	
1	116 (24.0)
2	106 (21.9)
3	114 (23.6)
4	100 (20.7)
5	48 (9.9)
Toothbrush type used	
Manual	426 (88.0)
Chargeable, battery operated	12 (2.5)
Both	46 (9.5)
Toothbrush renewing frequency	
<3 months	60 (12.4)
3 months	113 (23.3)
4-6 months	193 (39.9)
6 months	40 (8.3)
Toothbrushing frequency	
Irregularly/never	45 (9.3)
Once per day	124 (25.6)
Twice per day	272 (56.2)
Three times or more per day	43 (8.9)
Toothpaste usage	
Never	4 (0.8)
Sometimes	3 (0.6)
Always	477 (98.6)
Fluoridated toothpaste usage (n=480)	
Not know	132 (27.5)
No	50 (10.4)
Sometimes	83 (17.3)
Yes	215 (44.8)
Usage of oral care products other than toothbrush and toothpaste	
Never	183 (37.8)
Sometimes	256 (52.9)
Always	45 (9.3)
Dental visit history	
When have a complaint	312 (64.5)
Never/only once many years ago	25 (5.2)
Regularly, once per year	22 (4.5)
Regularly, twice per year (6-month interval)	13 (2.7)
During my orthodontic treatment, frequently visited	84 (17.4)
In these days, due to the active treatment period, frequently	28 (5.8)

<sup>a</sup> Characteristics of the sample: age (y), mean (SD)=21.4 (1.6), median=21, first and third quartiles=20-23, range=19-28

for “Antibiotics are used to relieve toothache,” true for “In case of tooth loss/missing tooth, prosthetic rehabilitation is performed,” true for “Smoking affects oral health,” and true for “It is among the duties of pharmacists to provide basic and correct information about preventive oral and dental health to the patient.” The percentage of correct answers for each statement was 97.1%, 66.7%, 44.8%, 80.2%, 97.7%, and 81.2%, respectively.

Regarding correct answers about possible effects of dental plaque accumulation, 66.7% indicated that plaque accumulation causes the formation of calculus, and 66.5% indicated that it causes halitosis. For the question on signs of periodontal disease, 55.4% correctly indicated that one sign was gingival hemorrhage, and 50.4% correctly indicated that another sign was gingival recession. The percentages of students who did not know about the possible effects of dental plaque accumulation, the causative factors of dental caries, and signs of periodontal disease, were 16.3%, 4.8%, and 43.2%, respectively.

The students’ answers regarding basic oral health knowledge were evaluated on a 5-point Likert scale. The results showed that nearly all participants (97.1% and 97.7%, respectively) knew that oral health affects overall health, and that smoking affects oral health.

With respect to whether antibiotics should be used to relieve a toothache, 44.8% of the students answered incorrectly or were indecisive, which was categorized as the

wrong answer in the statistical analysis. The correct answer was that “antibiotics should not be used to relieve a toothache.” Further, 18.8% of students responded “do not agree,” “definitely do not agree,” or were indecisive about whether providing basic and correct information about preventive oral health to the patient is among the duties of pharmacists, which was categorized as wrong in the statistical analysis; the correct answer was that this is the responsibility of a pharmacist.

Among the participants, 89.0% stated that they knew the possible side effects of some medications on oral health. Regarding the cariogenic and erosive effects of pediatric syrups or suspensions, 21.1% did not know this information and 17.6% had no idea about the subject. However, 297 participants (61.4%) reported that pediatric syrups or suspensions could negatively affect teeth. They indicated the causative factors including the sugar content in syrups and suspensions (92.6%), stickiness (70.0%), pH (67.0%), and viscosity (34.3%). Medicines containing ferrous (62.2%), some antibiotics (50.6%), and some oral rinses (35.5%) were marked as medicines, supplements, or products that may cause discoloration of the teeth. The percentages of participants who knew about sugar-free medicine and alternative or herbal oral health care products were 47.7% and 34.9%, respectively.

Some characteristics of the participants, according to their year and program, are given in Table 2. The sex,

Table 2. Characteristics of Pharmacy Students According to Their Year in the Program

Characteristics	Year, No. (%) <sup>a</sup>					P value <sup>b</sup>
	1	2	3	4	5	
Sex						.77
Female	88 (75.9)	76 (71.7)	87 (76.3)	79(79.0)	38 (79.2)	
Male	28 (24.1)	30 (28.3)	27 (23.7)	21 (21.0)	10 (20.8)	
Brushing frequency						.85
Never/irregularly	12 (10.3)	8 (7.5)	10 (8.8)	9 (9.0)	6 (12.5)	
Once per day	28 (24.1)	22 (20.8)	34 (29.8)	30 (30.0)	10 (20.8)	
Twice per day	62 (53.4)	70 (66.0)	61 (53.5)	54 (54.0)	25 (52.1)	
3 or more times per day	14 (12.1)	6 (5.7)	9 (7.9)	7 (7.0)	7 (14.6)	
Dental visit history						.62
Never/only once many years ago	6 (5.2)	4 (3.8)	7 (6.1)	6 (6.0)	2 (4.2)	
When have a complaint	66 (56.9)	74 (69.8)	81 (71.1)	60 (60.0)	31 (64.4)	
Regularly, once or twice per year	11 (9.5)	8 (7.5)	4 (3.5)	8 (8.0)	4 (8.3)	
Frequently due to orthodontic treatment	33 (28.4)	20 (18.9)	22 (19.3)	26 (26.0)	11 (22.9)	
Having history of prior oral health training						<.001
No	93 (80.2)	68 (64.2)	82 (71.9)	80 (80.0)	24 (51.1)	
Yes	23 (19.8)	38 (35.8)	32 (28.1)	20 (20.0)	23 (48.9)	

<sup>a</sup> Column percentage.

<sup>b</sup> Pearson Chi-square test,  $p < .05$ .

brushing frequency, dental visit history status, and prior oral health education status were not different among the various years in the program ( $p > .05$ ).

Thirty-two percent ( $n = 155$ ) of all participants stated they had been consulted about an issue related to oral health. The most common issues pharmacy students were consulted about were analgesic recommendations ( $n = 126$ , 81.3%) and toothaches ( $n = 104$ , 67.1%). Students had the highest self-confidence level for giving analgesic recommendations (65.7%) (Table 3).

In the basic oral health evaluation section of the questionnaire, some of the responses (true, indecisive, or false) to oral health-related statements showed no statistical differences between students according to history of having prior oral health training status ( $p > .05$ ; Table 4). Conversely, there was a significant difference in the self-confidence status of participants when giving advice for issues about oral health problems, conditions, or treatments, according to history of having prior oral health training status ( $P < .05$ ; Table 5). The most notable difference was found in advising a patient for a toothache, providing recommendations on toothpaste, toothbrush, dental

floss, and other oral care products, and halitosis and whitening tools ( $P < .05$ ; Table 5).

## DISCUSSION

Most oral diseases are preventable. Dental health care providers play the biggest role in preventive care, but other health care professionals can contribute to increasing individuals' oral health awareness.<sup>6</sup> In this study, we aimed to investigate the oral care habits, awareness, and basic knowledge of oral health of students. Pharmacists are uniquely positioned to take an active role by learning about oral health, hygiene, and behavior<sup>23</sup> while serving in their role to individuals, and as part of wider communities, who consult them about various oral health topics (including, but not limited to, dental pain, dental ulcerations, dental bleaching, dental care products, such as toothbrush and toothpaste selection). Therefore, it is necessary for pharmacists to acquire and develop information on oral health. Within the scope of this study, several questions were asked to determine the oral dental health habits of pharmacy students. Although the essential parts of daily oral

Table 3. Distribution of Pharmacy Students' Level of Self-confidence When Giving Advice About Oral Health Problems, Conditions, or Treatments

Issues about oral health problems, conditions, or treatments	Issues pharmacy students were consulted about, No. (%) <sup>a</sup>	Level of self-confidence when giving advice, No. (%) <sup>b</sup>				
		Definitely confident	Confident	Indecisive	Not confident	Definitely not confident
Gingival bleeding	68 (43.9)	13 (2.7)	92 (19.0)	211 (43.6)	129 (26.7)	39 (8.1)
Halitosis	90 (58.1)	38 (7.9)	214 (44.2)	142 (29.3)	66 (13.6)	24 (5.0)
Dental whitening products	99 (63.9)	22 (4.5)	114 (23.6)	210 (43.4)	89 (18.4)	49 (10.1)
Toothpaste with or without fluoride	73 (47.1)	37 (7.6)	148 (30.6)	189 (39.0)	75 (15.5)	35 (7.2)
Aphthous ulcer	70 (45.2)	45 (9.3)	123 (25.4)	171 (35.3)	87 (18.0)	58 (12.0)
Products that can be used during the dentition period in babies	57 (36.8)	16 (3.3)	77 (15.9)	196 (40.5)	106 (21.9)	89 (18.4)
What to do for toothache	104 (67.1)	50 (10.3)	237 (49.0)	121 (25.0)	53 (11.0)	23 (4.8)
Removable prosthesis or space maintainer cleaning	26 (16.8)	14 (2.9)	50 (10.3)	193 (39.9)	121 (25.0)	106 (21.9)
Tooth sensitivity	61 (39.4)	19 (3.9)	143 (29.5)	204 (42.1)	78 (16.1)	40 (8.3)
Analgesic recommendation	126 (81.3)	86 (17.8)	232 (47.9)	97 (20.0)	41 (8.5)	28 (5.8)
Antibiotic recommendation	80 (51.2)	68 (14.0)	143 (29.5)	139 (28.7)	79 (16.3)	55 (11.4)
Oral care products	76 (49.0)	61 (12.6)	194 (40.1)	144 (29.8)	60 (12.4)	25 (5.2)
Pacifier type recommendation	43 (27.8)	19 (3.9)	61 (12.6)	226 (46.7)	91 (18.8)	87 (18.0)
Toothbrush recommendation	77 (49.7)	78 (16.1)	228 (47.1)	118 (24.4)	40 (8.3)	20 (4.1)
Dental floss recommendation	43 (27.8)	39 (8.1)	116 (24.0)	207 (42.8)	76 (15.7)	46 (9.5)

<sup>a</sup> Frequencies were considered for the participants who answered that they had been consulted on some issue related to oral health ( $n = 155$ ).

<sup>b</sup> Frequencies were considered for all participants ( $N = 484$ ).

Table 4. Distribution of Pharmacy Students' Answers for the Knowledge Statements According to the History of Prior Oral Health Training

Statements	Pharmacy Students' History of Prior Oral Health Training						P value
	No, No. (%) <sup>a</sup>			Yes, No. (%) <sup>a</sup>			
	True	Indecisive	False	True	Indecisive	False	
Oral dental health affects general health	337 (97.1)	6 (1.7)	4 (1.2)	132 (97.1)	1 (0.7)	3 (2.2)	.40 <sup>b</sup>
Humans have 2-type dentition (primary and permanent)	229 (66.0)	107 (30.8)	11 (3.2)	93 (68.4)	40 (29.4)	3 (2.2)	.79 <sup>c</sup>
Antibiotics are used to relieve toothache	189 (54.5)	78 (22.5)	80 (23.1)	78 (57.4)	24 (17.6)	34 (25.0)	.50 <sup>c</sup>
In case of tooth loss/missing tooth, prosthetic rehabilitation is performed	280 (80.7)	63 (18.2)	4 (1.2)	107 (78.7)	27 (19.9)	2 (1.5)	.90 <sup>b</sup>
Smoking affects oral health	340 (98.0)	3 (0.9)	4 (1.2)	132 (97.1)	1 (0.7)	3 (2.2)	.75 <sup>b</sup>
It is among the duties of pharmacists to provide basic and correct information about preventive oral and dental health to the patient	322 (92.8)	17 (4.9)	8 (2.3)	127 (93.4)	6 (4.4)	3 (2.2)	.97 <sup>c</sup>

<sup>a</sup> Column percentage.

<sup>b</sup> Exact test;  $p < .05$ .

<sup>c</sup> Pearson Chi-square test;  $p < .05$ .

Table 5. Distribution of Self-Confidence Levels When Giving Advice for the Issues About Oral Health Problems, Conditions, or Treatments of Pharmacy Students According to the History of Prior Oral Health Training

Issues about oral health problems, conditions, or treatments	History of Prior Oral Health Training				P value <sup>b</sup>
	No, No. (%) <sup>a</sup>		Yes, No. (%) <sup>a</sup>		
	No idea/ Not Confident	Confident	No idea/ Not Confident	Confident	
Bleeding in the gingiva	275 (79.3)	72 (20.7)	104 (76.5)	32 (23.5)	.50
Halitosis	177 (51.0)	170 (49.0)	55 (40.4)	81 (59.6)	.04
Whitening Tools	260 (74.9)	87 (25.1)	87 (64.0)	49 (36.0)	.02
Aphthous ulcer	232 (66.9)	84 (61.8)	115 (33.1)	52 (38.2)	.29
Products that can be used during the dentition period in babies	287 (82.7)	60 (17.3)	103 (75.7)	33 (24.3)	.08
What to do for toothache	153 (44.1)	194 (55.9)	44 (32.4)	92 (67.6)	.02
Removable prosthesis or space maintainer cleaning	306 (88.2)	41 (11.8)	114 (83.8)	22 (16.2)	.20
Tooth sensitivity	246 (70.9)	101 (29.1)	76 (55.9)	60 (44.1)	.002
Toothpaste recommendation	225 (64.8)	122 (35.2)	73 (53.7)	63 (46.3)	.02
Analgesic recommendation	125 (36.0)	222 (64.0)	41 (30.1)	95 (69.9)	.22
Antibiotic recommendation	201 (57.9)	146 (42.1)	72 (52.9)	64 (47.1)	.32
Oral care products	183 (52.7)	164 (47.3)	46 (33.8)	90 (66.2)	<.001
Pacifier type recommendation	294 (84.7)	53 (15.3)	110 (80.9)	26 (19.1)	.30
Toothbrush recommendation	140 (40.3)	207 (59.7)	38 (27.9)	98 (72.1)	.01
Dental floss recommendation	251 (72.3)	96 (27.7)	78 (57.4)	58 (42.6)	.001

<sup>a</sup> Row percentage.

<sup>b</sup> Pearson Chi-square test;  $p < .05$ .

care include toothbrushing twice per day with fluoridated toothpaste and interdental cleaning with dental floss or interproximal brushes at least once per day,<sup>24</sup> the results of this study revealed less than 10% of participants themselves did not regularly brush their teeth, and over 50% did not regularly use, or had never used, fluoridated toothpaste.

In addition to adequate daily oral care, regular dental visits are also critical to one's understanding of oral health.<sup>25</sup> However, in the present research, 2 of 3 responded that they only went for a dental visit in the case of a complaint rather than visiting on a regular basis for the routine maintenance of proper oral hygiene.

According to the broadly described roles of pharmacists,<sup>8-10</sup> it suggests that a pharmacist might feel responsible for sharing basic preventive oral health knowledge with patients who consult with them. However, one-fifth of pharmacy students in this study reported negative results on a pharmacist's duty in providing basic information about preventive oral and dental health to patients.

The results of the present study also revealed that pharmacy students knew more about the causative factors of dental caries than the possible effects of dental plaque accumulation signs of periodontal disease. Nearly half of the students did not know or did not have any idea of the signs of periodontal disease. These results may be suggestive of pharmacy students having inadequate knowledge about dental caries and periodontal disease, two common oral health conditions.

Due to their daily interactions with patients, pharmacists may be the first health professionals consulted for general and oral health advice.<sup>14,15</sup> Due to time constraints, economic factors, anxiety or fear of dental health care professionals, or difficulty in getting an appointment. Instead many people may seek treatment, advice, and recommendations for the purchase of medication from pharmacists rather than visiting a dentist.<sup>14,26</sup> People who lack access to dental services or are otherwise limited in resources are especially more likely to seek advice from pharmacists about oral health.<sup>27</sup>

In our study, one third of participating pharmacy students stated they had been consulted on some issues related to oral health. Similar to the results reported in previous research, concerns related to analgesics and toothaches were the two issues participants had also been consulted about most or most frequently. In Turkey, it is common for an individual to seek a solution to an existing concern without consulting a dentist or medical professional. Given that patients may seek a solution prior to speaking with a dentist or medical practitioner, the high percentage of consultation with pharmacists on analgesics and antibiotics in our study was expected. Two-thirds of the pharmacy students

had the highest level of self-confidence for giving analgesic recommendations. The percentage of participants who said they were self-confident about giving advice on aphthous ulcers was higher in the group without prior oral health education. However, participants without prior oral health education were statistically less self-confident about giving advice on halitosis, dental whitening products, toothpaste, toothaches, tooth sensitivity, oral care products, toothbrushes, and dental floss. This difference may be attributed to the lower number of participants with prior oral health education.

Many products used to protect and maintain oral health are sold in pharmacies. These include denture care and teeth whitening products, prevention of tooth decay and tartar formation, gingivitis, dental erosion, and treatment for dentin hypersensitivity. Since self-medication with over-the-counter drugs is widespread, patients can easily access these drugs from pharmacies for cases, such as toothache.<sup>13,17,18</sup> This ease of access represents another need for pharmacists to be knowledgeable about basic oral health issues.

With pharmacists as part of the team that aims to improve oral health in society, it may be possible to increase people's awareness of oral health and reduce oral health inequalities, thereby improving quality of life.<sup>4</sup> Pharmacists can contribute greatly to preventive strategies by encouraging the use of fluoridated toothpaste, recommending a healthy and anticariogenic diet, and providing necessary knowledge and skills to individuals of how they can prevent oral diseases. Pharmacists can also emphasize the nature of dental diseases, identify the most common oral health issues, and refer patients to a dentist when necessary.<sup>13,17</sup>

Pharmacists and pharmacy students must become knowledgeable about the relevance and magnitude of preventive oral care and oral hygiene, appropriate oral care habits the most common oral and dental health problems and common issues they are likely to be asked about, and when to refer a patient to a dentist. Further, interprofessional cooperation between pharmacists and dentists is required.<sup>28</sup> To improve cooperation from the pharmacist standpoint, it is possible to make arrangements in the training processes of pharmacists and dental health professionals, including oral and dental health lectures or seminars. As some studies have revealed the need for pharmacy students be trained on oral care,<sup>29,30</sup> we recommend including developments in the curriculum to increase their awareness, knowledge, and practices toward oral care. In this context, Pogge and colleagues have demonstrated that interprofessional education between the dentistry and pharmacy programs can be effective.<sup>31</sup> This could be beneficial for the students of both programs, providing insight into

the other program's scope, respectively, and to further raise awareness about the two professions. For instance, a training program for pharmacy students could help prepare them for their future consulting roles in the community by improving their knowledge and consideration about oral health.

There are some limitations of this study. First, while the response rate for this study (69.1%) suggests that the data accurately reflect the overall knowledge and beliefs about oral care of pharmacy students at Hacettepe University, the reader should not assume that "this data was fully representative of all students in this program." The desired sample size was not achieved. The data collection period was limited by restrictions during the COVID-19 pandemic. Because of the nature of this cross-sectional descriptive study, the findings are not generalizable to other schools. Additionally, data were collected from students of only one program at one university. Studies in which data are obtained from pharmacy students at additional universities in Turkey and/or other countries, might prove more enlightening.

## CONCLUSION

Within the limits of the present study, we conclude that the oral care habits, awareness, and basic oral health knowledge of pharmacy students in one program need to be improved. Increasing the awareness of pharmacy students about oral health will also prove significant regarding their roles as consultants, service providers, and health care professionals to their communities.

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